



# **SOLAR ENERGY CORPORATION OF INDIA LIMITED (SECI)**



## **FINAL ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK**

**June 2020**

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## Abbreviations

AC	Alternating current
APTransco	Andhra Pradesh Transmission Company
APPCB	Andhra Pradesh Pollution Control Board
BESS	Battery energy storage system
BMS	Battery Management System
BOD	Biochemical Oxygen Demand
BPL	Below Poverty Line
CEA	Central Electricity Authority
CPCB	Central Pollution Control Board
CTE	Consent to Establish
CTO	Consent to Operate
DC	Direct current
EAC	Expert Appraisal Committee
EHS	Environment, Health and Safety
EMP	Environmental Management Plan
EPC	Engineering Procurement and Construction
ESIA	Environmental and Social Impact Assessment
ESMF	Environment and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Energy Storage System
FGD	Focus Group Discussions
GAP	Gender Action Plan
GHG	Green House Gas
GRM	Grievance Redressal Mechanism

GW	Giga Watt
IFC	International Finance Corporation
IMD	Indian Meteorological Department
IPDP	Indigenous Peoples Development Plan
IREDA	Indian Renewable Energy Development Agency
ISPHT	Innovation in Solar Power and Hybrid Technologies
IUCN	International Union for Conservation of Nature
JNNSM	Jawaharlal Nehru National Solar Mission
MNRE	The Ministry of New and Renewable Energy
MoEF&CC	Ministry of Environment, Forests & Climate Change
PARK DEVELOPER	New & Renewable Energy Development Corporation of Andhra Pradesh
PAP	Project Affected Persons
PV	Photovoltaic
RAP	Resettlement Action Plan
REC	Renewable energy certificate
MSL	Mean Sea Level
NAAQS	National Ambient Air Quality Standards
NABL	National Accreditation Board for Testing and Calibration
NISE	National Institute of Solar Energy
O&M	Operation and Maintenance
OBC	Other Backward Caste
PHC	Primary Health Centre
RF	Reserve Forest
SC	Scheduled Caste
SEIAA	State Environment Impact Assessment Authority
SECI	Solar Energy Corporation of India Limited

ESMS	Environmental & Social Management System
SPCB	State Pollution Control Board
VGf	Viability Gap Funding
WB	World Bank
WRA	Wind Resource Assessment
WTG	Wind Turbine Generators

## Executive Summary

Solar Energy Corporation of India (SECI) is proposing to implement the Innovations in Solar Power and Hybrid Technologies Project (ISHTP) with World Bank financial support to demonstrate large scale use of Solar-Wind Hybrid, Floating Solar PV generation systems & Battery based Energy Storage Systems, and related infrastructure like transmission lines and substations. The project endeavors to prove the commercial viability of these emerging technologies to give a broad set of options for energy security for India, while ensuring minimal environmental and social impacts. With use of these state-of-the-art technologies, reduced consumption of fossil fuels will ensure that the impact of the energy generation and use in the system will reduce Green House Gas Emissions, and optimized lay out will reduce land required, another permanent environmental and social impact. However, there could be some residual impacts of the novel combination of technologies proposed to be supported at large scale. In order to ensure that these are appropriately addressed, SECI has developed this Environmental and Social Management Framework (ESMF) to guide subsequent project preparation and implementation, including for sub-projects, both currently identified, and those being identified. The ESMF is divided into 9 chapters, following an introductory chapter, as below:

**Environmental and Social Policy/Act/Rules Regulations:** This describes the regulatory framework within which the project activities would be undertaken and determines the response required from the project to comply with the requirements set out. It covers the national, state and local requirements, in addition to WB policies, and EHS guidelines of the World Bank Group, as they apply to the proposed sub-projects. It highlights the fact that while the project supported activities are not covered under the Environmental Impact Assessment notification of the Government of India, several other requirements are to be satisfied by the project. In addition, relevant requirements of the WB safeguards policies are also elucidated here.

**Baseline Case Study of Sample Sub-projects:** Since there is no such projects to understand impacts of the proposed activities, and not all locations have been decided, in order to understand potential impacts, similar projects were identified for review. Solar parks in Madhya Pradesh, and Karnataka were studied and there were small floating solar installations (in kW range, unlike the proposed MW range) that were reviewed to identify potential impacts and feasible mitigation measures.

**Environmental and Social Assessment Process:** This chapter starts providing guidance for environmental management for sub-projects to be supported under ISHTP. It starts with screening of the potential locations for specific sensitive receptors. It also describes the process of scoping, and undertaking an Environmental and Social Impact Assessment (ESIA) to develop an Environmental and Social Management Plan (ESMP). It includes generic plan and provides several templates for guiding the subsequent preparation of ESIA, including the ESMP. It also refers to an Annexure that has detailed ToR for the undertaking the ESIA. It builds on Bank's OP4.01 guidance and WBG EHS guidelines, as these apply to the project activities. Emphasis is laid on Stakeholder Consultation processes to inform the ESIA and ESMP formulation.

**Environmental and Social Management Framework:** This section is focused on the various social assessments to be undertaken for the sub-projects, depending on the site conditions and its socio-economic milieu. Guidance is provided on entitlements of affected persons, handling indigenous people issues, and labour influx. Definitions and an Entitlement Matrix are provided for the development of a Resettlement Action Plan in case of involuntary land take being involved. Sample table of contents for various instruments – RAP, IPDP, and Gender Action Plan are also included.

**Consultation Framework and Information Disclosure:** The document also covers these two important aspects of robust project management with succinct guidance on undertaking consultations with stakeholders, including, but not limited to, project affected people. It describes process of mapping stakeholders and mechanisms for undertaking site-level consultations. Guidance is also provided on information to be disclosed in terms of timing, content, audience, location, language and other relevant parameters.

**Institutional Arrangements** are described in the next chapter. Roles and responsibilities for environmental management are laid out with SECI playing key role, but with support from other entities like state government. The project envisages that SECI staff will include an Environmental and Social Officer and separate Environmental and Social Experts will be used for sub-projects. The Grievance Redressal Process and a three-tiered Mechanism have also been outlined for customization in light of actual site conditions for sub-projects.

**Monitoring and Evaluation Framework:** provides guidance for this important function in subsequent stages of the project, with a focus on the sub-projects based activities. It covers

the important environmental aspects to be monitored, including safety and occupational health, as well as condition of the biophysical environment so that corrective measures, if any are required, can be undertaken promptly. It also covers reporting on various parameters including livelihood restoration, employment of local population, etc. Reporting formats have also been included for uniform collection and analysis of data.

Budget guidance is short and covers various items to be covered at the sub-project level. It has a list of items that would need to be checked and costs estimated when the sub-projects are assessed for environmental and social impacts.

Capacity building requirements are covered in the last chapter. These include the training on E&S assessments as they are required by the WB as there are currently no national or other requirements for such type of projects. Various target groups have been identified and content of several modules have been defined. Indicative duration for such sessions has been provided.

Thus the ESMF provides a comprehensive guidance base for management of environmental and social aspects of the ISHTP, in line with WB policies and guidelines.

## 1. INTRODUCTION

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### 1.1 Introduction

India is set on a path of development where the demand for energy is rising exponentially and the current energy produced by thermal and hydro power plants is not enough to meet the growing demand. India has undertaken several steps in promoting the power generation through clean and green energy technologies to meet the growing demand.

The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all matters relating to renewable energy. This ministry functions with an aim to develop and deploy new and renewable energy for supplementing energy requirements of the country.

SECI (Solar Energy Corporation of India Limited) is a PSU under the administrative control of the Ministry of New and Renewable Energy (MNRE), set up on 20th Sept, 2011 to facilitate the implementation of Jawaharlal Nehru National Solar Mission (JNNSM) dedicated to solar energy. However, over the years, the mandate of SECI has also been broadened to cover the entire renewable energy domain.

Wind and solar energy are becoming popular owing to abundance, availability and ease of harnessing for electrical power generation. Power generation from renewable sources is on the rise in India, with the share of renewable energy in the country's total energy mix rising from 7.8% in the year 2008 to 20% as on 31.03.2018<sup>1</sup>. By 31.03.2018 the total installed capacity of renewable energy in India reached up to 69.022 GW. Wind energy accounts for about 49.3% of the total renewable energy installed capacity, with 34.046 GW of installed capacity, making India the world's fourth-largest wind energy producer. The contribution of solar energy is 31.4 percent of total installed capacity with 21.651 GW which makes India the 6<sup>th</sup> largest solar energy producer. So, the total share of wind and solar energy in combination reached up to 80.7% of total installed capacity of renewable energy in the country by 31<sup>st</sup> March, 2018. Small hydro power (4.486 GW) and bio-energy (8.839 GW) constitute the remaining capacity.

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<sup>1</sup> <http://powermin.nic.in/en/content/power-sector-glance-all-india>

India has set an ambitious target of achieving 175 GW of renewable power generation by year 2022. With this ambitious target, India will become one of the largest Green Energy producers in the world, surpassing several developed countries. India plans to achieve 40% cumulative Electric power capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low cost International Finance including from Green Climate Fund.

The recent new technologies which introduce more possibilities of extracting maximum power from a limited resource have been further explored. The new system which emerged from research and development are Hybrid Power Plants where solar panels and wind turbines can perform in the same defined space without interfering much in each other's functionality. Due to the intense investment already made in the established solar or wind power plants, the limit of production can be further optimized by introducing solar panels in existing wind farms or adding wind turbines in existing solar farms or plan a hybrid (wind and solar) for a new power plant. This will give rise to a more constant power generation as solar panels cannot produce power during the night whereas; the wind turbines can work in the day and as well in the night. Likewise, during times when wind speed is not adequate for power generation while the solar radiation is strong.

Another major leap in renewable energy sector is the floating Solar PV Panels; this technology has explored the possibility of introducing power plants on vast surface of water bodies. Research indicates these floating solar PV plants are more efficient system when compared with similar capacity plants operating on land due to reduced heating of the panels. Additionally, the percentage of water surface covered by the PV panel helps reduce the evaporation losses of the water body.

## **1.2 Description of Innovation in Solar Hybrid Technologies Project (ISHTP)**

The ISHTP will finance innovative renewable energy projects and BESS to demonstrate applications that can be deployed at a large scale in India's power system, and build SECI's market facilitation capacity in a rapidly evolving RE market. As the ISHTP Implementing Agency (IA), SECI is the sole recipient of World Bank / CTF financing. SECI will invest in selected innovative RE technologies and BESS demonstration projects, and monitor and disseminate its experience in design, construction, operation and contractual arrangements to renewable market stakeholders in India. The proposed project has two components:

### **Component A: Investments in Innovative Renewable Energy (RE) Solutions**

The Component will support innovative power subprojects. The scope of subprojects will be



defined based on-site requirements, including: (a) site development (including site identification, feasibility and environmental studies, land acquisition and resettlement, obtaining permits); (b) construction of RE power plants and BESS, including design, supply and installation of equipment, associated civil works, construction of ancillary infrastructure; (c) construction of power evacuation and other common infrastructure (i.e. road access, water supply); and (d) operation and maintenance (O&M) contracts. An ISHTP Operations Manual (OM) sets investment criteria for subprojects. The estimated cost of this component is US\$398 million, which includes US\$150 million from the World Bank, US\$28 million from the CTF loan, US\$20 million from the CTF grant, and US\$200 million from SECI. The eligible subproject typologies are:

- **Utility-Scale Hybrid Subprojects:** The ISHTP will finance large-scale Greenfield hybrid solutions, combining wind, solar or BESS technologies that are tailored to meet site-specific requirements. Subprojects are expected to demonstrate benefits for the Indian power system, including better capacity utilization factors, reducing variability of RE power plants (i.e. due to the relative diurnal and seasonal complementarity of solar and wind resources), and optimizing use of power evacuation infrastructure. The first subproject [has been] appraised, comprises about 35 percent of IBRD/CTF investment resources, and includes:

**160 MW Solar PV-Wind Power Plant with BESS Subproject in Ramagiri, Andhra Pradesh (AP) ('Ramagiri WSH Subproject')**

The subproject comprises design, construction, O&M of co-located 120 MW of solar PV, 40 MW of wind power (about 20 wind turbine generators), 10 MW/22 MWh BESS, associated infrastructure, and control and energy management systems. The subproject is being set up on about 900 acres in the Ramagiri and Muthavakuntla villages, Anantapuram district, in AP, a wind and solar resource-rich province. The WSH power will be transmitted to a 220/33 kilovolts (kV) pooling substation (PSS) through a 33 kV transmission line and evacuated via a double circuit (D/C) 220 kV transmission line to the 400/220 kV Hindupuram substation (under construction by AP State Transmission Company [APTRANSCO]) located about 45 km from the PSS site. The PSS, 220 kV evacuation line and interconnection with the Hindupuram substation is being implemented by APTRANSCO under the Gol's Green Energy Corridor Project. Site preparation activities including land acquisition will be done by SECI with assistance from New and Renewable Energy Development Corporation of Andhra Pradesh and AP Solar Power Corporation Private Limited (APSPCL). The Andhra Pradesh Southern Power Distribution Company, Ltd. (APSPDCL) will be the sole off-taker under a long-term power purchase agreement (PPA) signed with SECI. SECI will select an Engineering, Procurement and Construction (EPC) contractor through competitive bidding and will sign a 10-year O&M contract. Further, SECI will retain an Owner's Engineer (OE) till one year of

O&M period. The BESS is installed to demonstrate use cases which benefit the generator: avoiding curtailment, minimizing deviation settlement mechanism penalties due to forecasting/scheduling errors, and piloting ramp rate control benefits. This is the first project of its kind in India and at this scale in the world.

- **BESS Subprojects:** () The ISHTP will finance BESS applications integrated with other RE generation technologies or providing grid services enabling improved use of power. As this technology is not yet commercially viable, selection of subprojects will be determined *inter alia* by the use cases most likely to be deployed at large scale in the Indian power system including time shifting, capacity firming, ramp rate control, and frequency regulation, and by the ability under existing regulations to recover at least part of the costs of the BESS. A US\$20 million CTF grant has been allocated to partially defray the costs of these subprojects.

#### **100 MW(AC) Solar PV Project (200MWp DC capacity) along with 50MW/150 MWh Battery Energy Storage System at Rajnandgaon, Chhattisgarh**

The subproject comprises design, construction, O&M of 100 MW(AC) Solar PV Project (200MWp DC capacity) along with 50MW/150 MWh Battery Energy Storage System associated infrastructure, and control and energy management systems. The Project is proposed to be setup on 225 Ha (approx.) in District Rajnandgaon, Chhattisgarh. The power generated through the project is propose to be evacuated through overhead 132kV transmission line of length 33 km approx. to the nearest 132 kV CSPTCL's Substation at Thelkadi, Chhattisgarh. For the execution of the Project, land will be provided by the Energy department, GoCG and acquisition of private land is not envisaged. The Chhattisgarh State Power Distribution Company Ltd. (CSPDL) will be the sole off-taker under a long-term power purchase agreement (PPA) signed with SECI. SECI will select an Engineering, Procurement and Construction (EPC) contractor through competitive bidding.

- **Utility-Scale FSPV Subprojects:** (about [100] MW targeted) The ISHTP will finance FSPV power plant subprojects – solar PV systems installed on synthetic floating beds anchored to the bottom or on the shore of selected water bodies. Sites will be selected where there is existing associated infrastructure such as reservoirs of the operating dams or sites where there are externalities such as high evaporation loss (in case of irrigation dams) or where the land is either unavailable or too expensive. [Based on initial discussions by SECI in multiple states (including AP, Kerala and Tamil Nadu), the target capacity estimate of a potential pipeline of subprojects ranges from 20-100 MW].

#### **Component B: Technical Assistance, Capacity Building, Implementation Support, Monitoring and Dissemination**

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This component, completely financed out of CTF grant, will support technical assistance, studies, workshops, training, study tours, and other capacity building and dissemination activities, including (but not limited to):

- Capacity building and institutional development to support implementation of SECI's five-year business plan (2018-2022), which is under preparation. A rolling capacity building plan will be agreed after the plan's approval by its management and can include a range of inputs to strengthen SECI's core functions and business lines, including project management, monitoring, engineering, procurement and contract management, O&M, financial management and organizational and process

management.

- Activities for ISHTP subproject development and management, including activities associated with identification of sites, preparation of environmental, feasibility, and other subproject preparation studies, due diligence for land acquisition and resettlement, bid document preparation, safeguards and project monitoring, project management consulting services, and OE services.
- Support to policy and regulatory proposals, stakeholder consultations and knowledge sharing activities to support scale-up of innovative technologies.

### 1.3 Sample Project Overview

This ESMF focuses on the following renewable energy power generation technologies to augment the power requirements. The technologies include solar power generation (in and outside solar park), Wind power generation, Floating solar PV projects over large water bodies and opportunities for Solar-Wind hybrid technologies. A brief of these technologies is presented in the sub sections hereunder.

#### (a) Solar PV power generation (In and outside Solar Park)

Fortunately, India lies in sunny regions of the world. Most parts of India receive 4.7 kWh of solar radiation per square meter per day with 300-325 sunny days in a year. India has abundant solar resources, as it receives about 3000 hours of sunshine every year, equivalent to over 5,000 trillion kWh. India can easily utilize the solar energy. Today, the Government of India is encouraging generation of electricity from various renewable energy sources such as wind, solar, small hydro, biomass by giving various fiscal & financial incentives.



**Figure 1-1: Solar PV panels installation**

MNRE has rolled out a scheme dated 12.12.2014 plans to set up 25 solar parks, each with a capacity of 500 MW and above; thereby targeting around 20000 MW of solar power installed capacity. These solar parks will be set up within in a span of 5 years commencing from 2014-15 and the solar projects may then come up as per demand and interest shown by developers. Based on the success of solar park scheme, MNRE has further enhanced the capacity of solar park scheme to 40000 MW.

The solar park is a concentrated zone of development of solar power generation projects and provides developers an area that is well characterized, with proper infrastructure and access to amenities and where the risk of the projects can be minimized.

#### **(b) Wind Power Generation – Land based**

Harnessing wind energy has come a long way in India, at par with international development, with the private sector actively participating in the path laid down by Ministry of New and Renewable Energy (MNRE) over the last decade. The policy formulated for the development of wind power by MNRE supported by the State Policies, including the evacuation of power through the State Electricity Boards/ State Transmission Companies, has placed India on the world wind energy map.



**Figure 1-2: View of WTG in a row (NIWE)**

As a step towards achieving these broad goals and to tackle the challenges in sustaining the development and accelerating the pace of utilization of wind energy in the country, the National Institute of Wind Energy (NIWE) has been established by MNRE at Chennai (along with a state of the art test facility at Kayathar) as an autonomous R&D institution of Government of India.

The use of wind as a renewable energy source involves the conversion of power contained in masses of moving air into rotating shaft power. The conversion process utilizes aerodynamic forces (lift and/or drag) to produce a net positive turning moment on a shaft, resulting in the production of mechanical power which can be converted to electrical power.

In India the factor which mostly governs the availability of wind energy at a particular site is its geographical location with respect to the monsoon wind.

The availability of data on wind speed being a basic requirement for determining the feasibility of wind power generation at any site and due to the highly uneven distribution of wind speed over the country, an assessment of the wind resource over different regions was undertaken before any plans of harnessing the wind energy were drawn for implementation. NIWE has assessed the wind potential within the country and released Indian Wind Atlas maps (online GIS).

### **Floating Solar PV plant power generation**

A floating Solar PV power generation results from the combination of PV plant technology and floating technology. This fusion of new concept consists of Floating System: A floating body (Structure + Floater) that allows the installation of the PV module. The module is anchored in



a way that it can adjust to water level fluctuations and waves while maintain the position in the desired direction. At present very few floating solar PV plants exist in India (mainly small scale) which were installed for research / and or experimental purposes.

The advantage of the floating system is reduction of evaporation, thus helping preserve water levels during extreme summer particularly in man-made water bodies.

When panels are installed on floating platform, the heating problem of solar panel as experienced on land is solved to a great extent. Research studies<sup>2</sup> reveal that the reported power generation is almost 10% more when compared to similar capacity plants installed over land.



**Figure 1-3: Floating Solar 10 Kw (Chandigarh)**

### **(c) Solar- Wind Hybrid power generation**

The availability of renewable energy resources at a site is an important factor to develop the hybrid projects. In many parts of India, Wind and Solar energy are abundantly available which pave way for their optimal integration. Wind speed is low in summer whereas the solar radiation is brightest and longest. The wind is strong in monsoon months whereas less sunlight is available owing to cloud cover. Because the peak operating times of wind and solar systems occur at different times of the day and year, hybrid systems are more likely to produce round-the-clock power.

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<sup>2</sup> URL: [http://www.sersc.org/journals/IJSEIA/vol8\\_no1\\_2014/7.pdf](http://www.sersc.org/journals/IJSEIA/vol8_no1_2014/7.pdf) (A Study on Power Generation Analysis of Floating PV System Considering Environmental Impact - Young-Kwan Choi / International Journal of Software Engineering and Its Applications / Vol.8, No.1 (2014), pp.75-84)



**Figure 1-4: Hybrid Solar-Wind project (NIWE)**

Wind-Solar Hybrid System means the Combined generation of power at existing or new solar/wind power projects (or) Co-located i.e. addition of Wind or Solar Power capacity at the interconnection point of the RE pooling station point of existing wind or solar power installations (or) Co-injection i.e. addition of Wind or Solar Power capacity after inter connection point (i.e. EHV Side) of the RE pooling station of existing wind or solar power capacity may also be coupled with any other Renewable Energy Sources and other emerging Technologies like Energy Storage systems. Under the category of wind-solar hybrid power plants, Wind and Solar PV systems will need to be configured to operate at the same point of grid connection. In addition, the issues related to maintenance needs to be planned as part of hybrid plants whereby the solar panels could be shifted to create adequate working space for maintenance of wind energy structures and equipment.

Such large scale solar, wind and hybrid (solar-wind) power generation projects could not be undertaken without causing any adverse effect to natural resources, forests, habitats (such as coasts and wetlands); resettlement issues, acquisition of productive land, etc. The impacts can be significant if such renewable projects are proposed in close vicinity of populated areas and rich biodiversity / forest areas. Wind and solar power projects can exert considerable environmental and social impacts during construction, which involves site preparation; construction of access roads, tower foundation / base slabs, erection of towers and transmission lines and the movement of vehicles.

#### **1.4 Rationale and Objectives of Environmental and Social Management Framework**

While, solar and wind projects in India do not require a regulatory environmental clearance, it is also understood that large-scale projects will have environmental and social impacts and these impacts need to be avoided and mitigated as far as possible. For large-scale projects (even if environmental clearance is not required), it is unlikely that projects could be undertaken without any adverse impacts on natural resources, forests, habitats (such as coasts and wetlands); land acquisition; resettlement; or loss of livelihood. Given that the sub-projects can be from anywhere in the country, this guiding framework is prepared to ensure that subsequent project activities have a common understanding of the environmental and



social issues involved, and a harmonized approach to handling these issues is followed. This Environmental and Social Management Framework (ESMF) will be used to identify the environmental and social impacts of each sub-project and help design commensurate mitigation/enhancement measures as well as to assign the responsibility for implementation of these measures.

The overall goal of the ESMF is to ensure that decision making in subsequent stages of the project is informed and influenced by environmental and social considerations for each of the sub-projects, many of which are still to be identified. It aims to integrate environmental and social concerns into the project's design and implementation. To achieve this, main objectives of the ESMF are

- a) To establish clear procedures and methodologies for the environmental and social planning, review, approval and implementation of subprojects to be financed under the Project;
- b) To specify appropriate roles and responsibilities, and outline the necessary reporting procedures, for managing and monitoring environmental and social concerns related to subprojects;
- c) To determine the training, capacity building and technical assistance needed to successfully implement the provisions of the ESMF;
- d) To establish the Project funding required to implement the ESMF requirements; and
- e) To provide practical information resources for implementing the ESMF.

It may be mentioned here that though the project activities for the development of this ESMF have been identified based on the analysis of such activities in sample projects, this is a live document which can be improved upon at the sub-project level by the concerned authorities, as and when the need arises.

This framework has been prepared based on review of (i) sample projects of similar nature; (ii) secondary data on various environmental and social issues; (iii) existing regulatory frameworks; and (iv) preliminary environmental and social assessment of proposed solar and wind hybrid project at Anantapur District of Andhra Pradesh. Consultations with various stakeholders were carried out as part of ESMF preparation.

## **1.5 Structure of Environmental and Social Management Framework**

The ESMF includes the following information:

- Existing Regulatory Framework Applicable to the Project

- Environmental and Social Baseline of the State and Key Issues
- Environmental and Social Management Framework
- Community Consultation
- Institutional Arrangement for Implementation
- Grievance Mechanism and Public Disclosure
- Capacity Building

## 2.0 POLICY AND REGULATORY FRAMEWORK

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### 2.1 Introduction

India has developed a fairly comprehensive regulatory framework to address environmental and social concerns in relation to development projects. Its wide ranging enactments cover almost all major issues that need to be addressed in the course of development of infrastructure from a social and environmental perspective.

The increase of environmental concerns has necessitated appropriate tools to protect the environment. After Stockholm Conference, first exclusive environmental act, Water (Pollution Prevention and Control) Act was enacted in India in 1974. In accordance with this act, Central and State Boards for Prevention and Control of Water Pollution were set up. Later these boards were renamed into Central Pollution Control Board and respective State Pollution Control Boards. Department of Environment was set up in 1980. Subsequently in 1985, it was upgraded to a full-fledged Ministry of Environment and Forest to serve as the focal point in the administrative structure for the planning, promotion and coordination of environmental and forestry programmes. The Ministry of Environment and Forest (MoEF) has overall authority for the administration and implementation of government policies, laws and regulations related to the environment, including conservation, environmental assessment, sustainable development and pollution control. MoEF identifies the need to enact new laws and amend existing environmental legislation when required, in order to continue to conserve and protect the environment. At the state level, the MoEF authority is implemented by the Department of the Environment and the Department of Forest.

In 1976, the 42<sup>nd</sup> Constitutional Amendment created Article 48A and 51A, placing an obligation on every citizen of the country to attempt to conserve the environment. As a result, a number of laws related to environmental conservation were passed to strengthen existing legislation. Environment (Protection) Act, 1986 is the landmark legislation as it provides for the protection of environment and aims at plugging the loopholes in the other related acts.

The Government of India through specific legislations regulates the environmental and social management system in India. The Ministries / Statutory Bodies responsible for ensuring environmental compliance by project proponents include:

- The Ministry of Environment, Forests and Climate Change (MOEFCC)
- Ministry of Rural Development (MoRD)
- Central Pollution Control Board (CPCB)

- State Pollution Control Boards (SPCBs)
- State Revenue Department
- Ministry / Department of Environment in the States

## 2.2 National Policies and Programme on RE and State-level Legislation and Regulations

MNRE has setup an autonomous institution i.e. National Institute of Solar Energy (NISE) as an apex National R&D institution in the field of Solar Energy. Similarly, the National Institute of Wind Energy was setup, more than 20 years back for providing technical support to the Ministry in the implementation of its wind energy programs. For market development and financing of renewable energy projects, a separate financing institution called the Indian Renewable Energy Development Agency (IREDA) has been set up as a public-sector undertaking.

### Key Policies on Wind and Solar Energy:

Some of the key policies guiding the growth and development of renewable energy sector in India related to solar, wind and hybrid solar & wind power generation in India includes:

#### i. Draft National Policy on Renewable Energy (RE) based mini /micro grids

The objective of the policy is to promote the deployment of micro and mini grids powered by RE sources such as solar, biomass, micro hydro, wind etc. in un-served and underserved parts of the country by encouraging the development of State-level policies and regulations, that enable participation of ESCOs<sup>3</sup>. The policy offers likely implementation solutions and approaches for overcoming common issues and challenges that hamper the growth of mini grid sector. The States are encouraged to refer to this policy document for developing their respective programs, policies and regulations. The underlying principles of the policy are listed below:

- Mainstream RE mini grids for enhancing access to affordable energy services, and improving local economy
- Streamline project development procedures for ESCOs
- Provide operational frameworks to operate along with the Distribution Company (DISCOM) grid

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<sup>3</sup> ESCO (Energy Service Companies) means a person, a group of persons, local authority, panchayat institution, users' association, co- operative societies, non-governmental organizations, or a company that builds, commissions, operates and maintains the mini grid

- Optimize access to central financial assistance and other incentives
- Foster innovation in mini grid models to cater to rural needs

## ii. Wind Power Program

Wind Power Program aims to catalyze commercialization of grid interactive wind power throughout the country. The Ministry has targeted 60GW production of energy from wind power plants by 2022 (as per the Paris Agreement). To re-assess the potential of wind farms in India, MNRE has constituted a Committee at National Institute of Wind Energy (NIWE). The program has prompted many representatives to set up wind power plants by the help of fiscal and financial incentives available which includes concessions defined in the guidelines developed by the Ministry of New and Renewable Energy. The key incentives offered by the MNRE's wind program are:

- **Excise duty relief:** The exemption on wind power plant components. Central Board of Excise and Customs (CBEC) shall exempt charges for all Wind Operated Electricity Generations (WOEG).
- IREDA has specific **Financing norms and schemes** for Project, only Equipment, Loan for manufacturing etc.
- **Preferential Tariffs** by state regulatory bodies for wind power projects are states under the regulatory for Useful life (25 years for wind), control period (5 years), Tariff period (13 years minimum for wind and 25 years for solar) etc.
- **Accredited Depreciation** (AD) as a promotional policy -80% (AD for wind)
- Projects which do not avail AD are eligible to **Generation Based Incentive** (GBI) @ 0.50 per unit of power fed to grid subject to a ceiling of Rs. 1 Crore per MW.
- **Income Tax Holiday** under section 80 1A. Tax deduction in respect of profit/gains from industrial undertakings or enterprises engaged in infrastructure development. Clause 6.1, case 4 & 5 for setting up & revival of infrastructural project respectively. Clause 6.2, 100% exemption for 10years for power plants.

## iii. Policy for repowering of wind power generation projects

The policy was announced by the Ministry of New and Renewable Energy in August, 2016. The policy aims at optimal utilization of wind energy resources in the country and it provides a new lease of life to existing wind power projects. The projects shall be implemented through the respective state nodal agency and the state will facilitate for acquiring additional footprint for higher capacity turbines. The guidelines for placement of wind turbines, 7Dx5D criteria would be relaxed for micro siting. The repower projects will be allowed to avail Accelerated Depreciation benefits or GBI as per the conditions applicable to new wind power projects.

Other incentives provisioned under the policy include:

- For repowering projects, Indian Renewable Energy Development Agency (IREDA) will provide an additional interest rate rebate of 0.25% over and above the interest rate rebates available to the new wind projects being financed by IREDA.
- All fiscal and financial benefits available to the new wind projects will also be available to the repowering project as per applicable conditions.
- National Solar Mission

The National Solar Mission is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth of power while addressing India's energy security challenge. It will also constitute a major contribution by India to the global efforts to meet the challenges of climate change.

Launched in 2010, the Mission has set the ambitious target of deploying 20,000 MW of grid connected solar power by 2022 is aimed at reducing the cost of solar power generation in the country through (i) long term policy; (ii) large scale deployment goals; (iii) aggressive R&D; and (iv) domestic production of critical raw materials, components and products, as a result to achieve grid tariff parity by 2022. Mission will create an enabling policy framework to achieve these objectives and make India a global leader in solar energy.

The mission is currently in phase-II of the implementation. After taking into account the experience of the initial years, capacity is being aggressively ramped up to create conditions for up scaled and competitive solar energy penetration in the country. Government has revised the target of Grid Connected Solar Power Projects from 20,000 MW by the year 2021-22 to 100,000 MW by the year 2021-22 under the National Solar Mission and it was approved by Cabinet on 17<sup>th</sup> June 2015.

SECI is a nodal agency under the National Solar Mission and is implementing several schemes for setting up of Solar Power projects with Viability Gap Funding (VGF). After the notification of Standard Bidding Guidelines by the Ministry of Power in 2017, SECI issues tenders on that mode, without provision of VGF.

#### **iv. National Wind-Solar Hybrid Policy**

MNRE has published this policy on 14 may 2018 with an objective to promote large scale grid connected Hybrid wind-solar system and encourage new technology & methods involving combined operation of wind as well as solar PV plants. Hybrid plants have benefits in terms of optimal and efficient utilization of transmission infrastructure and better grid stability by reducing the variability in renewable power generation. The installation can be most beneficial where wind power density is very high and the size of the solar PV capacity to be added as a

hybrid system is relatively smaller. The policy lays down two options for development of hybrid wind-solar power plants as described below:

**1) Hybridization of existing wind/solar power projects,**

Existing wind or solar power projects, willing to install solar PV plant or WTGs respectively to avail benefit of hybrid project, may be allowed to do so with following conditions

- No additional connectivity/transmission capacity charges shall be levied by the respective transmission entity for hybridization at existing wind/solar PV plants if already granted transmission connectivity/ access is being used. Transmission charges may be applicable for the additional transmission capacity/ access granted as per prevailing regulation.
- In case capacity margins are available at the receiving transmission sub-station of respective transmission entity, at which the existing wind/solar projects is connected, additional transmission capacity/access may be allowed subject to its technical feasibility. In such a case, any transmission augmentation required up to the receiving transmission sub-station will be the responsibility of project developer.
- In case of AC integration assessment of solar and wind power injected from the hybrid project in to the grid will be worked out by apportioning the reading of main meter installed at the receiving station based on readings of ABT meters installed on LT or HT side of the wind and solar PV plant as the case may be.
- In case of DC integration assessment of solar and wind power injected from the hybrid project in to the grid will be worked out by apportioning the reading of main meter installed at the receiving station on the basis of readings of DC meters installed at the DC output of the wind and solar PV plant. Till such time the methodology for DC metering of hybrid systems and standards & regulations are framed for DC meters, only AC integration will be permitted.
- The additional solar/wind power generated from the hybrid project may be used for (a) captive purpose; (b) sale to third party through open access; (c) sale to the distribution company (ies) either at tariff determined by the respective SERC or at tariff discovered through transparent bidding process; and (d) sale to the distribution company (ies) at APPC under REC mechanism and avail RECs. For bidding purpose, State or Central entities may bid for hybridization of existing projects connected to InSTS or ISTS as the case may be.
- Government entities may invite bids for hybridization of existing wind and solar plants with tariff being the main criteria for selection.

## 2) New Wind-Solar Hybrid Plants

New wind-solar hybrid projects shall be encouraged with following provisions: -

- The hybrid power generated from the wind-solar hybrid project may be used for (a) captive purpose; (b) sale to third party through open access; (c) sale to the distribution company (ies) either at tariff determined by the respective SERC or at tariff discovered through transparent bidding process; and (d) sale to the distribution company (ies) at APPC under REC mechanism and avail RECs.
- The power procured from the hybrid project may be used for fulfilment of solar RPO and non-solar RPO in the proportion of rated capacity of solar and wind power in the hybrid plant respectively.
- For procurement of hybrid power through transparent bidding process different parameters may be used. Parameters that may be considered for bidding could be capacity delivered at grid interface point, effective CUF and unit price of electricity.
- Government entities may invite bids for new hybrid plants keeping qualifying criteria such as those discussed in iii above, the tariff being the main criteria for selection.

## 3) Battery Storage:

The policy also has provision of battery storage for hybrid project and specifically mentions the following

Battery storage may be added to the hybrid project (i) to reduce the variability of output power from wind solar hybrid plant; (ii) providing higher energy output for a given capacity (bid/ sanctioned capacity) at delivery point, by installing additional capacity of wind and solar power in a wind solar hybrid plant; and (iii) ensuring availability of firm power for a particular period.

Bidding factors for wind solar hybrid plants with battery storage may include minimum firm power output throughout the day or for defined hours during the day, extent of variability allowed in output power, unit price of electricity, etc.

The additional solar/wind power procured from hybrid project shall be used for fulfilment of solar/non-solar RPO as the case may be.

## 2.3 Environment & Social (Policy/Acts/Rule& regulations)

Below is a set of key acts / regulations that are applicable for establishing RE projects in India regarding Environment and Social aspects:



**Table 2-1: Key Acts / Regulation applicable for RE Projects**

<b>Act/ Rule/ Policy</b>	<b>Year</b>	<b>Objective</b>	<b>Project Applicability</b>	<b>Agency Responsible</b>
Environmental (Protection) Act	1986	To protect and improve the overall environment	It is an Umbrella Act for all environmental legislations in the county.	MoEFCC, SPCB
Environment Impact Assessment Notification (and subsequent amendments)	2006	To provide environmental clearance to developmental activities, to mitigate the impact of the project on the surrounding environment.	Not Applicable	MoEFCC, SEIAA (State Environment Impact Assessment Authority) SPCB.
Indian Forest Act	1927	To protect Forest land from impacts of the project.	If RE Project and Transmission line pass through Forest Areas then it will attract the provision of Forest Conservation Act requiring Forest Clearance	State Forest Department / MoEFCC, Regional Office
The Forest (Conservation) Act  The Forest (Conservation) Rules	1980  1981	To keep a check on the forested land and check on deforestation by restricting conversion of forest areas into non-forest areas.		State Forest Department and Regional Office of MoEFCC and Central Government depending upon the extent of forest acquisition
National Forest Policy (Revised)	1988	To maintain ecological stability through preservation and restoration of biological diversity	RE Projects where clearing of forest/ felling of trees is required.	Forest Department, GoI
Wildlife (Protection) Act	1972	Parliament of India enacted for protection of plants and animal species	If RE project located inside the boundary of Wildlife Sanctuary or	National Board of Wildlife or Chief Wildlife Warden of State.

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
		by protecting National Parks and Sanctuaries.	National Park, Wildlife reserves.	
Biological Diversity Act	2002	An Act to provide for conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits arising out of the use of biological resources, knowledge and for matters connected therewith or incidental thereto.	If Project area under bio-reserves or National biodiversity reserves	MoEFCC, National Biodiversity Authority and State Biodiversity Boards
Air (Prevention and Control of Pollution) Act	1981	To control air pollution by controlling discharge of pollutants as per the prescribed. Approval for Consent to Operate (CTO) and Consent to Establish (CTE).	CTE & CTO is not applicable to RE projects as per AP solar and wind power policy.  CTE & CTO will be applicable if the contractor establishes high capacity Batching Plant.  Activities (DG sets Included) during construction phase should conform to the Air Act with respect emission standard.	SPCB
Water (Prevention and Control of Pollution) Act	1974	To control water pollution by controlling discharge of pollutants as per	CTE & CTO is not applicable to RE projects as per AP solar and wind power policy.	SPCB

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
		the prescribed norms. Approval for Consent to Operate (CTO) and Consent to Establish (CTE).	CTE & CTO will be applicable if the contractor establishes high capacity Batching Plant.  Activities (discharges from toilets included) during construction phase should conform to the Water act with respect discharge standard.	
Permission for abstraction of Ground water under Environmental (Protection) Act	1986	To protect unauthorized abstraction of Ground water.	If the RE project requires to abstract ground water at the time on construction and operation phase. No Objection Certificate (NOC) for ground water withdrawal will be required	Normally Central Ground Water Authority is the concerned authority. In case of Andhra Pradesh the concerned authority for such permission is Commissioner of Rural Development Authority
Construction and Demolition Waste Rules	2016	For addressing the indiscriminate disposal of C& D Waste and enable channelization of the waste for reuse and recycling in gainful manner	Approval required from local authorities, if waste generation is >20 tons in a day or 300 tons per project in month	Local Authority and State Pollution Control Board
E-waste (Management and Handling) Rules	2016	To control/mitigate potential impacts due to e-waste handling & storage on the site.	Applicable for RE projects while using and repairing, storing of equipment. To obtain authorization from SPCB.	SPCB

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
			Filing of return and maintenance of records in the forms given in the Rules	
Hazardous and Other Waste (Management and Trans-boundary Movement) Rules	2016	To control/mitigate potential impacts due to Hazardous-waste Import, Export, Handling, Storage and disposal.  Proper management of Hazardous storage facility.	Applicable to RE projects at the time of Construction (Prior to initiation of any work)  At the time of operation phase hazardous waste will be generated in from of refuse of turbine oil, transformer oil and their tank bottom sludge.  In addition, disposal of PV cells also attracts the provisions of rules  Permission for storage of hazardous and other wastes will be required for handling hazardous wastes	SPCB
The Bio Medical Waste Management Rules,	2016	To control storage, transportation and disposal of Bio Medical Waste.	Comply with the handling and disposal Requirements of the rules.	SPCB
Noise-Pollution (Regulation and control) Rules	2000	To control noise levels and maintain it to the standards prescribed for various areas like residential, commercial or silent zones by the Central Pollution	Noise abatement during construction time and compliance under the rules to maintain stipulated standards.	CPCB, SPCB

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
		Control Board (CPCB).		
Ozone Depleting Substances (regulation and Control) Rules	2000	To control and reduce the use of Ozone depleting substances to protect the Ozone layer	Applicable to RE Projects where air conditioning units installed	Secretary, MoEFCC
Batteries (Management and Handling) Rules	2001	The Act defines the requirements for disposal of used batteries for bulk users. The developers in sub-project would be likely bulk users.	Applicable when batteries are used for storage of power.	SPCB
Electricity Act	2003	Laws relating to generation, transmission, distribution, trading and use of electricity, promotion of efficient and environmentally benign policies.	Applicable for RE and Transmission line projects. Where the national grid connectivity is being involved.	Power Grid, State transmission and distribution company
The Central Electricity Authority (Technical Standards for Connectivity to the Grid) Amendment Regulations	2013	Guidelines for Grid – Connectivity (Technical Standards) for RE projects  Compensation payments for transmission (ROW) <sup>4</sup>	Applicable for RE and Transmission line projects. Where the national grid connectivity is being involved.	Ministry of Power, Central Electricity Authority (CEA),

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[http://powermin.nic.in/sites/default/files/uploads/Guidelines\\_for\\_payment\\_of\\_compensation\\_towards\\_damages\\_in\\_regard.pd](http://powermin.nic.in/sites/default/files/uploads/Guidelines_for_payment_of_compensation_towards_damages_in_regard.pd) -Guidelines for compensation

<b>Act/ Rule/ Policy</b>	<b>Year</b>	<b>Objective</b>	<b>Project Applicability</b>	<b>Agency Responsible</b>
Energy Conservation Act 2001	2001	Established under the National Mission for enhanced Energy Efficiency.	Not directly applicable for RE projects	BEE (Bureau of Energy Efficiency.
Ancient Monuments and Archaeological Sites and Remains Act	1958	Conservation of cultural and historical remains found in India.	For the project located within 300 m from such features. (first 100 meters as prohibited area followed by 200 meters to be regulated area)	Archaeological Dept. GOI, Indian Heritage Society and Indian National Trust for Art and Culture Heritage (INTECH).
Andhra Pradesh Water, Land and Trees Act (WALTA Act)	2002	Andhra Pradesh Water, Land and Trees Act 2002 is a comprehensive law enacted by the Govt. Of Andhra Pradesh and it is a unique initiative in the country. APWALTA promotes water conservation and tree cover; regulates the exploitation and use of ground and surface water. The objective is protection and conservation of land, water sources and environment and matters connected therewith or incidental thereto.	Applicable for permission for ground water abstraction, cutting of trees in Andhra Pradesh	District Authority

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
The Karnataka Preservation of Trees Act,	1976	To regulate the felling of the trees and for the planting of adequate number of trees to restore ecological balance and for matters connected therewith. The Act also stipulates constitution of a Tree Authority in different areas. The Act also elaborates the restriction on felling of trees and liability for preservation of trees. Section 8(2) of the Act specifies that "Any person desiring to fell a tree, shall apply in writing to the concerned Tree Officer for permission in that behalf. The application shall be accompanied by a site plan or survey sketch specifying clearly the site or survey number, the number, kind and girth of tree sought to be cut and the reasons therefore along with the consent of the	For felling of trees	Department of Forests, Department of Social Forestry, GoAP
The Karnataka Preservation of Trees Rules	1977			

Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
		owner or occupant".		
<b>ACTS AND REGULATIONS GOVERNING LAND &amp; SOCIAL ISSUES</b>				
Recognition of Forest Rights Act - The Scheduled Tribes and other Traditional Forest Dwellers	2006	Act seeks to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded	Applicable when any sub project is located in customary forest land including reserved and protected forests; protected areas and also community forest.	Ministry of Tribal affairs (nodal agency); Department of tribal welfare at district level
Rights of Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act (RFCTLARRA) (replaced Land Acquisition Act, 1894)	2013	To ensure least disturbance to the owners of the land and other affected families and provide fair compensation to the affected families whose land has been acquired.	Applicable for any sub project involving Land acquisition for the power plant.	Administrator (as per Act), Municipality/ Municipal Corporation/ District Collector/ Sub-Divisional Magistrate & Revenue Officer
73 <sup>rd</sup> Constitution Amendment Act,	1992	The Act enables participation of Panchayat level institutions in decision-making. Panchayats at the village level will be involved for preparation and implementation of the project.	Applicable for any project located in panchayat area	Department of Panchayat Raj, State Government



Act/ Rule/ Policy	Year	Objective	Project Applicability	Agency Responsible
Land Purchase policy		Provision of Direct Land Purchase by respective state governments such as Bihar, M.P., Karnataka, West Bengal. etc. from land owners considering need for immediate land for any projects	In any project requiring private land	Land purchase committees of respective state government.
Guidelines issued by Ministry of Power for payment of compensation towards damages caused by tower and Right of Way for transmission lines.	2015	To determine compensation Tower base area impacted due to installation of tower / pylon structure; and compensation towards diminution of land value in the width of Right of Way (RoW) corridor due to laying of transmission line and imposing certain restrictions.	Any sub project that also includes transmission line or as an associate project of solar park.	Corporation / Municipality /Local Body or the State Government.

## 2.4 Labour Laws Applicable in the Project

All the workers are governed by the relevant Indian labour laws as stated below. The Developer shall undertake the requisite license from Labour Commissioner prior to initiation of any works onsite. Some of these are directly relevant during the construction stage of the proposed sub-projects:

Applicable Acts	Coverage Provisions
Minimum Wages Act 1948	The act ensures minimum wages for each category of workers

Child Labour (Prohibition and Regulation) 1986	Prohibits employment of children below 14 years age
The Labours Act 1988	Ensure general labour standards and health and safety of construction workers
The Factories Act, 1948	Ensures Health and safety considerations of workers
Workmen's Compensation Act, 1923	Ensure fair compensation in case of injury by accidents during the course of employment
Contract Labour (Regulation and Abolition) Act, 1970	Ensure basic welfare measures to be made available to the contract workers by the employer
The Building and other Construction Workers Act, 1996	Ensure safety measures at construction work site and other welfare measures such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the Workplace etc.
Payment of Wages Act, 1936	Ensures regular payment by laying down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
Equal Remuneration Act, 1979	The Act provides for payment of equal wages for work of equal nature to men and women workers and not for making discrimination against Female employees.
Payment of Bonus Act, 1965	The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages.

## 2.5 Summary of Statutory Clearance/Permits Requirement

The projects may require some statutory permission/clearances under different Acts and Rules at different stage of the project. These are listed in **Table 2.2**.

**Table 2-2: Summary of Statutory Clearance Requirement of the Project**

S. No.	Type of Clearance/Permits	Applicability	Project Stage	Responsibility	Time Required
1.	Forest Clearance for land diversion	For diversion of forest land if RE Project and Transmission line pass through Forest Areas	Pre-Construction	SECI/ State Agency	10-11 months
2.	Wild life Clearance	If RE project located inside the boundary of Wildlife Sanctuary or National Park, Wildlife reserves.  If Project area under bio-reserves or National biodiversity reserves	Pre-Construction	SECI	10-12 months
3.	Tree felling permission	For tree cutting, if any	Pre -construction	State Agency/ SECI	1-2 months
4.	NOC (Consent to Establish and Consent to Operate) under Air and Water Act from SPCB	For siting and erection Batching plants etc. DG sets & toilet water treatment (if reqd.)	Construction Stage (Prior to erection and operation of Plants)	Contractor	2-4 months
5.	Explosive License from Chief Controller of Explosives	For storing fuel oil, lubricants, diesel etc. beyond optimal permissible limit	Construction stage (Prior to storing fuel, lubricants and Diesel, etc.)	Contractor	2-3 months
6.	Permission for storage of hazardous chemical from CPCB	Manufacture storage and Import of Hazardous Chemical	Construction stage (Prior to initiation of any work)	Contractor	2-3 months
7.	Authorisation Under Haz. Waste rules	For proper disposal of Used Oil/Other Haz wastes generated during construction & operations	Construction & operation	Contractor & SECI	2-3 Months
8.	Permission for extraction of ground water for Solar Panel cleaning and other activities	Extraction of ground water	Operation Stage (Prior to initiation of installation of Bore wells and	SECI	1-2 months

S. No.	Type of Clearance/Permits	Applicability	Project Stage	Responsibility	Time Required
			abstraction of water from such source)		
8.	Permission for use of water for construction	Use of surface / ground water for construction	Construction stage (Prior to initiation of abstraction of water from such source)	Contractor	1-2 months
9.	Labour license from Labour Commissioner Office	Engagement of Labours	Construction stage (Prior to initiation of any work)	Contractor	2-3 months
10.	NOC for Storage of Battery	Applicable when batteries are used for storage of power.	Operation Stage	SECI	4-6 months

## 2.6 Land Procurement for RE power generation projects

For the development of renewable energy power generation projects land will be required. As far as possible government land will be utilized for such projects. Wherever private land is involved for such project, it shall be procured within the framework of “The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013” (LA Act 2013) and the state policies on procurement of private land to ensure that there are no adverse impacts on the owners whose land is being procured under the project. The compensation is based on the state ‘multiplication factor’ value which is multiplied to the market value, second component is the addition of all the assets attached to the land or the building, lastly 100 percent of solatium value. The assimilation of all the components defines the compensation against land for development, guidelines for land acquisition and resettlement and rehabilitation is elaborated in the policies.

If the government revenue land is recorded as forest land (with or without tree cover) in the revenue records or it is defined as a forest land as per Revenue Department, then the applicant will have to take necessary permissions, as per provisions of Forest Conservation Act 1980, from concerned authorities.

## 2.7 Forest Land Diversion for Wind Farms

The guidelines for diverting forest land for non-forest purpose were developed under the Forest (Conservation) Act, 1980 for wind energy projects. The following guidelines are adopted for development of wind farms on forest land:

- The wind power plants cannot be developed over National Parks and Sanctuaries,

areas of Outstanding Natural Beauty (AONBs), Natural Heritage Site, Sites of Archaeological importance and sites of specific scientific interests and other important landscapes. Also, a safe distance shall be maintained if the selected site is near to the above-mentioned areas.

- The distance of the turbines shall be positioned 300 meters (considering safe distance) away from any settlement, highway and village habitation.
- The wind turbines shall be painted with orange stripes at ends to avoid bird hits. The wind farm should not stand in the migratory path of birds and should not be near the breeding sites of the migratory birds as the humming noise of the turbine may cause disturbance for the avian habitat.
- Wind mills of less than 500KW capacity will not be allowed on forest land. For optimization of wind energy in the given forest land, wind farm should have at least 500 KW power generating capacity.
- If the terrain permits wind mill of capacity of at least 1 MW should be preferred. This shall not be applicable to projects already in pipeline having wind mill capacity from 500KW up-to 1MW.
- For exception, a 'Stand Alone' wind mill up to 10KW off-grid will be allowed in the forest area to have access to energy in remote areas.
- Initially the forest land shall be leased for 30 years' period. Initially for the first 4 years, the lease will be in favour of the developer. Later for the stage-II approval the lease shall be transferred in the name of investor/power producer. In case the developer failed to develop wind farms, the land shall be reverted back to the Forest Department without any compensation.
- A lease rent of Rs. 30,000/- per MW for the period of lease. Additional compensatory afforestation, net present value etc. shall be charged from the user agency. Afforestation shall be done on the expense of developer.
- Details of alternative explored on non-forest land shall be provided with the proposal.
- 65% to 70% leased out areas of wind farms shall be utilized for developing medicinal plant gardens wherever feasible by the forest department. The intervening distance between two wind mills should be planted by dwarf species of trees in the project cost and the transmission lines should be aligned collaterally along the road.

## 2.8 State Policies for generation of power from RE sources

Wind and solar projects are classified as white industries by Central Pollution Control Board/State Pollution Control Boards and kept out of the purview of stringent scrutiny since the projects have insignificant long term adverse impacts on surrounding environment.

Most of the states/developers prefer that the land procured for the projects be maximum government revenue land with minimum private land acquisition. The preferred land parcels are generally fallow lands / rain fed irrigated land parcels / barren / open scrub lands. Designated forest area is generally avoided due to the clearance requirements and anticipated delays.

Most of the States have their respective policies and procedure guidelines for the procurement of land for the development of power generation projects from renewable energy, some of which are mentioned in subsequent sub-sections:

### (a) Andhra Pradesh Solar Policy 2015

The policy targets an additional 5000MW in the next five years in the State to meet the growing demand for power in an environmentally sustainable manner. The policy objective is to promote distributed generation that can help in avoiding upstream network cost and contribute towards loss reduction. As the energy consumption is very high in the agricultural sector, the policy aims to deploy solar powered agricultural pump sets and meet power requirements. The policy shall also promote local manufacturing facilities which will generate employment in the state. The government will develop solar parks with 2500MW capacity in 500-1000ha clusters.

It is the responsibility of the project developer to acquire the land required for the project. However, in case of land owned by Revenue Department, the land allotment shall be done as per the prevailing government policy. Solar PV power projects will be exempted from obtaining any NOC/Consent for establishment under pollution control laws from AP Pollution Control Board.

### (b) Andhra Pradesh Wind Power Policy 2015

The policy is to encourage, develop and promote wind power generation in the state with a view to meet the growing demand for power in an environmentally manner. There are three categories of wind power projects:

<b>Category I</b>	Project set up on government/ revenue lands or forested area or	Land allotted on first-come-first-serve basis on wind power potential areas, as per New Land Allotment Policy of Revenue Department. District collector shall handover
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	assigned lands and also in private lands selling power within state.	the possession of land in the joint name of PARK DEVELOPER and developer. In case of forest land, submit the application through the Nodal Agency to the forest department. Private land shall be procured by the developer.
<b>Category II</b>	Projects set up for captive use or group captive use /3rd party sale within or outside the state.	State will promote wind power producers to set up wind power projects with no cap on capacity for captive use/group captive or sale of power to 3rd party within the State/States other than Andhra Pradesh
<b>Category III</b>	Sale of power at average power purchase cost and availing Renewable Energy Certificate (REC)	State will promote wind power producers to set up wind power projects with no cap on capacity for sale through Renewable Energy Certificate (REC) mechanism.

Hybrid projects are encouraged to enable better utilization of common infrastructure and related facilities.

**(c) Andhra Pradesh Wind-Solar Hybrid Power Policy Draft, 2016:**

Similar to the Government of India, The Government of Andhra Pradesh has prepared Draft Andhra Pradesh Wind-Solar hybrid Power Policy in 2016 with an objective of optimal utilization of transmission infrastructure. Under the Policy the Government of Andhra Pradesh target to achieve 18000 MW of RE capacity addition by year 2021-2022, comprising of 10000 MW solar power and 8000 MW wind power.

The main objective of the Policy is to provide a framework for promotion of large grid connected wind-solar PV systems for optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation and thus achieving better grid stability, optimal utilization of transmission infrastructure being built by State Utility to evacuate renewable power, encouragement of new technologies such as combined operation of wind and solar PV plants coupled with any other Renewable Energy Sources and other emerging Technologies like Energy Storage systems.

The policy provided incentives to developers for establishing the RE system.

**(d) Gujarat Wind Energy Policy (2016 to 2021)**

Gujarat state has a wind energy potential of more than 35,000MW. The state is committed to promote generation of clean and green sources of energy. The policy enables an individual, whether incorporated or not will be eligible for setting up Wind Turbine Generators (WTGs) either of captive use or for selling of electricity. A 100% captive use is permissible for Micro Small Medium Enterprises.

Gujarat Energy Development Authority (GEDA) being the state nodal agency facilitates in registration of Wind Projects, Identification of potential sites and Renewable Energy Certifications (REC).

**Land for Project development:** The Wind Turbine Generators may be set up on private land, or revenue wasteland allotted by the State Government / GEDA land, if available. The allotment of GEDA land on lease shall be done upon approval of the Coordination Committee. Issues other than the allotment of GEDA land including interpretation of any of the provisions of this Policy will also be decided by the coordination committee.

**Incentives:** The projects for either captive use or third-party sale within the state will be exempted from payments of electricity duty in accordance with Electricity Duty Act, 1958 and amendments. Additional incentives include:

- GST for solar modules to 5%.
- Clean Development Mechanism (CDM) under Kyoto Protocol will be shared among the producer and the procurer. The percentage shared to 100% to producer for the first year, and 10% incremental annually for the consecutive years from the sixth year onwards the share of CDM benefits partnership to be 50:50.
- Renewable Purchase obligation (RPO) tariff will be regulated and fixed as per the Gujarat Electricity Regulatory Commission (GERC).

#### **(e) Gujarat Solar Power Policy 2015**

The Gujarat Solar power policy 2015, aims to scale up the solar power generation in sustainable manner. The main objectives of the policy are to promote green and clean power, reduce use of fossil fuels for power generation, promote investment, employment & skill enhancement, promote productive use of barren /uncultivable land, encourage growth of local manufacturing facilities in line with 'Make in India' and lastly to promote R&D, innovation in renewable energy sector.

Gujarat Energy Development Agency (GEDA) is the nodal agency for registration of projects, facilitating approvals for power evacuations, recommending the solar power projects for REC and respond to queries and problems of developers.

#### **(f) Kerala Renewable Energy Policy 2002**

This policy is directed towards a greater thrust on overall development and promotion of renewable energy technologies and applications. Renewable Energy covers all sources of energy solar, wind, biomass, small hydel power plants up to 25 MW capacity, tide, wave, geo-thermal etc. The nodal agency for the development of non-conventional energy for the state of Kerala is ANERT (Agency for non-renewable energy and Rural Technology). The



procedures for project preparation, approvals monitoring etc. are structured by the nodal agency.

The nodal agency is responsible for promoting the development of renewable energy sources and function as a single window clearing agency for all renewable energy power projects for issuing all necessary clearances and approvals on behalf of Government of Kerala. The agency also provides technology support, fiscal incentives etc. and responsible for certifying or arranging for certification of all devices related to renewable energy sources.

The eligible producers were the grid –grade electricity generators. The producers sell power to Kerala State Electricity Board (KSEB) at rates defined by the board. Producers for captive use shall be considered under eligible producers and can sell the excess produce to KSEB at the prescribed tariff rate.

The Central clearing Agency has representatives from ANERT, KSEB, Power Department other experts in corresponding fields to coordinate matters relating to different renewable energy projects.

**(g) Policy Guide lines for the development of wind power in Kerala through private developers 2005**

The developmental policy for land procurement is categorized as under:

- Project -Captive Power Plants (CPP) on Government Land – the nodal agency calls for a two-stage tendering process and land is allotted to the highest bidder. The land shall be preferentially allotted to given to HT/EHT industrial consumers having settled undisputed dues with KSEB/State Utility and any other requisites from the statutory authorities and Local Bodies.
- Development on Private Land-The Technical Proposal is submitted on a prescribed format provided by ANERT. The decision is made in 120 days by ANERT. A petition is filled to State Electricity Regulatory Commission (SERC) for Open Access (to enter bulk power agreement with Kerala State Electricity Board). All necessary clearances are to be attained by the developer solely. No-Objection Certificate from Local Self-Governance, Wind farm proof of Ownership or Lease Rights should be submitted to ANERT.
- WTGs Developer shall be required to provide Bank guarantee @Rs 1 Lakhs per MW (2 Lakh maximum depending on the capacity) to ANERT ensure the developer succeeds in commissioning the Wind Farm and transmission line in the time mentioned. Pooling station and Evacuation facility is developed by KSEB/STU as per the Master Plan by ANERT. But the costs will be borne by the developer and 50% initially by ANERT, which will be returned back after the (COD) Commercial Operative Date. Other infrastructure costs shall be borne by the developer.

#### **(h) Kerala Solar Energy Policy 2013**

The policy was framed to mainstream the use of solar energy in the energy mix of Kerala and to ensure optimal usage of solar potential in the region. The mission is to install 500MW solar power by 2017 and 2500MW by 2030. The installations to be targeted for macro and micro levels and the incentives & disincentives packages to be made for identified groups. Policy promotes entrepreneurs/start-ups industries/ institutions that are engaged in innovative solar based systems. ANERT shall act as a facilitator for developer for making available the subsidies from MNRE/ other central agency.

#### **(i) Chhattisgarh Solar Energy Policy 2017 – 2027**

Chhattisgarh currently has a total renewable energy potential of 4500 MW which includes solar (grid connected and roof top), wind, biomass and small hydro. Chhattisgarh Solar Policy is targeted to tap solar potential. The main objective of the policy are as under:

- To encourage, develop and promote solar power generation in the State with a view to meet the growing demand for power in an environmentally and economically sustainable manner.
- To enhance the private sector participation in solar power generation.
- To create a favorable environment for development of solar manufacturing capabilities within the State.
- To contribute to long term energy and ecological security of Chhattisgarh with gradual reduction in dependence on con-ventional thermal energy sources such as coal.
- To promote the Off-Grid Solar applications to meet the energy needs of vulnerable section of society residing in far flung area and also to promote Stand-alone system.
- Universalization of access to clean energy.
- To encourage Decentralized, Distribution Generation System in the State.
- To create opportunities for huge direct and indirect employment in solar generation, manufacturing and related Support industries.
- To productively utilize the available waste-lands/non-industrialized unused land for solar generation.
- To create skilled and Semi-skilled human resources for the Sector.
- To encourage innovative projects pertaining to Solar Power Generation.

The incentives proposed in the policy are as under:

- As available under state industrial policy will be applicable.
- Exemption from electricity duty for auxiliary consumption or captive consumption within the state.
- If the incentives available under industrial policy are less than those under solar policy, then the incentives as per solar policy will prevail.

- For third party sale through open access to entities outside the state, the open access charges will be as per state regulations or Central Electricity Regulatory Commission.
- Wheeling and transmission charges will be as per state regulations.
- Cross subsidy surcharge for sale of power inside the state shall be as per state regulations.

**Reservation of land for the renewable project:** The prime responsibility for identifying the land for renewable energy shall be with the developer. Government shall endeavour to assess clearly the land suitable for the development of solar installations in the possession of either Government, private or tribal individuals. For tribal lands, in addition to the lease rentals, a revenue (not profit) sharing mechanism for the land owner is envisaged as follows.

- The willingness of the land owner is mandatory.
- The land ownership rights shall continue to fully vest with the original owner. The developer shall have only rights to setup and operate the project.
- Revenue (not profit) sharing based on the power generated, possibly in the range not below of 5% is envisaged.
- The payment of share of revenue shall be made directly to the bank account of the land owner. For this purpose, a tripartite agreement has to be entered into among the developer, the land owner and the KSEB.
- Only lands which do not have an immediate productive use shall be thus identified/ permitted.

**(j) Maharashtra Comprehensive Policy for Grid connected Power Projects based on New and Renewable (Nonconventional) Energy Sources – 2015**

The policy targets total of 14,400 MW capacity power projects based on renewable energy to be installed in next five years. The policy envisages setting up of grid-connected renewable power projects of capacity 5000MW from wind and 7500MW from solar and remaining from biomass, small hydro, industrial waste and other renewable energy sources. Maharashtra Energy Development Agency (MEDA) will implement the policy as per the methodology. It shall give assistance with respect to matters relating to the MNRE. Hybrid projects shall also be allowed under this policy.

Out of 7500MW target under this policy, 2500MW capacity solar power project will be

developed by MAHAGENCO in PPP mode to fulfil the Renewable Generation Obligation (RGO). Remaining 5000MW will be developed by the other developers. The policy states:

- Solar parks should be a minimum capacity of 1MW and above.
- Land to be procured by the developer, but government waste land can be granted on lease hold basis as per availability.
- District collector can allot up to 4 hectares of land for grid connected solar power projects of up to 2MW capacity after scrutiny of the regional plan. Such land will be given on lease at 50% concessional rate in accordance with Maharashtra Land Revenue Code and disposal of government land rules, 1971.
- Private land owners can lease /rent their land for solar power projects.
- Developer can generate electricity for captive use and can be sold through REC mechanism.
- The projects are exempted from obtaining NOC/ consent from Pollution Control Board.

## 2.9 Applicable World Bank Safeguard Policies

The implementation of the World Bank Operational Policies seeks to avoid, minimize or mitigate the adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the proposed project. Based on the information collated by the consultants during the baseline study, following OP's are likely to apply to the proposed project and would require adequate measures to address the safeguard concerns.

**Table 2-3: Applicable WB Policies**

<b>World Bank Safe Guard Policies</b>	<b>Objective</b>	<b>Applicability</b>	<b>Safeguard Requirements</b>
OP 4.01 Environmental Assessment	The objective of this policy is to ensure that Bank financed projects are environmentally sound and sustainable.	The environmental issues will be addressed adequately in advance. An integrated Environmental Screening and Environmental Assessment (EA) with Environmental Management Plan (EMP) will be developed to manage environmental risks and maximize environmental and	EIA and/or EMP required.

<b>World Bank Safe Guard Policies</b>	<b>Objective</b>	<b>Applicability</b>	<b>Safeguard Requirements</b>
		social benefits wherever it is applicable.	
OP 4.04 Natural Habitats	The policy recognizes that the conservation of natural habitats is essential for long-term sustainable development. The Bank, therefore, supports the protection, maintenance and rehabilitation of natural habitats in its project financing, as well as policy dialogue and analytical work. The Bank supports and expects the Borrowers to apply a precautionary approach to natural resources management to ensure environmentally sustainable development	This policy may apply to the Project due to activity requiring forest/ wildlife lands, locating close to the natural habitats with the potential to cause significant adverse impact or degradation of natural habitats whether directly (through construction) or indirectly (through human activities induced by the project).	EIA and EMP required
OP 4.36 Forests	This policy focuses on the management, conservation, and sustainable development of forest ecosystems and resources. It applies to project that may have impacts on  (a) health and quality of forests;	Impact of construction activities on Forest areas required to be taken care of. Generally, diversion of reserve forest will be avoided, however the roadside trees along state highways being declared as protected forest, and roadside tree felling will attract the provision of Forest (Conservation) Act. The forest related issues, avoidance/	Forest land diversion Application has to be prepared and submitted to forest department. The issue of forest loss and its mitigation/compensatory measures is required to be integrated in EIA study and EMP.

<b>World Bank Safe Guard Policies</b>	<b>Objective</b>	<b>Applicability</b>	<b>Safeguard Requirements</b>
	(b) Affect the rights and welfare of people and their level of dependence upon forests and projects that aim to bring about changes in the management, protection or utilization of natural forests or plantations, whether they are publicly, privately or community owned. The Bank does not support the significant conversion or degradation of critical forest areas or related critical natural habitats.	minimization of forest loss and its management should be integrated with EA study and EMP.	
OP/BP 4.12 Involuntary Resettlement	The objective of this policy is to avoid or minimize involuntary resettlement where feasible, exploring all viable alternative project designs. Furthermore, it intends to assist displaced person in improving their former living standards; community participation in planning and implementing resettlement; and to provide assistance to affected people,	There will be need for limited land acquisition resulting in: relocation or loss of shelter, loss of assets or access to assets; loss of income sources or means of livelihood.  This policy applies to all components of the project that result in involuntary resettlement, regardless of the source of financing. It also applies to other activities resulting in involuntary resettlement, that in the judgment of the Bank, are  (a) directly and significantly related to the Bank-assisted project,	Social Impact Assessment and Resettlement Action Plan in consultation with the community and project authorities

<b>World Bank Safe Guard Policies</b>	<b>Objective</b>	<b>Applicability</b>	<b>Safeguard Requirements</b>
	regardless of the legality of title of land	(b) necessary to achieve its objectives as set forth in the project documents; and  (c) carried out, or planned to be carried out, contemporaneously with the project.	
OP/BP 4.10 Indigenous People	This policy aims to protect the dignity, right and cultural uniqueness of indigenous people; to ensure that they do not suffer due to development; that they receive social and economic benefits	This policy may apply if there are indigenous people in the project area; when potential adverse impacts on indigenous people are anticipated; and if indigenous people are among the intended beneficiaries.	Indigenous people development Plan
OP/BP 4.11 Physical Cultural Resources	This policy aims at assisting in the preservation of cultural property, historical, religious and unique natural value-this includes remains left by previous human inhabitants and unique environment features, as well as in the protection and enhancement of cultural properties encountered in Bank-financed project.	This policy may apply to sub-projects where cultural property, historical, religious and unique natural value-this includes remains left by previous human inhabitants and unique environment features may be affected due to project.	Application has to be prepared and submitted to Archaeological department in case any impact is envisaged due to the project. The impact on such features should be integrated with EIA study and included in EMP
OP4.37 Safety of Dams	This policy aims at ensuring safe dams, where facilities supported by the Bank are dependent on such dams.	This policy applies to existing as well as new dams and dams under construction, whether or not financed by the Bank, wherever Bank supported project is	Since the project will mostly depend on existing dams, in case of floating solar plants, SECI will provide previous assessments of

World Bank Safe Guard Policies	Objective	Applicability	Safeguard Requirements
		dependent on the safety of such dams.	dam safety or recommendations of improvements needed in the existing dam or DUC. These need to be satisfactory to the Bank, which can be confirmed on a case-by-case basis once SECI provides evidence that (a) an effective dam safety program is already in operation, and (b) full-level inspections and dam safety assessments of the existing dam, which are satisfactory to the Bank, have already been conducted and documented.

## 2.10 Community Health, Safety and Security

While acknowledging the public authorities' role in promoting the health, safety, and security of the public, client's responsibility is to avoid or minimize the risks and impacts to community health, safety, and security that may arise from project related-activities, with particular attention to vulnerable groups. The objective of Performance Standard 4 is:

- Avoid or minimize the risks to, and impacts on, the health and safety of the local community over the project life cycle, from both routine and non-routine circumstances.
- Ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimizes risks to the community's safety and security.

### IFC – EHS Guidelines

The EHS Guidelines include information relevant to power generation and transmission that occur during the construction and operation phases of a facility, along with recommendations for their management. Additional recommendations for the management of environmental issues during the construction and decommissioning phases are provided in the General EHS



Guidelines. The impacts addressed in the General EHS Guidelines include:

- Construction site waste generation;
- Soil erosion and sediment control from materials sourcing areas and site preparation activities;
- Fugitive dust and other emissions (e.g. from vehicle traffic, land clearing activities, and materials stockpiles);
- Noise from heavy equipment and truck traffic;
- Potential for hazardous materials and oil spills associated with heavy equipment operation and fueling activities.

The EHS guidelines are technical reference documents with industry specific examples of good international industry practice. The document is available online on URL: <http://www.ifc.org/ehsguidelines> for download. For IFC-financed projects, application of the EHS Guidelines to existing facilities may involve the establishment of site-specific targets with an appropriate timetable for achieving them. The environmental assessment process may recommend alternative (higher or lower) levels or measures, which, if acceptable to IFC, become project- or site-specific requirements.

The below industry specific, relevant to solar / wind / hybrid solar-wind guidelines should be used together with the general EHS guidelines:

**(a) Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution**

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid. The document lists the likely impacts during the construction phase along with the performance indicators and monitoring guidelines.

The detailed document can be downloaded from URL:

<http://www.ifc.org/wps/wcm/connect/66b56e00488657eeb36af36a6515bb18/Final%2B-%2BElectric%2BTransmission%2Band%2BDistribution.pdf?MOD=AJPERES&id=1323162154847>

**(b) Environmental, Health, and Safety Guidelines for Wind Energy**

The EHS Guidelines for wind energy include information relevant to environmental, health, and safety aspects of onshore and offshore wind energy facilities. It should be applied to wind energy facilities from the earliest feasibility assessments, as well as from the time of the environmental impact assessment, and continue to be applied throughout the construction and operational phases.

The detailed document can be downloaded from URL:

[http://www.ifc.org/wps/wcm/connect/2c410700497a7933b04cf1ef20a40540/FINAL\\_Aug+2015\\_Wind+Energy\\_EHS+Guideline.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/2c410700497a7933b04cf1ef20a40540/FINAL_Aug+2015_Wind+Energy_EHS+Guideline.pdf?MOD=AJPERES)

### 3.0 BASELINE- CASE STUDY SAMPLE SUB-PROJECTS

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#### 3.1 Introduction

Documentation of Environmental and Social Baseline information for the proposed project sites is necessary for assessing the likely impacts because the project. The major objectives for which the Baseline information of the project site must be collected are as follows:

- To confirm the presence of environmentally sensitive areas from secondary sources or preliminary site observations.
- To verify the extent of applicability of GoI, and World Bank policies in project activities.
- Identify potential negative and positive impacts; provide clarity on which issues need to be investigated more comprehensively during preparation of Environmental & Social Impact Assessment that will be done during the design stage.
- To provide inputs for sequencing of projects, and factoring in timelines, like those associated with regulatory clearance processes, into project implementation.

Since the sub projects under this project are not known, few projects of similar nature were studied to establish baseline. The sample project study helped in identification of environmental and social issues and likely adverse environmental and social impacts of the investments in projects. Since the proposed project is for innovative technologies, commercial scale of similar solar-wind hybrid with storage projects and large scale battery storage projects are not available in India and therefore small-scale projects largely put for research and development purpose were identified for review purpose.

The sample projects reviewed for this purpose are:

I. Solar projects:

- (i) Rewa (Madhya Pradesh)- 750 MW
- (ii) Pavagada (Karnataka)- 2000 MW and
- (iii) Mandsaur (Madhya Pradesh)- 500 MW,

II. Wind projects:

- (iv) Tirunelveli (Tamil Nadu)- 51 MW,
- (v) Kayathar (Tamil Nadu)-

III. Hybrid project:

- (i) Kayathar (Tamil Nadu)-54 kW

- (ii) Anantapur (Andhra Pradesh)- 160 MW

IV. Battery Energy Storage System projects:

- (i) 100 MW(AC) Solar PV Project (200MWp DC capacity) along with 50MW/150 MWh Battery Energy Storage System at Rajnandgaon, Chhattisgarh

The study of sample project cases covers an analysis of environmental, social and other data obtained from secondary sources, and consultation with different stakeholders.

### 3.2 Review of Solar Projects

The consolidated parameters of solar projects are depicted in table 3.1 below.

**Table 3-1: Consolidated parameters of sample projects reviewed**

S. No	Parameter	Rewa (Madhya Pradesh)	Pavagada (Karnataka)	Mandsaur (Madhya Pradesh)	Anantapur (Andhra Pradesh)	Rajnandgaon Chhattisgarh
1	Project Villages Location	Badwar, Barseta Desh, Barseta Pahar, Ram Nagar Pahar and Etar Pahar	Thirumani, Balasamudra, Vollur, Kyathaganacherlu, Rayacharlu	Gujarkhedi (uninhabited) and Runija Villages; Sitamau Block; Suwasra	Ramagiri and Muthuvakuntla	Dhaba, Khoka, Rangakhetra, Amlidih, Dhundera, Orebandh, Giragaon, Tolagaon, Margaon and Dhudwa
2	Tehsil	Gurh	Pavagada Tumkur (Karnataka State)	Tehsil, Mandsaur	Ramagiri,	Dongrangaon and Rajnandgaon
3	District Name/ State	Rewa / Madhya Pradesh	Tumkur, Karnataka	Mandsaur, Madhya Pradesh	Anantapur, Andhra Pradesh	Rajnandgaon, Chhattisgarh
4	Location coordinates	Longitude 81° 31' 38" E to 81° 37' 31" East Latitude 24° 27' 1" N to 24° 29' 47" North	Latitude 14°13' to 14°20' North Longitude 77°23' to 77°30' East	Between Latitude 24°-4'-30" N to 24°-6'-10" N and Longitude 78°-45'-50" E To 75°-46'-30" E	Latitude 14.3104° N Longitude 77.5060° E	Latitude 21°5'32.89"N, Longitude 80°50'30.37"E

5	Climatic zone	Humid subtropical climate zone	Warm & Humid		semi-arid climate	Tropical (Hot and Humid)
6	Average Elevation	360 meters above MSL			Varies between 470 m to 517 m amsl	250 m to 330 m above msl

S. No	Parameter	Rewa (Madhya Pradesh)	Pavagada (Karnataka)	Mandsaur (Madhya Pradesh)	Anantapur (Andhra Pradesh)	Rajnandgaon Chhattisgarh
7	Road Accessibility	National Highway – 75; <i>Connecting Rewa town (north side) and Sidhi town (south side)</i>	Linked by MDR to Taluk Headquarters; SH to Tumkur 180 km from Bengaluru		Nearest Railhead from the site location is Dharmavaram (31 Km) and the district headquarter Anantapur is located about 61 Km away from proposed site.	Nearest railhead from the site location I Rajnandgaon Station. NH – 6 is passing very close to project site.
8	Nearest Airport	Allahabad Airport (160 kms)	Bengaluru Airport (200 kms)		Bengaluru Airport (187 Km)	Raipur Airport (95 km)
9	Land availability	Estimated 82% government land and rest private acquisition for a total of 1500 Ha approximately	12,000 Acres on long-term lease (30 year)	553.6 Ha approximately	900 acres approximately	377 Ha approximately
10	Key Social issues	Private land acquisition; loss of livelihood and sources of livelihood.	Land on long term lease though there will be loss of sources of livelihood for tenants.	Loss of land and livelihood.  No displacement.	The project site is mainly located on government and assigned land. There is no settlement in the proposed area.  The tentative alignment of transmission line passes through	The project site is located on government land. There is no settlement in the proposed area.

S. No	Parameter	Rewa (Madhya Pradesh)	Pavagada (Karnataka)	Mandsaur (Madhya Pradesh)	Anantapur (Andhra Pradesh)	Rajnandgaon Chhattisgarh
					<p>mainly private lands but does not encounter settlement areas.</p> <p>However, all the affected persons whose assigned land will be affected belong to BPL category.</p>	
11	Key environmental issues				<p>Protection of existing surface water resources / natural drainage.</p> <p>Waste management including hazardous waste disposal.</p> <p>Pre-construction stage activities impacting topography, drainage and slope.</p> <p>Water recycling / ground water recharge considering</p>	<p>Protection of existing surface water resources / natural drainage.</p> <p>Waste management including hazardous waste disposal.</p> <p>Pre-construction stage activities impacting topography, drainage and slope.</p> <p>Water recycling / ground water recharge considering scarcity of water resource.</p>

S. No	Parameter	Rewa (Madhya Pradesh)	Pavagada (Karnataka)	Mandsaur (Madhya Pradesh)	Anantapur (Andhra Pradesh)	Rajnandgaon Chhattisgarh
					scarcity of water resource.	
12	Water requirement	Estimated at 1.55 MLD			Estimated at 330 cum	Estimated at 105 KL per day
13	Proposed capacity	750 MW	2000 MW	250 MW	160 MW	100 MW(AC) Solar PV Project (200MWp DC capacity) along with 50MW/150 MWh BESS
14	Site conditions	A few scattered trees, almost flat to sloping hard surface	Largely flat land; seasonal cultivation	Largely flat and rocky land, seasonal cultivation in case of good monsoon	Undulated land rocky strata with scanty bushy vegetation and without any habitation.	Undulated land rocky strata with scanty bushy vegetation and without any habitation.
15	Power Evacuation	Vindhyachal - Jabalpur 400 KV line (airborne distance of 30 kms) ( <i>Actual alignment yet to be established</i> )		400 kV Mandsaur-Sitamau substation; alignment currently being finalized.	400 KV line Hindupur substation Total distance from Ramagiri wind-solar hybrid power 45 Km. The actual alignment yet to be established	Through overhead 132kV transmission line of length 33 km approx. to the nearest 132 kV CSPTCL's Substation at Thelkadi, Chhattisgarh
16	Soil characteristics	Sandy loam	weathered loamy red soil	Sandy and black cotton soils	Sandy and black cotton soil	Deep black soil, yellow soil and red let

Detailed description of the baseline data on environmental and social parameters for Anantapur is provided in **Annexure-I** and Rajnandgaon, Chhattisgarh is provided in Annexure-XVI

### 3.3 Review of wind projects

- a) **NLC Wind project-** Neyveli Lignite Corporation (NLC) plans to set up a 51-MW wind power farm at Kaluneerkulam in Tamil Nadu. The consultant's team visited the multiple sites (under operations stage) managed by NLC and NIWE in the state of Tamil Nadu. Following environmental and social aspects were observed during the site visits.

An area of approximately 1 Ha (100 meters x 100 meters) is acquired for setting

up a single unit WTG (1.5MW). The footprint of the WTG may not be very large but land to the tune of 1 Ha is acquired for ensuring safety and maintenance requirements.

- At present 9 Wind Turbine Generators (WTG) have been commissioned and work on the balance WTG are on-going. One of the key issues in delay is due to the non-availability of land parcels for setting up of the WTG.
  - Most of the land owners continue to cultivate the remaining parcel of land available with them. There have been no alternative livelihood options being explored by the parcel owners except the employment by the firm for ensuring safety and security of the installed WTG. Informal consultations with a few of the land owners who have sold their land (mainly marginal land parcel owners) reveals that land was sold to meet family expenses (marriage of daughters etc). It was observed during the site visits that the original land owners are also cultivating some portion of the sold land as it is lying vacant.
  - In all the installed WTGs, the original land parcel owners have also been employed in the project for ensuring safety and security of the installed WTG. This has also provided additional source of income for the complete project duration to the land parcel owner.
  - The WTG does not lead to any large-scale employment generation possibilities for the locals due to the requirement of skilled man power for preventive maintenance / operations and repair tasks.
  - No adverse impacts due to the installation / operation of the WTG have been reported during the informal consultations with the local residents. There have been no issues related to noise pollution, bird hits etc. The noise levels generated from “gear operated WTG” was found to be slightly higher when compared with “gearless WTG” operations for 1.5/2MW WTG.
  - Currently none of the proposed WTG sites were fenced but NLC plans to undertake fencing of all the sites in future to avoid any encroachments etc. There have been no safety issues or public access requirements reported in any of the sites.
- b) **NIWE Wind project-** NIWE established its research Station at Kayathar (Thoothukudi), Tamil Nadu around 20 years back as a technical focal point of excellence to foster the development of wind energy in the country. The consultant's team conducted detailed discussions with NIWE in order to gain understanding of the wind-based power generation technology and its development potential. Following



were the key points of discussion concerning environmental and social management framework:

- A typical footprint (direct surface area of impact which last the life of the facility) for a single WTG of 1.5 MW / 2 MW is calculated based on the size of the blade lengths. For a 40 meter to 45-meter blade length, an area of approximately 100 meter by 100 meter (1 hectare) is required. This includes the area occupied by the wind turbine pads, sub stations, service buildings and other supporting infrastructure facilities. An area of approximately 1 Ha (100 meters x 100 meters) is acquired for setting up a single unit WTG (1.5MW).
- Additionally, there is a radius of restriction which is calculated as (tower height plus (+) 0.5 times the blade diameter) wherein there are height restrictions for buildings / vegetation to ensure safety of the WTG.
- The setbacks / spacing between multiple WTGs are influenced by issues including visual impacts, noise, flicker effect and safety. The wind turbines do generate marginal amount of noise due to the mechanical components and aerodynamic sources. These impacts can be mitigated through turbine siting. Shadow flicker is generally not considered a significant issue in siting of wind turbines. However, in case of sensitive receptors (schools/colleges, health care facilities etc.), adequate modelling techniques could be used to identify safe distance to avoid shadow flicker effects.
- In addition to the permanent impacts which last the life time of a facility (approximately 25 years), there are usually reversible short-term construction stage adverse impacts. These impacts are associated with temporary construction of approach roads to proposed site, storage facilities; transportation of heavy machinery / equipment and manpower. Therefore, large wind turbines cannot be installed in hilly terrains or areas which lack road access as the movement of heavy machinery / equipment may not be feasible.
- Based on the discussions with the NIWE officials there have been no reported incidents of bird kills due to WTGs at the site.

### 3.4 Review of Solar-Wind Hybrid Project

Not much work has been undertaken in hybrid solar-wind power generation in India at present and currently it is more on experimental basis. The results have been encouraging due to reduced cost of transmission lines, better utilization of available land resource and most importantly a more stable power supply to the grid.

- NIWE has installed a 54-kW solar along with the existing wind power generation WTGs.

Looking at the potential of the hybrid solar-wind power generation at existing and new sites, Government of India has also come up with a policy for development of hybrid solar

– wind power generation India. The policy document has been reviewed in the previous chapter of the report.

### **3.5 Review of RE integrated with BESS Project**

RE integrated with BESS projects are a very new phenomenon in India and there are no large-scale operational projects available in the country. SECI has awarded tenders for RE coupled with BESS projects under its '1200 MW RE with assured peak power supply' tender, but the projects are under development. Therefore, such projects are being proposed for demonstration of various use-cases of Battery systems for various grid-support applications.

## 4.0 ENVIRONMENTAL AND SOCIAL ASSESSMENT PROCESS

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The ESMF would be used for incorporation of environmental and social safeguards in the planning, execution and operation stages of each sub-project activity. A step-by-step methodology has been provided that can be followed along with engineering and institutional interventions required for the sub-project activities.

### 4.1 Environmental and Social Screening

Various sub projects shall be appraised during the planning stage based on the step-by step process beginning with screening phase. The screening checklist will help categorize sub-projects based on the extent of adverse social and environmental impacts. The corrective actions and mitigation plans can be formulated according to the severity of the impacts identified during the planning stage.

The project will use a structured approach to environmental and social management to allow the project development process, follow the hierarchy of avoidance, minimization, compensation/mitigation for negative impacts and enhancement of positive impacts where practically feasible and advantageous. The overall process is depicted in a flow chart below:

Following sections describe what needs to be done at each stage of the overall project life – sub-project selection, design of the project supported interventions, implementation of the project activities, institutional mechanisms to support implementation, budgetary allocations to implement proposed mitigation measures and reporting on progress.

### 4.2 Screening and Environment and Social Due Diligence (ESDD)

This step will involve review of the available environmental and social information about the sub-project and its surrounding areas. It would help identify issues to be verified during reconnaissance site visits and also provide a preliminary idea regarding the nature, extent, and timing of environmental and social issues that would need to be handled during the subsequent stages. It will also help identify opportunities for avoidance and/or minimization of such issues early in the project cycle so that these could be appropriately addressed as part of the design process. The steps for environmental and social screening and due diligence to be followed for all the projects will as below:

- a) Confirm the presence of environmentally sensitive areas from secondary sources or Site reconnaissance.
- b) Verify the extent of applicability of GoI, and World Bank policies in sub-project activities

- c) Identify potential negative and positive impacts based on the project components, proposed activities and location of the project. Provide clarity on which issues need to be investigated more comprehensively during preparation of Environmental & Social Impact Assessment.

This should help with sequencing of sub-projects, and factoring in timelines like those associated with regulatory clearance processes into project implementation.

The process of preparing the environmental and social screening checklist and ESSD will typically cover:

- Describing the need for the project, i.e. the issues or problems to be addressed.
- Describing the proposed project or options.
- Identifying the potential environmental and social impacts of the projects or options.
- Undertaking a preliminary evaluation of the potential environmental and social impacts of the project or options.
- Consulting local officials on the project or options, and the potential impacts.
- Describing the preliminary consultation with relevant agencies and local community. The focus of these consultations would be informing the local community, reviewing the likely issues and problems.
- Selecting a preferred project option or short list of options. The appraisal of the available DPR / Feasibility study reports should be included from an environmental and social perspective.
- Identifying the planning approvals which are likely to be required from MOEFCC, SPCB and other regulatory agencies.
- Determining the type and scope of EIA study. ToR for an Environmental and Social Assessment Study of the preferred option or a short list of options.

The results of this step will help identify the scope of the ESA study and timeframe required for obtaining the regulatory clearances (if any). The environmental and social safeguard screening as well as ESDD shall occur during the project preparation stage as soon as the accurate site location is known for the sub-project. The formulation of the sub-project specific ToR shall be done based on the screening and ESDD outputs highlighting environmental and social components that require detailed assessment during the ESA stage. A generic ToR for ESIA study is attached in **Annexure-II** for similar sub-projects.

EIAs may take the form of Comprehensive EIAs or Rapid EIAs depending on whether the environmental and social impacts can be readily mitigated. Comprehensive EIAs generally

need to rely on data collected over a 12-month period whereas Rapid EIAs can rely on data collected in one season (other than the monsoon season) to facilitate a speedier assessment process.

Rapid EIAs are generally acceptable if the analysis of environmental and social impacts is sufficient for the purposes of selecting a preferred project option and determining appropriate measures for mitigating environmental and social impacts. The outcome of a Rapid EIA process will sometime determine if a Comprehensive EIA is required and, if this is likely, then it will often be more efficient to prepare a Comprehensive EIA from the outset. Having identified the probable adverse impacts, the next step shall involve quantification of the impacts and developing action plans to mitigate such adverse impacts.

The checklists that would help identify the screening components that need to be investigated in detail during the preliminary stages of evaluation or to conclude that insignificant adverse impacts are anticipated, are given in **Annexure III**.

Since there is limited prior experience of working on MW-scale Floating Solar PV (FSPV) plants, separate criteria have been developed to guide the deployment of this innovative technology within this project. These would be applied for selection, preparation, and implementation of FSPV sub-projects. These are included in **Annex IV**.

The ESDD and preparation of ESDD Report will inform SECI of environmental and social impediments that needs to be addressed while executing the project. The ESDDR will help prepare a/n preliminary/outline Environmental and Social Management Plan that will be part of bid document. This draft ESMP will be used by the EPC contractor who will be responsible for preparing a detailed ESMP based on ground truthing that will include mitigation measures, implementation and monitoring & reporting plan addressing all the issues identified.

The ESDDR shall comprise of (i) a description of the sub-project and its components (ii) an environmental and social profile of the sub-project areas and the proposed project facilities (iii) an Environmental and Social Screening and categorization of the sub-project as outlined in Environmental and Social Management Framework (iv) an analysis of environmental and social issues associated with the project and (v) Environmental and Social Management Plan (ESMP) outlining various management measures to be implemented by the contractor. The ESDDR will also help in determining if full ESIA is required or a detailed assessment of only specific aspects is required for a given sub-project at a later stage, in consultation with the World Bank.

SECI will primarily be responsible for the preparation of ESDDR and ESMP and overall management of their implementation.

The ESDDR along with ESMP shall be submitted to World Bank along with the DPR for review. The ESDDR and ESMP upon approval and prior to the initiation of the bid process, shall be disclosed locally and on the World Bank website.

The ESMP shall be included in the bid document, clearly outlining the responsibility for various safeguard management actions for the sub-project in line with its safeguard requirements as outlined ESDDR and ESMF.

### 4.3 Environmental and Social Impact Assessment

The ESIA is the most commonly used tool to ensure that environmental and social aspects are considered during decision making – by influencing design to prevent /minimize, and where unavoidable, mitigating the residual adverse impacts and/or enhancing positive impacts. It also provides a platform for getting views from stakeholders including the directly affected population to improve the design. Detailed guidance regarding the EIA/SIA contents is available in the OP4.01 /OP 4.12 of World Bank. The key steps in preparing the ESIA would involve:

- a) Defining the scope in line with the already completed screening, and the Operational Policies of the World Bank. The template ToR provided in **Annexure-II** shall act as a guidance document.
- b) Obtaining information from primary or secondary sources regarding the current conditions of environmental and social features within the influence area of the sub-project. Generally, the impact zone for environmental impacts is considered as 10 km buffer along the proposed site whereas for the social impacts, it is considered up to 2 km buffer along the proposed site or even lesser depending upon the location of PAP/ settlements / land parcels that are likely to be impacted due to the project either directly

or indirectly. The environmental impacts zone for renewable energy generation projects could also be much less than 10 km in majority of the sub-projects.

- c) Carrying out effective stakeholder consultation along the proposed sub-project impact zone will be critical to identifying any social, cultural, gender specific and indigenous community concerns/issues. This shall also include landless labourers / marginalized communities whose livelihood may be impacted due to sub-project.
- d) Identifying feasible alternatives for proposed layout changes, use of alternative technologies etc. in close collaboration with the project design team.
- e) Identifying and estimating quantitatively (to the extent possible), key impacts and classify these for ease of understanding and determination of significance (by severity, duration, project phase, etc.)
- f) Selecting measures that can help manage these impacts in cost effective manner – reduce the negative ones; and enhance positive ones and estimate the residual impacts, including those that may need further study.
- g) Clarifying the institutional arrangements, any capacity building needs, and resource requirements including grievance redress mechanism and budget as part of the preparation of environmental and social management plan.

The following will be the outline contents for each ESIA under the project:

- i. Executive Summary
- ii. Project Description
- iii. Policy, Legal and Institutional Framework
- iv. Current (Baseline) Environmental & Social Status
- v. Potential Environmental & Social Impacts
- vi. Analysis of Alternatives
- vii. Stakeholder Consultations, including Community Consultations / Public Disclosure
- viii. Environmental & Social Management Plan (including additional studies, if any)
- ix. Grievance Redressal Mechanism
- x. RAP / IPDP (if required) depending upon the likely R&R impacts else would be addressed under the EMP document.
- xi. Recommendations and Conclusion
- xii. Annexes (including data sources, List of EIA preparers, consultation details, etc.)

#### 4.4 Environmental & Social Baseline Information

The process of preparing the environmental and social screening checklist and scoping will typically cover:

Describing the need for the project

Describing the proposed project or options.

Identification of the issues or problems to be addressed.

Identifying the potential environmental and social impacts of the projects or options.

Consulting local officials on the project or options, and the potential impacts.

Preliminary consultation with relevant agencies and local community to assess the gravity of these issues and impacts from the perspective of the stakeholders. The focus of these consultations would be to inform the local community, reviewing the likely issues and problems.

Undertaking a preliminary evaluation of the potential environmental and social impacts of the project or options.

Selecting a preferred project option or short list of options. (The appraisal of the available DPR / Feasibility study reports should be included from an environmental and social perspective).

Identifying the regulatory approvals required from MOEFCC, CPCB, SPCB and other regulatory agencies.

Determining the type and scope of EIA study. Developing terms of reference (ToR) for an Environmental and Social Assessment Study of the preferred option or a short list of options.

While more extensive data is likely to be required for ESIs, some data on baseline conditions (mostly secondary sources) will generally be required for screening to compare the environmental and social impacts of project options and to assess the extent of any environmental and social impacts.

The robustness of screening will often be dependent on the quality of data on baseline conditions and the assessment of projects induced environmental and social impacts. The assessment of baseline conditions should take into account:

Past trends in environmental and social quality

Community preferences and competing demands for resources Other

current or proposed development programs in the project area.



Good maps are generally required to indicate the spatial relationship between the sources and recipients of the environmental and social impacts. Google Earth and other open source satellite imagery data can also be very useful in identification and indicating changes in land use and other environmental features. Following are the essential maps:

A map specifying the location coordinates of the proposed sub project

A study area map indicating features such as locations of human settlements, locations of other wind farm / solar farms and its distances, other neighbourhood industries with details, if any

Schematic layout of the project showing the position of wind turbine / array of solar panels including spacing between the row and perpendicular distance between two turbines/ solar panel modules.

A layout map showing access road, internal access roads, underground cable, substation and switchyard and additional structures including all utilities.

A map specifying the land use patterns / drainage / topography of the project site and study area.

A map marking the sensitive zones in the study area, such as national parks and sanctuaries, forests, defence installations, international border, protected areas, and airports (if applicable).

#### **4.5 Probable Impacts**

Environmental and social impact analysis of a project (or project options) consists of comparing the expected changes in the biophysical and socioeconomic environment with and without the project. For each potential environmental or social impact, the analysis should predict the nature and significance of the expected impacts or explain why no significant impact is anticipated.

Based on the information available for the selected case studies / sub-projects for the development of ESMF, key environmental issues / impacts identified that would require detailed investigations during the ESA stage are listed below. A summary of the issues and potential impacts is presented in the following paragraphs to guide preparation of sub-project ESIA and ESMPs.

##### **(a) Impacts on Natural Physical Environment**

The proposed Renewable Energy projects will require excavations for laying foundation, water for construction and operation stage, area for storage of spare parts/ equipment etc. The

physical environment would be used differently at construction and operation stages.

The site climatic conditions are an integral part of the impact assessment, where the resource used for the project purpose will be used judiciously and conserving, replenishing techniques for these resources would be at utmost priority. The ESA study should provide a detailed assessment for all the resources required for the project.

#### **(b) Impacts on Biological Environment**

Wherever forest land is acquired for Renewable Energy projects would require the appropriate clearance procedures to be adopted for conversion of land use / compensatory land allocation.

There is a high probability that these projects are likely to come up in remote / barren land parcels with minimal tree cover. The protection of existing tree cover is crucial in such areas and should not lead to removal of trees. This may lead to increased dust in these areas. Minimum alteration to existing ground cover in such sites is a chosen strategy. In case of Wind power plants, the probability of high wind density falls under forest land with heavy tree coverage, all necessary precautions for safety buffer etc. should be considered while planning such power generation facilities.

The proposed Renewable Energy Projects should be completely contained entities with controlled access thereby minimizing the risks of wild animals getting impacted in all aspects. The ESA study shall establish the wildlife species movement corridors/ paths/ habitat if any applicable in and around the proposed site. The ESA study shall establish the status of wildlife in vicinity of the proposed site and adequate mitigation measures to ensure no conflicts / poaching occurs during the various stage of project development.

There will not be any anticipated impacts on the ambient noise levels and air quality due to the proposed solar, wind and hybrid solar-wind projects. The proposed sub project is likely to have minimal short term adverse impacts due to increased noise levels during the construction phase.

#### **(c) Impacts on Visual Environment**

The concern for the impact on visual environment is predominant in wind power projects where the height of the wind turbine is often found to be at a 50meter, 80meter or 100meter height. The movement of the wind turbine and the motion at which it moves can be harmful for the exposed sensitive receptors. The preferable locations for most of the high-density wind areas are in the hilly regions or forested land, thus a higher probability of blocking or hampering scenic value of the place.

#### **(d) Impacts on the settlement Infrastructure**

Based on the reviews and the studies for renewable energy power sector, the disruption/change in the built infrastructure environment (roads, sewage system, water supply,

solid waste disposal etc.) does affect the settlements in its surroundings. This is an often occurrence because the infrastructure is made available for the power plants by compromising/changing the existing fabric of the area.

#### **(e) Impacts on Land/water Form**

The proposed innovative RE projects will require water for construction and operation stage. The water for construction stage would be a one-time requirement whereas the requirement of water during the operations stage would be a continuous one.

Most of the proposed sub-projects would be in remote areas with arid conditions and scarcity of water generally. The ESA study should provide a detailed assessment of the water requirements during the operations phase along with an adequate assessment of the existing available water resources.

For floating solar projects, the impact on aquatic bodies is yet unknown and needs to be investigated in detail. Presently no major floating solar power projects have been built nationwide. However, in future if SECI is to develop a floating solar power plant then a separate project specific ESIA study shall be undertaken

#### **(f) Impacts on Private Land, Livelihood and Human Environment**

Based on the review of sample projects, each MW of solar power requires 5 acres of land and a typical footprint (direct surface area of impact which last the life of the facility) for a single WTG of 1.5 MW / 2 MW is calculated based on the size of the blade lengths. For a 40 meter to 45-meter blade length, an area of approximately 100 meters by 100 meters (1 hectare) is required. This includes the area occupied by the wind turbine pads, sub stations, service buildings and other supporting infrastructure facilities. An area of approximately 1 Ha (100 meters x 100 meters) is acquired for setting up a single unit WTG (1.5MW). Additionally, there is a radius of restriction which is calculated as (tower height plus (+) 0.5 times the blade diameter) wherein there are height restrictions for buildings / vegetation to ensure safety of the WTG.

The review of sample projects indicates potential land acquisition for the park area and associate facilities. In these sample projects land was either taken on lease (Pavagada) or was directly purchased (Rewa / Mandsaur) on willing buyer willing seller basis. The sample projects visited however, indicates very little encroachment on site thus impact on non-titleholders will be minimum. The land identified is largely owned by the government or are assigned land. The review identified following social impacts:

- Loss of agricultural land in case of private land acquisition, although in most cases agriculture is season as it is primarily rainfed;
- Loss of livelihood due to impacts on sources of earning;

- Impact on natural drainage leading to loss of water in downstream areas
- Probable loss of common property resources such as religious places and cremation ground;
- Impact on host community due to influx of construction workers.

The proposed projects would be fully fenced entities wherein access would be restricted. The proposed site may include tracks /pathways which are frequently used by the local villagers while performing their day-to-day activities. Such tracks need to be clearly identified during the ESA stage in consultation with the local stakeholders so that the same can be included into the project layout plan or alternative route / tracks may be identified if it is unavoidable.

#### **(g) Impact of labour Influx**

At the peak of construction, it is expected that 500 labourers will be working at the site. The influx of workforce will put additional pressure on existing resources. The workforce normally consists of solitary migrant males and that can be potential risk for host population. Specifically, influx of labour force can lead to:

- a) Risk of conflict and social unrest due to cultural differences between the labourers and local community
- b) Risk of spread of communicable diseases due to interaction of the labourers and the local community
- c) Risk of gender-based violence
- d) Health hazard for host community due to lack of sanitation facilities and waste management.

A summary of the likely issues and potential impacts & mitigation measures is presented in the table 4.1 below.

**Table 4-1: Summary of potential impacts and proposed mitigation measures**

<b>S. No.</b>	<b>Activity</b>	<b>Potential Environmental &amp; Social Impacts</b>	<b>Proposed Mitigation</b>
1	Pre-Construction Stage	Loss of land / and other physical assets	Carrying out analysis of alternatives to avoid / minimize involuntary taking of land and other physical assets.

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			Compensation as per applicable laws/ regulations & guidelines
		Loss of livelihood	Preferable employment with developer Alternative livelihood options and training for skill enhancement CSR activities may be undertaken by developer to ensure alternative livelihood opportunities
		Loss of Access rights	Thorough analysis of alternatives that access enjoyed by the community remains intact may be ensured. In case of unavoidable circumstances, alternative access shall be provided.
		Loss of Common property resources	To the extent possible will be avoided Impacted CPR's will be replaced by the project.
		Transmission line alignment	To the extent possible settlement area; places of social, cultural and historical importance; and productive agricultural land through analysis of alternatives may be avoided. Loss of land under towers and ROW to be mitigated as per the guidelines of Ministry of Power.
2	Site Preparation	Soil Erosion; Alteration of natural drainage	Construction facilities may be placed 500 meters from water bodies,

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			<p>The natural water way should not be blocked.</p> <p>Minimize cut &amp; fill operations, the site clearing and grubbing operations should be limited to specific locations only.</p> <p>Any disruption of socially sensitive areas with regard to human habitation and areas of cultural significance will be avoided.</p> <p>The existing slope and natural drainage pattern on the site should not be altered.</p> <p>If trees on private lands are felled or damaged during construction operations, compensation shall be paid to the owner as determined by the forest/horticulture departments.</p> <p>The contractor shall ensure that site preparation activities do not lead to disruption of activities of the local residents.</p>
3	Construction Activity	Noise from construction works	<p>Construction activity shall be restricted to daytime as far as possible to avoid disturbance to surrounding areas.</p> <p>Wherever required, personal protective equipment such as ear plugs, earmuffs, helmets etc. should be provided to the persons working in high risk areas.</p>
		Dust	<p>Construction machinery shall be properly maintained to minimize exhaust emissions of CO, SPM and hydrocarbons.</p>

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			<p>Dust generated as a result of clearing, levelling and site grading operations shall be suppressed using water sprinklers.</p> <p>Dust generation due to vehicle movement on haul roads / access roads shall be controlled through regular watersprinkling.</p>
		Labour influx and Safety Issues	<p>Prevent entry of unauthorized personnel and proper storage and control of hazardous materials on site.</p> <p>Labour management plan to be prepared by contractor and shared with client</p> <p>Labour camps to be set up as per ESMP</p> <p>The site shall be secured by fencing and manned at entry points</p>
4	Laying of transmission lines	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites
5	Water for Construction	Conflicts with existing users due to scarcity of resource base.	<p>A detailed assessment of the available resources and consent of the local panchayat for withdrawal of water from existing surface water sources shall be taken.</p> <p>If ground water is withdrawn, adequate approvals from the GWB / SPCB department need to be undertaken before setting up bore wells.</p>

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
6	Road safety and traffic management plan	Increase in road accidents	<p>The movement of heavy machinery and equipment shall be restricted to defined routes.</p> <p>Proper signage to be displayed at major junctions.</p> <p>Road diversions and closures to be informed well in advance to the local residents.</p> <p>Vehicular movement to be controlled near sensitive locations viz. schools, colleges, hospitals identified along designated vehicular transportation routes.</p>
7	Base Camp Construction Activity – Labour Camp Management	Conflicts with the local residents	<p>Alternate arrangement for cooking fuel, heating and cooking should be made to meet cooking fuel requirement of the labour</p> <p>Work force should be prohibited from disturbing the flora, fauna including hunting of animals, Wildlife hunting, poaching and tree felling.</p> <p>Adequate facilities ensuring sanitation for labour camps. Contractor will arrange for separate toilets for men and women.</p> <p>Treated Water will be made available at Site for Labour drinking purpose.</p> <p>Adequate accommodation arrangements for labour. For women labourers and labours with family, contractor will provide for separate family.</p>



S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			<p>Awareness generation among migrant labours on gender-based violence; HIV/AIDS; etc.</p> <p>The contractor and labourers will sign code of conduct by contractors and workers to maintain good manners with the community and avoid GBV;</p> <p>Project will undertake awareness raising program for the workers and community on the risk of labour influx; and</p> <p>To the extent possible, local workforce will be engaged to minimize the influx of workers</p>
8	Occupational Health and Safety for Workers	Accident risk and deterioration of health of workers due to exposure with pollution, chemicals, etc.	<p>The Contractor will provide adequate good quality Personal Protective Equipment (PPE) to all the workers working at construction zones and Plant sites and will ensure that these PPEs are used by workers at all time during works.</p> <p>The Contractor will comply with the workers safety requirements as per the statutory norms and Environmental, Health, and Safety (EHS), Guidelines of the World Bank, April, 2007 to maintain workers safety during construction.</p> <p>The Contractor will provide regular safety training to their workers about the accident hazards and risk related to specific works and preventive measures for avoiding accidents at site</p>

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			<p>The Contractor will develop emergency response system to handle accidents</p> <p>Adequate drainage, sanitation and waste disposal will be provided at workplaces.</p> <p>Proper drainage will be maintained around sites to avoid water logging leading to various diseases</p> <p>Adequate sanitation and waste disposal facilities will be provided at construction camps by means of septic tanks, soakage pits etc.</p> <p>A healthcare system will be maintained at construction camp for routine check-up of workers and avoidance of spread of any communicable disease</p> <p>Readily available First-Aid kit bearing all necessary first aid items will be proved at all the work sites and should be regularly maintained.</p> <p>Contractor will organize health check-up camps related to occupational health at least once in six months</p> <p>The Contractor will organize awareness program on HIV aids and sexually transmitted diseases (STDs) for workers on periodic basis</p>
8	Waste Management	Land and water pollution due to indiscriminate waste	<p>Preparation of a waste management plan covering the following aspects:</p> <p>Construction and commissioning of projects</p>

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
		disposal	<p>Temporary accommodation facilities for labour</p> <p>Waste generation from equipment maintenance / vehicles on-site.</p> <p>The scrap material generated from erection of structures and related construction activities will be collected and stored separately in a stack yard and sold to local recyclers.</p> <p>Hazardous waste viz. waste oil etc. will be collected and stored in paved and bounded area and subsequently sold to authorized recyclers.</p> <p>Applicability of the Hazardous Waste Management Rules</p>
Operation Stage			
1	Generation of Used oil from Turbine maintenance and Transformer oil	Soil pollution and Water pollution	<p>Used oil to be securely stored in appropriate containers over impervious platform and sold only to authorized vendors by State Pollution Control Board.</p> <p>Catch drains to be provided around the storage platform to arrest accidental spillage of oil</p> <p>Transformer oil to be replaced and returned by the supplier of transformers</p> <p>Log book for storage and disposal of such oils to be maintained</p>
2	Operation of wind turbine	Collison of Birds due to wind turbine	Standard practice on turbine blades shall be considered to enhance visibility.

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			<p>Marking overhead cables and transmission poles using deflectors and avoiding use of areas of high bird concentrations, especially for species vulnerable to collision.</p> <p>Where possible, installing transmission cables underground in accordance with existing best practice guidelines for underground cable installation. Otherwise if possible, install overhead cables with proper insulation to avoid bat and bird electrocution through body touch. Install bird deflectors on overhead transmission cables at selected points wherever possible.</p> <p>The illumination within the project area should be bare minimum and be within the acceptable limits, particularly during night hours. This will help in undisturbed activities of nocturnal species like rodents, bats and owls.</p> <p>Some bird reflectors can be fitted at relevant places to divert low-medium and medium-high flying bird species during day time.</p> <p>Feasibility of fixing of bird deflector on the turbine to avoid perching of birds near blades can be worked out, especially raptor species which prefer to perch at higher points.</p> <p>An Avifaunal Expert to be appointed during operation stage for assessment of</p>

S. No.	Activity	Potential Environmental & Social Impacts	Proposed Mitigation
			incidence of bird collision and train the staff at site to address the incidents of bird hit / injury.
		Man, Animal Conflict	<p>Removal of bushes, tree, shrubs beyond the project limit to be strictly prohibited</p> <p>The site area to be properly fenced to avoid entry of wild animals within the project compound</p> <p>In case wild animals are recorded in close vicinity or within the project site, the same should be recorded and reported to the wildlife department to take suggestions for further measures</p> <p>Awareness development among the employees to conserve</p> <p>/ protect the ecosystem</p> <p>Fire protection measures to be provided at site to avoid any fire due to project</p>
3	Cleaning of solar panel	Wastage of water Generation of waste water	<p>The use of water to be minimized through recycling of used of water for cleaning</p> <p>The waste water to be properly channelized through drains and stored in settling tank</p> <p>The unusable water can be utilized for irrigation purpose in landscaping or in neighbouring agriculture field.</p> <p>Rainwater harvesting facilities will be provided at site to collect the rainwater which</p>

			should be utilized for ground water recharging and storing for cleaning purpose
<b>4</b>	<b>Handling and management of Battery Energy Storage System</b>	<p>Land contamination</p> <p>Water Contamination</p> <p>Health Hazards due to random disposal of Battery wastes and E-wastes</p>	<p>All the non-functional batteries to be stored in a safe place following the norms stipulated in the batteries (Management and Handling) Rules, 2001. The waste batteries to be handed over to the authorised vendors/recyclers.</p> <p>A record of such practices to be maintained at site office.</p> <p>All the electronic wastes should be disposed of as per E-waste (Management) Rules, 2016.</p> <p>All the safety precautions in storage, handling and disposal of battery energy storage systems will be adopted as per safety code of World Bank, which is enclosed as Annexure.</p>
<b>Operational Stage TL</b>			
<b>1</b>	Location of transmission towers and transmission line alignment and design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.
<b>2</b>	Oil spillage	Contamination of land / nearby water bodies	Substation transformers located within secure and impervious sump areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks

3	Inadequate Provision of staff/workers health and safety during operations	Injury and sickness of staff / workers	Careful design using appropriate technologies to minimize hazards  Safety awareness raising for staff  Preparation of fire emergency action plan and training given to staff on implementing emergency action plan
4	Electric shock hazards	Injury / mortality to staff and public	Careful design using appropriate technologies to minimize hazards Regular monitoring of faults and immediate repair/ replacement of damaged wires/ towers  Issue of warning to the local public regarding the malfunctioning and scheduling of repairs/replacement  Barriers to prevent climbing on /dismantling of transmission towers  Appropriate warning signs on facilities  Electricity safety awareness raising in project areas
5	Transmission line maintenance	Exposure to electromagnetic interference	Transmission line design to comply with the limits of electromagnetic interference overhead power lines

#### 4.6 Environmental & Social Management Plan

A generic Environmental & Social Management Plan (ESMP) is presented here is focused on implementation stage. It ensures that the project impacts are minimized to an acceptable level during implementation of the sub-project. Thus, ESMP becomes the document for ensuring that all the preceding analysis is used to preserve/improve overall environmental quality within the influence area of the project.

The ESMP is generic in nature though the probable impacts and mitigation measures is based

on issues identified from the sample projects. The ESMP describes the probable adverse impacts, selected management measures to bring it to an acceptable level and timelines for implementing these measures. It also clarifies roles and responsibilities among the various stakeholders including developer, contractors, etc. A sub project specific ESMP will be prepared once sub projects are identified and that has to be integrated with the bidding document. The building blocks of an ESMP are:

- Potential adverse impacts identified and mitigation measures to be adopted, together with conditions within which one or other measure would apply and their integration with phases – Pre-construction, Construction/ Implementation and Operation;
- Enhancement plans for positive impacts;
- Monitoring Plan with indicators, mechanisms, frequency, locations;
- Budgetary allocations for all the above activities;
- Institutional arrangements for each activity and mitigation measures;
- Implementation schedules for each activity and its integration with the sub-project implementation timelines;
- Reporting procedures, including for redressing grievances related to environmental and social issues;

The site specific EMP would need to be prepared for specific sub-projects as and when identified based on ESIA. An EMP document should include:

- Lists of all project related activities and impacts, for each stage of the development of Projects, i.e., for the design, construction and maintenance stages;
- A list of regulatory agencies involved and their responsibilities;
- Specific remedial and monitoring measures proposed for each stage;
- A clear reporting schedule, including discussion of what to submit, to whom, and when;
- Cost estimates and sources of funding for both one-off costs and recurring expenses for implementation of the EMPs.

ESMP shall deal with the construction and operations stage of the sub-project. The extent and timing of mitigation actions should be based on the significance of the predicted impacts. Some mitigation measures can be incorporated into the design of the project and can largely resolve the potential impacts of a project, e.g., drainage, access roads. Other measures require an on-going implementation plan to ensure that proposed actions are carried out at the correct times, that environmental measures such as slope protection are maintained, and that prompt remedial actions are taken when the initial measures are not fully effective.



Based on the project components and the associated activities the environmental impacts on various environmental components have been identified for such project and the generic environmental and social management plan (ESMP) has been developed which is presented at **Annexure V**.

**Annexure VI** gives the Selection criteria of sub projects based on environmental parameters

#### 4.7 Stakeholder Consultations

Stakeholder consultations are integral to development projects and need to be carried out all through the project life. These are an effective way to communicate about the priorities for both the SECI and the stakeholders should be used extensively as the project progresses. These consultations can provide insights that may elude designers and help unravel inexplicable responses to proposals effectively. Ensuring an open and transparent information exchange right from start is a key ingredient of successful project implementation. Recognizing this, SECI has begun consultations right from the start of the project.

Consultations with stakeholders across the spectrum are needed early and continuously in the project. The identified stakeholders include project affected people-with an emphasis on disadvantaged groups, youth, local NGOs, private sectors, local leaders, officials from other state government departments. Some sub projects may have special groups that may need to be sensitively handled like Scheduled Tribes and Castes. SECI should be geared up to carry out consultations from the Identification stage, through project planning and design, as well as during implementation.

At the identification stage of any sub project, the general public in the area would be informed regarding the possible sub-project interventions and feedback would be sought on the overall picture. This will also help the scoping of the EIA since the local information regarding environmental aspects may be more robust and relevant for identifying key issues.

Second round would start once iteration has happened with design response to the first round of inputs from stakeholders. There should be clarity regarding what is accepted, what is not accepted for consideration for integration with project design. There should be clear and convincing reasons for each choice made to maintain the integrity and sanctity of the process and to nurture trust among the stakeholders.

Where mandatory consultations are required, such as Public Hearing for clearance under the EIA notification, these would be led by the respective authorities and SECI would provide its full support. On other occasions, SECI would be in-charge and would seek to ensure that the

consultations are useful to the affected groups, are non-discriminatory by social status, and supplemented with timely and relevant information.

These consultations would:

- Make SECI aware of community needs and preferences for its sub-projects
- Identify what park design work best and have minimum adverse impact on the stakeholder resources; site identification is key for minimizing adverse impacts.
- Identify mitigation measures for adverse impacts and enhancement of positive impacts informing the selection of the measures in the EMP
- Identify any opportunities to involve local stakeholders in subsequent project activities, including providing feedback
- Disseminate information regarding avenues available for redressing grievances, including those about environmental quality.

#### **4.8 Budget**

Each sub-project will have its own budget to cover the EMP costs relating to mitigation measures, enhancements, wherever included in the plan, and monitoring costs. In addition, training and capacity building costs need to be added for specific issues that EIA and EMPs may bring out. For instance, there may be a need to have short courses on specific topics, experience exchanges on common issues, and so on.

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## 5.0 ENVIRONMENT AND SOCIAL MANAGEMENT FRAMEWORK:

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### 5.1 Social Management Framework

Social Management Framework (SMF) will help to identify and address the potential social concerns or impacts of a project throughout the project cycle. The objective of SMF is to help project in taking informed decisions and mainstream social concerns in the project design.

#### 5.1.1 Need for Social Management Framework

Since specific sub project identification is in progress, the exact nature and scale of their impacts will be known later. Therefore, a social management framework (SMF) document is prepared to 'guide' the planning and design elements of the sub project activities. Such a guidance document or a framework would help in integrating and harmonizing the social management principles at the various stages of project preparation and execution.

This SMF forms part of the comprehensive social management approach that has been adopted for addressing the potential social impacts of the project. As said above, specific impacts will only be identified during the project preparation. This SMF defines (a) the approach for identifying the social issues associated with the project, (b) the requirements for conducting social screening and social assessment studies, and (c) measures to prevent, mitigate and manage adverse impacts and enhance positive ones. This SMF includes a simplified screening checklist, which will be used to determine the degree of social assessment. Based on screening results, Social Impact Assessment (SIA) will be carried out and Resettlement Action Plan (RAP) and Indigenous Peoples Development Plan (IPD) for specific initiatives will be prepared if required. This SMF includes a resettlement policy framework describing mechanisms for addressing the possible loss of land, livelihood, sources of livelihood, temporary disruption of services and income, and temporary restrictions on access to facilities while the construction work is ongoing in the project area. The SMF includes guidance on preparing of indigenous peoples development plan, gender action plan; consultation mechanism; capacity building measures and a monitoring mechanism.

#### 5.1.2 Objectives of Social Management Framework

The SMF seeks to:

- Establish clear procedures and methodologies for screening, reviewing and managing social issues.
- Consolidate and facilitate understanding of all essential policies and regulations of the GOI; GOUP as well as the World Bank's social safeguards regime that are applicable

to the Project

- Provide guidance on preparing mitigation plans for adverse impacts and implementation of the environmental and social management measures.
- Specify institutional arrangements, including appropriate roles and responsibilities for managing, reporting and monitoring social concerns.
- Provide a framework for consultation and information disclosure.
- Determine the other institutional requirements, including those related to training and capacity building, needed to successfully implement the provisions of the SMF.

The application and implementation of the SMF therefore, will:

- Support the integration of social aspects into the decision-making process at all stages related to planning and design by identifying, avoiding and/or minimizing adverse social impacts early-on in the project cycle.
- Enhance the positive/sustainable social outcomes through improved/appropriate planning, design and implementation.
- Build the capacity of SECI to take-up and coordinate responsibilities related to the application and implementation of the SMF, including preparation of Social Assessment and Management Plans (if required).
- Provide guidelines and procedures for further consultations during project implementation.
- Provide a systematic guidance to address potential risks and to enhance quality, targeting, and benefits to the neighbouring communities.
- Ensure that stakeholders, irrespective of whether they benefit from or are adversely affected by the project interventions, are well informed and are able participate in the decision-making process.
- Support compliance with applicable legal/regulatory requirements of GOI and state governments; as well as with the requirements set forth in the relevant Bank policies.
- Minimize adverse impacts on cultural property and other common property resources.

This social management framework includes (i) Resettlement Policy Framework; (ii) Indigenous Peoples Planning Framework (IPPF); (iii) Gender Assessment and Development Framework (GAD); and (iv) Consultation framework.

### 5.1.3 Social Assessment Process

The SA begins with the screening and identification of social issues and stakeholders and communities, including socially and economically disadvantaged communities, for each subproject. The SA focuses on (i) Identification of key social issues associated with the proposed subproject and specify the social development outcomes; and (ii) prepare based on available data the profile of the population and available infrastructure facilities for services (disaggregated by gender, ethnicity, vulnerable groups, socially and economically backward communities, youth and aged, economic aspects, etc.) in the project affected area.

#### (i) Social Screening Process

Screening is the first step in the SMF process. The purpose of screening is to get an overview of the nature, scale and magnitude of the issues in order to determine the need for conducting Social Impact Assessment (SIA) and preparing Resettlement Action Plan (RAP). Once issues are identified, the applicability of the Bank's environment and social safeguard policies will be established along with Government of India's and state government's regulatory requirements. Based on this, boundaries and focus areas for the SIA along with the use of specific instruments will be determined.

The outcome of the screening process will help prioritize the sub project and where required, start the social mitigation process in a timely manner. This will also assist in sequencing /phasing sub projects in overall project implementation. This shall help ensure that no sub-projects are dropped merely due to delay in the clearance procedures / land requirement. The social screening checklist is given in **Annexure VII**.

#### (ii) Establishing Impacts

Having identified the potential impacts of the relevant sub-projects, action plans to mitigate the impacts will be developed. This will require detailed social impact assessment. The Project Authority will undertake a survey for identification of the persons and their families likely to be affected by the project. Every survey shall contain the following municipality / ward or village-wise information of, the project affected families:

- Members of families who are residing, practicing cultivation, any trade, or any other vocation in the project affected area;
- Project Affected Families who are likely to lose their house, commercial establishment, agricultural land, employment or are alienated wholly or substantially from the main source of their trade occupation or vocation or losing any other immovable property.
- Agricultural labourers and non-agriculture labourers.

- Losing access to private property or common property resources
- Loss of common property resources

The project on completion of the survey will disseminate the survey results among the affected community. Based on the social impact assessment survey, will prepare an action plan to mitigate or minimize the adverse impacts as identified during the survey. The draft mitigation plan in form of resettlement action plan (RAP) will be again disseminated among the affected individuals / community. The feedback received from the affected groups will be incorporated to the extent possible before finalization of the RAP.

### (iii) Sub-Project Approval

In the event that a subproject involves land acquisition against compensation or loss of livelihood or shelter, project shall:

- not approve the subproject until a satisfactory RAP has been prepared and shared with the affected person and the local community; and
- not allow works to start until the compensation and assistance has been made available in accordance with the framework.

### (iv) Stakeholder Consultations

Stakeholder consultations are integral to development projects and need to be carried out all through the project life. These are an effective way to communicate about the priorities for both the SECI and the stakeholders should be used extensively as the project progresses. These consultations can provide insights that may elude designers and help unravel inexplicable responses to proposals effectively. Ensuring an open and transparent information exchange right from start is a key ingredient of successful project implementation. Recognizing this, SECI has begun consultations right from the start of the project.

Since this is a category A project, consultations with stakeholders across the spectrum are needed early and continuously in the project. The identified stakeholders include project affected people-with an emphasis on disadvantaged groups, youth, local NGOs, private sectors, local leaders, officials from other state government departments. Some sub projects may have special groups that may need to be sensitively handled like Scheduled Tribes and Castes. SECI should be geared up to carry out consultations from the Identification stage, through project planning and design, as well as during implementation.

At the identification stage of any sub project, the general public in the area would be informed regarding the possible sub-project interventions and feedback would be sought on the overall

picture.

Second round would start once iteration has happened with design response to the first round of inputs from stakeholders. There should be clarity regarding what is accepted, what is not accepted for consideration for integration with project design. There should be clear and convincing reasons for each choice made to maintain the integrity and sanctity of the process and to nurture trust among the stakeholders.

These consultations would:

- Make SECI aware of community needs and preferences for its sub-projects,
- Identify what park design work best and have minimum adverse impact on the stakeholder resources; site identification is key for minimizing adverse impacts.
- Identify mitigation measures for adverse impacts and enhancement of positive impacts informing the selection of the measures in the EMP
- Identify any opportunities to involve local stakeholders in subsequent project activities, including providing feedback
- Disseminate information regarding avenues available for redressing grievances, including those about environmental quality.

## 5.2 Resettlement Policy Framework (RPF)

Since sub projects are not known, RPF will help in conducting SIA and preparation of RAP. The project specific policy has been developed based on the Right to Fair Compensation and transparency in land Acquisition, Rehabilitation and Resettlement (RFCTLARR) Act, 2013 and subsequent supplements by state governments and World Bank Operational Policy 4.12 on involuntary resettlement.

Both the RFCTLARR Act 2013 and the World Bank Operation Policy on involuntary resettlement aim to ensure that involuntary resettlement should be avoided or minimized, wherever feasible, exploring all viable alternative project designs, and where displacement is unavoidable, people losing assets, livelihood or other resources shall be assisted in improving or at a minimum regaining their former status of living at no cost to themselves.

Also, World Bank safeguards policy requires consultation with PAPs during planning and implementation of resettlement action plan and tribal development plan and public disclosure of drafts. Once the draft is prepared it is to be made available at a place accessible to, and in a form, manner and language understandable to the displaced or affected people and local NGOs. Based on the detailed comparative analysis of RFCTLARR Act 2013 and the World

Bank Operation Policy on involuntary resettlement, **key differences** identified and addressed under the Resettlement Policy Framework (RPF) are listed in **Annexure VIII**.

### 5.2.1 Broad Principles

The Policy aims to resettle and rehabilitate the affected persons on account of its sub-projects in a manner that they do not suffer from adverse impacts and shall improve or at-least retain their previous standard of living, earning capacity and production levels. It is also the endeavour of SECI that the resettlement shall minimize dependency and be sustainable socially, economically and institutionally. Special attention will be paid for the improvement of living standards of marginalized and vulnerable groups. This policy recognizes that involuntary resettlement dismantles a previous production System and a way of life, all such rehabilitation programs will adopt a developmental approach rather than the welfare approach. These guidelines detail out the assistance in re-establishing the homes and livelihoods of the Project Affected People (PAP) during the course of projects.

- a) All information related to resettlement preparation and implementation will be disclosed to all concerned, and community participation will be ensured in planning and implementation.
- b) The principles of mutual consent and negotiated settlement will also be used for land acquisition as required.
- c) The persons affected by the project who do not own land or other properties but who have economic interest or lose their livelihoods will be assisted as per the broad principles brought out in this policy.
- d) Before taking possession of the acquired lands and properties, compensation and R&R assistance will be made to those who are available and willing to receive the entitlements in accordance with this policy.
- e) There would be no/minimum adverse social, economic and environmental effects of displacement on the host communities, but if needed, specific measures would be provided.
- f) Broad entitlement framework of different categories of project-affected people has been assessed and is given in the entitlement matrix. Provision will be kept in the budget. However, anyone moving into the project area after the cut-off date will not be entitled to assistance.
- g) Three-tier appropriate grievance redressal mechanism would be established at project level to ensure speedy resolution of disputes.
- h) All activities related to resettlement planning, implementation, and monitoring would



ensure involvement of women. Efforts will also be made to ensure that vulnerable groups are included.

- i) All consultations with PAPs shall be documented. Consultations will continue during the implementation of resettlement and rehabilitation works.
- j) As required, a Resettlement Action Plan will be prepared including a fully itemized budget and an implementation schedule.

The broad principles of the Resettlement and Rehabilitation (R&R) policy are as given below;

- All negative impacts including displacement should be avoided/ minimized wherever feasible by exploring all viable alternative project designs.
- Where negative impacts are unavoidable, efforts should be made either to improve the standard of living of the affected persons or at least assist them in restoring their previous standard of living at no additional cost to them. Support will be extended under the broad principles of this policy to meet the replacement value of the assets and loss of livelihood.
- Ensure peoples' participation during the course of the project cycle.
- Effort should be made towards the enhancement of the positive impact of the projects.
- The policy further recognizes extension of support to non-titleholders for the loss of livelihood and replacement value for assets other than land.
- The common property resources will be replaced as far as feasible and if not, then assistance will be provided at replacement value to the group.
- The implementation of solar projects would involve transportation of equipment during the installation phase and all efforts will be made during implementation to minimize any disturbance in the daily activities of the local people.
- Before taking possession of the acquired lands and properties, all compensation, resettlement and rehabilitation would be made in accordance with this policy.
- In case of displacement, resettlement sites will be developed as part of the project. In such circumstances care should be taken so that there is no/or minimum adverse social, economic and environmental effects of displacement on the host communities and specific measures would be provided in the Resettlement and Rehabilitation Action Plan (RAP) to mitigate any such impacts. Before taking possession of acquired land, sufficient time would be provided to harvest standing crop (if any).
- The implementation of the R&R Action Plan will be synchronized with the execution of

works under the project.

### 5.2.2 Definitions

The following definitions are used in the RPF:

**Cut-off Date:** In the cases of land acquisition affecting legal titleholders, the cut-off date would be the date of issuing the publication of preliminary notification u/s 11(I) of RFCTLARR Act, 2013 & for the Non-Titleholders cut-off date would be the date of Census Survey.

**Project Affected Person:** Person who is affected in respect of his/her land including homestead land and structure thereon, trade and occupation due to construction of the project.

**Project Displaced Person:** A displaced person is a person who is compelled to change his/her place of residence and/or work place or place of business, due to the project.

**Projected Affected Family:** Family includes a person, his or her spouse, minor children, minor brothers and minor sister's dependent on him. Provided that widows, divorcees and women deserted by families shall be considered separate families;

Explanation - An adult of either gender with or without spouse or children or dependents shall be considered as a separate family for the purpose of this Act.

**Land Owner:** Land owner includes any person –

- Whose name is recorded as the owner of the land or building or part thereof, in the records of the authority concerned;
- or Any person who is granted forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 or under any other law for the time being in force;
- or Who is entitled to be granted Patta rights on the land under any law of the State including assigned lands; or any person who has been declared as such by an order of the court or Authority.

**Marginal Farmers:** Marginal farmer means a cultivator with an un-irrigated land holding up to one hectare or irrigated land holding up to one half hectare, or as may be defined by the concerned state government.

**Small Farmer:** Small farmer means a cultivator with an un-irrigated land holding up to two hectares or irrigated land holding up to one hectare, but more than the holding of a marginal farmer, or as may be defined by the concerned state government.

**Encroacher:** A person who has trespassed Government/ private/community Land, adjacent to his or her land or asset to which he/she is not entitled and who derives his/her livelihood

and housing therefrom prior to the cut-off date.

**Squatter:** A squatter is a person who has settled on publicly owned land for housing or livelihood without permission or who has been occupying publicly owned building without authority prior to the cut-off date.

**Landless/Agriculture Labour:** A person who does not hold any agriculture land and has been deriving his main income by working on the lands of others as sub-tenant or as an agriculture labour prior to the cut-off date.

**Below Poverty Line:** A household, whose annual income from all sources is less than the designed sum as fixed by the Government of India, will be considered to be below poverty line (BPL).

**Vulnerable Person:** The Vulnerable group may include but not be limited to the following:

- Member of Scheduled caste/tribe community/other backward community.
- Households below poverty line
- Women Headed households.
- Senior citizen-person above the age of 60 years.
- Landless and Marginal Farmers
- Persons with disability

### 5.2.3 Social Impact Assessment Process

Based on screening results, the project will undertake a survey for identification of the persons and their families likely to be affected by the project. Every survey shall contain the following municipality / ward and / or village-wise information of, the project affected families:

- members of families who are residing, practicing cultivation, any trade, occupation or vocation in the project affected area;
- Project Affected Families who are likely to lose their house, commercial establishment, agricultural land, employment or are alienated wholly or substantially from the main source of their trade occupation or vocation or losing any other immovable property.
- Agricultural labourers and non-agriculture labourers.
- Families belonging to scheduled caste and scheduled tribe categories
- Vulnerable persons such as the disabled, destitute, orphans, widows, unmarried girls, abandoned women, or persons above the age of 50 years of age, who are not provided or cannot immediately be provided with alternative livelihood, and who are not

otherwise covered as part of a family;

- Families that are landless (not having homestead land, agriculture land or other homestead or agriculture land) and are below poverty line, but residing continuously for a period of not less than three years in the affected area preceding the date of declaration of the affected area;
- Losing access to private property or common property resources
- Impact on women due to construction activities, loss of assets; loss of access; etc.

The project on completion of the survey will disseminate the survey results among the affected community. Based on the social impact assessment survey, project will prepare an action plan to mitigate or minimize the adverse impacts as identified during the survey. The draft mitigation plan in form of resettlement action plan (RAP) will be disseminated among the affected individuals/ community. The feedback received from the affected groups will be incorporated to the extent possible before finalization of the RAP.

#### **5.2.4 Resettlement Action Plan: Broad Structure and Processes**

In case the sub-project requires involves land acquisition against compensation or loss of livelihood or shelter, SECI shall ensure that a satisfactory RAP has been prepared and shared with the affected persons and the local community. The park developer shall not start the works until compensation and assistance has been made available in accordance with the framework.

The RAP document provides a link between the impacts identified and proposed mitigation measures to realize the objectives of involuntary resettlement. The RAPs will take into account nature and magnitude of impacts that is consistent with this framework for Bank approval before the sub-project is accepted for Bank financing. RAP will establish the cut-off date and anyone who encroach on the area after the cut-off date will not be entitled to compensation or any other form of resettlement assistance. In case, the

- Sub-projects that will affect more than 200 people due to involuntary land taking and/or physical relocation will require a full Resettlement Action Plan (RAP).
- Sub-projects that will affect less than 200 people will require an abbreviated RP (Resettlement -plan).
- The above plans will be prepared as soon as subproject is identified.
- Projects that are not expected to have any land acquisition or any other significant adverse social impacts; on the contrary, significant positive social impact and improved livelihoods are exempted from such interventions.

Every- **Resettlement Action Plan (RAP)** prepared shall contain the following:

- **Baseline:**
  - Village-wise or municipality-wise list of project affected families and likely number of displaced persons by impact category.
  - Family-wise and the extent and nature of land and immovable property in their possession indicating the survey numbers thereof held by such persons in the affected zone.
  - Socio-economic survey of affected people including income/asset survey of PAPs.
  - Information on vulnerable groups or persons for whom special provisions may have to be made
- **Impact:**
  - The extent of area to be acquired for the project, the name(s) of the corresponding village(s) and the method employed for acquiring land with the relevant documentation.
  - Adverse impact on common property resources including cultural properties
  - Impact on host community due to labour influx
  - Any indirect impact
- **Quantification of impacts in terms of number of**
  - agricultural labourers in such area and the names of such persons whose livelihood depend on agricultural land to be acquired;
  - persons who have lost or are likely to lose their employment or livelihood or who have been alienated wholly and substantially from their main sources of occupation or vocation consequent to the acquisition of land and / or structure for the project;
  - occupiers on the government land, if any;
  - number of public utilities, government buildings, cultural properties which are likely to be affected.
- **Mitigation Measures and Entitlements:**
  - Comprehensive list of benefits and packages which are to be provided to project affected families by impact category.

- Measures to address impact on host community due to influx of migrant labour.
  - Gender Action Plan
- Relocation:
  - Details of the extent of land available which may be acquired in settlement area for resettling and allotting of land to the project affected families.
  - Details of the basic amenities and infrastructure facilities which are-to be provided for resettlement.
- Consultation Results and incorporation of community suggestions / feedback in project design
- Implementation Arrangements
  - Institutional mechanism for RAP implementation.
  - Consultation strategy; a disclosure plan and a capacity building plan
  - Grievance redressal mechanism
  - The time schedule for shifting and resettling the displaced families in resettlement zones.
- Monitoring and Evaluation
  - Mechanism for internal monitoring
  - Mechanism for external evaluation
  - Indicators for monitoring and evaluation; and
- Budget

The RAP will be developed based on the Right to Fair Compensation and transparency in land Acquisition, Rehabilitation and Resettlement Act, 2013 including subsequent amendments; other applicable state regulatory requirements and World Bank Operational Policy 4.12 on involuntary resettlement. States have formulated various legislations pertaining to direct purchase of land / land for land exchange options, etc. which shall be applicable depending upon the location of the sub-project.

### 5.3 Entitlement Framework

The resettlement and rehabilitation (R&R) benefits shall be extended to all the Project Affected Families (PAF) whether belonging to below poverty line (BPL) or non-BPL. The details are to be provided in the entitlement matrix (presented below). Contractor will ensure that access to

residences or business or agricultural land is not blocked during construction or subsequently.

The easement rights for the villagers shall be ensured while planning the layouts for the parks/projects. The agency responsible for RAP implementation and M&E consultants will bring it to the notice of project authorities if contractor fails to do so.

For tribal population the following provisions will be adhered to:

- Each Project Affected Family of ST category shall be given preference in allotment of land.
- Tribal PAFs will be re-settled close to their natural habitat in a compact block so that they can retain their ethnic/linguistic and cultural identity
- The Tribal Land Alienated in violation of the laws and regulations in force on the subject would be treated as null and void and-the R&R benefits would be available only to the original tribal land owner.

**Table 5-1: Entitlement Matrix**

(\*This Entitlement matrix is only a guidance document & specific sub projects shall require their own Entitlement Matrix to be prepared)

(\* The following table is not exhaustive & contains certain key provisions of relevant acts / guidelines & policies–SECI is not liable for their correctness/ applicability to any/all sub-projects & the table is to be read in context of applicable updated acts & rules made thereunder/ guidelines & policies)

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
<b>A.</b>	<b>Loss of Private Agricultural, Home-Stead &amp; Commercial Land</b>			
	Land for RE Project ( Agriculture/H ome Stead/ Commercial type)	Titleholder family and families with traditional land Right	Compensation at Market value, Resettlement and Rehabilitation	<p>a) Land for land, if available. Or, Cash compensation for the land at replacement value, which will be determined as provided under section 26 of RFCTLARR Act 2013.</p> <p>b) The land if allotted will be in the name of both husband and wife.</p> <p>c) If post acquisition, residual land is economically unviable, the land owner will have the choice of either retaining or sell off rest of the land.</p>

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
				<p>d) Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to project affected persons.</p> <p>e) Subsistence allowance of Rs. 36000 as one-time grant</p> <p>f) One time grant of Rs. 500,000 or annuity</p> <p>g) Compensation at market value for loss of crops if any</p>
	Residual land	Titleholder family and families with traditional land Right	Compensation at Market value, Resettlement and Rehabilitation	<p>In case residual land is found to be economically unviable, PAPs have the choice of:</p> <p>a) selling off the residual land at the market value to the project</p> <p>b) take 25% of the compensation value and retain the land parcel.</p>
<b>B.</b>	<b>Loss of Private Structures (Residential/Commercial)</b>			
	Loss of Structure	Title Holder/ Owner	Compensation at Market value, Resettlement & Rehabilitation Assistance	<p>a) Cash compensation for the structure at Market value which would be determined as per as per section 29 of the RFCTLARR Act 2013. House under PM Awas Yojna in rural area or Rs 1,20,000 in lieu off and house under PM Awas Yojna in urban area or Rs 4,00,000 in lieu off. The house if allotted will be in the name of both husband and wife.</p> <p>b) Right to salvage material from the demolished structures.</p> <p>c) Three months' notice to vacate structures.</p> <p>d) Refund of stamp duty and registration charges for purchase of new alternative</p>



S. No.	Application	Definition of Entitled Unit	Entitlement	Details
				<p>houses/shops at prevailing rates on the market value as determined in (a) above. Alternative houses/shops must be bought within a year from the date of payment of compensation.</p> <p>e) In case of partially affected structures and the remaining structure remains viable, additional 10% to restore the structure. In case of partially affected structures and the remaining structure becomes unviable additional 25% of compensation amount as severance allowance.</p> <p>f) Subsistence allowance equivalent to Rs. 36000 as one-time grant.</p> <p>g) Each affected family getting displaced shall get a one-time financial assistance of Rs 50,000 as shifting allowance.</p> <p>h) Each affected family that is displaced and has cattle, shall get financial assistance of Rs. 25,000/- for construction of cattle shed.</p> <p>i) One-time grant of Rs. 50,000 as resettlement assistance</p> <p>j) Each affected person who is a rural artisan, small trader or self-employed person and who has been displaced (in this project owner of any residential-cum commercial structure) shall get a one-time financial assistance of Rs 25,000/-for construction of working shed or shop.</p> <p>k) One-time grant of Rs. 500,000</p> <p>l) In case only part of the structure is demolished and rest of the structure becomes unsafe or economically unviable, project to compensate for the entire structure.</p>

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
	Structure	Tenants/ Lease Holders	Resettlement & Rehabilitation Assistance	<p>a) Registered lessees will be entitled to an apportionment of the compensation payable to structure owner in case the lessee has erected any part of the structure as per applicable local laws.</p> <p>b) In case of tenants, three months written notice will be provided along with Rs 50,000 towards shifting allowance.</p>
<b>C.</b>	<b>Loss of Trees and Crops</b>			
	Standing Trees, Crops in project land	Owners and beneficiaries (Registered/ Un-registered tenants, contract cultivators, leaseholders & sharecroppers	Compensation at market value	<p>a) Three months advance notice to project affected persons to harvest fruits, standing crops and removal of trees.</p> <p>b) Compensation to be paid at the rate estimated by:</p> <p>i) The Forest Department for timber trees</p> <p>ii) The State Agriculture Extension Department for crops</p> <p>iii) The Horticulture Department for fruit/flower bearing trees.</p> <p>c) Registered tenants, contract cultivators &amp; leaseholders &amp; sharecroppers will be eligible for compensation for trees and crops as per the agreement document between the owner and the beneficiaries.</p> <p>d) Un-registered tenants, contract cultivators, leaseholders &amp; sharecroppers will be eligible for compensation for trees and crops as per mutual understanding between the park/project owner and the beneficiaries.</p>
<b>D.</b>	<b>Loss of Residential/ Commercial Structures to Non-Titled Holders</b>			
	Structures on Government land	Owners of Structures or Occupants of	Resettlement & Rehabilitation Assistance	<p>a) All non-titleholders including encroachers and squatters will be compensated for the structure as described in section 29 of the RFCTLARR</p>

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
		structures identified as per Project Census Survey		<p>Act 2013 but not for the land. They will be given three months' notice to vacate occupied land.</p> <p>b) All squatters (other than kiosks) will be eligible for one-time grant of Rs 36000 as subsistence allowance.</p> <p>c) All squatters other than Kiosks will be given shifting allowance of Rs 50,000 per family as one-time grant for a permanent structure and Rs. 30,000 for a semi-permanent structure and Rs. 10,000 for a temporary structure.</p> <p>d) Each affected person who is a rural artisan, small trader or self-employed person assistance' of Rs 25,000/- for construction of working shed or shop.</p> <p>e) In case of Kiosks, only Rs. 5000 will be paid as one-time grant.</p> <p>f) In case only part of the structure is demolished and rest of the structure becomes unsafe or economically unviable, project to compensate for the entire structure.</p>
<b>E.</b>	<b>Loss of Livelihood</b>			
	Families living within the project area	Title Holders/ Non-Title holders/ sharecroppers, agricultural labourers and employees	Resettlement & Rehabilitation Assistance	<p>a) Subsistence allowance of Rs. 36,000 as one-time grant. (PAPs covered under 1(f), 2 (f) and 5 (e) above would not be eligible for this assistance).</p> <p>b) Training Assistance of Rs 10,000/- for income generation per family.</p> <p>c) Temporary employment in the project construction work to project affected persons with particular attention to vulnerable groups by the project contractor during construction, to the extent possible and preference in the</p>

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
				employment of semi-skilled and unskilled jobs in the project with adequate training for the job.
<b>F.</b>	<b>Additional Support to Vulnerable Families</b>			
	Families Within project area	As per definition of vulnerable	Resettlement & Rehabilitation Assistance	One-time additional financial assistance of Rs. 50,000.  Squatters and encroachers already covered under section D are not eligible for this assistance.
<b>G.</b>	<b>Loss of Community Infrastructure/Common Property Resources</b>			
	Structures & other resources (e.g. land, water, access to structures etc.) within the project area	Affected Communities and groups	Reconstruction of community structure and common property resources	Reconstruction of community structure and Common property resources in consultation with the community.
<b>H</b>	<b>Temporary Impact During Construction</b>			
	Land & assets temporarily impacted during construction	Owners of land & Assets	Compensation for temporary impact during construction  e.g. damage to adjacent parcel of land / assets due to movement of vehicles for transportation of equipment's, machinery and	Compensation to be paid by the contractor for loss of assets, crops and any other damage as per prior agreement between the 'Contractor' and the 'Affected Party'.

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
			construction activities for Infrastructure development.	
I.	<b>Resettlement Site</b>			
	Loss of Residential structures	Displaced Titleholders and non-titleholders	Provision of resettlement site/ vendor market	Resettlement sites will be developed as part of the project, if a minimum of 25 project displaced families opt for assisted resettlement. Vulnerable PAPs will be given preference in allotment of plots/flats at the resettlement site. Plot size will be equivalent to size lost subject to a maximum of provision given in RFCTLARR Act 2013. Basic facilities shall be provided by the project at resettlement site as per the provisions given in the Third Schedule of RFCTLARR Act 2013. Similarly, if at least 25 displaced commercial establishments (small business enterprises) opt for shopping units, the Project Authority will develop the vendor market at suitable location in the nearby area in consultation with displaced persons. Basic facilities such as approach road, electricity connection, water and sanitation facility, will be provided in the vendor market by the project. Vulnerable PAPs will be given preference in allotment, of shops in vendor market. One displaced family will be eligible for only one land plot at resettlement site or shop in the vendor market.
J.	<b>Govt. Land on lease / assigned land</b>			
	Lessees/ Assignees	Land Owners/ usufruct right	Compensation	a) Cash compensation as per the circle rate

S. No.	Application	Definition of Entitled Unit	Entitlement	Details
				b) Provisions related to loss of structure/ trees/crops as per the provisions of section B and / or D as applicable.
	Agricultural Labour	Non-Title holders/ sharecroppers, agricultural labourers and employees	Annual Lease rental for use of land	Lease amount paid to land owner will be deducted from the compensation of land owner and returned to the lease holder.  Will receive Rs. 36,000 as one time grant.

#### 5.4 Gender equality and Social Inclusion Framework

Mainstreaming gender equity and empowerment will be an intrinsic aspect of the project. Its development objective and proposed activities related to local economic development as well as the provision of basic services pay special attention to address women and men as well as girls' and boys' specific needs.<sup>5</sup> Applying a gender lens to the project's preparation and implementation means that:

- All data should be disaggregated by gender, caste, ethnicity, location and age.
- Issues of division of labour, access to resources and decision making power (who is doing what, who has access to what, who makes the ultimate decision) have to be assessed for their gender differential impact on women and men of different social identity group.
- Assessment of policies, programs, institutional arrangements, human resources

<sup>5</sup>The effectiveness and sustainability of any project relies substantially on its capacity to address the constraints on women's participation in its several stages from design, implementation, operation and maintenance to training and monitoring and evaluation. Successful projects have also focused on understanding the linkages between gender and poverty, by identifying, for example, households headed by females and with special needs. Experience shows that an adaptive, learning-by-doing, and process-oriented approach works better than a blue print approach; continuous dialogue between the project team and its target population is therefore important. Project target groups and individuals are likely to have a stronger sense of ownership when the project gives them enough time, design flexibility, and capacity to take corrective action. Therefore, consultative mechanisms are being proposed under the project to allow such two-way interactions between its target population and service providers.

issues and M&E system has to be done from a gender perspective of project, project authorities and community groups.

To this end, a Gender Development Framework that outlines the preparation of a Gender Assessment and Gender Action Plan is proposed under the project as part of this ESMF in order to provide SECI, the implementing entities and partners with the necessary guidance for the analysis of gender issues during the subproject preparation and later execution.

To gather data and ensure that subprojects are gender sensitive, gender analysis will be an integral part of the subproject screening. Any adverse gender issues identified will be further analyzed as part of the Social Impact Assessment of the subproject. This analysis will include gender specific queries both at primary data collection and review of available secondary data. This quantitative and qualitative analysis will bring out sex disaggregated data and issues related to gender disparity, needs, constraints, and priorities; as well as understanding of potential for gender based inequitable risks, benefits and opportunities.

The subproject further technical detailing (feasibility studies and DPR preparation) will address the findings and recommendations from the gender analysis as well as feedback from potentially affected groups and individuals.

In case of major gender issues identified beyond specific subprojects, SECI will promote the necessary dialogue with the concerned authorities, such as the Ministry of Women and Children, National Commission for Women, National Mission for Empowerment of Women, the Federation of the Indian Chambers of Commerce and Industry's Ladies Organization, to ensure national and state requirements are followed by the project.

#### **5.4.1 Gender Assessment and Gender Action Plan**

The gender assessment identifies the key gender issues in the project area as well as ways to mitigate any adverse effects. The assessment also provides an overview of the institutional or regulatory frameworks concerned with gender in the project area. The tasks to be carried out as part of the gender assessment include, but are not limited to, the following:

- Desk review that looks at all available information (e.g. statistics, other gender reports or documents of previous similar projects) in the project area and the socioeconomic profile of the target population. The review will identify the relevant legal policy and institutional frameworks and their gender implications as well as the government programs that encourage equal opportunities and participation of women in the project area.
- Primary qualitative and quantitative data collection including household surveys, focus group discussions, and random interviews with women and men in sub projects.

- Assessment of the most disadvantaged areas and sections of society (widows, female-headed households, disabled men and women) in terms of access to services and poverty level. Identification of major stakeholder groups that work on gender issues and assessment of women's participation in implementing entities, community organizations, and tender boards or other decision-making forums related to the planning, implementation, monitoring, and evaluation of subprojects.
- Identification of how renewable energy sector strategies, policies, or grievance mechanisms address gender issues. This can also include specific training, communication or gender sensitization workshops held for men and women in the SECI and implementing entities.

A **Gender Action Plan** (GAP) will be prepared at the earliest stage of subproject preparation and implementation. The GAP will help (i) guide how any potential adverse gender impacts will be addressed, (ii) set forth guidelines and plans for each subproject to ensure that men and women participate and benefit equally, and support gender-disaggregated data collection. The tasks to be carried out as part of the gender assessment include, but are not limited to, the following:

- Undertake quality social and gender analyses. Identify constraints to participating and benefiting men and women; develop strategies for each subproject to ensure that men and women participate and benefit equally.
- Revisit gender design strategies at inception. The plan needs to be tested and reviewed early in implementation; identify detailed activities, targets, resources, and responsibilities for implementation.
- Gender Action Plan must be fully owned and understood by the implementing agency. Use a participatory and flexible approach to developing the plan; a strong rationale that is directly linked to overall project objectives is needed for targeting and working with women.
- Identify realistic targets linked to subproject objectives. Targets and strategies should enable step-by-step progress, bringing incremental changes and challenging culture without threatening it; linking targets to loan objectives helps all stakeholders to understand the rationale for focusing on women and helps monitoring of participation and benefits.
- Include gender capacity building in the Gender Action Plan. Both formal training and ongoing support and mentoring are needed for developing skills, ownership, and commitment.



- Provide adequate skills and resources for implementation of Gender Action Plan. Long-term gender specialists in the implementing entities or project team and adequate resources for implementation of actions; nongovernmental organizations and other agencies contracted to implement project activities should have a demonstrated gender capacity.
- Monitor and follow up gender-related targets and activities. Systematic follow-up to ensure that policy reforms and gender actions are implemented; routine monitoring and reporting; gender-sensitive indicators and gender-related risks must be included in project logical frameworks.
- **Monitoring indicators:** The action plan must have process and outcome indicators that will help project monitor the actions and expected outcomes. The table below provides suggestive process indicators.

Checklist for preparing Gender Action Plan is given in **Annexure IX**.

## 5.5 Indigenous Peoples Planning Framework

The guiding principles enshrined in the constitution of independent India as also various plans and policies for safeguarding the interests of scheduled tribes notwithstanding, the benefits of development of free and shining India have by and large by-passed the scheduled tribes. This issue is source of anxiety and worry for the administrators, implementers and researchers of the country. This anxiety and worry has to be understood in the context of all kinds of development projects that have been/are being carried out across country.

The Indigenous People (IPs) in India are categorized as tribal who often become vulnerable in development projects because of their cultural autonomy which is usually undermined and also because this group endure specific disadvantages in terms of social indicators of quality of life, economic status and usually as subject of social exclusion.

### 5.5.1 Objective

The objective is to design and implement projects in a way that fosters full respect for Indigenous Peoples' dignity, human rights, and cultural uniqueness and so that they: (a) receive culturally compatible, gender and inter-generationally inclusive social and economic benefits; and (b) avoid adverse effects during the development process, or if not feasible ensure that these are minimized, mitigated or compensated.

The term "Indigenous Peoples<sup>6</sup>" is used in a generic sense to refer to a distinct, vulnerable,

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<sup>6</sup>As per Operational Policy 4.10 on Indigenous Peoples, World Bank.

social and cultural group possessing the following characteristics in varying degrees:

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories<sup>7</sup>
- customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- an indigenous language, often different from the official language of the country or region.

**The Constitution of India, Fifth Schedule** (Article 244) provides for the administration and control of Scheduled Areas<sup>7</sup> and Scheduled Tribes (areas and tribes needing special protection due to disadvantageous conditions).

The provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996 lays down process to be followed for acquisition of land in Scheduled V Areas. The Act under sub-section (1) of Section 4 provides for mandatory consultation with the Gram Sabha before any land acquisition proceedings can be undertaken. It further states that all Gram Sabhas in which even if one person is affected by the proposed project would have to be consulted before acquisition proceedings are initiated, by the procedure prescribed. Every Gram Sabha shall be competent to safeguard and preserve the traditions and customs of the people, their cultural identity, community resources and the customary mode of dispute resolution. The World Bank OP 4.10 emphasizes “a process of free, prior, and informed consultation with the affected Indigenous People’s communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project.

Project shall avoid adverse impact on such areas to the extent possible. Where unavoidable, it will consult the concerned Gram Sabha / Panchayat for obtaining their broad support and resolution for initiating land acquisition as per the provisions of the Act and OP 4.10.

As mentioned earlier, the social screening survey will identify presence of IPs and any adverse or positive impacts on tribal people (Indigenous Peoples). In case such cases are found provisions of World Bank OP 4.10, and government regulations will be applicable. An

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<sup>7</sup>Article 244 (1) and 244 (2) of the constitution of India enables the government to enact separate laws for the governance and administration of the tribal areas. In pursuance of these articles, the President of India had asked each of the states in the country to identify tribal dominated areas. Areas thus identified by the states were declared as Fifth Schedule areas.

indigenous Peoples Development Plan (IPDP) will be prepared, to provide specific benefits to the tribal people, as applicable.

### **5.5.2 Generic Issues / Concerns of Tribal Communities**

Though no tribal settlement was identified in the case study sample projects, tribal issues were identified through review of secondary information. In order to have a more focused tribal development strategy, these issues have been grouped into (i) issues that are directly related to the project development for which measures will have to be taken up under the project to address them and (ii) issues which are outside the scope of the project but institutional collaboration could help the tribes in their development. These have been listed below:

#### **Issues directly related to the project**

- Loss of agriculture income
- Loss of employment of daily wagers in farms.
- Loss of shelter
- Physical displacement

#### **Other Issues:**

- Low level of agriculture productivity
- Lack of employment opportunities
- Low income levels
- Poor health
- Low level of education
- High levels of debt

#### **Community level issues include:**

- Loss of and / or access to institutions of importance to tribal population
- Loss of community facilities

### **5.5.3 Procedure for Preparing an Indigenous Peoples Development Plan (IPDP)**

In order to prepare an IPDP the following steps will be taken:

- Social screening to establish the presence of tribes in the project area or have collective attachment to the project area
- based on a detailed social assessment, establish baseline data on the tribal people (subsistence, employment, community networks) in the project area;

- a process of free, prior, and informed consultation with the affected Indigenous Peoples' communities at each stage of the project, and particularly during project preparation, to fully identify their views and ascertain their broad community support for the project
- review Acts / policy guidelines applicable in the respective states regarding tribal groups and also the central Acts / Policies;
- identify the impacts (both positive and negative) and prepare an IPDP;
- disclose the draft IPDP

#### **5.5.4 Screening**

During the ESA stage of sub project, survey will be carried out based on group discussion with the communities in the sub project area in order to identify presence of any tribal group or any such group that have collective attachment to the project area. Apart from the consultation with the community members, consultations / in depth interviews will also be carried out with the NGOs working in the area and representative of local self-government. The screening will look into the details of tribal households, assessing the number of such households along the zone of influence of the proposed sub project. If the result shows that there are tribal households, the issues related to the community will be included in the social assessment (SA) survey.

#### **5.5.5 Social Assessment**

The park developer would be responsible for conducting SA and the development of an action plan with the help of indigenous community and organizations working for them. The SA will gather relevant information on demographic, social, cultural; economic and networking aspects of each household and needs of the community as a whole. The information on individual household will be collected through household survey whereas, community based needs will be assessed through group discussions with the community as a whole as well as in discussion with the community leaders and government and non-governmental officials working in the area on tribal issues. The discussion will focus on both positive and negative impacts of the sub project. The suggestion and feedback of the community on the design and planning of the sub project will also be documented.

#### **5.5.6 Entitlement**

Based on the Operational Policy 4.10 of the World Bank and as one of its significant R&R requirements; special provisions for the Scheduled Tribes (ST) has been made in the project R&R Policy (apart from the general compensation and assistance to be received as Project Affected Persons (PAPs)/Project Affected Households (PAHs)) of sub-project for loss of assets. Apart from compensation at replacement value and R&R assistance for any adverse impact, each IP family will be entitled for additional benefits as one time grant of INR 50,000/-

#### **5.5.7 Monitoring & Evaluation**

The park developer will set up an internal monitoring system comprising its own staff, tribal

people to monitor the IPDP implementation. Monitoring indicators will be established. In addition, an external independent monitoring agency will be employed by park developer. Some of the relevant indicators for monitoring are listed below as a guideline:

**Table 5-2: indicators for monitoring**

Sl. No.	Actions	Indicators
1	Tribal settlements identified	Number of consultations carried out
2	Participation of tribal community	Tribal issues identified IPDPs prepared
3	Implementation of IPDP	Budget allocated for implementation Institutional arrangement in place Grievance redress mechanism established

#### **5.5.8 Suggested Format for IPDP**

The suggested format for the IPDP is as follows

- Description of sub projects and implications for the indigenous community Gender disaggregated data on number of tribal households by impact category
- Social, cultural and economic profile of affected households
- Land tenure information
- Documentation of consultations with the community to ascertain their views about the project design and mitigation measures
- Findings of need assessment of the community
- Community development plan based on the results of need assessment
- Modalities to ensure regular and meaningful consultation with the community
- Institutional arrangement and linkage with other national or state level programmes
- Institutional mechanism for monitoring and evaluation of IPDP implementation and grievance redress
- Implementation Schedule and cost estimate for implementation

#### **5.5.9 Participatory Approach for Preparation of IPDP**

The main thrust of IPDP is to address the developmental issues of the project taking into consideration the marginality status of tribal community. The IPDP will offer developmental options addressing community based needs of indigenous people while respecting their

sociocultural distinctiveness. The IPDP aims at strengthening the existing capacity of the affected tribal community. The strategy of IPDP therefore would be to promote participation of the tribal people, initiating and identifying people's need, priorities and preferences through participatory approaches. Therefore, the action plan for a particular village will be prepared by the project in close consultation with the community themselves.

Participatory Rural Appraisal (PRA) initiates the process of people's participation, facilitating decision-making through mutual discussion and direct consultation. Participatory approach is intended to promote participation of all stakeholders creating development opportunities for the affected community. It is therefore, mandatory that appropriate PRA tools along with Focus Group Discussion (FGD) is employed to initiate participation in IPDP for collection of qualitative data.

The areas of enquiry would mainly include:

- Identification of tribal groups
- Access to natural resources, likely impact on land ownership and land distribution, share cropping and lease holder
- Participation in the livelihood security component of the project
- Employment and income generating opportunities in agriculture, trade and business and services
- Poverty
- Women and Gender relation
- Felt needs and community organization

With a view to assess the life patterns of the affected indigenous population and to prepare IPDP in consistent with community and region-specific background, pertinent baseline information shall be collected, compiled and analyzed. The baseline information on socio-economic characteristics including land tenure, land holding categories, occupational pattern, usual activity status, income – expenditure pattern, access to natural resources, health status, literacy level, age structure, gender, marital status, etc. shall be collected in order to facilitate the planning process. The baseline data shall be collected through pre-tested structured schedules.

The most important component of IPDP is to assess the type and magnitude of impacts, both positive and negative on the tribal communities. The assessment of impacts on tribal population in the projects shall focus on the probable consequences of the project according to specific criteria / indicators.

One major activity during the course of the survey would be to identify, various community specific developmental needs linked to their socio-economic and cultural life. The needs shall be identified for infrastructure development and community service facilities such as weekly markets, drinking water facility, sanitation, health facility, schools, community halls, post office, watershed structure, drainage, etc.

#### **5.5.10 Implementation Issues and Strategy**

It is envisaged that proper implementation of IPDP is possible only through community participation. The participatory approach will ensure:

- Promotion of community concern and involvement
- Proper organization and management of resources
- Setting up of criteria and fixing criteria and procedures for project execution are done at the grass root level
- Identification, selection and strengthening of implementing agency at the grass roots level

Steps will be taken to ensure that (i) tribal community participates in the project, (ii) is fully aware of their rights and responsibilities; and (iii) are able to voice their needs during IPDP preparation. The community would be encouraged to prepare their own plan that caters to the needs of the community.

Appropriate people's organization and forum need to be built up and strengthened to ensure effective peoples representation and empowerment in the process of selection of specific community development activities and their execution. The conventional top down approach to project implementation through prevailing bureaucratic framework, need to be reoriented for the framework of participative administrative structure to respond to bottom up initiatives based on participatory process for informed community participation and empowerment.

IPDP as a means of sustainable development is based on the strategy of using culturally appropriate, socially acceptable and economically viable opportunities for livelihood of the tribal community including farmers, agriculture and non-agriculture labour, women and wage earners.

The strategy includes:

- Participation of tribal community in plan preparation, formulation and implementation by strengthening their existing tribal social, political and community organizations through required legislative measures, positive administrative responses and people's mobilization.

- Strengthening women's traditional role in subsistence economy through organization, capacity building for leadership and skills improvement, access to non-timber forest produce (NTFP), while bringing about greater sharing of household responsibilities between men and women.
- Keeping in view the strong bondage of the tribal community with land and forest, subsistence practices, traditional culture and ways of life, the strategy may create space for innovative policy measures through appropriate legislation / executive actions. Such innovative policy responses may cover any aspect of their needs from food security, income generating activities, right over forest produce, community health measures or any such issue as generated by the community in course of their participation in the plan process.
- Involvement of non-governmental organization (NGO) as an interface between the government and the tribal community to "bind" and strengthen their organizations, develop a mechanism for redress of grievances and facilitate their being a "stakeholder" in the institutional arrangements for IPDP.
- To ensure the right institutional mechanism for this strategy, IPDP will be integrated with the existing structures of ITDP/DRDA wherever necessary.

Non- governmental organizations (NGO) are "secondary stakeholders" who can facilitate the participation of "primary stakeholders"-the tribal community. The NGOs must have a clear understanding of the socio-economic, cultural and environmental context of the project.

The social and community organizations of tribal population will be identified to strengthen and involve them in participatory process of IPDP. The IPDP will develop a linkage with the structure and the process of tribal development administration so that the tribal communities can enjoy more benefits. The NGOs will also provide the important interface between tribal administration and the community.

#### **5.5.11 Grievance Redress Mechanism**

Apart from project GRM, a specific grievance mechanism will be established for indigenous people. A district level grievance redressal cell will be constituted to address the grievances of the PAPs related to disbursement of compensation and resettlement. The space for the functioning of the cell will be provided in the concerned PIU office.

**Members of GRC:** The cell will be constituted by the SECI in the concerned project districts. The GRC will be headed by District Level Official from Tribal Development Department. The other members will include representatives of tribal community; NGOs contracted for the implementation of RAP; representative of contractor and social specialist of SECI.



**Functions of the Cell:** The grievance cell will conduct a meeting in the first week of every second month (unless any issue is to be sorted out on an urgent basis) to hear the grievances from the tribal community. The cell should resolve the issue within 15 days of hearing. In case issue cannot be sorted out at project level, it should be escalated to Tribal Welfare Department at the district level.

The cell shall submit a bi-monthly report to SECI for the reference regarding the issues received and the cases disposed and a copy should be forwarded to district level tribal welfare department. In case an aggrieved person / community is not satisfied by the verdict given by GRC and the tribal welfare department, he or she is entitled for approaching the judiciary. The agency responsible for implementing the RAP, will assist such PAP to approach the judiciary.

#### 5.5.12 Gender Issues among Tribes

The tribal women play an important role in the community and family. Women normally constitute half of the total population in any project area and for survival tied themselves to land and forest. These women work as farm servants and attached labourers. Even in agricultural household, women share with men the burden of agricultural operations like transplanting, weeding, harvesting, threshing, winnowing, etc. The concentration of women in agricultural and allied activities is due to the decline of rural industries leading to large-scale reduction of labour force within non-agricultural sector.

In IPDP, therefore, efforts will be made to (i) create an institutional framework to make gender sensitive decisions. SECI / Contractor in consultation with Women and Child Welfare Department shall constitute Women Interest Groups (WIGs) within a village, (ii) women members would be trained for upgradation of skills to initiate viable income generation activities for their economic empowerment, (iii) through training, women members will be provided information to make them an active participant in various activities of WIGs. The activities include (a) provide information on developing a WIG sub plan, (b) linking with other women's development programs of line department, and (iv) NGO will focus on women's need for social development

## 5.6 Construction Labour Management Plan

**The influx of workers and followers can lead to adverse social and environmental impacts on local communities**, especially if the communities are rural, remote or small. Such adverse impacts may include increased demand and competition for local social and health services, as well as for goods and services, which can lead to price hikes and crowding out of local consumers, increased volume of traffic and higher risk of accidents, increased demands on the ecosystem and natural resources, social conflicts within and between communities,

increased risk of spread of communicable diseases, and increased rates of illicit behavior and crime. Such adverse impacts are usually amplified by local-level low capacity to manage and absorb the incoming labor force, and specifically when civil works are carried out in, or near, vulnerable communities and in other high-risk situations. While many of these potential impacts may be identified in a project's Environmental and Social Impact Assessment (ESIA), they may only become fully known once a contractor is appointed and decides on sourcing the required labor force. This means that not all specific risks and impacts can be fully assessed prior to project implementation, and others may emerge as the project progresses. Thus, measures defined in the project Environmental and Social Management Plan (ESMP) to address such problems sometimes may be insufficient. It is therefore important to develop site-specific measures before the contractor starts work, and update them as necessary to reflect project developments. Overall, adequate monitoring and adaptive management of the potential impacts from labor influx are key to properly addressing them and mitigating risks.

The proposed 160 MW hybrid (Solar + Wind) power project is in its preliminary phase of execution. It is envisaged that during construction phase of the project, labourers for various jobs such as civil, mechanical and electrical works will be hired through authorized manpower agencies. The labour requirement will range from 250-300 workers during normal operations which can reach upto 500 workers during peak construction activities. Therefore, it is also envisaged that many of the labourers will be employed from outside the region and will therefore, be migrant labourers and hence, accommodation will be provided. These migrant labourers will be accommodated in a temporary campsite within the project area. The construction of solar array, wind tower, sub-station and transmission line can start simultaneously which can lead to increase in migrant labour at a given point of time. This could result in stress on local resources, disruption in community relations, and movement of labourers.

### 5.6.1 Objectives

The influx of migrant labour will have both negative and positive impacts on the nearby community and local environment. The labour will be accommodated in temporary campsites within the project area which can have significant interface with the nearby community. However, the influx of migrant workers would lead to a transient increase of population in the immediate vicinity of the project area for a limited time. This would put pressure on the local resources such as roads, fuel for cooking, water etc.

Hence, a framework has been designed to demonstrate the:

- Potential impacts associated with influx on the host population and receiving environment are minimized; and

- Provision of safe and healthy working conditions, and a comfortable environment for migrant labour; and

### 5.6.2 General Requirements

All migrant workers are envisaged to be accommodated in temporary campsite within the project area. If migrant workers are accompanied by their families, provisions should be made accordingly. Guidance on Workers Accommodation developed by IFC and EBRD is also referred for inclusion of requirements for labour camp to be established by developers during construction phase of the project. Developer(s) shall ensure implementation of the following measures to minimize the potential negative impacts of worker accommodation and workers on local communities:

**Cleanliness:** Pest extermination, vector control and disinfection are to be carried out throughout the living facilities in compliance with local requirements and/or good practice.

**Complaints and incident reporting:** A formal Complaints Procedure will be implemented to ensure timely and transparent response to complaints as received from labour.

**Labour education:** The workforce will be sensitized to local social and cultural practices through provision of an induction course for all employees that stipulates expected behaviour;

**Labour behaviour in campsite provided:** A Code of Behaviour governing appropriate behaviour in the accommodation facilities to be kept in place and to be strictly enforced. The contractor shall ensure implementation of the “rules of engagement” between labourers living in campsite and community and shall be implemented by construction contractors for all engaged labourers. A code of conduct has been developed and has been annexed with the report.

**Labour Compensation and Accommodation:** Client shall ensure that labourers are provided with benefits such as annual leave, weekly rest day, etc. Accommodation to be provided for the construction labour which cover facilities (including catering facilities, dining areas, washing and laundry facilities etc.) and supporting utilities.

### 5.6.3 Hiring and Recruitment Procedure

The manpower contractor shall, wherever possible, locally recruit the available workforce and shall provide appropriate and requisite on job and EHS training as necessary. The following general measures shall be considered for the workforce during their employment tenure:

- Park Developer should include a code of conduct relating to the accommodation to be signed with the contract Document of developers.
- The contractor shall not employ any person below the age of 18 years nor will have any forced labour;

- The construction labourers will be provided with documented information regarding their rights under national labour and employment law such as but not limited to Factories Act, Minimum Wages Act, Trade Unions Act and Workmen's Compensation Act;
- First priority for employment of labour should be given those impacted by the project such as landowners who have lost land;
- No discrimination shall be done by the construction contractor with respect to recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, termination of employment or retirement, and disciplinary practices;
- The contractor to ensure that work hours are set at eight hours a day, 48 hours a week, with a weekly rest day for all engaged labour;
- Every labour is entitled for maximum of only two hours a day as Overtime (OT) work. OT pay is twice the hourly remuneration;
- Client shall ensure equal wages for male and female workers for work of equal nature or value is maintained;
- A grievance redress mechanism for workers shall be put in place by the contractor to raise workplace concerns. The workers will be informed about the grievance mechanism at the time of recruitment; and
- The Developer shall ensure that their contractors develop and implement a procedure to review the performance of their sub-contractors.
- The procedure developed should include regular inspection of the camp sites, maintaining information pertaining to labour sourced by sub-contractors;

#### **5.6.4 Workers' Accommodation**

##### **(i) Dwelling Units**

The Developer will supervise and monitor the activities performed by their contractor and accommodation facilities provided in campsite. The following measures shall be provided:

- The labour will be provided with accommodation on twin sharing basis made of insulated material and locally available building material, etc.;
- The migrant workers with families shall be provided with individual accommodation comprising bedroom, sanitary and cooking facilities;

- The units will be supported by common latrines and bathing facilities duly segregated for male and female labour;
- Adequate number of toilets shall be provided in the accommodation facilities. A minimum of 1 unit to 15 males and 1 unit for 10 females shall be provided;
- The contractor shall provide a canteen facility for the construction workers and the food will be of appropriate nutritional value and will take into account religious/cultural backgrounds;
- All doors and windows shall be lockable and mobile partitions/curtains shall be provided for privacy;
- Facilities for the storage of personal belongings for workers shall be provided within the campsite only;
- Dustbins shall be provided for collection of garbage and will be removed on a daily basis;
- It is also required to provide first aid box in adequate numbers; and
- Ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

**(ii) Security**

The contractors shall put in place the following security measures to ensure the safety of the workers. The following measures shall be incorporated:

- Access to the campsite shall be limited to the residing workforce;
- The contractor shall be responsible for deploying adequate number of guards;
- Adequate, day-time night-time lighting shall be provided;
- The security personnel shall be provided with training to respect the community traditions and in dealing with, use of force etc.; and
- The rental accommodation shall be provided with firefighting equipment and portable fire extinguishers.

**(iii) Provisions for Drinking Water**

Access to an adequate and convenient supply of free potable water is necessity for workers. The domestic water supply shall be made available by the contractor.

- Safe drinking water conforming to the IS 10500:2012 for drinking water shall be provided;
- Private tanks can be utilized for provision of drinking water for the migrant labours;
- The direct usage of water from bore well should not be allowed and water shall be adequately treated;
- The Developer(s) should regularly monitor the quality of drinking water available. In case of non-compliance with the Drinking Water Specifications, additional treatment shall be provided or alternative sources of water supply shall be arranged; and
- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

**(iv) Cooking Arrangements**

The construction phase will involve engagement of large number of migrant people in the project area for a limited time. Hence, there shall be requirement of provision of cooking facilities (kitchen) as listed below:

- Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation;
- Adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water; and
- All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials;
- Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials.

To ensure that the fuel need of labourers in the project area does not interfere with the local requirements, necessary arrangements for supply of fuel to the labourers shall be done by the contractor.

**(v) Wastewater Generation**

There will be generation of wastewater from the campsite. About 80% of water used shall be generated as sewage/wastewater. Developers shall ensure that the campsite are equipped with septic tank and soak pit for disposal of sewage. It is also recommended that the storm water and sewage system should be separate. The surface water drainage shall include all

necessary gutters, down pipes, gullies, traps, catch pits, manholes etc. Sanitary and toilet facilities are constructed of materials that are easily cleanable. Sanitary and toilet facilities are required to be cleaned frequently and kept in working condition.

**(vi) Solid Waste Management**

The municipal solid waste generated from campsite will mostly comprise of compostable wastes like vegetable matters (kitchen waste) and combustible waste like paper, cans, plastic and some non-degradable waste like glass/glass bottles. Improper disposal of solid waste will lead to environmental degradation and health hazards to labour as well as nearby community.

The following measures shall be adopted by contractors for ensuring effective management of solid waste:

- The solid wastes of domestic nature generated shall be collected and stored separately in appropriate containers with proper sealing on them;
- Separate bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the houses and kitchen premises in sufficient numbers for collection of garbage;
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation; and
- The contractor shall identify the nearest municipal solid waste storage facility and tie up with the concerned urban local body for disposal of waste at frequent intervals.

**(vii) Medical Facilities**

Effective health management is necessary for preventing spread of communicable diseases among labour and within the adjoining community. The following medical facilities shall be provided by contractors for the construction workers:

- A first aid centre shall be provided for the labour within the construction site equipped with medicines and other basic facilities;
- Adequate first aid kits shall be provided in the campsite in accessible place. The kit shall contain all type of medicines and dressing material;
- Contractor shall identify and train an adequate number of workers to provide first aid during medical emergencies;
- Regular health check-ups shall be carried out for the construction labourers every six month and health records shall be maintained;

- Labours should have easy access to medical facilities and first aider; where possible, nurses should be available for female workers;
- First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
- An adequate number of staff/workers is trained to provide first aid; and
- Information and awareness of communicable diseases, AIDS etc. shall be provided to workers.

**(viii) Recreation Facilities**

- Basic collective social/rest spaces are provided to workers.
- Facilities like a common television can be provided in labour camps

**(ix) Inspection of Accommodation Facilities**

Campsite shall be inspected at frequent intervals to ensure that the facilities are well organized and maintained to acceptable and appropriate standards by the Developer. The key areas are:

- Daily sweeping of rooms and houses shall be undertaken;
- Regular cleaning of sanitary facilities shall be undertaken;
- The kitchen and canteen premises shall be established under good hygiene conditions;
- Daily meal times shall be fixed for the labour;
- Smoking and alcohol consumption shall be prohibited in the workplace;
- Water logging shall be prevented at areas near the accommodation facilities and adequate drainage is to be provided; and
- Checklists pertaining to the daily housekeeping schedule shall be maintained and displayed at houses, toilets and kitchen.

To limit the impact due to cumulative labour onsite during construction phase, developers shall provide adequate labour camp which should be appropriate for its location and be clean, safe and, at a minimum, meet the basic needs of workers.

- Developers should assess the location of labour camp, that it should not be constructed in immediate vicinity of any drainage channel;
- It should be ensured that the labour camp(onsite) should have basic amenities such as electricity, drinking water, health& sanitation facility, kitchen and rest room;



- All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated and all the migrant workers will be instructed accordingly;
- Employers should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of workers;
- The labour camp will be equipped with septic tanks and soak pits and avoid presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes;
- Developers should ensure that the disruption of local communities is minimum, in particular local communities' transport infrastructures and if required limit the workers movements in nearby areas;
- Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers;
- Developers should ensure that workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff;

Where possible, an adequate transport system to surrounding communities will be provided. It is good practice to provide workers with free transportation to and from local communities

#### 5.6.4 Contractor's responsibility

Within 30 days from the appointed date, the Concessionaire/Contractor shall prepare and submit 4 hard copies and 1 soft copy of Labour Influx and Worker's Camp Management Plan to [Executing Agency] that addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, training programs on HIV/AIDS, etc. A Workers' Camp Management Plan addresses specific aspects of the establishment and operation of workers' camps

This Labour Influx and Worker's Camp Management Plan will include:

- *mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women;*
- *informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted;*
- *introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination), manual scavenging, engagement with local residents, child labour, non-discrimination, harassment of co-workers including*

*women and those belonging to SC and STs and other minority social groups,*

- *contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.*
- *training programs on HIV/AIDS and other communicable diseases,*
- *workers' Camp Management Plan addressing specific aspects of the establishment and operation of workers' camps provided the ULB/ Executing Agency is unable to cater to the demand for affordable housing for this additional workforce in terms of rentals, hostels, apartments etc.; and*
- *compliant handling Mechanism at the project level*

Additional measures that aim to reduce incentives to engage with the local community by providing workers with the opportunity to spend their time off away from the host community, where feasible with a small transport allowance, ideally allowing workers to regularly return for brief visits to their families, spouses and friends, or to visit nearby urban centres that provide a variety of legal social opportunities. For workers who need to travel further it may be attractive to forego weekends off in exchange for longer breaks that would allow for such home leave travel.

While clear and decisive measures by the contractor are critically important, the effectiveness of these measures often depend on complementary actions by the Borrower. Those are typically focused on public administration and law enforcement, such as: (i) reinforcing local police in a remote setting, where services may not be sufficiently staffed or equipped to maintain public order after the influx, (ii) ensuring that complaints about gender-based violence are taken seriously by local law enforcement, which may be supported by (iii) deploying female officers to the project area, and (iv) participating in preventive training with workers to demonstrate the presence of government authority in the project area.

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## 6. CONSULTATION; CONSULTATION FRAMEWORK AND INFORMATION DISCLOSURE

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### 6.1 Sample Project Consultations- Solar parks

The FGDs / stakeholder consultations in selected villages in the sample sub-project locations were conducted in the respective project (Rewa 750MW solar park, Pavagada 2000 MW solar park, Mandsaur 250 MW solar park, NLC Wind project, NIWE wind project, NIWE hybrid project) involving the team of social experts, community mobilizer and other key experts to gauge the stakeholder perception about the sub-project. A total of 20 local level consultations were carried out in the selected 12 villages spread across three different projects. The stakeholders included land owners losing land, landless laborers and other villagers. Team ensured participation of women members in each of the consultations.

The key issues and concerns identified during the above consultations as raised by the local community included:

- Are these projects going to provide any benefits for the local people especially in terms of employment?
- Whether local people will get employment as skilled / semi-skilled / unskilled labourers?
- Whether solar panels/wind turbines will have any impact on the health of the people and the crops being grown in the area.
- What will be the rate for land payable to the land owners (in case of Rewa) as private land parcels falling within the government revenue land was being acquired through mutual consent policy.
- The villages in this area have inconsistent electric supply; kindly ensure 24-hour electric supply in all the project villages in lieu of the land being given on lease in case of Pavagada.
- What is the mechanism to ensure timely payment of lease rent for land being pooled for solar project (in case of Pavagada)?
- What will be the fate of agricultural labour that do not own land and are dependent on land owners for labour work on agricultural land owned by big farmers?
- In case the developer fails to honour the commitments, then what corrective steps will the government take to address the concerns of the local villagers during the

implementation or operations stage.

- How will the access be ensured for the villagers to the cultural properties located in vicinity / now falling within the proposed site. Will there be restriction on movement in these areas?
- How would the developer ensure that the noise / dust / labour camps setup during the construction phase of the project does not impact the local village community?
- Will the construction activity have any adverse impacts on our existing surface water resources?

The details of the consultations are provided in **Annexure X**.

## **6.2 Sub project consultations – wind projects / floating solar / hybrid**

The floating solar and hybrid wind-solar projects are currently in its emerging stage of development. The existing hybrid as well as floating solar plants, visited by the consultant's team was installed, currently being operated on research / experimental basis. The power generated from these is supplied to the grid and does not support any battery backup.

### **(a) Floating solar PV projects**

The two floating solar parks of 10kW each at Chandigarh and Kolkata were established around 2 -3 years back in a controlled environment.

- The access to lake is the only issue brought up by the community living close to the lake. The access to general public for these sites is restricted due to safety concerns.
- Incidents of stone pelting and subsequent damage to PV panels by the miscreants have been reported at Chandigarh.
- Interactions with the project proponents / developers and neighbouring community, reveals no adverse impacts on the lake water quality due to the floating structures.
- No adverse impacts on fisheries diversity or population reported due to these floating structures.

### **(b) Hybrid wind – solar project**

Hybrid wind -solar facility is installed within the campus of NIWE, Kayathar, Tamil Nadu. Hence there is no community interface. In depth interview with the developer brought out following points:

- The hybrid facility at existing WTG stations should be planned in such a manner that, in case of major repairs / preventive maintenance requirements, the solar panels can be easily dismantled and reinstalled post the repairs. All wiring for panels should be underground for ease of dismantling / reinstalling as and when required.

- The installation of WTG's in existing Solar PV Parks (subject to technical feasibility) is expected to have more adverse social and environmental impacts as compared to installation of solar panels in existing WTG's. This is mainly due to the expected movement of heavy machinery / materials / components for installation of WTG's.
- The negative impacts due to flickering shadows also need to be considered while planning for hybrid solar-wind power plants.

### (c) Wind farms

WTG installations, i.e. installations within NIWE campus wherein these have been installed for long term research and training activities; second being installed by NLC India Limited, through private developers on PPP mode. In the case of later, land is being procured directly by the developer as per the prevailing market rates / negotiations with the parcel owner, WTG installed and operated by the developer himself. Interactions with the local villagers / land parcel owners in a few of these locations in Tamil Nadu reveals that:

- There is no impact on livelihood as the developer in most of the cases have appointed the original owner of land as a security personnel on ground and paid a monthly salary. The income enhancement measures undertaken by the developer have been well accepted by the locals.
- The original land parcel owners continue to carry out agricultural activities in the remaining parcel of land available with them. Agricultural activities are being carried out in the land parcel sold by the original owner as sites are not fenced.
- None of the locals have reported any adverse impacts due to humming noise generated by WTG's and flickering shadow effects.

## 6.3 Consultation Framework

Public participation and community consultation is an integral part of environmental and social assessment. Public participation has been viewed as a continuous two-way process, involving promotion of public understanding of the processes and mechanisms through which developmental problems and needs are investigated and solved. Consultation is used as a tool to inform and educate stakeholders about the proposed action both before and after the development decisions are made. It assists identification of the problems associated with the sub projects as well as the needs of the population likely to be impacted. This participatory process enables the participation of the local people in the decision making process. The involvement of the various stakeholders ensures that the affected population and other stakeholders are informed, consulted and allowed to participate at various stages of project

preparation

The SECI and project developer will be responsible for ensuring participation of the community at sub-project level. Involvement of the community is not limited to interactions with the community but also disclosing relevant information pertaining to the project tasks. This however requires identification and mapping of stakeholders. Stakeholder mapping will be an ongoing activity throughout the project cycle.

### 6.3.1 Stakeholder Mapping

Through the formal and informal consultation, following stakeholder mapping has been done, identifying their interests concerned with the project activities.

**Table 6-1: Stakeholder Mapping**

Stakeholder Category	Interests	Potential/Probable impacts
<b>Primary stakeholders</b>		
Project affected people	Access to the facility, Project entitlement, Time-bound delivery of benefits, enhanced quality of life	(+/-)
Beneficiaries	Access to the facility, Project entitlement, Time-bound delivery of benefits, enhanced quality of life	(+/-)
<b>Secondary stakeholders</b>		
SECI & PAPs	Project implementation, Contracting; Project management, Monitoring and evaluation	(+/-)
NGOs, CSOs, Local Administration	Development, Community participation, and Community welfare	(+/-)

This is a tentative mapping and is likely to change during the project implementation. Each of these stakeholders will be part of the consultation process and their views will be incorporated into the project design. The key stakeholders can be grouped into two categories viz., primary and secondary. Their respective roles are presented below:

**Primary Stakeholders:** The primary stakeholders include project affected persons and direct beneficiaries.

*Project Affected Persons (PAPs)* have the following roles:

- Participate in public meetings and identify alternatives to avoid or minimize displacement

- Assist DPR consultants and NGOs in developing and choosing alternative options for relocation and income generation
- Participate in census survey and meetings with host population
- Provide inputs to entitlement provisions, thus assisting in preparation of the resettlement action plan
- Participate in grievance redress as members of grievance redress cells (GRC)
- Decide on relocation and management of common properties
- Labour and other inputs in the project
- Members of implementation committee

Beneficiaries and Host Population have the following roles:

- Assist DPR consultants and M&E Consultants in data collection and design
- Provide inputs to site selection
- Identify possible conflict areas with PAPs
- Identify social and cultural facilities needed at resettlement sites
- Help develop consultation process between hosts and PAPs.
- Manage common property
- Participate in local committees.
- Assist PAPs in integration with hosts.

### **Secondary Stakeholders**

*SECI* has the following roles:

- Establish separate cell for social development
- Notification at various stages for land acquisition and joint measurement of land to be acquired along with the revenue department
- Design and approval of resettlement policy
- Coordinate with line departments such as telephone, state electricity board, public health engineering department and forest department for shifting of utilities and cutting of trees
- Participate with NGOs in verification survey of PAPs and categorization of PAPs

- Participate in consultations with PAPs and beneficiaries
- Designing and distribution of ID cards along with NGO
- Coordinate and facilitate relocation of displaced persons including designing and construction of resettlement colony / vendor market; provision of basic amenities; distribution of plots / houses / to residential and/or commercially displaced persons
- Coordinate with NGO in identifying land for relocation of common property resources
- Coordinate with civil construction contractor to relocate common property resources
- Permission and liaison with line departments for provision of basic amenities in resettlement colonies, land acquisition and income restoration schemes;
- Coordinate with revenue department and NGO for facilitating disbursement of compensation and resettlement and rehabilitation assistances
- Monitoring of physical and financial progress
- Approval of micro plans
- Participate in training programmes for income restoration organized by NGOs
- Consult with panchayat and block office to facilitate inclusion of PAPs name for poverty alleviation schemes of government of India.

NGOs have following roles:

- Develop rapport with PAPs and between PAPs and SECI/ Implementing Agency
- Verification of PAPs
- Consultations with the community
- Assess the level of skills and efficiency in pursuing economic activities, identify needs for training and organize programmes either to improve the efficiency and/or to impart new skills.
- Assist PAP in receiving rehabilitation entitlements due to them
- Motivate and guide AP for proper utilization of benefits under R&R policy provisions;
- Facilitate purchase of agriculture land in negotiating price and settling at a reasonable price or expedite through Land Purchase Committee.
- Assist PAPs in obtaining benefits from the appropriate development programmes.
- Help PAPs in increasing their farm income through provision of irrigation facility or



improving farm practices, and

- Ensure marketing of produce particularly those under self-employment activities.
- Complete the consultation at the community level and provide support by describing the entitlements to the entitled persons (EPs) and assisting them in their choices
- Accompany and represent the EPs at the Grievance Redress Committee meeting.
- Assist EPs to take advantage of the existing government housing schemes and employment and training schemes that are selected for use during the project, and
- Promote location specific Community Based Organizations (CBOs) of PAPs to handle resettlement planning, implementation and monitoring.
- Create awareness among PAPs of HIV/AIDS, trafficking of women and child, child labour and health and hygiene

### 6.3.2 Mechanism for Consultation

The Consultation Framework envisages involvement of all the stakeholders at each stage of project planning and implementation. Involvement of the community is not limited to interactions with the community but also disclosing relevant information pertaining to the project tasks. Community consultation will be a continuous process throughout the project cycle starting from the project inception to till the end of the project; namely (a) sub-project identification; (b) planning stage (c) implementing stage.

#### (i) Sub Project identification stage

- To sensitize the community about the sub-project and their role

#### (ii) Planning Stage

- For disseminating information pertaining to the sub-project, work schedule and the procedures involved; finalization of project components with identification of impacts, entitled persons, mitigation measures; and Grievance Redressal mechanisms to be adopted.
- Dissemination of project information to the community and relevant stakeholders is to be carried out by Project developer at this stage of the project initiative. The community at large shall be made aware of the project alternatives and necessary feedback is to be obtained. Community and other stakeholders should be involved in the decision-making to the extent possible. Information generated at this stage should be documented for addressal of queries arising out of the Right to Information Act, 2005.

- Consultations with Project Affected Persons and their profiling are mandatory as per the requirements of SIA and preparation of RAP. This needs to be done as socio-economic and census surveys as part of the ESA study. Consultations with respect to cultural aspects are to be carried out as part of the Social Impact Assessments for all alternatives and the selected alternative subproject option.

### (iii) Implementation Stage

- Consultations as part of the implementation stage would be direct interactions of the implementation agency with the Project Affected Persons. These would comprise of consultations towards relocation of the PAPs, relocation of cultural properties, and towards addressing the impacts on common property resources (CPRs) such as places of religious importance, community buildings, trees etc.
- With the implementation of the R&R provisions in progress, consultations and information dissemination is to be undertaken to let the affected persons informed of the progress.
- Implementation stage also involves redressal of grievances in case of R&R aspects as well as relocation of common property resources through the grievance redressal mechanisms. These would usually be undertaken through one to one meetings of PAP or community representatives with the grievance redressal committee established for the project.

## 6.4 Information Disclosure Mechanism

The mechanism of information dissemination should be simple and be accessible to all. Two of the important means that have been followed until now include briefing material and organization of community consultation sessions. The briefing material (all to be prepared in local language) can be in the form of (a) brochures (including project information, anticipated environmental impacts, mitigation measures, land requirements and details of entitlements including compensation and assistance to be given to the PAPs) that can be kept in the offices of local self-government (municipal office in case of urban area and gram panchayat office in case of rural area), State Agency and SECI; (b) posters to be displayed at prominent locations and (c) leaflets that can be distributed in the impacted zone of the project. Consultation meetings should also be organized at regular intervals by the Implementing Agency to acquaint the PAPs of the following:

- Timeline and progress of the project;

- Information on compensation and entitlements;
- Information on land acquisition and market valuations of property;
- Time line for acquisition.

Also, opinion and consensus of the community needs to be sought for common and cultural property relocation. Information disclosure procedures are mandated to provide citizen centric information as well as all documentation necessary for addressing any queries under Right to Information Act that came into effect from October 2005. A computer based information management systems shall be employed to disseminate information pertaining to the project. Disclosure of information will enhance governance and accountability specifically with respect to strengthening of monitoring indicators to help the World Bank monitor compliance with the agreements and assess impact on outcomes.

Information shall be provided in a timely and regular manner to all stakeholders, affected parties, and the general public. Access by the public to information and documentation held or generated by SECI will facilitate the transparency, accountability, and legitimacy as well as operations overseen by it. As a part of its disclosure policy, all documents shall be made available to the public in accordance with relevant provisions of the RTI Act, except when otherwise warranted by legal requirements. A designated Information Officer shall be responsible for ensuring timely and complete dissemination in accordance with this policy.

#### **6.4.1 Information to be disclosed**

The Table 6.1 below specifies the type of additional information and frequency of dissemination for projects which are financed either from domestic or donors' funds. In addition to the information specified in the table, the following information shall also be displayed / disseminated, wherever applicable.

- Project specific information need to be made available at each contract site through public information kiosk
- Project Information brochures shall be made available at all the construction sites as well as the office of implementation agency and the office of Engineer in charge.
- Reports and publications, as deemed fit, shall be expressly prepared for public dissemination e.g., English versions of the ESIA and RAP and Executive Summary of ESIA and RAP in local language.
- Wherever civil work will be carried out a board will be put up for public information which will disclose all desired information to the public, for greater social accountability.
- All information will be translated into local language and will be disclosed to the public

through the Panchayat, District Magistrate's office, concerned offices of Implementing Agency, websites of SECI.

**Table 6-2: Information to be disclosed**

Topic	Documents to be Disclosed	Frequency	Where
Resettlement, Rehabilitation and Land Acquisition	ESDDR; Action Resettlement Plan (RAP).	Once in the entire project cycle. But to remain on the website and other disclosure locations throughout the project period.	World Bank's Infoshop On the website of SECI, RAP to be made available at a place accessible to affected persons and local NGOs, in a form, manner, and language that are understandable to the PAPs in the following offices: DM's Office State and District Libraries Local municipal and <i>gram panchayat</i> office Office of Implementing Agency Office of the contractor
	Resettlement & Rehabilitation Policy translated in local language	Once in the entire project cycle.	Distributed among Project Affected Persons (PAP)
	Information regarding impacts and their entitlements in local language	Once at the start of the project and as and when demanded by the PAP.	Through one-to-one contact with PAPs. Community consultation List of PAPs with impacts and entitlements to be pasted in the SECI office and website of SECI,
	R&R and LA monthly progress report.	10th day of every month	Website of, SECI. Hard copy in the office of contractor in local language
	RAP Impact Assessment Report	At midterm and end of the RAP implementation	SECI website in local language.
	Land Acquisition notifications	As required under the RFCTLARR Act 2013	SECI, website. Hard copy in the office of contractor in local language

Topic	Documents to be Disclosed	Frequency	Where
	Grievance redressal process.	Continuous process throughout the project cycle.	World Bank's Info shop. On the web sites of SECI Hard copies in local language in the following offices: DM's Office Local municipal and <i>gram panchayat</i> office Office of the contractor PAPs to be informed on one to one contact by SECI through NGO
Public Consultation	Minutes of Formal Public Consultation Meetings	Within two weeks of meeting	On the web sites of SECI Hard copies in local language in the following offices: DM's Office Local municipal and <i>gram panchayat</i> office Office of the contractor

## 6.5 Consultation on Draft ESMF

A stakeholder workshop was held on August 28, 2018 on draft ESMF. The objective of the workshop was to disseminate draft ESMF and invite comments on the content and structure of ESMF. The participants included representatives of civil society, developers and consultants. The issues raised by the participants and its addressal in ESMF is given in the table 6.3 below:

**Table 6-3: Issues Raised during consultation on draft ESMF**

Sl. No.	Issues Raised	Response
1	Training of EPC contractors on environment and social issues	The same would be taken up at sub project level
2	Monitoring mechanism is not clear	The internal monitoring of physical and financial indicators will be carried out by SECI whereas external evaluation will be

		carried out by third party. The detailed mechanism has been discussed in chapter 8.
3	Learning and information dissemination: frequency and responsibility	The information dissemination will be an ongoing activity. SECI is primarily responsible for dissemination of project information. The mechanism is detailed out in section 6.4 of this chapter.
4	Mitigation plan for depletion of ground water not mentioned in ESMF	In case ground water depletion is identified as adverse impact, mitigation measures will be part of sub project specific ESMP.
5	Benefit sharing has not been mentioned	Benefit sharing will be part of sub project activity. The mechanism of benefit sharing will be detailed out in sub project specific RAP.
6	Community participation and engagement mechanism	Community consultations are integral to projects and will be carried out all through the project life. The mechanism for community consultation has been discussed in chapter 4.

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## 7 INSTITUTIONAL STRUCTURE / IMPLEMENTATION

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For successful implementation of Environmental and Social safeguards, Institutional setup plays a vital role. The sub-projects would be fully owned by SECI, a company under 100% ownership of the Government of India. The solar-wind hybrid project would be set up inside a hybrid power park, to be developed by PARK DEVELOPER, the state nodal agency under the State Government of Andhra Pradesh.

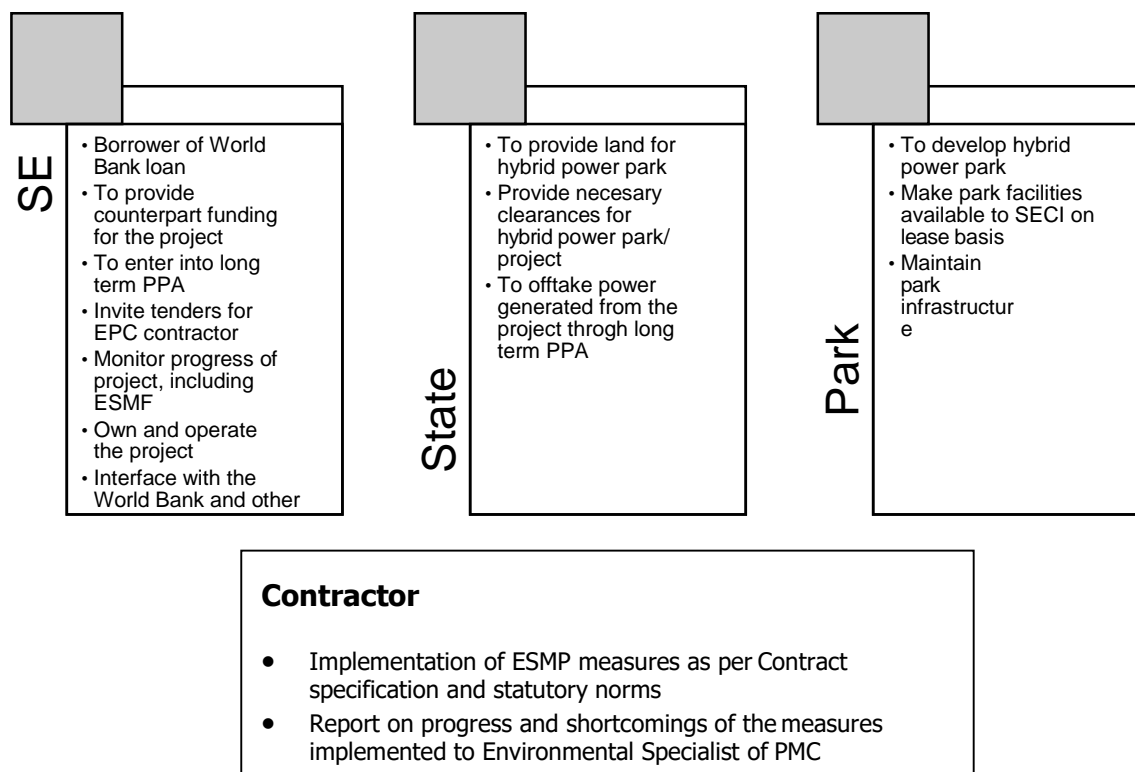
### 7.1 Sub-project Execution Structure and Responsibilities

Government of India has given its approval to the proposal “*Investment for innovation in Solar power and Hybrid technologies*”. Under the proposal, the World Bank would finance USD 200 million (50% of project cost) for projects with innovative technologies, such as solar-wind hybrid, floating solar etc. to be developed by SECI. The counterpart 50% funding would be met by SECI through its equity and/or through domestic commercial borrowings.

As the first project under this proposal, a 160 MW solar-wind hybrid project with battery storage is being developed. SECI is the Project Implementation Agency (PIA) for the project. Other project options are being explored.

The solar-wind hybrid with storage project would be under the ownership of SECI. It would be set up on a land-lease basis inside a hybrid power park being developed by PARK DEVELOPER. Ownership of land remains with PARK DEVELOPER & shall be returned after 25 years Project would be set up in a turnkey EPC mode, with EPC contractor being determined through a transparent international competitive bidding process.

The implementation arrangement for the project is depicted in the figure 2 below:



**Fig. 7-1: Implementation structure**

**(a) Role of SECI**

- SECI is the Project Implementation agency. It would develop the project under its ownership. SECI is the borrower of World Bank loan. Counterpart funding to the tune of 50% of project cost would be provided by SECI.
- As project developer, SECI would get the necessary technical, social and environmental due diligence done before project set-up. SECI would enter into long term power purchase agreements with Discoms/bulk consumers for ensuring offtake of power from the project.
- SECI would invite tenders for EPC contractor through international competitive bidding process. SECI would enter into contract with the selected bidder. During execution phase, SECI would monitor progress of project and ensure compliance with World Bank norms.
- SECI would own the project assets and operate it for the project life time. During operation phase, SECI would ensure compliance with World Bank norms.

**(b) Role of State Government**

- The State Government would provide land and necessary clearances for setting up of the project.



- The State Government would have to agree to offtake power generated from the project.

**(c) Role of Hybrid Power Park Developer**

- Developer would obtain necessary approvals for developing the hybrid power park at the designated site.
- Park developer would develop the land and infrastructure for the hybrid power park and make the facilities available for the project on lease basis.
- Developer would be responsible for maintaining the hybrid park infrastructure.

**(d) Role of EPC Contractor**

- EPC contracting mode has been envisaged in the project execution. This document's model EMP can be used as reference for projects but relevant inputs for specific projects shall be incorporated, the EMP for such subprojects including codes of practice shall be included in the Bid Document. EPC contractor shall ensure that the design conforms to the requirements of the World Bank policy. EPC Contractor shall follow all E&S requirements as mentioned in bid document & shall assign all resources including necessary staff for relevant project stages to mitigate any residual E&S risks.

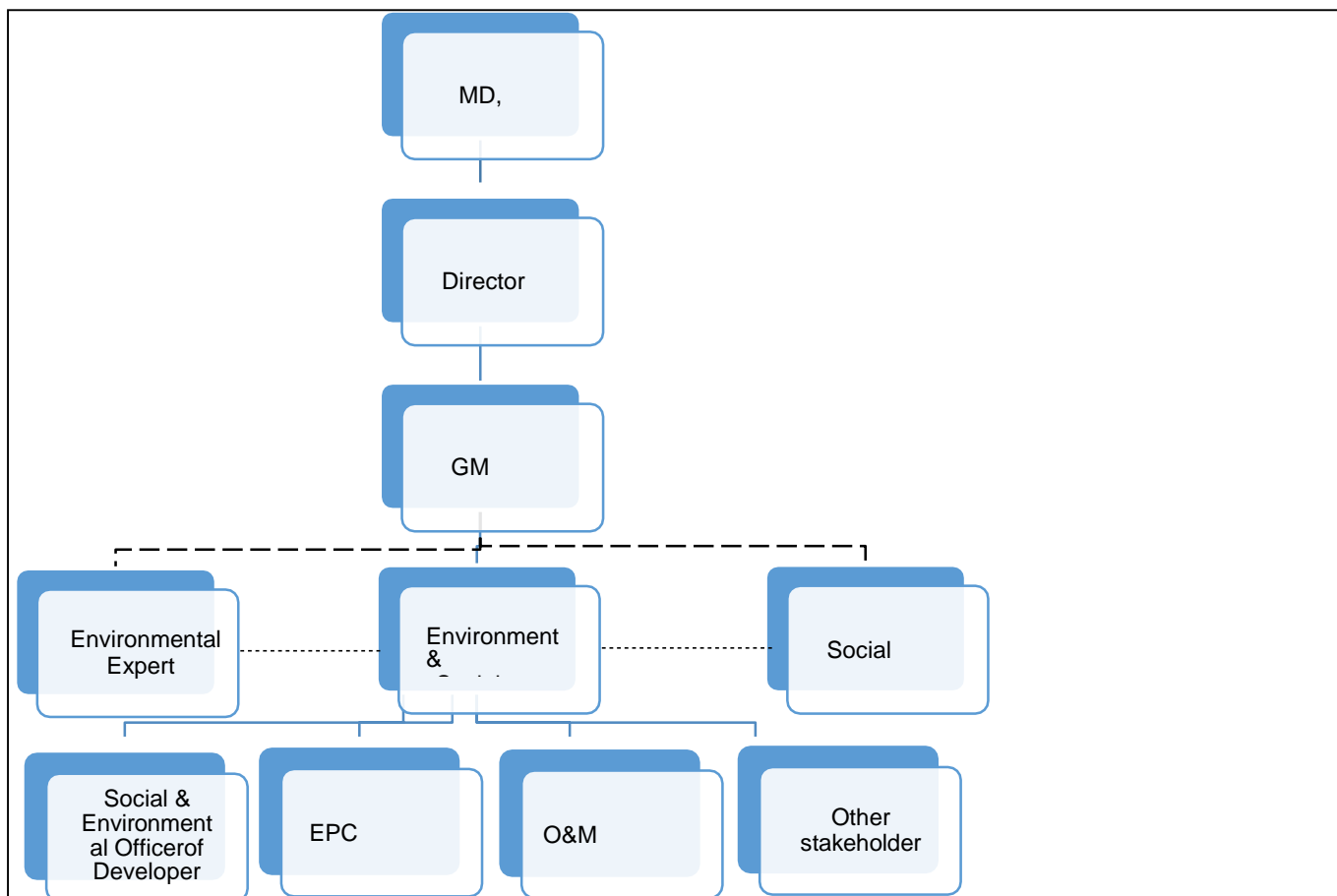
The above-mentioned activities related to hybrid park development and project development are likely to have some adverse impacts on the environment which need to be mitigated and ensured that the appropriate mitigation measures are included as part of the EPC contract and O&M processes.

SECI, being the PIA for the project, would be overall responsible for monitoring the compliance of environmental and social norms for the project-related activities. Presently, SECI does not have an Environment and Social Management System (ESMS), however, same would be developed. SECI would designate Social & Environmental (s) Officer for the project.

**(e) Roles and Responsibilities of Social & Environmental Officer - SECI**

The project sites would be spread across several villages and remote areas. Project development may necessitate relocation of the people in those areas or affect their livelihood. For upliftment of people and community development, there is a need for Rehabilitation and Resettlement (R&R) of Project Affected People (PAP) with the objective that standards of living of the PAP improves or at least regain their previous standards of living.

The proposed organization structure for RAP/EMP implementation is presented in Figure below.



**Fig. 7-2: Institutional arrangement in SECI**

Managing Director, SECI will have overall responsibility for implementation of the project. Environmental and Social development expert(s) would be engaged by SECI as part of project development and will report to GM (Solar), SECI.

The Environmental & Social Development officer is overall responsible for EMP and RAP implementation, coordinating and liaising with PARK DEVELOPER, contractors and other agencies, as well as the World Bank, with respect to different social and environmental issues. The officer will also be responsible for progress monitoring of Environmental and social safeguards during project construction and execution stage and submission of monthly report (during construction stage) and quarterly report (during operations stage) on EMP compliance to the World Bank.

The roles and responsibilities of the Social and Environmental Officer shall be:

- Conduct Screening and Environmental and Social Due Diligence of the sub project
- Prepare TOR for any studies required and qualitative dimensions to the implementation of RAP/ ESMP;

- 
- Participate in and facilitate consultations with stakeholders;
  - Participate in project meetings and report on the issues related to environmental management and social safeguards to provide for any mid-course corrections that may be required based on situation on the ground;
  - Assist PAPs to resolve their grievances;
  - Coordinate on the training and capacity building initiatives;
  - Review contract documents to ensure that EMP provisions related to works are included in the contract documents;
  - Act as a resource person in trainings based on experience on implementing this project and previous relevant work;
  - Oversee and report to management on implementation of EMP provisions included in the works contract for each sub-project in the state;
  - Liaison with state administration for land acquisition/procurement and implementation of RAP;
  - Report progress, highlighting social issues not addressed, to provide for mid-course correction;
  - Assist PAFs in approaching the grievance redressal mechanism;
  - Carry out other responsibilities as required from time to time.

SECI does not have prior experience of implementing World Bank financed projects. Till recently, it had one officer handling environmental matters, reporting to GM (Solar). However, presently the post is vacant. Recruitment process for hiring of Social and Environmental Officer is underway. The overall responsibility of safeguards would lie with GM (Solar).

## **7.2 Utilization of Grant**

The expenditure on the development of the solar-wind with storage project will mainly constitute (a) solar power generation assets, (b) wind power generation assets, (c) energy storage assets and (d) interconnection upto pooling substation. CTF grant is available for the energy storage portion. SECI, responsible for development of the project, shall endeavour to optimize the total expenditure to be made for the development of the project, such that the power generated by the project is low and competitive.

## **7.3 Grievance Redressal Mechanism**

Effective environmental grievance redressal mechanism gives an opportunity to the

organization to implement a set of specific measures to ensure good governance accountability and transparency in managing and mitigation of environmental and social issue of a particular project. This consists of defining the process for recording/receiving complaints and their redressal in respect of environmental and social matters.

An integrated system will be established with Grievance Redressal Cell (GRCs), with necessary officers, officials and systems, at the state as well as SECI. Grievances if any, may be submitted through various mediums, including in person, in written form to a noted address, e-mail, or through direct calls to concerned officials. The Social and Environmental Expert in the concerned agency shall be responsible for coordination of grievance/complaints received.

**(a) Grievance redressal through web based mechanism**

In case of grievances received through toll free number or web based system, a person will be made in-charge of screening and resolution of the same/communicating with the concerned divisions for resolution of the same. The person in-charge based on nature of complaint, will forward the same to the concerned official. A ticket or a unique number will be generated for all such complaints. The complainant will follow up based on that unique number. All calls and messages will be responded within two weeks. If response is not received within 15 days, the complaint will be escalated to project head. A sample template for submission of complaints on environmental and social issues of the project may be utilized as per **Annexure-X**.

Grievance Register:

It is also recommended to maintain a grievance register on action taken and disposal of grievance. A sample format for Grievance register is enclosed in **Annexure- XI**.

**(b) Tier One: Site level Grievance Redressal Cell**

A site level GRC will be set up that is easily accessible to the affected community. The staffing of GRC will include site level Environmental and Social officer of developer; contractor and two representatives from community / beneficiary / affected persons. The head of the cell can be a government officer not below the rank of Additional District Magistrate or a person of repute in the project area. The site level GRC should give its verdict within 15 days from the first hearing.

**(c) Tier Two: Central Level Grievance Redress Cell**

If the person affected is not satisfied with the verdict of the site level GRC, he or she can escalate the grievance to SECI. The General Manager (Solar) and Environmental and Social Officer of SECI will be responsible for resolving the grievance within 30 days of receiving the grievance.

**(d) Tier Three: Judiciary**

The aggrieved person if not satisfied with the verdict given by SECI, will have the right to approach the Judiciary. SECI will help the aggrieved person in all respects if person want to approach the judiciary.

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## 8 MONITORING AND EVALUATION FRAMEWORK

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### 8.1 Introduction

Environmental and Social safeguards monitoring is an essential tool to make necessary recommendations and adopt suitable control strategies so that menace of rising environmental degradation could be minimized and a relief be extended to the people including labours in case of any damage caused under occupational health hazards. The monitoring is necessary for the following reasons:

- To see what impacts have occurred;
- To evaluate the performance of mitigation measures proposed in the ESMF;
- To ensure that the conditions of approval are adhered to;
- To suggest improvements in management plan, if required;
- To see that benefits expected from the implementation of safeguard measures are achieved as the project proceeds; and
- To satisfy the legal and community obligations

Monitoring and evaluation is primarily required to ensure proper and timely implementation of environmental and social mitigation measures identified in the planning stage, based on the ESMF. Monitoring at regular intervals during implementation and for a specified period in the post implementation stages is necessary to identify and implement any change / improvement needed in the execution of the activity or in the mitigation measures. A monitoring and evaluation cell may be created at State level under the supervision of an official familiar with environmental and social issues of the sub-projects. He may be given suitable training if needed. In specific situations, one may consider appointing external agencies to carry out the monitoring and evaluation activities and report to the supervising official. The indicators to be monitored can be framed from the ESMF taking into consideration the activities involved. A list of indicators for monitoring and evaluation in the implementation and post implementation stages is given in the following section.

The physical, biological and social components, which are significant in affecting the environment as well as society, have been suggested as Performance Indicators. The following specific environmental parameters can be qualitatively measured and compared over a period of time and therefore selected as Performance Indicators for monitoring due to their regulatory importance and the availability of standardized procedures and relevant expertise.

- Environmental Performance Indicators
  - Soil contamination & Erosion indices
  - Air quality
  - Water quality
  - Noise levels around sensitive locations
  - Restoration of borrow pits
  - Construction camp management
  - Debris Clearance and disposal
  - Safety Aspects
  - Site Restoration
- Socioeconomic Performance Indicators:
- Employment of local population
- Labour standards at camp
- R&R Components:
  - Livelihood Restoration
  - Livelihood training
  - Change in Income
- Gender Issues:
  - Women employment (%)
  - Wages

## 8.2 Monitoring of Environmental Performance Indicator

### (a) Monitoring of Statutory compliance:

The status of necessary permits and licenses including their renewals will be monitoring for each project to assess the statutory compliances.

### (b) Air Quality (AAQ) Monitoring

Ambient air quality parameters which are recommended for monitoring of are PM<sub>10</sub> (Particulate Matter having less than 10-micron size) or PM<sub>2.5</sub> (Particulate Matter having less than 2.5-

micron size), Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and Carbon Monoxide (CO) and Hydrocarbon (HC). These parameters are to be monitored at project construction and allied sites before commencement of work to compare the data with National Ambient Air Quality (NAAQ) Standards 2009.

**(c) Ambient Noise Monitoring**

The measurement for monitoring the noise levels to be carried out at the work site and near habitation area if any in accordance to the Ambient Noise Standards formulated by Central Pollution Control Board (CPCB). Sound pressure level would be monitored on twenty-four hourly basis. Noise shall be recorded at “A” weighted frequency using digitized noise monitoring instrument. The equivalent Noise Level will be recorded for comparison with prescribed limit.

**(d) Water Quality**

Water quality of local water body/ stream within or adjacent to the project site that is used by local community shall be monitored on downstream of the works and dumping area. The physical and chemical parameters recommended for analysis of water quality are pH, turbidity, total solids, total suspended solids, total dissolved solids, COD, BOD, DO, Oil and Grease, Iron, heavy metals, pathogens etc. Monitoring parameters will be as per as per CPCB Guidelines for used based surface water classification.

**(e) Soil Quality**

The soil quality of the surrounded fields close to the project and disposal site will be monitored to understand the impact of soil quality. The physio-chemical parameters recommended for analysis are physical Parameter: Soil Texture, Grain Size, Gravel, Sand, Silt and Clay and Chemical Parameter: pH, Conductivity, Calcium, Magnesium, Sodium, Nitrogen and Absorption Ratio, heavy metal, pesticides, etc.

**(f) Erosion Control Measures:**

Visual inspection of vulnerable locations such as embankment slopes, borrow areas, etc. will be carried out on periodical basis, especially before and after monsoon.

**(g) Debris clearance and disposal**

The contractor has to clear the debris material from all the site of activities on regular basis and the same will required to be disposed off at approved disposal sites. To ensure regular clearance and disposal of debris the monitoring will be required for the same. Visual monitoring of the site will be carried out on periodical basis especially in the section which is completed.

**(h) Site Restoration**

The restoration of all the temporary sites utilized for construction such as borrow areas, stock



yards, camp site, etc. will be monitored after completion of works to monitored restoration works to the satisfactory level before issuing completion certificate.

**(i) Safety Aspects:**

Visual inspection of safety at site is required to be checked on day to day basis by the site supervisor/ Engineer. The parameters to be checked on daily basis are:

- Number of laborer's working at site
- Number of PPEs used by the Labourers
- Safe access to worksite and safe working platform
- First Aid Kit

Apart from monitoring of above safety parameters the Record safety training for workers, Safety register, First Aid Register, incidence report are required to be checked on monthly basis

### **8.3 Monitoring of Socio-economic Performance Indicators**

**(a) Employment of local population:**

Percentage of local and migrant labour engaged for different works will be assessed by checklist method on monthly basis to indicate total employment generated verses local employment of labourers.

**(b) Labour standards at campsite:**

Labour camps are provided by the contractors for their migrant labours including operators. The labour standards at campsite with respect to basic facilities provided to the labour at the labour camp and their maintenance will be checked visually on monthly basis through checklist method.

**(c) Livelihood Restoration**

In the project where displacement of population is involved, following components will be monitored on periodic basis. The major impacts associated with the displacement are livelihood loss which is required to be restored for the affected population. The following indicators will be monitored on periodical basis:

- Livelihood training
- Change in Income

**(d) ESMF Monitoring Action Plan**

The monitoring action plan covering various performance indicators, frequency and institutional arrangements of the project in the construction and operation stages is given in

the Table 8.1

**Table 8-1: Monitoring Plan for Performance Indicators on ESMF Compliance**

S. No	Environment & Social Parameters	Performance Indicators	Implementing Agency	Monitoring Agency	Frequency
1.	<b>Compliance to Statutory Norms</b>	Labour License	Contractor	Implementing Agency (IA) /SPPD	Quarterly
		Statutory permission for Borrow area (If the Contractor operate their own new borrow area)			
		Statutory permission for stone quarry (If the Contractor operate their own new stone quarry)			
		Explosive permit (In the project involving blasting)			
2.	<b>Air Quality</b>	Particulate matters PM10 and PM2.5, Oxides of Sulphur (SOx), Oxides of Nitrogen (NOx), Carbon Monoxide (CO) Hydrocarbon (HC)	Contractor through Approved Environmental Laboratory	IA	Quarterly
2.	<b>Noise Quality</b>	Leq Day and Night	Contractor through Approved Environmental Laboratory	IA	Quarterly

S. No	Environment & Social Parameters	Performance Indicators	Implementing Agency	Monitoring Agency	Frequency
3.	<b>Water Quality</b>	Suspended Solids (SS), Total dissolved solids (TDS), oil, grease, Heavy metals (Fe, Cr, Pb, etc) Biological Oxygen Demand (BOD), Total coliforms, Faecal coliforms	Contractor through Approved Environmental Laboratory	IA	Quarterly
4.	<b>Soil Quality</b>	Oil and grease, Heavy metals (Pb, Cr, Ni, Mn, Fe, etc.), N.P.K.	Contractor through Approved Environmental Laboratory	IA	Quarterly
5.	<b>Personnel Safety</b>	Total supply of PPEs vs number of workers working Number of workers working using PPEs Safe access Safe working platform for work site	Contractor	IA	Daily
6.	<b>Labour Standards</b>	Basic Facilities at labour camp	Contractor	IA and SPMU	Monthly
7.	<b>Site Restoration</b>	Visual Observation of Allied sites including plant site, borrow area, camp site	Contractor	IA	After completion of works & before demobilization of the contractor

S. No	Environment & Social Parameters	Performance Indicators	Implementing Agency	Monitoring Agency	Frequency
8.	Debris Management	Removal of debris from site (visual Observation)	Contractor	IA	After completion of works & before issuing completion certificate
9.	Livelihood	a. Number of people losing livelihood b. livelihood c.No. of women Headed Household d. Training for eligible persons	IA	IA  Through third party	Before commencement of construction
10.	Gender issues	e. Percentage of women labours engaged f. Wages	IA	IA	Monthly
• During Operation Stage					
11.	Ecological Issue	g. Bird collision survey	IA through Expert	SECI	Quarterly during operation stage
12.	Ground water level	h. Monitoring of ground water level fluctuation	IA through External Agency	SECI	Yearly
13.	Soil Quality	i. Oil and grease, Heavy metals (Pb, Cr, Ni, Mn, Fe, etc.), N.P.K.	Contractor through Approved Environmental Laboratory	IA	Half yearly

#### (e) Monitoring Budget

A monitoring budget has been drawn up considering various environmental and social components. This provides cost for different mitigation measures of likely environmental/social impacts at sub-project level. Cost for environmental enhancement measures and monitoring

has also been included. The detailed budget is provided In **Table 8-2**

**Table 8-2 Environmental and Social Monitoring Budget (Based on Current Market Estimates)**

COMPONENT	ITEM	UNIT	UNIT COST (Rs.)	QUANTIT Y
<b>(A) Mitigation Costs</b>				
Air suppression (dust suppression)	Dust Suppression with sprinkling of water, covers of the vehicles transporting construction material	Pert Tanker of 15000-20000 liters	1200-1600	Site Specific
<b>(B) Monitoring Cost</b>				
Ambient Air quality monitoring (during Construction Stage)	Quarterly Ambient air quality monitoring during construction period	Per sample	12000	Site Specific
Surface Water quality monitoring (during Construction Stage)	Quarterly Surface water quality monitoring during implementation period	Per sample	8000	Site specific
Ambient noise level monitoring (during Construction Stage)	Quarterly ambient noise level monitoring during implementation period near Gen-set/ batching plant	Per sample	4000	Site specific
Surface Water quality monitoring (during Operation stage)	Surface water quality monitoring twice a year for three years	Per sample	8000	Site specific
Ambient noise level monitoring (during Operation stage)	Ambient noise level monitoring twice a year for three years	Per sample	4000	Site specific

COMPONENT	ITEM	UNIT	UNIT COST (Rs.)	QUANTIT Y
Soil quality	Oil and grease, Heavy metals (Pb, Cr, Ni, Mn, Fe, etc.), N.P.K.	Per Sample	8000	Near storage area
Ground water level monitoring	Ground water level	Lump Sum	500000	Project site near boring once in a year
<b>(D) R &amp; R Cost</b>				
Included in R&R Framework				
Training on ESMP	Once in a year	Lump Sum	300000	-

#### **(f) Monitoring and Reporting**

SECI, through the EPC/O&M contractors, will monitor the project to ensure conformity to the requirements of the ESMF. The monitoring will cover all stages of planning and implementation. The monitoring will be carried out through the (a) environmental and social safeguard compliance reports that will form a part of Monthly Progress Reports (MPR) for the project, and (b) regular visits by the environmental and social specialists of SECI.

SECI will review these evaluation reports and identify technical, managerial, policy or regulatory issues with regards to the compliance of the RAP reports. The identified technical issues will be duly incorporated. Policy and regulatory issues will be debated internally by SECI and the need for appropriate interventions will be determined. These interventions could include appropriate revision of ESMF document / R&R Policy in consultation with the Bank or suitable analytical studies to influence policy or programs of the state, if found necessary / warranted.

An external evaluation of the RAP implementation prepared for the project will also be undertaken twice during the implementation of the project – mid-term and at the end of the implementation as per the terms of reference. During implementation, meetings will be organized by SECI inviting all stakeholders for providing information on the progress of the project work.

Project monitoring will be the responsibility of EPC contractor who will submit Monthly Progress Reports to SECI. The reports will compare the progress of the project to targets set up at the commencement of the project.

**Tables 8.3** below present the Mitigation, Monitoring, Responsibility and Timeline for Environmental and Social Impacts

**Table 8-3 Monitoring and Reporting**

S. No.	Impact / Issues	Monitoring Measures	Responsible Agency
<b>Environmental Indicators</b>			
1	Handling / disposal of defected PV panels	Number of panels defective / number of panels replaced	EPC / O&M contractor
2	Extent of wash water reuse / recycling	Water used on a monthly basis / wash water recycled on a monthly basis	EPC / O&M contractor
3	Regulatory Compliance	Quarterly and annual compliance reports submitted to the regulatory authority / Park Developer	EPC / O&M contractor
4	Disposal of Batteries	Number of batteries disposed / new installed	EPC / O&M contractor
<b>Social Indicators</b>			
1	Land acquisition	Regular internal monitoring by the Park Developer and periodic evaluation	Park Developer
2	Acquisition of house/ structure	Regular internal monitoring by the Park Developer and periodic evaluation	Park Developer
3	Loss of livelihood or source of livelihood	Regular internal monitoring by Park Developer; midterm and end term evaluation	Park Developer
4	Loss of access to private and / or common property	Regular internal monitoring by Park Developer; midterm and end term evaluation	Park Developer
5	Displacement of Non-Titleholders	Regular internal monitoring by the Park Developer; midterm and end term evaluation	Park Developer
6	IPDP (If applicable)	Regular internal monitoring by the social development professional of SECI. Mid-term and end-term evaluation	Park Developer
7	Gender Action Plan	Regular internal monitoring by the social development professional of SECI. Mid-term and end-term evaluation	Park Developer

The list of above mentioned impact performance indicators will be used to monitor project objectives as depicted in table below along with the milestones.

<b>Milestones</b>	<b>Objectives</b>	<b>Process</b>	<b>Responsibility</b>	<b>Decision/Target /Deliverable</b>
i. <b>Project Appraisal</b>	To ensure satisfactory compliance with ESMF	Detailed appraisal (including EIA & EMP, RAP, GAP and IPDP where relevant), including site visits/ investigations if necessary assess suitability of site, adequacy of safeguard measures, risk analysis and regulatory clearances).	SECI	Review report and decide to - accept - accept with modifications - reject and instruct to resubmit
ii. <b>Implementation of EMP, RAP, GAP and IPDP Monitoring and Review</b>	Ensure Implementation of agreed RAP, GAP and IPDP where applicable)	a. Prepare quarterly progress reports b. Schedule field visits as required c. Mid-term and end-term evaluation	SECI	Quarterly Progress Report

The assessment methodology and the expected outputs for the various stages of implementation process are given in **Annexure XIII**.

The terms of reference for concurrent monitoring & evaluation is given in **Annexure XIV**.



## 9 ENVIRONMENTAL AND SOCIAL MANAGEMENT BUDGET

The project will have its budget for implementation of EMP, RAP and IPDP. Most of the cost heads would be included within the hybrid power park charges on account of the project. The budget heads for planning and pre-construction stage will include cost towards

Compensation for immovable properties;

- R&R assistances;
- Implementation of labour management plan
- Cost towards relocation facilities if required;
- Training and capacity building;
- Implementation arrangement;
- Monitoring and evaluation and
- Cost incurred for day to day expenses on R&R issues.
- Environmental & Social plan preparation

The budget heads for construction and O&M stage will include cost towards

- Waste Water treatment and reuse
- Personal protective equipment
- Health & Safety
- Hazardous material handling, transportation & disposal

The sample budget format is as under:

**Table 9-1: Estimated Costs for Resettlement Action Plan (RAP) as per Entitlement of Provisions of ESMF under SECI**

Sl No.	Items	Unit	Quantity	Unit Rate (in INR)	Amount (in INR)
1	Implementation of EMP				
1	Land compensation	Acre			
2	Assistance for Vulnerable	Nos.			

	Families (as per EM)				
3	Training Assistance to PAPs (as per EM)	No. of families			
4	Hiring of agency for M & E of RAP and GAP implementation				
5	GRC establishment and operations	-			
6	Awareness Generation and continued consultation				
7	Livelihood and Capacity Building trainings	Eligible PAPs			
8	External Monitoring and Evaluation				
9	RAP Implementation Agency				
	Sub-Total				
10	Contingency @ 2 % of Total Cost				
	G.Total				

## **10 CAPACITY BUILDING REQUIREMENTS / ACTIVITIES**

The Solar Energy Corporation of India is overall responsible for safeguards compliance. SECI will be supported by developers and contractors. Given that SECI is implementing a World Bank-financed project for the first time, the capacity to address environmental, social and cultural issues as per the World Bank safeguards policies is limited. To this end, SECI has already hired an experienced Environmental and Social Development Specialist to coordinate, review, support and monitor all respective safeguards aspects of the project. The specialist will also train and strengthen the capacities of specialists with the developers and contractors. SECI will also hire qualified civil society organizations for the implementation of a RAP as required.

Staff members of SECI, developer and contractor involved in the project will also continue to receive training in the management of safeguards issues. The training program is to be coordinated and anchored by the SECI with support from agencies/individuals experienced in safeguard aspects of renewable energy infrastructure investments for developing courses on conducting training programs. The course contents focus on the project's ESMF, concept, regulatory requirements, environment and social priority issues, project cycle of investments, outline of the ESIAs, management plans and report formats. It will also focus on the resettlement and rehabilitation and procedures, land acquisition process, identification of project affected people, social entitlement frameworks, social assessment, risk assessment and management skills.

The course outline for various modules, the duration and the participation envisaged are illustrated in Table below.

In addition to the above, SECI program will continue to mainstream the environmental and social issues within the solar programs. The program will be structured in such a way that it clearly brings out the value addition and enhancement benefits of proper management of environmental and social issues.

**Table 10-1 - Capacity Strengthening Plan**

<b>Modules</b>	<b>Content</b>	<b>Duration</b>	<b>Participants</b>
<b>ESMF</b>	Project Concept ESMF Concept Regulatory Requirements E&S Priority Issues	Half a day  To be repeated every alternate year	Staff of:  SECI / Developer / Contractor

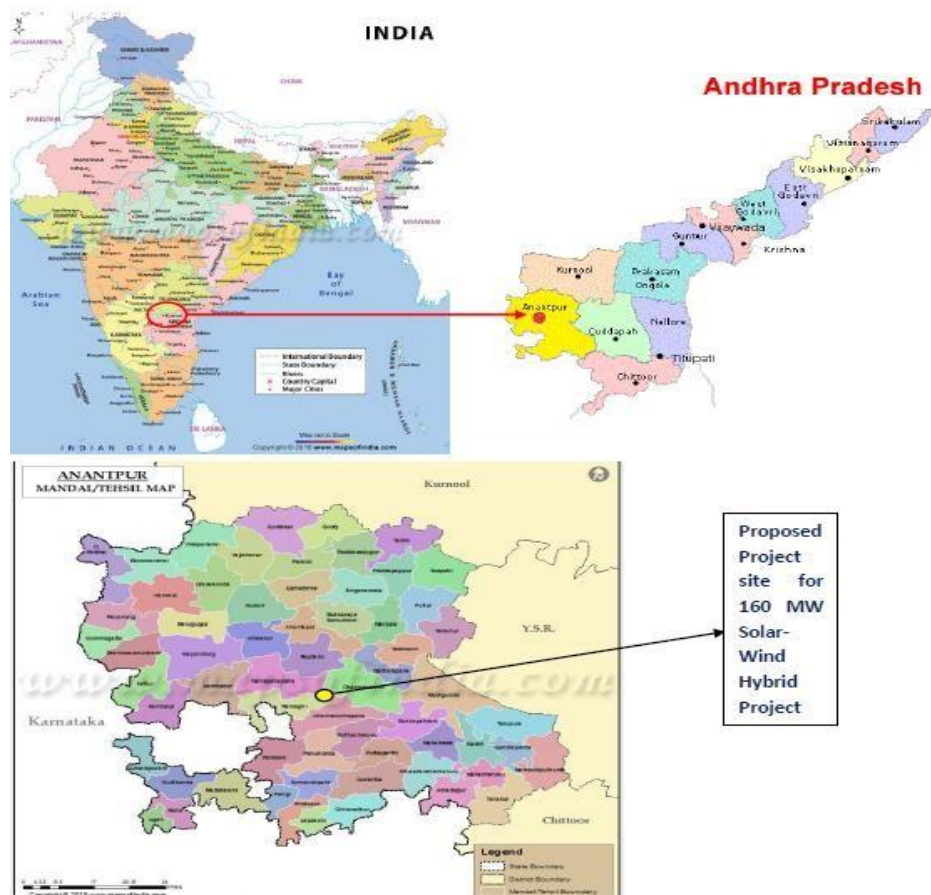
	<p>Subproject types</p> <p>ESIA</p> <p>Process Outline</p> <p>Reporting</p>		
<b>Environmental Assessment Process</b>	<p>Environmental Laws &amp; Regulations</p> <p>EIA process</p> <p>Identification of Environmental Impacts</p> <p>Impact Identification Methods</p> <p>Identification Mitigation Measures</p> <p>Formulation of Environmental Management Plan</p> <p>Implementation and Monitoring</p> <p>Institutional Mechanism</p>	<p>Full day class room training.</p> <p>Half a day field training.</p>	
<b>Social Assessment Process</b>	<p>Social Assessment process</p> <p>Description of project; RPF, gender frameworks; and National regulatory frameworks</p> <p>LA process</p> <p>Necessity for RAP/ ARAP, Gender plan and its preparation process</p> <p>Labour management plans</p> <p>Implementation and Monitoring</p> <p>Institutional Mechanism</p> <p>Grievance Mechanism</p>	<p>Half a day class room training.</p> <p>Half a day field training.</p>	

## ANNEXURE-I Anantapur Hybrid Park (Baseline)

Baseline Environmental and Social Status of Solar-Wind Hybrid Project, Ramagiri, Anantapur, Andhra Pradesh: (For reference purpose only)

Location Characteristics:

The proposed project area is located in Ramagiri and Muthavakuntla village, Ananthapuramu district in the Rayalaseema region of Andhra Pradesh, India. The geographical location of the proposed solar-Wind Hybrid park project site is 14°21'29.7" N latitude and 77°31'18.9" E longitude. –The proposed site located in Anantapur district of Andhra Pradesh (A.P). It is the largest district of Andhra Pradesh spanning an area of 19,130 square kilometres. It is bounded on the north by Kurnool District, on the east by Kadapa District, on the southeast by Chittoor District, and on the southwest and west by Karnataka state. The project is located 10 km away from National Highway no 44 (AH43).



Physiography and Soil:

Geomorphologically, Anantapur district forms the northern extension of Mysore Plateau. Northern and central portions of the Anantapur district are a high plateau, generally undulating, with large granite rocks or low hill ranges rising occasionally above its surface. In the southern portion of the district the surface is more hilly, the plateau there rising to 610 m above the sea. The project area has undulated terrain with elevation varying from 470 m to 517 m amsl. The land is uncultivated land. The project and have thin layer of soil over rocky strata. The soil in the project area is predominantly red gravelly soil and black soil. The area lies over zone IV of seismic region, which is considered as stable zone.

#### Drainage Pattern and Water Bodies:

The Anantapur district is drained by six rivers namely Penna, Chithravathi, Vedavathi, Papagni, Swarnamukhi, and Thadakaleru. The area around the project is mainly drained by project area dendritic drainage pattern is observed at the project area. There are 6-7 local drains/streams spotted in the project area which carry water only during rains. There is one natural tank in Mutaificent village which is rainfed and stores water throughout the year. In this tank 3 of the drains converge.

#### Climatic Characteristics:

The area fall under has a semi-arid climatic zone of India with hot and dry conditions for most of the year. Summers start in late February and peak in May with average high temperatures around 37 °C. Monsoon starts in September and lasts until early November with about 250 mm of precipitation. A dry and mild winter starts in late November and lasts until early February; with little humidity and average temperatures in the 22–23 °C. Total annual rainfall is about 535 mm. The average annual rainfall of the district is 535 mm, September and October are the wettest months of the year. The mean seasonal rainfall distribution is 316 mm during southwest monsoon (June-September)

#### Groundwater characteristics:

The ground water is used for drinking, irrigation and other domestic purpose around the project area. The area falls under semi-critical zone and the water table varied between 60m to 100m below the ground level. The ground water contains high TDS and hardness.

#### Environmental Quality:

The proposed project area is away from habitation area and there are no significant human activities around the project area. There is no any industrial establishment around the project area. Due to lack of human activities around the project area, the environmental quality in general is fairly good.

#### Ecological Features:

The topography of the proposed site is undulated plateau with scanty vegetation. Mainly bushy vegetation is observed in the area. *Cymbopogon procerus* (Boda Grass), a species commonly used for cattle fodder is predominantly spotted in the project area. Beside that dispersed growth of plant species like *Acacia catechu*, *Prosopis juliflora*, *Acacia nilotica*, *Cassia auriculata*, *Agave Americana*, Palm tree etc. are also spotted. Spotted deers and blackbucks are spotted around the project area which roam around for the fodder. The reptiles and hare are also seen around the land. The project area does not encounter any migratory route for wild animals and birds as confirmed by the Local forest Office. The area does not fall in migratory route of birds.

Two Reserve Forest patches i.e. Ramagiri West RF (at 1.4 Km distance) and Ramagiri East RF (at 3.5 km Distance) is located at south-west and North-East side of proposed project site respectively.

No notified Protected Area (under Wildlife Protection Act, 1972) such as Wildlife Sanctuary, national parks, tiger reserves, Bird Sanctuary etc. is located in and around the project area within 10 Km radius of the proposed project site.

There is no any archaeological site, protected/ historical monument within 10 Km radius of the project area.

#### Socio-economic Environment:

Although the project area falls in the extent of revenue village Ramagiri (Mandal - Ramagiri) and Mutafacient (Mandal - Kanaganapalle) of Anantapur District of Andhra Pradesh State, there is no settlement in the vicinity of the project area. The nearest settlement is Ramagiri village which is about 200 m away from south west boundary. The other settlements areas are Talimadugula, Balepalyam, Konapuram, Ramagiri, Mutafacient located within 5 Km radius of the project area.

Nearest Railhead from the site location is Dharmavaram (31 Km) and the nearest Airport is Bangalore (187 Km). The district headquarter Anantapur is located about 61 Km away from proposed site.

#### State Profile: Andhra Pradesh

Andhra Pradesh is one of India's Southern states and is situated on the south-eastern coast of the country. Also known as the Rice Bowl of India, because of being one of the highest producers of rice in the state. The population of Andhra Pradesh as per Census 2011, before the formation of Telangana as a separate state was 84,580,777 of which male and female are 42,442,146 and 42,138,631 respectively. In 2001, total population was 76,210,007 in which males were 38,527,413 while females were 37,682,594. The total population growth in this

decade was 10.98 percent while in previous decade it was 13.86 percent. The population of Andhra Pradesh forms 6.99 percent of India in 2011. In 2001, the figure was 7.41 percent. The state covered an area of 275,045 sq. km before formation of Telangana. But now, the state is spread across 160,205 sq. km and has a population of 49,378,776. Following Table depicts details about the districts of the state:

S No.	District	Population (Census 2011)	Sex Ratio (per 1000)	Average Literacy
1	Anantapur	4,081,148	977	63.57%
2	Chittoor	4,174,064	997	71.53%
3	East Godavari	5,154,296	1006	70.99%
4	Guntur	4,887,813	1003	67.4%
5	Krishna	4,517,398	992	73.74%
6	Kurnool	4,053,463	988	59.97%
7	Prakasam	3,397,448	981	63.08%
8	Sri Potti Sriramulu Nellore	2,963,557	985	68.9%
9	Srikakulam	2,703,114	1015	61.74%
10	Visakhapatnam	4,290,589	1006	66.91%
11	Vizianagaram	2,344,474	1019	58.89%
12	West Godavari	3,936,966	1004	74.63%
13	YSR (Kadapa)	2,882,469	985	67.3%

Source: Census of India, 2011

#### **District Profile: Anantapur**

The district has five divisions namely Anantapur, Dharmavaram, Kadiri, Kalyandurga and Penukonda divisions. These revenue divisions are further classified into 63 mandals.



Anantapur district stands 1st position in terms of area with 19,130 Sq. Kms. and ranks 7th in terms of population with 40,81,148 persons in the State. Project district stands 7th in terms of urban area with 376.89 Sq. Kms. and ranks 9th in terms of urban population with 11,45,711 persons in the State while it stands 1st in terms of rural area with 18,753.11 Sq. Kms. and ranks 6th in terms of rural population with 29,35,437 persons in the State.

### **Project Influence Area**

The proposed project is covering 20 Census villages of Ramagiri and Kanaganapalle Mandal of District Anantapur (Andhra Pradesh). The study area for this proposed project has been considered both the Mandal of the project area. Further, to achieve an informative result the total area has been segregated into two different mandals namely Ramagiri and Kanaganapalle.

#### **(I) Demographic Profile of the Study Area**

The study area for the project has been considered as 5 km radius of the proposed solar-wind hybrid park. The demographic profile around the project area has been consolidated for all the villages falling within 5 Km radius of the project area.

Table: Demographic Profile of the Study Area

S. No.	Name of Villages	HH	Population			Literates			Main Workers			Marginal Workers			Non Workers		
			Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
Ramagiri Mondal																	
1.	Perur	1752	7234	3652	3582	3922	2276	1646	3341	1993	1348	369	131	238	3524	1528	1996
2.	Makkinavaripalle	92	371	190	181	207	131	76	196	98	98	6	2	4	169	90	79
3.	Kondapuram	338	1543	781	762	836	499	337	721	419	302	153	28	125	669	334	335
4.	Motarchintalapalle	1095	4868	2500	2368	2630	1558	1072	2198	1395	803	652	108	544	2018	997	1021
5.	Nasanakota	1528	6482	3275	3207	3232	1913	1319	2602	1605	997	606	305	301	3274	1365	1909
6.	Ramagiri	865	3778	1933	1845	2093	1246	847	1177	866	311	674	261	413	1927	806	1121
7.	Ganthimarri	554	2210	1165	1045	1158	741	417	871	525	346	394	146	248	945	494	451
8.	Kuntimaddi	823	3271	1688	1583	1633	977	656	1484	886	598	423	168	255	1364	634	730
9.	Seshadribhatra Halli	201	856	458	398	420	277	143	526	281	245	5	0	5	325	177	148
10.	Polepalle	815	3388	1722	1666	1960	1122	838	1219	818	401	507	139	368	1662	765	897

S. No.	Name of Villages	HH	Population			Literates			Main Workers			Marginal Workers			Non Workers		
			Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
Sub-Total		8063	34001	17364	16637	18091	10740	7351	14335	8886	5449	3789	1288	2501	15877	7190	8687
Ramagiri Mondal																	
1.	Thumucherla	1090	4515	2319	2196	2124	1234	890	2253	1292	961	465	145	320	1797	882	915
2.	Thogarakunta	964	4059	2088	1971	2213	1328	885	1777	1055	722	458	167	291	1824	866	958
3.	Maddalacheruvu	1497	6426	3280	3146	3326	1938	1388	2647	1479	1168	1022	422	600	2757	1379	1378
4.	Konetinayanipalyam	683	2820	1478	1342	1565	932	633	1294	801	493	18	7	11	1508	670	838
5.	Narasampalle	370	1562	808	754	863	510	353	575	361	214	290	111	179	697	336	361
6.	Elakkuntla	733	3094	1577	1517	1681	997	684	982	613	369	841	330	511	1271	634	637
7.	Muthavakuntla	601	2634	1376	1258	1397	826	571	1278	713	565	292	112	180	1064	551	513
8.	Kanaganapalle	1702	6965	3647	3318	3755	2288	1467	2948	1738	1210	721	257	464	3296	1652	1644
9.	Mukthapuram	985	4093	2136	1957	2369	1440	929	1919	1086	833	394	161	233	1780	889	891

S. No.	Name of Villages	HH	Population			Literates			Main Workers			Marginal Workers			Non Workers		
			Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F
10.	Dadalur	856	3505	1820	1685	1837	1112	725	1298	853	445	447	154	293	1760	813	947
<b>Sub-Total</b>		9481	39673	20529	19144	21130	12605	8525	16971	9991	6980	4948	1866	3082	17754	8672	9082
<b>G. Total</b>		17544	73674	37893	35781	39221	23345	15876	31306	18877	12429	8737	3154	5583	33631	15862	17769

Source: Census of India, 2011

### Baseline Data of the Study Area

In the table below an attempt has been made to provide salient features of socio-economic features of the study area:

**Table: Demography, Literacy and Occupational details of people living in Study Area**

S. No.	Description	Number	% to total
1	<b>Total Population - Gender wise</b>	73,674	100
	Male	37,893	51.43
	Female	35,781	48.57
	Sex ratio (No. of females per 1000 males)	944	
2	<b>Total Population (0-6 years) - Gender wise</b>	7,899	100.00
	Male	4,191	53.06
	Female	3,708	46.94
	Sex ratio (No. of females per 1000 males)	885	
3	<b>Total Population (Sector Wise)</b>	73,674	100
	Rural	73,674	100
	Urban	0	0
4	<b>Total no. of households</b>	17,544	-
	Average House hold size	4	-
	Lowest Household size	4	-
	Highest Household size	5	-
5	<b>Total SC &amp; ST Population</b>	16,597	22.53
	<b>Total Population (SC)</b>	13,861	18.81

S. No.	Description	Number	% to total
	<b>Total Population (ST)</b>	2,736	3.71
<b>6</b>	<b>Total Literates – Gender wise</b>	39,221	53.24
	Male Literacy (with respect to the male population)	23,345	61.61
	Female Literacy (with respect to the female population)	15,876	44.37
	Literacy gap between male and female	-	17.24
<b>7</b>	<b>Total Literates – Sector wise</b>	47,524	--
	Rural (Number and % to total literates)	47,524	100
	Urban (Number and % to total literates)	0	0
<b>9</b>	<b>Total Workers &amp; Work Participation Rate</b>	40,043	54.35
	Male (Number and % with respect to the male population)	22,031	58.14
	Female (Number and % with respect to the female population)	18,012	50.34
	Gender gap in workforce (in percentage)	-	7.80
<b>10</b>	<b>Total Main Workers &amp; percentage to total worker</b>	31,306	78.18
	Male (Number and % with respect to the male working population)	18,877	85.68
	Female (Number and % with respect to the female working population)	12,429	69.00
a)	Main Worker as Cultivator (Number and Percentage)	11,905	38.03
b)	Main Worker as Agricultural Labour (Number and Percentage)	14,306	45.70
c)	Main Worker as Household Industry Worker (Number and Percentage)	628	2.01
d)	Main Worker as Other workers (Number and Percentage)	533	1.70

S. No.	Description	Number	% to total
11	<b>Total Marginal Workers &amp; percentage to total worker</b>	8,737	39.66
	Male (Number and % with respect to the male working population)	3,154	17.51
	Female (Number and % with respect to the female working population)	5,583	46.90
a)	Marginal Worker as Cultivator (Number and Percentage)	953	10.91
b)	Marginal Worker as Agricultural Labour (Number and Percentage)	6,908	79.07
c)	Marginal Worker as Household Industry Worker (Number and Percentage)	149	1.71
d)	Marginal Worker as Other workers (Number and Percentage)	727	8.32
12	<b>Number and Percentage of Marginal Worker (3-6 Months)</b>	8,180	93.62
13	<b>Number and Percentage of Marginal Worker (0-3 Months)</b>	557	6.38

### Demographic Composition

#### Population:

According to Census of India 2011, the total population of the study area is 73,674 in which 51.43% are males and 48.57% are females. An average gender ratio of the study area is approx. 944 females per 1000 males, which is much better than national average of 933 females per 1000 males. Total study area comes under rural settlement. Approx. 10.72% of the total population belongs to 0-6 age group. The sex ratio of this age group is 885 female children per 1000 male children, which is much below than average sex ratio of the study area. The break-up of population data for the study area is given in Table.

#### Households and Household Size:

The entire population of the study area has been grouped into 17,544 households and the average size of household is approx. 4 persons/ household.

During site visit it was observed and noted that most of the houses of the study area are semi-pucca and approximately 21% are kachcha houses. Nearly every respondent reported that they were living in their own houses. The area of the house structure was varying from 300-

600 square metres. Approx. 35% households have toilet facility but 75% people of the study area defecate outside due to lack of water.

#### Mandal-wise break up of Population in Study Area

S. No.	Study Area	House-holds	House hold Size	Population				Population (06 years)			
				Total	M	F	Gender Ratio	Total	M	F	Gender Ratio
1	Ramagiri	8063	4.22	34001	17364	16637	958	4255	2267	1988	877
2	Kanaganapalle	9481	4.18	39673	20529	19144	933	3644	1924	1720	894
Total		17544	4.20	73674	37893	35781	1891	7899	4191	3708	885

**Source:** Census of India, 2011

With reference to the Tables above, approx. 18.81% of the total population of the study area belongs to Schedule Caste and Schedule Tribes. Among the total population, Scheduled Caste constitutes of 15.10% and 3.71% belongs to Schedule Tribe community. Reddy, Rao, Vaishya, Chaudhari, Setty, Rao, Lingabaleja etc. are comes under general category (O.C.); Kurma, Valamiki, Boya, Pinjari, Dudekula, Yadaya, Kurva, Kumbhari, Golla, Dukula, Chakali, Mangala, Wadde, Uppare etc. comes under Backward Caste (B.C.); Madiga, Mala, Harizana, Dasari etc. comes under Schedule Caste (SC) and Yerukala, Nayak comes under Scheduled Tribes of social group in the study area. As per primary survey, standard of life of people of the study area is below average. Though the composition of the people of higher caste (approx. 10% as per our site visit observation) is very low but they are dominating to the whole society. Approx. 70% people come under Backward Caste (B.C.).

The population composition of SC is 15.10% and ST is 3.71% in the villages of study area and they come under vulnerable groups of family. Their livelihood depends on agriculture and agricultural labour. None of the SC/ST family is directly affected due land procurement process. During construction period, they will be given employment opportunity and in PARK Developer's CSR activity skill development training will be provided to them on the basis of their hobbies and employment opportunity in the region.

The break up distribution of scheduled caste and scheduled tribe population in the project area is shown in below Table



**Mandal-wise Distribution of SC and ST Population in Study Area**

S. No.	Village	Schedule Caste Population				Schedule Tribe Population			
		Total	M	F	Percentage	Total	M	F	Percentage
Ramagiri Mandal									
1	Perur	1205	621	584	16.66	31	14	17	0.43
2	Makkinavaripalle	156	77	79	42.05	0	0	0	0.00
3	Kondapuram	468	231	237	30.33	0	0	0	0.00
4	Motarchintalapalle	1374	692	682	28.23	20	11	9	0.41
5	Nasanakota	2127	1066	1061	32.81	121	54	67	1.87
6	Ramagiri	644	349	295	17.05	255	128	127	6.75
7	Ganthimarri	238	127	111	10.77	0	0	0	0.00
8	Kuntimaddi	284	148	136	8.68	460	231	229	14.06
9	Seshadribhatra Halli	57	29	28	6.66	17	10	7	1.99

10	Polepalle	392	198	194	11.57	144	71	73	4.25
<b>Sub-Total</b>		6945	3538	3407	20.43	1048	519	529	3.08
<b>Kanaganapalle Mandal</b>									
11	Thumucherla	852	434	418	18.87	6	3	3	0.13
12	Thogarakunta	382	202	180	9.41	362	185	177	8.92
13	Maddalacheruvu	1397	727	670	21.74	557	273	284	8.67
14	Konetinayanipalyam	481	254	227	17.06	29	16	13	1.03
15	Narasampalle	324	167	157	20.74	4	1	3	0.26
16	Elakkuntla	443	212	231	14.32	2	1	1	0.06
17	Muthavakuntla	586	308	278	22.25	165	83	82	6.26
18	Kanaganapalle	976	514	462	14.01	27	14	13	0.39
19	Mukthapuram	988	493	495	24.14	36	18	18	0.88
20	Dadalur	487	236	251	13.89	500	274	226	14.27

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Sub-Total	6916	3547	3369	17.43	1688	868	820	4.25
G. Total	13861	7085	6776	18.81	2736	1387	1349	3.71

Source: Census of India, 2011

### Literacy and Literacy Rate:

The average literacy rate of the study area is 53.21% (18,091) in which male's literacy is 61.85% with respect to the male population as against 44.18% for females with respect to the female population, creating a gender gap of 17.67%. Though the state govt. has facilitated every village with at least Govt. Primary Schools, Upper Primary Schools and Anganwadi Centres but the quality of education in the study area is very poor. As per our observation and consultation with villagers, it was found out that most of the villagers above 50 years of age are literate but they do not have any educational certificates. In core zone, 90% of literate females are educated only up to primary level and only 8- 10% of the females are educated up to secondary levels. Dropout rates especially for girl child are very high in these villages and also in the study area. This is mostly because of poor economic conditions of the study area and less independence of women. Hence, instead of attending schools, these small girls/boys help their parents in household works, or in daily paid labour jobs. Few villagers left their houses with their family members for more than 4 to 6 month every year in search of jobs in nearby villages, towns and cities, therefore schooling education of children are affected. The break up distribution of literate population in the project area is shown in Table below

Mandal-wise Distribution of Literacy in the Study area

S. No.	Study Area	Number of Literates			Literacy Rate			
		Total	M	F	Total	M	F	Gender Gap
1	Ramagiri	18091	10740	7351	53.21	61.85	44.18	17.67
2	Kanaganapalle	21130	12605	8525	53.26	72.59	47.12	25.47
Total		39221	23345	15876	53.24	61.61	44.37	17.24

Source: Census of India, 2011

The literacy rate of the project area has been compared with the literacy rate of district, state and national level which shows that literacy rate of the study area is below than the literacy rate of the district, state and national level. This figure reflects that a little more than the half of the total population of the study area is literate. Literate people can bargain better and put interest of the community during project planning and procurement stage. Literate people can get employment opportunity during project construction and operation phase as per their skill and qualification. They can assess positive and negative impact of the project and give their suggestions during project planning and construction phase better than others.

### Workers and Work Participation Rate:

The total number of workers in the study area is 40,043 and the WPR is 54.35% in which male are 58.14% with respect to the male population and females are 50.34% with respect to female population. Among the total workers 85.30% are main workers and the remaining 14.70% are marginal workers. The percentage of male in the main workers is 85.68% with respect to male working population, while it is only 14.32% in the case of marginal workers. On the other hand, the percentage share of female in the main workers is 69.00 % with respect to female working population; it is 17.51% in the case of marginal workers. As per the table below, it appears that most of the people (male & female) are engaged in main workers while in overall male workers dominate to female workers because less opportunity of work, unawareness of women rights, lack of education, lack of skill development opportunity and male dominating tradition to female workers.

### Work Participation Rate of the Study area

S. No.	Category	Total	M	F
1.	Total Worker	54.35	58.14	50.34
2.	Non-Worker	45.65	41.86	49.66
Total			100.00	100.00
1.	Main Worker	78.18	85.68	69.00
2.	Marginal Worker	21.82	14.32	31.00
Total			100.00	100.00

Source: Census of India, 2011

### Categorization of Main Workers on the basis of Occupation:

Following tables reflects that 45.70% of main worker are involved as agricultural labourers followed by cultivators 38.03%, household industry 2.01 % and only 1.70% are involved in other workers.

Table: Categorization of Main Workers on the basis of Occupation

S. No.	Zone	Types of Main Workers			
		Cultivators	Agricultural Labourers	Household Industrial Workers	Other Workers

		Nos.	Percentage	Nos.	Percentage	Nos.	Percentage	Nos.	Percentage
1	Ramagiri	6595	38.86	7741	45.61	308	1.81	2327	13.71
2	Kanaganapalle	5310	37.04	6565	45.80	225	1.57	2235	15.59
	<b>Total</b>	<b>11905</b>	<b>38.03</b>	<b>14306</b>	<b>45.70</b>	<b>533</b>	<b>1.70</b>	<b>4562</b>	<b>14.57</b>

Source: Census of India, 2011

### **Categorization of Marginal Workers on the basis of Occupation:**

Following tables reflects that 79.07% of marginal worker are involved as agricultural labourers followed by cultivators 10/91, other workers 8.32% and only 1.71% are involved in household industry.

**Table: Categorization of Marginal Workers on the basis of Occupation**

S. No.	Zone	Types of Marginal Workers							
		Cultivators		Agricultural Labourers		Household Industrial Workers		Other Workers	
		Nos.	Percentage	Nos.	Percentage	Nos.	Percentage	Nos.	Percentage
1.	Ramagiri	349	7.05	4116	83.19	105	2.12	378	7.64
2.	Kanaganapalle	604	15.94	2792	73.69	44	1.16	349	9.21
<b>Total</b>		<b>953</b>	<b>10.91</b>	<b>6908</b>	<b>79.07</b>	<b>149</b>	<b>1.71</b>	<b>727</b>	<b>8.32</b>

Source: Census of India, 2011

Considering the work culture of the study area, it appears that most of the workers in both the category main and marginal are engaged in agricultural labourers. In the study area most of the Workers are either main/marginal agricultural labourers or cultivators or other workers. The daily paid labourers work in the nearby villages, towns or cities as agricultural labours, industry, iron ore mine or earn their livelihood by working as labourers in various construction sites/building etc.

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### **Culture and Religion:**

The field survey has revealed that majority of the persons living in the villages are Hindus with approx. 10 % of population in the study area are Muslim and Christian. Most part of the study area has been occupied by Hindus and they play a vital role in making cultural and religious activities. Out of total population in the study area, approximately 80% population are general and Backward Caste category, 20% are SC and ST. Men of the study area generally wear Lungi and kamiz/shirt, pant and shirt and women wear saris and suits. Yugadi, Dashahara, Deepawali, Sankranti, Vinayak Festival, Muharram, Eid ul Fiter, Christmassy are the main festivals celebrated by the people of the study area. They worship Lord Shiva, Anjaney, Rama, Durga and Shiva etc.

### **House Types:**

Houses in the study area are generally semi-pacca. There are pacca and temporary types of structures have also been observed. The houses are generally made by bricks and stones. Although 35% households have facility of toilet and state government is also providing financial donation in making toilets in rural area but approximately 75% of people defecate outside due to lack of water and unawareness. Tap water supplied by village panchayat with government assistance and hand pumps are the main source of drinking water and other domestic use.

### **Occupation and Economy:**

The main occupation of the study area is agriculture and more than 75% people depend on agriculture or as agricultural labourers. Main crops grown in the region are cotton, ground nut, onion, makka, corn etc. which depends on rain water. Few people are engaged in their paternal profession like barber, carpentry etc. There are very few opportunities of livelihood except agriculture and agricultural labours. Average land holding size of the study area is 3 to 30 acres per family. The average income of the family of the study area is INR 5,000 to 10,000 per month while the income of BPL family is < INR 5,000 per month and most part of the income is spent on food. There is requirement of skill development training so that local villagers may get more option to earn their livelihood.

### **Infrastructures Facilities**

#### **Roads**

The study area of the proposed solar/wind power project is well connected with state highway and inter village road which are in good in good condition. The internal roads of the villages which link one village to another are also pucca and semi-pucca.

#### **Education:**

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Considering the educational facilities in the study area, Govt. Primary School, Upper Primary School and Anganwadi is available in every village of core zone. Govt. Senior Secondary School is available in Aspari and Pattikonda villages. Government Degree Colleges are available in Pattikonda and Adoni. In every school and college there is facility of toilets for girls and boys separately but it is observed that it is not in a good condition. Although local panchayat provides water supply through pipeline connection but they are not good for drinking as there is a contamination of fluoride. In spite of government infrastructure facility and support (facility of mid-day meal, free books distribution and two pairs of uniform to every student) for education, the literacy rate is very poor in the study area. Although, there is support for girl child education, but it is only up to junior level. Very few people are able to provide higher education to their girl child.

**Health:**

As per Rural Health Statistics 2015, there are 576 sub-centres, 83 PHC, 18 CHC, 1 Sub divisional Hospital and 1 District Hospital is running in Anantapur District. In of the study area there are two governments Primary Health Centre working properly, one is in Ramagiri village and another is in Kanganapalle village. Government Community Health centre is available in Penukunda town which is 15 km. from the project site. In this hospital all the facility with advance technology is available. There are so many Private Hospitals are also working with better facility. There is no any epidemic or chronic disease have been reported in the study area during consultation with local villagers except general fever, cough, cold and bone related pains due to contamination of fluoride in ground water.

**Drinking Water Facility:**

As reported during consultation, there is acute shortage of water in the villages of the study area and ground water level is 400 to 500 feet. Every village, there is water tank constructed. Water is supplied for drinking and other domestic use to each house via pipe line with the assistance of government and village panchayat.

**Communication:**

The villages in the study area are well connected via mobile, telephone and internet. Government post office is also available in most of the village panchayat of the study area. Means of communications such as internet, telephone and television has made a vital role in changing the conservative thoughts of the people of the study area and brought awareness for development in every dimension of life.

**Electricity Facility:**



The study area is good in terms of electricity supply. Generally, 20 to 22 hours' electricity is available in most of the villages of the study area. Proposed 200 MW Wind power project may reduce demand-supply gap of the state. Thus, in future, power cut will be reduced. They utilize power in establishing household industry, irrigation etc. The implementation of the proposed wind power plant project will throw opportunities to local people for both direct and indirect employment. The project will provide impetus to industrialization of the area. Further, the occupational pattern of the people in the area will change making more people engaged in industries and business. With this, occupational shifting of people from tertiary sector to industry, trade and business will get going. Thus, proposed project will improve socio-economic status of the study area.

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## ANNEXURE II- TOR FOR ESIA CONSULTANT

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### Broad Scope of Work

Environmental and Social Impact Assessment (ESIA) Scope would include:

Identification and review of the applicable local, State, National and International Environmental legislation and regulatory framework;

Conduct visits to sites for the purpose of site reconnaissance and establishing study area, baseline and collecting data from the local concerned authorities.

Describe the environmental and social settings by collecting of baseline information through primary field surveys, monitoring and secondary data/documents with respect to topography, land cover, geology, geomorphology, climate, meteorology, ambient air quality, noise quality, soil quality, traffic pattern, hydrology including surface and ground water quality, Ecology-terrestrial and aquatic flora and fauna, environmental sensitive areas, archaeological resources, Socio- cultural and economic environment.

Assessing the natural resource consumption for project activities.

Prediction and identification of environmental and social impacts of the project in construction and operation phase of project followed by evaluation of significance of the predicted impacts;

Assess risks and hazards associated with the project activities, environment, health & safety.

Suggesting appropriate mitigation/ enhancement measures for identified environmental and social impacts;

Comparison and analysis of the alternatives considered for the project with respect to location and power generation technology;

Perform effective and efficient public consultation process as per requirement. Develop proper communication plan and specific actions to be taken to ensure good representation and good attendance of affected communities and stakeholders in the planned Public consultation meetings/events.

Formulation of ESIA, Environmental and Social Management Plan (ESMP), Resettlement action plan (RAP) in accordance with World Bank Safeguard Requirements with management tools and techniques including monitoring and reporting requirements for effective implementation. Develop summary reports in local languages.

Attend meetings, presentations as per requirement.

Submission of action plan/inception report, progress reports, ESIA, ESMP, RAP reports in soft and hard copies (draft and final reports).

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List out the required clearances, NOCs for Project activity.

The consultant shall be responsible for supplying all the environment and social related information required by the World Bank and other agency/authority through the SECI. The consultant is also required to justify the findings in the ESIA and ESMP during the meeting with SECI, WB expert's team and any other agency/authority through SECI.

Any other scope as per requirement of Environmental and Social Impact Assessment Framework, World Bank Safeguard Requirements and project activity.

Preparation of final reports after incorporating of suggestions/comments on reports made by SECI, WB.

#### Objective of the Study

It is understood that Large-Scale Solar/Hybrid Projects may have Environmental and Social impacts and these impacts need to be avoided as far as possible. The impacts which cannot be avoided, needs to be mitigated or managed. The overall objective of this study is to conduct Environmental and Social Assessment (ESA) with a view to identify any critical environmental and social concerns of the subject Project and address them as an integral part of project design.

The consultant shall also confirm the extent to which regulatory clearances other than under the EIA notification are required for the proposed project including, but not limited to those listed below:

Under Green category and requires consent to establish and operate under the Water (Prevention and Control of Pollution) Act 1974 and Air (Prevention and Control of Pollution) Act 1981.

To establish the requirement of clearances from MoEFCC/CPCB/SPCB/CGWB/Any other.

Establishing clearance requirements related to the transmission lines for transfer of generated Solar power to National and State grid.

Usual clearances will be required if land acquisition is involved.

The specific objective includes:

To assess the existing status of bio-physical environment and social conditions in the study area and its vicinity (5 km radius) and to identify threats and issues which have potential to adversely impact important environmental and social features of the project influence area.

Carry out environmental and social analysis of project area in relation to activities under the project.

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Analyse the various options available for ancillary facilities like water supply, with special reference to sources – whether local groundwater or water from distant sources would be used, in case of the later situation conveyance facilities will also be analyzed for impacts, drainage, access, etc. to minimize adverse impacts and enhance positive impacts, where feasible.

Identification of the project affected families; assessment of loss of land / livelihood / common property resources for people living within the proposed site. The consultants however will carry out consultations with community members in its immediate vicinity (5 km) in addition to consultations with project affected persons (PAP).

Assess impacts on the indigenous/marginalized communities within the proposed site and its immediate vicinity (5 km).

Prepare a site specific environmental and social assessment report by documenting environmental features of the project area, socio-economic and cultural status of community in and around the project site (5km) and PAPs. This assessment should also include considerations of safety – both for the workers in the site and related facilities, as well as of nearby residents, especially those that live close to ancillary facilities like borrow areas, for instance.

To identify the environmental and social issues associated with implementation of project and develop environmental codes of practices for common activities like site preparation, installation of panels, management of waste, occupational health and safety, etc. and social exclusion list that need to be followed during various stages such as planning, construction and operation & maintenance.

To undertake consultations with potentially affected people and other community members to understand their views, obtain their input regarding environmental and social issues, and to take these into account during the preparation of the management framework and plans that would be executed before start of work at site.

To prepare an Environment and Social Management Framework (ESMF) including well-defined performance indicators for addressing the identified issues, through various activities/tasks under the proposed project, and strategy for its implementation to achieve sustainable environmental benefits.

To identify portions of the codes of practice/management framework that need to be integrated with the bidding documents to ensure that the prospective bidders are aware of what all will be required during project implementation and operation from an environmental, health and safety, as well as social perspective.

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To prepare an Environmental & Social Management Plan (EMP); Resettlement Action Plan (RAP); Gender Action Plan (GAP) and /or Indigenous Peoples Development Plan (IPDP) for the mitigation/enhancement activities that is to be undertaken by SECI. The ESMP / RAP / GAP / IPDP will include the description of relevant activities, institutional responsibilities, budgetary allocations, timelines and reporting arrangements for the same.

## 2. Scope of Study

Project Description; Providing a Project description with focus on understanding the environmental and social setting and sensitivities for the proposed Solar power project, including an overview of the land acquisition and resettlement requirements and its impacts on indigenous peoples, if any. This would also include any related facilities that may be required (e.g., access roads within the project area, water supply arrangements, housing, raw material and Transmission lines<sup>1</sup> etc.). The project area of influence would also be determined on the basis of the activities involved.

Laying down Policy, legal, and administrative framework: Discussing the policy, legal and administrative framework within which the assessment is carried out, national and state specific regulations (including permits and licenses), and the World Bank's Operational Policies and Best Practices and Performance Standards. Reviewing the Social & Environmental compliance requirement with respect to the above; present an overview of *Government of India's and State Government's social policies, legislations, regulatory and administrative frameworks* in conjunction with the World Bank's safeguard policies and Performance Standards. Where gaps exist between these policies, make recommendations to bridge the gaps in the context of the proposed project.

Generating Data for Environmental and Social Assessment and Management Framework: Collection and generation of relevant social and environmental (physical, biological) data (primary & secondary) within the study area. This data should be relevant to decisions about project location, design, construction, operation, or mitigation measures.

The data generation should specifically focus on issues related to

Water- its quality, availability and adequacy vis-à-vis the requirements during different phases of the project life cycle

Land and physical environment

Physiographic characteristics

Prepare Socio-economic profile in terms of demographic characteristics, land use pattern, economic profile, occupational pattern and other socio-economic parameters.

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Identify and analyze the issues of vulnerable communities and gender

Land, access requirements, land use, and involuntary resettlement

Assess the likely impacts of the sub-project, in terms of land acquisition/ transfer (loss of lands, houses, livelihood, etc.), and resultant involuntary resettlement extent and undertake the census of potential project affected people;

Based on the assessment of potential social and economic impacts, should establish criteria that will assist in the formulation of strategies; to the extent possible maximize project benefits to the local population and minimize adverse impacts of the project interventions on the affected communities;

The consultants would study the living patterns of vulnerable population (including tribal, scheduled castes, women, landless, households below poverty line, etc.) in the project area.

Identify likely loss of community assets including the religious structures and common property resources (e.g. forest, grazing land, drinking water source, etc.) within project site; the impacts of their loss on the local population, and prepare mitigation plans

Ecology or biodiversity

Physical or cultural heritage (if any)

Flooding and seismic risk

Hazardous and domestic waste management, etc.

Review of the land take/lease process to assess any legacy or current/existing issues (like informal settlers, livelihood dependence, other usage etc) on the allotted land. It will also look at current and proposed development activities within the project's area of influence, including those not directly connected to the project

Information Disclosure, Consultation and Participation: Describe the consultation and participation mechanisms adopted, including the activities undertaken to disseminate project and resettlement information during project design and engaging stakeholders. The results of consultations with affected persons, the host communities, civil society organizations and other stakeholders, raised will be summarized.

Conduct *stakeholders' consultation*: that ensures that all key stakeholders are aware of the objectives and potential environmental and social impacts of the proposed project, and that their views are summarized in a structured manner. Stakeholders' will include all those who are directly or indirectly dependent on the project site(s). Therefore, identify the key stakeholders (Government, NGOs, CSOs, Academicians, etc.) in the project area; analyze

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their perspectives of the project. The analysis shall be carried out for both primary and secondary stakeholders at project level through structured discussions on the (a) importance of addressing social issues (b) impressions of past efforts, if any (c) suggestions for what to do differently in future (d) key issues (goals and safeguards) to be addressed; and

(e) issues of co-ordination and / or conflict among various stake holders. The analysis shall be summarized in a structured manner and shall clearly bring out the implications for project design.

Review of negotiated land acquisition, if any: The consultant, based on documentation provided, site visits and consultations with the affected people, will review the following processes followed for land procurement including an assessment of the adequacy of information disclosed to the landowners and the bargaining power of landowners to negotiate for fair compensation, Policies and laws (if any) that are applicable for negotiated settlements in the area, Confirmation of third party validation of the negotiations carried out, (iv) mechanisms adopted for calculating the replacement costs of land and other assets impacted, and (v) record keeping requirements of the negotiation process.

Analyzing the Alternatives: For the proposed project site compare reasonable alternatives to technology in terms of their potential social 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. It would also state the basis for selecting the particular site and project design justifying recommended approaches to pollution prevention and abatement.

#### Assessing Social and Environmental Impacts and Mitigation Measures:

Assessing the Social and Environmental impacts (both positive and negative) of solar energy project, with potential assessment of cumulative impacts (linked to development or other solar projects and the overall park), if relevant and as appropriate. Identify mitigation measures and any residual negative impacts that cannot be mitigated. Also evaluate impacts and risks from associated facilities and other third-party activities. The mitigation measures shall be presented in the form of Environmental and Social Management Plan (ESMP), which shall include but not limited to:

Water Management including transportation, storage, recycling for use in the plant as well as rainwater harvesting

Occupational health and safety

Labour working conditions

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Construction labour management

Waste Management including for Hazardous waste

Disaster management plan

Develop an R&R entitlement framework in consultation with the affected people and other stakeholders and prepare a resettlement action plan (RAP) which is acceptable to the project affected people;

Description of the entitlements for various categories of impacts, mitigation measures to address livelihood impacts, etc.

Interventions needed for skill development and overall social upliftment of the communities in the project influence area

To develop a consultation framework for participatory planning and implementation of proposed mitigation plan;

Assess the capacity of institutions and mechanisms for implementing social development aspects of the project implementation including the social safeguard plans and recommend capacity building measures; and,

Develop monitoring and evaluation mechanism to assess social development outcomes

Preparation of Gender Action Plan and Indigenous Peoples Development Plan (if required)

Assessment and mitigation measures for health and safety issues of the workforce and community, as well as compliance with national labour laws, and World Bank Group EHS Guidelines

Environmental monitoring plan

The ESMP shall include an adequate institutional structure and resources including financial budget to undertake measures identified in it, and report on the same to stakeholders on a regular basis.

Grievance Redress Mechanism: Description of the community grievance redress framework/mechanism (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental and social performance.

Draft inputs for inclusion in the Bidding Documents: These would essentially operationalize the ESMP measures that would need to be implemented by the private sector partner – concessionaire. These would include contractual requirements, specific indicators that would

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be monitored during implementation and operation by the successful bidder, and (dis)incentives for compliance with requirements as well as how any disputes relating to performance on these aspects would be managed.

Conclusion and Recommendation - Providing conclusions drawn from the assessment and providing recommendations.

*Note: The consultant must provide monthly updates and also make presentations to the Solar Energy Corporation of India Limited on the status of the project and deliverables.*

#### Management of the ESIA process

The consultant will manage the overall ESIA process and will be responsible for the compilation and presentation of the ESIA Report. The consultant will plan, coordinate and execute all activities of the ESIA process and will assist SECI in the planning and execution of the public scoping meeting and public hearing if required. The consultant will provide updates to WB, SECI and other relevant agencies on the ESIA process.

#### Report structure:

##### ESIA Summary Report

Introduction: Introduction to the Project and ESIA methodology;

Project Description: Project description and applicable standards (Local, Regional, National, International), Site assessment, Study area, Technical description of the Project and activities & related infrastructure and activities:

Administrative Framework: Applicable environmental and social regulatory framework and its relevance for Project;

Environmental and Social Baseline: Outlines Environmental and Social Baseline in the study area of the project;

Stakeholder Mapping and Analysis: An overview of the stakeholder engagement activities undertaken during the ESIA;

Impacts Assessment and Mitigation Measures: Environmental and Social Impact Assessment and mitigation measures;

Environmental and Social Management Plan: Detailed Environmental and Social Management Plan (ESMP) in accordance to WB/ADB/IFC Performance Standard

Resettlement Action Plan (RAP)

Conclusions and Recommendations

## Deliverables

The following output is expected during the course of the assignment. In consultation with Office of the Commissioner (New & Renewable Energy), Consultant will prepare a monthly progress report covering progress against the work plan agreed in the inception report.

Report Title	Printed Copies	Soft Copies	Time Frame from Start of Assignments	Payment as % of the Total Cost of Assignment
Inception Report	3	6	3 weeks	10
Draft ESIA and Consultations Report	3	6	9 weeks	35
Final ESIA and Consultations Report	3	6	13 weeks	40
Inputs to the Bidding documents for developers	6	12	15 weeks	15
Monthly Progress Report & Review Presentation at SECI office			Every 4 weeks	

In addition, the consultant should have their team ready to make presentations to the regarding the progress of the assignment, and significant findings. These are expected to be in advance of submission of the Draft and Final reports, as well as finalization of inputs to bidding documents for developers.

## Submission of Deliverables

The submission of deliverables will be as defined in clause 7. The printed copies as per clause 7 shall be submitted in neatly bounded in standard format as approved by the nodal office

## Eligibility Criteria

### General Eligibility Criteria

The Bidder should be a body incorporated in India under the Companies Act, 1956 or 2013 including any amendment thereto, Government owned Enterprises & Limited Liability

Partnership Firms.

Any kind of Technical or Financial JV/Consortium is not allowed under this Tender Document.

The offers submitted without documentary proof shall not be evaluated and will be liable for rejection without any further correspondence in any manner. However, SECI may seek clarifications from the Bidders so as to ascertain the correctness of facts & documents as presented by the Bidder.

Canvassing or offer of an advantage or any other inducement by any person with a view to influencing acceptance of a tender will be an offence under laws of India. Such action will result in the rejection of the tender, in addition to other punitive measures.

Technical Eligibility Criteria

The Consultant must have the following experience:

The consultant should have completed at least 03 (Three) EIA/ESIA studies in last 03 (Three) financial years preceding to the Bid Deadline date for large Scale/Power/Infrastructure.

(Document Required: Copy of final Environmental Clearance for all such Projects/Successful Project completion confirmation from client side for all such Projects)

Experience of at least 03 (Three) completed Consultancy Projects in conducting ESIA, preparing an Environmental Management Plan (EMP)/Resettlement Action Plan (RAP)/Gender Action Plan (GAP) or Indigenous Peoples Development Plan (IPDP) for large Scale/Power/Infrastructure/Renewable funded by multilateral agencies (World Bank/ADB/IFC etc).

(Document Required: Proof of documentation conforming above experience details/Client work order copies/Recommendation letter/ Successful Project completion confirmation from client side for all such Projects)

*Desirable Criteria*

The consultant having certificate of “Accredited EIA consultant” with MoEFCC/NABET for Power/Renewable Energy Sector will be preferred (Document Required: Document certifying Accreditation from MoEFCC/NABET).

*NOTE: EIA is not required for RE projects & consequently NABET accreditation (required for EIA as per MOEFCC) is a desirable criteria to ensure quality of report*

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### Team Composition:

The Consultant must have the following Team Composition:

#### Team Leaders

- A post-graduate / doctoral degree holder in Environmental or Social Sciences or a related field with at least 15 years of experience in delivering ESIA's for development projects
- S/he should have demonstrated experience of working with and leading multi- sectoral teams
- S/he should be conversant with relevant regulations and multilateral funding agencies like the World Bank
- S/he should be fluent in English and similar level of competency in Hindi would be an advantage.

#### Social Experts

- A post-graduate/doctoral degree holder in Social Sciences, or a related field with at least 10 years of undertaking (E)SIA studies, preferably for development projects, with funding support from multilateral agencies like World Bank
- S/he should have experience of organizing consultations with potentially affected persons
- Familiarity with the relevant regulations would be an advantage Fluency in English & Hindi languages.

#### Environmental Experts

A post-graduate/doctoral degree holder in Environmental science/engineering/ Planning or related field with at least 10 years of experience in undertaking E(S)IA studies, preferably for development projects, with funding support from multilateral agencies like World Bank

- S/he should have experience of organizing environmental surveys, covering pollution as well as biodiversity aspects where relevant, analyzing results and incorporating the findings into the report.
  - Familiarity with contracting procedures, especially in the PPP mode would be an advantage
  - Prior experience of developing codes of practice and other tools for management of generic issues would be an asset.
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#### Renewable Energy Expert

- Renewable Energy expert with relevant post graduate qualification and experience of 10 years with at least 5 years in India

#### Dam Safety Expert (For projects involving dams – Floating Solar)

- Civil Engineer with at least 15 years of experience in Water Resource Engineering with focus on water retaining structures
- Familiarity with World Bank policy OP4.37 – Safety of Dams – at conceptual and operational level

#### Support staff (As per requirements)

The proposed team shall necessarily be the employees of the bidding company.

Any entity, which has either been directly barred by the Central/State Government in India, or any entity controlled by them, from participating in any project, and the bar subsists as on the date of Proposal, would not be eligible to submit the Proposal; and

A Bidder should have, during the last three (3) years, neither failed to perform on any agreement (as evidenced by imposition of a penalty by an arbitral or judicial or regulatory authority or a judicial pronouncement or arbitration award against the Bidder) nor been expelled from any project or agreement nor have had any agreement terminated for breach of contract by such Bidder.

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## ANNEXURE III CHECKLIST FOR ENVIRONMENT AND SOCIAL SCREENING

Sub project activities affecting the natural physical environment

S. No.	Information/Checklist confirmation	Status	Detailed Information
1	Preliminary secondary data related to soil quality and its bearing strength		
2	State /National Boundaries		
3	Anticipated change in Topography (Cut and Fill activity)		
4	Clearance of land, vegetation, any other physiographic feature (number and type specify)? Specify area under each feature (in Hectare)		
5	Addition of new features to topography due to project		
6	Anticipated underground works		
7	Anticipated changes in existing drainage pattern		
8	Land Reclamation works		
9	Water source identified for activities		
10	Identification of erosion prone areas		
11	Change in Land cover due to project		
12	Site prone to any natural hazard		
13	Activities changing hydrology or water courses or aquifers		
14	Abstraction / transfers of water from ground or surface waters		

S. No.	Information/Checklist confirmation	Status	Detailed Information
15	Water quality characteristics and its availability		
16	Other activities impacting the physical environment		
17	Water body identified for floating solar is reservoir / backwater/ any other (specify)		
18	Does the identified water body is used for water supply?		
19	Is water body used for fishing activities?		
20	Is water body used for any other human activity?		
21	Will project activity restrict access to the water body		
22	Any order/policy specific to the site		

**Project activities affecting the biological environment**

S. No.	Information/Checklist confirmation	Status	Aerial distance (within 10 km) of proposed-project location boundary
1	Vicinity to National Park, Wildlife Sanctuary, Reserved forests, woodland, protected forests		
2	Vicinity to Migratory bird routes		
3	Site in vicinity to congregatory areas (nesting, roosting, breeding, foraging)		
4	Vicinity to sensitive flora, fauna		
5	Areas already subjected to pollution or environmental damage		
6	Vicinity to eco-sensitive areas (wetlands, CRZ, water course, mountains etc)		

S. No.	Information/Checklist confirmation	Status	Aerial distance (within 10 km) of proposed-project location boundary
7	Presence of endangered species / habitat areas		
8	Vicinity to island, coastal marine or underground water		
9	Loss of any native species or genetic diversity		
10	Any season specific issues with site regarding ecological functions		

Project activities affecting the visual environment

S. No.	Information/Checklist confirmation	Status	Aerial distance (within 10 km) of proposed-project location boundary
1	Area with Outstanding Natural Beauty (ANOBs) or Natural Heritage sites		
2	Area with Archaeological importance		
3	Area with high scenic value		
4	Existing viewpoints/ pause points		

Project activities affecting the settlement / infrastructure

S. No.	Information/Checklist confirmation	Status	Details thereof (quantification wherever possible) with source of information data
1	Settlement area/Built up environment in vicinity / distance		
2	Agricultural land/land under livelihood (area in Hectare)		
3	Type of crops grown / number of crops		



S. No.	Information/Checklist confirmation	Status	Details thereof (quantification wherever possible) with source of information data
	grown in a year		
4	Source of Irrigation		
5	Drinking water sources		
6	Area of sensitive receptors		
7	Religious –Physical Resources		
8	Community-Physical Resources		
9	Underground utility lines like electricity lines, pipelines for gas, etc		
10	Defence Installations / Airport Routes		
11	Likely damage to existing infrastructure, public utilities, amenities etc.		
12	Presence of Indigenous / vulnerable communities		
13	Major Movement Corridors /Traffic		
14	Anticipated waste generation & Waste Disposal Facility		
15	Potential Water sources for project activities		
16	Source of energy including electricity and fuel for various purposes for the project (amount of fuel in MT & electricity in MW)		
17	Facilitates for transportation of construction materials		

S. No.	Information/Checklist confirmation	Status	Details thereof (quantification wherever possible) with source of information data
18	Facilities for storage of construction goods & materials		
19	Facilities for storage of any hazardous material		
20	Facilities for long term housing for operational workers		
21	List of construction works (Permanent & Temporary)		
22	Facilities for construction workers (temporary labour camp, drinking water, waste disposal, etc.)		
23	Facilitates for disposal of waste (dry or wet)		
24	Facilitates for disposal liquid waste/effluents		
25	New Road, rail etc during construction or operational phase		
26	Any closure or diversion to the current movement pattern due to the project during construction or operational phase		
27	New or diverted transmission lines due to the project		
28	Is there a risk of long term build-up of pollutants in the environment from storage of hazardous material, disposal of effluents and waste disposal?		

S. No.	Information/Checklist confirmation	Status	Details thereof (quantification wherever possible) with source of information data
29	Cumulative effects due to proximity to other existing or planned projects with similar impacts		

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## ANNEX IV SCREENING CRITERIA FOR FLOATING SOLAR PV SUB-PROJECTS

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1. The currently proposed ISHTP plans to invest in about 1-2 FSPV sub-projects totaling approximately 100 MW of installed power generation. The objective of the sub-projects is to demonstrate the operational and economic feasibility of this innovative solution in particular for states in India facing land resource constraints to meeting their renewable power deployment goals. The Government of India has invited the World Bank and the Clean Technology Fund to support the ISTHP to introduce scalable innovations that help it meet its ever growing clean energy ambitions.

2. Practice suggests that on average approximately 1.7-2 hectares of reservoir area is required for each 1 MWp installed. Based on this assumption, the ISTHP target of 100 MWp installed generation capacity would cover approximately 170-200 hectares or 1.7-2.0 square kilometers (km<sup>2</sup>) of reservoir surface area. Currently, the Solar Energy Corporation of India (SECI), the implementing agency and borrower of the ISTHP, is looking at 2 sites in Jharkhand and 3 in Tamil Nadu.

### Benefits

3. There are many benefits associated with FSPV:

4. Critically, suitable land for meeting India's RE targets will become scarce – sites with the 'best' RE resources and with easy access to land are being taken up. Yet, land acquisition requirements for stand-alone solar (ground mounted about 2 hectares / MWp) suggest vast land needs to meet RE targets. Preliminary studies suggest that utilization of just 10 percent of India's water bodies would allow for the development of about 300 GW of FSPV generation capacity.<sup>8</sup>

5. Additional advantages of the technology include optimizing utilization of existing power evacuation infrastructure, improved efficiencies of PV panels due to a surface water cooling effect, lowering PV panel cleaning requirements, potentially reducing evaporation, and improving the habitat for aquatic life, i.e. by reducing water temperatures.

6. For example, Floating Solar PV Projects (FSPV) were observed to reduce water evaporation up to 1000 liters per m<sup>2</sup> per year saved in Spain (M. R. Santafé, P. S. Ferrer Gisbert, F. J. Sánchez Romero, J. B. Torregrosa Soler, J. J. Ferrán Gozávez, and C. M. Ferrer Gisbert, "Implementation of a photovoltaic floating cover for irrigation reservoirs," Journal of Cleaner Production, vol. 66, pp. 568-570, 2014.) and also there is increase in the quality of water with reduction in Algae growth ([www.waterworld.com/articles/2011/09/floating-solar-systems-provide-power-environmental-benefits.html](http://www.waterworld.com/articles/2011/09/floating-solar-systems-provide-power-environmental-benefits.html)) formation which will help to protect the environment.

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<sup>8</sup> According to a preliminary assessment of Renewable Energy College, Kolkata.

## Potential Environmental Impacts

7. The area of potential impact of a FSPV sub-project will be its footprint and the associated areas of electrical evacuation infrastructure. Environmental impacts associated with the construction and operation of solar PV plants and their mitigation measures are well known. When the sub-project is expected to complement generation output with an existing hydropower plant there may be potential environmental impacts associated with any changes to the hydropower plant's operation, i.e. water levels and associated water flows. These associated impacts and mitigation measures are also well understood in the practice. There may also be well understood risks associated with the upstream construction and operation of evacuation infrastructure.

8. Potential environmental impacts that are somewhat novel to FSPV are their impacts to water quality and aquatic-supported biodiversity. These include but are not limited to:

- Impacts on temperature stratification and on dissolved oxygen levels due to shading of water
- Impacts on aquatic habitat resulting from shading
- Impacts on water quality and aquatic fauna/flora due to leaching from materials
- Impacts on water quality and aquatic fauna/flora from accidental release of oils and or lubricants of boats used during maintenance activities or detergents in panel washing
- Impacts on aquatic habitat as a results of installations in shallower (littoral zone) and benthic zone (bottom of reservoir) due to mooring systems or disturbances from placement/movement of underwater electrical cables (i.e. increased turbidity)
- Impacts that could occur from exposure to EMF associated with underwater electrical cables
- Impacts on water feeding and surface diving birds while hunting at the water surface or pursuing fish or foraging underwater.
- Impacts from the creation of waste (replacement parts)

9. The probability and scale of any of these impacts are site specific. For example, reservoir characteristics vary widely, including from where there is practically no aquatic-supported biodiversity (i.e. coal mine/quarry reservoirs), reservoirs that are used for drinking water supply, and natural ponds/lakes.

Following measures would be among the list of options to be considered in a comprehensive Environment Management Plan (EMP) for the sub-project, based on the specific environmental and social impacts that have been identified in the ESIA.

1. Water quality studies, if not available with reservoir owner, shall be conducted.
2. Avoiding /minimising use of motorised boats. Manual operating boats may be used while performing operations & Maintenances activities. Walkways/Platforms may be constructed wherever possible.
3. Cleaning by using water without detergents or methods of dry cleaning may be explored.
4. Cable mostly installed on the cable trays above the water surface. Only Mooring arrangement shall be done under water.
5. The material to be used in the power plant, shall be recyclable

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#### ISTHP Screening Criteria and Procedures

10. SECI shall make a determination of the suitability of the proposed sub-project site on a case by case basis.

11. While there is over 1 GW of FSPV installations worldwide, studies on environmental impacts of these sites are currently limited. Therefore, a site-specific ESIA will be required for each sub-project site and shall be consistent with applicable World Bank safeguards policies for the ISTHP (as defined in the ISTHP ESMF). The findings of the ESIA and the robustness of recommended mitigation measures will be used as the basis for the suitability of the site.

12. As the objective of the ISTHP is to achieve effective demonstration impacts and the limited number of sub-projects envisioned to achieve this objective, SECI shall be guided by the following principles in screening potential sites:

- identify and prioritize sites that minimize potential negative environmental and social impacts
  - avoid all legally protected areas whether on land or water. These include various degrees of protection such as National parks, Sanctuaries, Conservation Reserves, Community Reserves that are specified in the Indian Laws governing Wildlife Protection.
  - avoid areas that are being proposed for such legal designation, where finalization is not yet done
  - avoid areas identified as important areas for conservation using IBAT, a tool that the World Bank Group has internalized for screening of projects for their impact on biodiversity.
  - In a case where an existing hydropower plant with evacuation infrastructure exists in a protected area as defined above, SECI shall assess the likelihood and scope of potential incremental environmental impacts and consult with relevant authorities to determine whether the site is suitable and consistent with these screening principles.
  - For locations that meet all the criteria above, SECI would ascertain presence of important fish species – either ask local experts or fishermen whether any species listed in Tables 1, 2 or 3 of the Publication “Threatened Freshwater Fishes of India” (available at <http://www.nbfgr.res.in/pdf/ThreatenedFreshwaterFishes.pdf>).
  - Follow the ‘do no harm’ principle in assessing site suitability – because experience with FSPV is relatively limited, mitigate potential impacts by aiming to limit the footprint of the sub-project on a specific reservoir where aquatic flora and fauna exist.
    - Based on this principle, favorable go/no go decisions are more likely if the subproject’s footprint is limited to ten percent of the average surface area of such a proposed reservoir over the last decade.
    - Subprojects larger than ten percent can be considered on such a reservoir provided that SECI can have reasonable assurance that the ESIA consultant would be able to collect sufficient data of satisfactory quality to assess the environmental and social impacts of a larger subproject on such a reservoir.
    - For reservoirs where no significant aquatic flora or fauna exist, the size of the footprint of the sub-project can be made on a case by case basis, following the above-mentioned principles.
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13. SECI shall prepare a recommendation with a FSPV Site Suitability Report based on its initial screening, including references to supporting documentation, as appropriate, and a proposed Terms of Reference for the scope of the site-specific ESIA (informed by SECI's inquiries above). SECI shall submit it to the Bank for its review and no objection. A Bank no objection on SECI's recommendation is required prior to taking a go/no go decision on ISTHP support and subsequent ESIA preparation.

#### ESIA Preparation and Sub-Project Appraisal

14. The scope of work in the ESIA in addition to assessing impacts on such selected sites, would also analyze the potential measures to minimize, mitigate, compensate identified unavoidable adverse impacts – on water quality, ecology and any other environmental features deemed to be important in the particular context of that waterbody.

15. SECI shall be responsible for the hiring of high quality consultants to conduct the ESIA (and associated preparation of the EMP or other instruments as may be needed), for quality control and eventually ensuring the EMP is appropriately implemented following obligations spelled out in the ISTHP legal agreements.

16. SECI's sub-project appraisal will assess the likelihood and scale of environmental and social impacts and whether the proposed mitigation measures are likely to be effective, there is sufficient capacity to implement them and that they are appropriately resourced.

17. Following the ISTHP's ESMF, WB/CTF resources supporting the ISTHP shall be used only if the Dam Safety Report confirms there are no major issues associated with the relevant Dam (that resulted in the formation of the waterbody) as defined by the Dam Safety Policy of the Bank. SECI shall follow the ESMF wherever relevant to ensure the Dam Safety Report is prepared by a qualified dam safety expert following terms of reference agreed with the Bank.

18. SECI's appraisal findings and recommendations will be submitted to the World Bank for its no objection, which would include SECI's recommendation for a go/no go decision on investing in the project with partial WB/CTF financing.)

#### Implementation and Monitoring

19. Following the ISTHP's ESMF, SECI shall also monitor safeguards compliance accordingly during implementation.

20. SECI shall task its environmental and social safeguards staff to monitor emerging literature and studies on FSPV. New studies may inform future sub-project preparation and development of appropriate ecosystems required to help sustainably scale up FSPV in India.

21. SECI shall also explore opportunities to have its sub-projects participate in long-term studies that aim to fill knowledge gaps on environmental and social impacts, such as partnering with universities, scientific research institutes, etc.

## ANNEXURE V GENERIC ENVIRONMENTAL MANAGEMENT PLAN

### Generic Environmental and Social Management Plan for Pre-Construction and Construction Stage

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
A: Design & Preconstruction Stage						
1	Project Location:  Land Acquisition & R&R Issues	Loss of land / properties and livelihood; shelter due to land acquisition for development of Solar/wind/Hybrid park and associated sites	<ul style="list-style-type: none"><li>• Identify appropriate government site to avoid land acquisition and resettlement impacts.</li><li>• The affected persons/families to be identified in advance and should be compensated at replacement value for the lost asset as per prevailing rules and policy of the state government and the World Bank .</li><li>• The affected person must be compensated before taking physical possession of the asset.</li><li>• Any displaced person to be resettled</li><li>• Loss of livelihood to be compensated monetarily as well as in form of alternative livelihood</li><li>• Any loss of sources of livelihood to be compensated</li></ul>	Design and Pre-Construction Stage	Park developer	Developer/SECI
		Loss of forest land and resources due to location of the project in forest areas	<ul style="list-style-type: none"><li>• As far as forest area to be avoided for establishing the project</li><li>• If the project is passing through forest area, the necessary permission/ clearance to be obtained from the Forest department prior to start of construction activities.</li></ul>	Design and Pre-Construction Stage	Park developer	Developer/SECI



Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>Tree felling for the project should be avoided to the possible extent. However, if tree felling is unavoidable, then permission for felling of trees to be obtained from the forest department.</li> <li>Compensatory plantation to be done against the tree felling as per rule</li> <li>The condition of the forest clearance/ tree felling permission to be strictly complied.</li> </ul>			
B: Construction Stage						
1	Site Clearance /Excavation and grubbing operation	a) Air/ Noise Pollution	<ul style="list-style-type: none"> <li>The Contractor will take every precaution to control dust nuisance at all the construction zones and allied sites where works are under progress.</li> <li>Every equipment and machinery will be fitted with dust suppression devices such as water sprinklers, dust bags, cyclone etc. As appropriate.</li> <li>Dust generating activities from construction to be avoided/ minimized by suitable water sprinkling</li> <li>Equipment's/ machinery to be properly maintained to minimize smoke in the exhaust emissions.</li> <li>Machinery to be turned off when not in use.</li> <li>Housekeeping of the area to be maintained</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>• Vehicles transporting materials will be covered by tarpaulin sheets</li> <li>• Mixing equipment will be well sealed and equipped as per PCB norms</li> <li>• Vehicle speed to be restricted to minimum speed at site to minimize potential for dust generation in the surroundings</li> <li>• The Contractor will submit PUC certificates for all vehicles/ equipment/machinery used for the project.</li> <li>• Periodical monitoring of fine Particulate Matters (PM<sub>10</sub> and PM<sub>2.5</sub>) will be carried out as per Environmental Monitoring Plan.</li> <li>• Only well-maintained equipment conform to the MoEFCC/CPCB/APPCB noise standards will be operated on site.</li> <li>• DG sets shall be used for emergency power/ backup (if any).</li> <li>• Provision of rubber paddings/noise isolators at equipment/machinery used for construction</li> <li>• Construction vehicles to be well maintained (Pollution Under Control Certificate- PUC is a Certification Mark issued to certify that motor</li> </ul>			

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<p>vehicles in India meet emission and pollution control norms) and minimise idling time for vehicles when not in use.</p> <ul style="list-style-type: none"> <li>• Loud, sudden noise emissions to be avoided wherever possible.</li> <li>• Information about blasting activities (if any) to be provided as per standard practice.</li> <li>• Site workers working near high noise equipment use personal protective devices to minimize their exposure to high noise levels.</li> </ul>			
		b) Soil Erosion/ Loss of Top Soil & Soil Compaction	<ul style="list-style-type: none"> <li>• The removal of soil cover and vegetation should be restricted to the area necessary for project development.</li> <li>• Top soil shall be stripped from all the area that is to be utilized during construction and were permanent structure and access is required.</li> <li>• It should be preserved at suitable place at a height of 2m with proper sloping (1: 1.5).</li> <li>• Once the construction activity is over all the preserved top soil shall be utilized for rehabilitation of the disturbed areas, borrow areas and landscaping.</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>Localized sprinkling of water in applicable affected areas where vegetation is removed shall be undertaken for the entire duration of construction.</li> <li>Use of existing track for transport of man and material to the extent possible</li> <li>Loose soil to be protected from wind and runoff by covering/ watering/ other means of covering</li> <li>All construction material to be kept within the footprint of the area acquired.</li> <li>Loose construction material should be taken care to avoid being carried into adjoining area by wind.</li> <li>To avoid soil erosion, it is recommended growing turf grass beneath the solar panel.</li> <li>Appropriate contour bunding/ field bunding measures coupled with recharge pits may be undertaken in the entire project area to ensure that soil &amp; water are conserved within the project area.</li> </ul>			
		c) Soil Contamination	<ul style="list-style-type: none"> <li>Impervious platform and oil and grease trap for collection of spillage from construction equipment vehicle maintenance platform will be appropriately provided at construction camp, servicing area and liquid fuel and lubes at storage areas</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>Re-fueling of machinery at site to be undertaken over paved/ suitable surface.</li> <li>In case of any accidental spill, the soil to be cut and stored securely for disposal with hazardous waste</li> </ul>			
		d) Loss of vegetation	<ul style="list-style-type: none"> <li>Vegetation will be removed from the construction zone before commencement of construction. All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimum.</li> <li>Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert.</li> <li>The Contractor, under any circumstances will not cut or damage trees.</li> <li>Trees identified under the project will be cut only after receiving clearance from the Forest Department and after the receipt of written permission from Engineer.</li> <li>Access to areas of the natural vegetation that are to be considered must be prohibited. A temporary</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<p>fence should remain on site until all construction activities have completed.</p> <ul style="list-style-type: none"> <li>Construction vehicles, machinery and equipment will move or be stationed in the designated area only to prevent compaction of vegetation outside the construction area.</li> <li>Collection of firewood is prohibited.</li> <li>No fires may be ignited with the intent to destroy the flora on the site and surrounding</li> </ul>			
2	Internal Access Road Construction		<ul style="list-style-type: none"> <li>Mitigation measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
		B. Soil Erosion/ Loss of Top Soil/ Compaction	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 b)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		C. Soil Contamination	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		D. Loss of vegetation	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 d)</li> </ul>	Construction Stage	Contractor	Developer/SECI
3	Storage of Construction Material	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation measures same as 1a)</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
		b) Soil Contamination/ Compaction	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Water Pollution (Surface Water) including  Increased erosion and sediment load impounding of local depressions  Change in micro level drainage pattern	<ul style="list-style-type: none"> <li>All necessary precautions will be taken to construct temporary or permanent devices to prevent water pollution due to increased siltation and turbidity.</li> <li>The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into water bodies or the irrigation system and avoid construction works close to water bodies / waterways during monsoon.</li> <li>All wastes arising from the project will be disposed off, so as not to block the flow of water.</li> <li>No construction materials/ spoils will be stored along the water bodies/ natural waterways and adequate provision will be made for preventing spillage of materials into these water bodies.</li> <li>Wastes must be collected, stored and taken to approve disposal site.</li> <li>Water quality to be monitored periodically as per Environmental Monitoring Plan.</li> </ul>	Construction Stage	Contractor	Developer/SECI



Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
		c) Loss/Damage to vegetation	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 d)</li> </ul>	Construction Stage	Contractor	Developer/SECI
4	Heavy machinery	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Soil Pollution/ Compaction	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
5	Concrete mixture and heavy pumps	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Soil Pollution/Compaction	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
6	Tree felling/ vegetation clearance	a) Landscape Degradation	<ul style="list-style-type: none"> <li>Plantation work on open sites may be done</li> <li>Waste along settlement or access route may not be dumped</li> <li>Quarry &amp; borrow area rehabilitation program may be framed</li> <li>Green belts along approach road may be developed</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>On completion of the works all the temporary structures shall be cleared away.</li> </ul>			
		b) Impact on flora	<ul style="list-style-type: none"> <li>All works will be carried out such that the damage or disruption to flora other than those identified for cutting is minimum.</li> <li>Only ground cover/shrubs that impinge directly on the permanent works or necessary temporary works will be removed with prior approval from the Environmental Expert.</li> <li>The Contractor, under any circumstances will not cut or damage trees in the project locations without the receipt of written permission from Engineer. The engineer before giving permission may get clearance from forest department/ any other authority as the case may be</li> <li>Access to areas of the natural vegetation that are to be considered must be prohibited. A temporary fence should remain on site until all construction activities have completed.</li> <li>Construction vehicles, machinery and equipment will move or be stationed in the designated area so</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			as to avoid compaction of vegetation outside the construction area. <ul style="list-style-type: none"> <li>No fires may be ignited with the intent to destroy the flora on the site and surrounding</li> </ul>			
		c) Soil Erosion	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 b)</li> </ul>	Construction Stage	Contractor	Developer/SECI
7	Transportation of machinery	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Soil Contamination / Compaction	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
8	Debris Disposal	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation Measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Water Pollution (Surface Water)	<ul style="list-style-type: none"> <li>All necessary precautions will be taken to construct temporary or permanent devices to prevent water pollution due to increased siltation and turbidity.</li> <li>The Contractor will take all precautionary measures to prevent the wastewater generated during construction from entering into water bodies or the</li> </ul>			

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			irrigation system and avoid construction works close to water bodies / waterways during monsoon. <ul style="list-style-type: none"> <li>All wastes arising from the project will be disposed off, so as not to block the flow of water.</li> <li>No construction materials/ spoils will be stored along the water bodies/ natural waterways and adequate provision will be made for preventing spillage of materials into these water bodies.</li> <li>Wastes must be collected, stored and taken to approved disposal site.</li> <li>Water quality to be monitored periodically as per Environmental Monitoring Plan.</li> </ul>			
		c) Soil Pollution/Compaction	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 a) &amp; 1 b)</li> </ul>			
9	Transportation of Construction material	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		Soil Pollution/Compaction	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
10	Movement of Construction Vehicles	<ul style="list-style-type: none"> <li>• Movement of heavy vehicles leading to congestion and accidents</li> <li>• Improper parking of vehicles used by workers and for movement of material can lead to discomfort to other users.</li> <li>• Damage to road and related structure from heavy vehicle</li> </ul>	<b>Construction traffic:</b> <ol style="list-style-type: none"> <li>a. Construction routes and required access roads may be clearly defined;</li> <li>b. Only trained drivers with valid license shall be recruited by the construction contractor.</li> <li>c. The access of all construction and material delivery vehicles especially during wet weather shall be strictly controlled to avoid compaction and damage to the topsoil structure;</li> <li>d. Speed of all project vehicles shall be restricted to minimum on internal village roads</li> <li>e. Delivery hours shall be scheduled to avoid peak hour traffic, weekends and evenings;</li> <li>f. Wheel washing and damping down of un-surfaced roads shall be implemented to reduce dust and nuisance;</li> <li>g. Vehicles and equipment shall be regularly serviced to avoid the contamination of soil from oil and hydraulic fluid leaks, etc. Servicing of vehicles and equipment must be done off-site and on an impermeable surface such as concrete;</li> </ol>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<b>Access:</b> <ul style="list-style-type: none"> <li>h. Temporary access roads shall be rehabilitated prior to the Demobilization contractor from the site;</li> <li>i. Entry and exit points shall be positioned strategically to ensure minimal effects on traffic;</li> <li>j. Primary routes to the site shall be clearly signposted and communicated to all suppliers and Sub-Contractors.</li> </ul>			
11	Labour Camps/	<ul style="list-style-type: none"> <li>• Influx of migrant laborer's</li> <li>• additional pressure on the local resources and social infrastructures</li> <li>• Risk of social conflict</li> </ul>	<ul style="list-style-type: none"> <li>• The contractor will preferably engage local labour force except for the laborer's requiring special skills and non-availability of such skilled labourers from local area.</li> <li>• Project to assess and manage labor influx risk based on risks identified in the ESIA. Depending on the risk factors and their level, appropriate site-specific Labor Influx Management Plan and/or a Workers' Camp Management Plan.</li> <li>• Project will incorporate social and environmental mitigation measures into the civil works contract. The responsibilities for managing these adverse impacts will be clearly reflected as a contractual</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<p>obligation, with a mechanism for addressing non-compliance.</p> <p>Worker's Accommodation</p> <ul style="list-style-type: none"> <li>• For migrant laborers the contractor will provide labour camps with all basic facilities sufficiently away from local habitation</li> <li>• No labour camp will be provided within 1 km from Forest area, Wildlife Sanctuary, National Park or any other protected area.</li> <li>• Provisioning adequate arrangements of drinking water, lighting, ventilation, bedding, bathing and other basic facilities in the labour camps;</li> <li>• Ensuring proper health-check-ups of all laborer's employed at the project site;</li> <li>• Providing separate toilet facilities for men and women at the accommodation as well as site; and</li> <li>• Facilitating healthcare services and medical care in case of sickness.</li> <li>• Locate handling sites away from populated areas</li> <li>• Follow proper operation and handling measures to minimize exposure</li> </ul>			

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>• Provide prior warning /signals for blasting</li> <li>• Provide sirens in vehicles to avoid any collision with human/animals</li> <li>• Organize awareness programs on environmental resource management</li> <li>• Organize Health camps</li> <li>• Use of child labour will be strictly prohibited. Contractor will maintain a labour register with name, age and sex with supporting document (preferably copy of Aadhar card or voter's ID card). This will be monitored by Environmental and Social office of contractor and SECI.</li> <li>• Provide signage near construction sites and approach roads</li> </ul> <p>Avoiding Gender Based Violence</p> <ul style="list-style-type: none"> <li>• Contractor will prepare and implement robust measures to address the risk of gender-based violence that include (i) mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women; (ii)</li> </ul>			



Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<p>informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted; (iii) introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination), and (iv) contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.</p> <ul style="list-style-type: none"> <li>Additional measures can aim to reduce incentives to engage with the local community by providing workers with the opportunity to spend their time off away from the host community, where feasible with a small transport allowance, ideally allowing workers to regularly return for brief visits to their families, spouses and friends, or to visit nearby urban centers that provide a variety of legal social opportunities. For workers who need to travel further it may be attractive to forego weekends off in exchange for longer breaks that would allow for such homeleave travel.</li> </ul>			

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
		Impact on Human health, especially workers working at construction sites (Labour Camps)	<ul style="list-style-type: none"> <li>• Routine medical checkup of Field staff and labourers</li> <li>• Provision of potable drinking water at site</li> <li>• Provision of proper sewage and waste disposal system. Sanitation facilities have to be provided at the camp sites.</li> <li>• Awareness program on HIV aids and other communicable disease may be provided to the work force.</li> <li>• First aid facilities to be provided at the construction camps. Any case of disease outbreak may be immediately subjected to medical treatment. Mosquito repellent to be provided to the labors such as odomos, coil and sprays. The camps may maintain cleanliness and hygienic condition.</li> <li>• Proper ventilation may be provided in labour camps</li> </ul>	Construction Stage	Contractor	Developer/SECI
		Impact of labour influx/ migrant workforce	<ul style="list-style-type: none"> <li>• Provisioning adequate arrangements of drinking water, lighting, ventilation, bedding, bathing and other basic facilities in the labour camps;</li> <li>• Ensuring proper health-check-ups of all labourers employed at the project site;</li> <li>• Providing separate toilet facilities for men and women at the accommodation as well as site;</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>Contractor and labourers will sign code of conduct to maintain good manners with the community and avoid GBV</li> <li>Project will undertake awareness raising program for the workers and community on the risk of labour influx; and</li> <li>To the extent possible, local workforce will be engaged to minimize the influx of workers</li> </ul>			
12	Borrow materials/ Quarry area	a) Air / Noise Pollution	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 a)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		b) Soil Pollution / Compaction	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 b) &amp; 1 c)</li> </ul>	Construction Stage	Contractor	Developer/SECI
		c) Soil Erosion	<ul style="list-style-type: none"> <li>Mitigation measures same as 1 b)</li> </ul>	Construction Stage	Contractor	Developer/SECI
13	Occupational Health and Safety	Increased accident risks and health hazards	<ul style="list-style-type: none"> <li>The Contractor will comply with the requirements of the Environmental, Health, and Safety (EHS), Guidelines of the World Bank, April, 2007 and the statutory norms of safety during construction.</li> </ul>	Construction Stage	Contractor	Developer/SECI

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>The Contractor will provide adequate good quality Personal Protective Equipment's (PPE) to all the workers working at construction zones and Plant sites and will ensure that these PPEs are used by workers at all time during works.</li> <li>The facility should have firefighting system, Proper ventilation system, first aid facilities</li> <li>Provide persons working in the site with appropriate training, equipment and the information necessary to ensure their safety.</li> <li>Material Safety Data Sheet (MSDS) should be placed in public area and near the Storage.</li> <li>Unauthorized access should be strictly prohibited.</li> <li>Emergency contact name and number should be displayed in front of the storage</li> <li></li> <li>Adequate drainage, sanitation and waste disposal will be provided at workplaces.</li> <li>Proper drainage will be maintained around sites to avoid water logging leading to various diseases</li> </ul>			

Sr. No	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementati on	Supervision
			<ul style="list-style-type: none"> <li>Adequate sanitation and waste disposal facilities will be provided at construction camps by means of septic tanks, soakage pits etc.</li> <li>A health care system will be maintained at construction camp for routine checkup of workers and avoidance of spread of any communicable disease</li> <li>Readily available First Aid kit bearing all necessary first aid items will be proved at all the work sites and should be regularly maintained.</li> <li>The Contractor will organize awareness program on HIV aids and sexually transmitted diseases (STDs) for workers on periodic basis</li> </ul>			

**Generic Environmental and Social Management Plan for Operation Stage**

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
1	Generation of Used oil from Turbine maintenance and Transformer oil	Soil pollution and Water pollution	<ul style="list-style-type: none"> <li>Used oil to be securely stored in appropriate containers over impervious platform and sold only to authorized vendors by State Pollution Control Board.</li> <li>Catch drains to be provided around the storage platform to arrest accidental spillage of oil</li> <li>Transformer oil to be replaced and returned by the supplier of transformers</li> <li>Log book for storage and disposal of such oils to be maintained</li> </ul>	Operation and Maintenance stage	EHS Engineer of O & M Contractor	SECI
2	Operation of wind turbine	Collision of Birds due to wind turbine	<ul style="list-style-type: none"> <li>Standard practice on turbine blades shall be considered to enhance visibility.</li> <li>Marking overhead cables and transmission poles using deflectors and avoiding use of areas of high bird concentrations, especially for species vulnerable to collision.</li> <li>Where possible, installing transmission cables underground in accordance with existing best</li> </ul>	Operation and Maintenance stage	O & M Contractor	SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<p>practice guidelines for underground cable installation. Otherwise if possible, install overhead cables with proper insulation to avoid bat and bird electrocution through body touch. Install bird deflectors on overhead transmission cables at selected points wherever possible.</p> <ul style="list-style-type: none"> <li>• The illumination within the project area should be bare minimum and be within the acceptable limits, particularly during night hours. This will help in undisturbed activities of nocturnal species like rodents, bats and owls.</li> <li>• Some bird reflectors can be fitted at relevant places to divert low-medium and medium-high flying bird species during day time.</li> <li>• Feasibility of fixing of bird deflector on the turbine to avoid perching of birds near blades can be worked out, especially raptor species which prefer to perch at higher points.</li> <li>• An Avifaunal Expert to be appointed during operation stage for assessment of incidence of bird collision and train the staff at site to address the incidents of bird hit / injury.</li> </ul>			

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
		Man, Animal Conflict	<ul style="list-style-type: none"> <li>Removal of bushes, tree, shrubs beyond the project limit to be strictly prohibited</li> <li>The site area to be properly fenced to avoid entry of wild animals within the project compound</li> <li>In case wild animals are recorded in close vicinity or within the project site, the same should be recorded and reported to the wildlife department to take suggestions for further measures</li> <li>Awareness development among the employees to conserve / protect the ecosystem</li> <li>Fire protection measures to be provided at site to avoid any fire due to project</li> </ul>	Operation and maintenance stage	O&M engineers of contractor at site in consultation with Wildlife Department	SECI
3	Cleaning of solar panel	Wastage of water Generation of waste water	<ul style="list-style-type: none"> <li>Necessary permits for use of water, including groundwater where applicable, shall be obtained in advance of beginning of operations.</li> <li>The use of water to be minimized through recycling of used of water for cleaning</li> <li>The waste water to be properly channelized through drains and stored in settling tank</li> </ul>	Operation and maintenance stage	O&M engineers at site	SECI



Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>The unusable water can be utilized for irrigation purpose in landscaping or in neighbouring agriculture field.</li> <li>Rainwater harvesting facilities will be provided at site to collect the rainwater which should be utilized for ground water recharging and storing for cleaning purpose</li> </ul>			
4	<b>Handling and management of Battery Energy Storage System</b>	Land contamination Water Contamination Health Hazards due to random disposal of Battery wastes and E-wastes	<ul style="list-style-type: none"> <li>All the non-functional batteries to be stored in a safe place following the norms stipulated in the batteries (Management and Handling) Rules, 2001. The waste batteries to be handed over to the authorised vendors/recyclers.</li> <li>A record of such practices to be maintained at site office.</li> <li>All the electronic wastes should be disposed of as per E-waste (Management) Rules, 2016.</li> <li>All the safety precautions in storage, handling and disposal of battery energy storage systems will be adopted as per safety consideration, which is enclosed as <b>Annexure XV</b>.</li> </ul>	Operation and maintenance stage	O&M engineers at site	SECI

## Generic Environmental and Social Management Plan for Transmission Line

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
• DESIGN & PRE-CONSTRUCTION STAGE						
1	Land Acquisition & R&R Issues	Loss of land / properties and livelihood due to land acquisition	<ul style="list-style-type: none"><li>Careful route selection to avoid existing settlements</li><li>Minimize need to acquire agriculture land and other immovable properties</li><li>Compensation to be paid for temporary/permanent loss of productive land including land under ROW as per state policy on transmission line</li><li>Compensate and assist for loss of livelihood or sources of livelihood as per the agreed entitlement framework of RPF</li></ul>	Design and Pre-Construction Stage	State Power Transmission Agency	SECI
		Loss of precious ecological values/damages to precious species	<ul style="list-style-type: none"><li>Avoid encroachment by careful site and alignment selection. If the project is passing through forest area, the necessary permission/clearance to be obtained from the Forest department prior to start of construction activities.</li></ul>	Design and Pre-Construction Stage	State Power Transmission Agency	SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>Tree felling for the project should be avoided to the possible extent. However, if tree felling is unavoidable, then permission for felling of trees to be obtained from the forest department.</li> <li>Compensatory plantation to be done against the tree felling as per rule</li> <li>The condition of the forest clearance/ tree felling permission to be strictly complied.</li> </ul>			
2	Transmission line through forestland	Loss of forest land Deforestation and loss of biodiversity	<ul style="list-style-type: none"> <li>Avoid forest area by careful site and alignment Selection</li> <li>Obtain statutory forest clearances from the Government</li> <li>Compensatory plantation to be done against the tree felling as per rule</li> <li>The condition of the forest clearance/ tree felling permission to be strictly complied.</li> </ul>		State Power Transmission Agency	SECI
3	Encroachment into farmland	Loss of agricultural productivity	<ul style="list-style-type: none"> <li>Minimise encroachment into farm land by careful alignment selection.</li> <li>Farmers / land owners compensated for significant trees that need to be trimmed / removed along ROW.</li> <li>Statutory approvals for tree trimming / removal</li> </ul>		State Power Transmission Agency	SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
4	Interference with drainage patterns/Irrigation channels	Flooding hazards / loss of agricultural production	Appropriate siting of towers to avoid channel interference	Construction Stage	State Power Transmission Agency	SECI
5	Escape of polluting materials	Environmental pollution	Transformers designed with oil spill containment systems, and purpose-built oil, lubricant and fuel storage system, complete with spill cleanup equipment.  Substations to include drainage and sewage disposal systems to avoid offsite land and water pollution		State Power Transmission Agency	SECI
<b>B. CONSTRUCTION STAGE</b>						
1	Construction of roads for accessibility	Increase in airborne dust particles	Existing roads and tracks used for construction and maintenance access to the line wherever possible	Construction Stage	Contractor	State Power Transmission Agency/ SECI
2	Site clearance	Loss of vegetation	<ul style="list-style-type: none"> <li>Clearance activities to be restricted to pegged area only Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure</li> </ul>	Construction Stage	Contractor	State Power Transmission

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>minimal clearance</li> </ul>			n Agency/ SECI
3	Equipment layout and installation	Noise and vibration	<ul style="list-style-type: none"> <li>Construction techniques and machinery selection seeking to minimize ground disturbance</li> </ul>	Construction Stage	Contractor	State Power Transmission Agency/ SECI
4	Foundation works for tower legs and concrete foundations	Interference with cropping season and disturbance/damage to the field crop	<p>Construction activities on cropping land to be scheduled to avoid cultivation period preferably after one month of harvest wherever possible</p> <p>Movement of man and machines in designated area only to avoid compact of land</p> <p>Top soil</p>	Construction Stage	Contractor	State Power Transmission Agency/ SECI
		Loss of top soil due to excavation for foundation work	<ul style="list-style-type: none"> <li>The removal of soil cover and vegetation should be restricted to the area necessary for project development.</li> <li>Top soil shall be stripped from all the area marked for foundation and preserved separately</li> </ul>	Construction Stage	Contractor	State Power Transmission Agency/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<ul style="list-style-type: none"> <li>Once the construction activity is over all the preserved top soil shall be utilized for rehabilitation of the disturbed areas</li> <li>Use of existing track for transport of man and material to the extent possible</li> <li>Loose soil to be protected from wind and runoff by covering/ watering/ other means of covering</li> <li>All construction material to be kept within the footprint of the area acquired.</li> <li>Loose construction material should be taken care to avoid being carried into adjoining area by wind.</li> </ul>			
5	Trimming /cutting of trees within Row	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations.	Construction Stage	Contractor	State Power Transmission Agency/ SECI
		Loss of vegetation and deforestation	<p>Trees that can survive pruning to comply should be pruned instead of cleared.</p> <p>Felled trees and other cleared or pruned vegetation to be disposed of as authorized by the statutory bodies</p>	Construction Stage	Contractor	State Power Transmission Agency/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
6	Nuisance to nearby properties	Losses to neighboring land uses/ values  Social inequity	<ul style="list-style-type: none"> <li>Contract clauses specifying careful construction practices.</li> <li>The Contractor shall take all the precaution not to disturb the neighboring land use and properties</li> <li>As much as possible existing access ways will be used</li> <li>Productivity land will be reinstated following completion of construction</li> <li>The Contractor will pay compensation to the owner of the affected land/property for the loss caused by the construction activities including crop loss, if any</li> </ul>	Construction Stage	Contractor	State Power Transmission Agency/ SECI
7	Pollution Control Measures		Ensure that the site is kept tidy at all times and managed to reduce the risks of pollution (noise, water, dust etc.)	Construction Stage	Contractor	State Power Transmission Agency/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
8	Conductor stringing	Accident Hazards and injury to workers	<ul style="list-style-type: none"> <li>Towers shall be complete in all regards before starting stringing operation</li> <li>All the precautionary measures to be adopted by the Contractor against the safety hazards</li> <li>Only</li> <li>No workers shall be allowed to work on towers without proper PPES, such as hard hat, safety gloves, safety shoes, safety belts, and safe working lift with safe working platforms, etc</li> <li>Only trained persons shall be allowed to work stringing works</li> <li>First Aid Kit with all necessary first aid items must be available site during works.</li> <li>The Contractor will make arrangement with nearby health center to deal with any accident.</li> <li>Regular safety awareness training to be organized by the Contractor</li> </ul>	Construction Stage	Contractor	State Power Transmission Agency/ SECI
9	Public Safety	Installation of towers and stringing	<ul style="list-style-type: none"> <li>The trespassing inside the work zone to be restricted</li> <li>Information and caution to general public</li> </ul>	Construction Stage	Contractor	State Power Transmission



Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
		activities	through caution boards and sign boards <ul style="list-style-type: none"> <li>the schedule for stringing activities to be communicated to the public</li> <li>All safety precaution to be taken during construction at the location where the alignment is passing through roads, rivers/streams and other public facility.</li> <li>Deployment of well-trained flag man and warning signs at locations, where there is public movement.</li> </ul>			n Agency/ SECI
10	Surplus earthwork / soil	Runoff to cause water pollution, solid waste disposal	Soil excavated from tower footings to be disposed of at designated place or nearby house blocks if requested by landowners.	Construction Stage	Contractor	State Power Transmission Agency/ SECI
11	Waste Management	Land contamination and loss of aesthetics	<ul style="list-style-type: none"> <li>All the waste and debris materials must be cleared periodically from the site immediately after completion of tower works and stringing.</li> <li>All the debris must be disposed of at designated site</li> </ul>	Construction Stage	Contractor	State Power Transmission Agency/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
12	Labour Camps/	<ul style="list-style-type: none"> <li>Influx of migrant labourers</li> <li>additional pressure on the local resources and social infrastructures</li> <li>Risk of social conflict</li> </ul>	<p>The contractor will preferably engage local labour force except for the laborer's requiring special skills and non-availability of such skilled labourers from local area.</p> <p>Project to assess and manage labor influx risk based on risks identified in the ESIA. Depending on the risk factors and their level, appropriate site-specific Labor Influx Management Plan and/or a Workers' Camp Management Plan.</p> <p>Project will incorporate social and environmental mitigation measures into the civil works contract. The responsibilities for managing these adverse impacts will be clearly reflected as a contractual obligation, with a mechanism for addressing non-compliance.</p> <p><b>Worker's Accommodation</b></p> <p>For migrant labourers the contractor will provide labour camps with all basic facilities sufficiently away from local habitation</p> <p>No labour camp will be provided within 1 km from Forest area, Wildlife Sanctuary, National Park or any other protected area.</p>	Construction Stage	Contractor	Developer/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<p>Provisioning adequate arrangements of drinking water, lighting, ventilation, bedding, bathing and other basic facilities in the labour camps;</p> <p>Ensuring proper health-check-ups of all laborer's employed at the project site;</p> <p>Providing separate toilet facilities for men and women at the accommodation as well as site; and</p> <p>Facilitating healthcare services and medical care in case of sickness.</p> <p>Locate handling sites away from populated areas</p> <p>Follow proper operation and handling measures to minimize exposure</p> <p>Provide prior warning /signals for blasting</p> <p>Provide sirens in vehicles to avoid any collision with human/animals</p> <p>Organize awareness programs on environmental resource management</p> <p>Organize Health camps</p> <p>Use of child labour will be strictly prohibited.</p>			

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			<p>Contractor will maintain a labour register with name, age and sex with supporting document (preferably copy of Aadhar card or voter's ID card). This will be monitored by Environmental and Social office of contractor and SECI.</p> <p>Provide signage near construction sites and approach roads</p> <p><b>Avoiding Gender Based Violence</b></p> <p>Contractor will prepare and implement robust measures to address the risk of gender-based violence that include (i) mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women; (ii) informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted; (iii) introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination), and (iv) contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.</p>			

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			Additional measures can aim to reduce incentives to engage with the local community by providing workers with the opportunity to spend their time off away from the host community, where feasible with a small transport allowance, ideally allowing workers to regularly return for brief visits to their families, spouses and friends, or to visit nearby urban centers that provide a variety of legal social opportunities. For workers who need to travel further it may be attractive to forego weekends off in exchange for longer breaks that would allow for such home leave travel			
13	Occupational Health and safety	Injury and sickness of workers	<p>The Contractor has to follow all the safety precaution during works</p> <p>Contract provisions specifying minimum requirements for construction camps.</p> <p>All the workers must be provided with appropriate PPEs to the workers during works. Contractor to arrange for health and safety training sessions for workers.</p>	Construction Stage	Contractor	State Power Transmission Agency/ SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
14	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Construction Stage	Contractor	State Power Transmission Agency/ SECI
15	Traffic and Vehicle movement and maintenance	Soil Pollution/Compaction	<ul style="list-style-type: none"> <li>Impervious platform and oil and grease trap for collection of spillage from construction equipment vehicle maintenance platform will be appropriately provided at construction camp, servicing area and liquid fuel and lubes at storage areas</li> <li>Re-fueling of machinery at site to be undertaken over paved/ suitable surface.</li> <li>In case of any accidental spill, the soil to be cut and stored securely for disposal with hazardous waste</li> </ul>	Construction Stage	Contractor	Developer/ SECI
<b>C. OPERATION AND MAINTENANCE (O&amp;M) STAGE</b>						
1	Location of transmission towers and transmission line alignment and	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	O&M Stage	State Power Transmission Agency	SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
	design					
2	Oil spillage	Contamination of land / nearby water bodies	Substation transformers located within secure and impervious sump areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks	O&M Stage	State Power Transmission Agency	SECI
3	Inadequate Provision of staff/workers health and safety during operations	Injury and sickness of staff / workers	(a) Careful design using appropriate technologies to minimize hazards (b) Safety awareness raising for staff (c) Preparation of fire emergency action plan and training given to staff on implementing emergency action plan	O&M Stage	State Power Transmission Agency	SECI
4	Electric shock hazards	Injury / mortality to staff and public	Careful design using appropriate technologies to minimize hazards Regular monitoring of faults and immediate repair/ replacement of damaged wires/ towers  Issue of warning to the local public regarding the malfunctioning and scheduling of repairs/replacement  Barriers to prevent climbing on /dismantling of transmission towers	O&M Stage	State Power Transmission Agency	SECI

Sr. No.	Activities	Potential Impact	Mitigation Measures	Time Frame	Institutional Responsibility	
					Implementation	Supervision
			Appropriate warning signs on facilities Electricity safety awareness raising in project areas			
5	Transmission line maintenance	Exposure to electromagnetic interference	Transmission line design to comply with the limits of electromagnetic interference overhead power lines	O&M Stage	State Power Transmission Agency	SECI



## ANNEXURE VI CRITERIA FOR SUB-PROJECT SELECTION

S. No.	Environmental Feature	Category Assigned (High/Medium/Low)	Significance (based on extent of area of the park and length of transmission line)	Remark/Explanation
Physical Environment				
	Drainage Conditions			
	Surface Water Resources			
	Erosion Prone stretches			
	Construction Material			
	Topography			
Biological Environment				
	National Park / Wildlife Sanctuary			
	Non-NP/WLS areas			
	Migratory routes			
	Reserved Forests			
	Green Tunnels/ Large Trees			
	Protected Forests			
Human Environment				
	Settlement			
	Sensitive Receptors			

S. No.	Environmental Feature	Category Assigned (High/Medium/Low)	Significance (based on extent of area of the park and length of transmission line)	Remark/Explanation
	Drinking Water sources			
	Physical cultural Resources – Religious			
	Physical cultural resources – community			
	Utilities like electricity lines, pipelines for gas, etc			

## ANNEXURE VII SOCIAL SCREENING CHECKLIST

S. No.	Screening Criteria	Assessment of Category (High/ low)	Remarks /Explanatory note for categorization
1	Is the project in an eco-sensitive area or adjoining an eco-sensitive area? (Yes/No) If Yes, which is the area? Elaborate impact accordingly.		
2	Will the project create significant/ limited/ no social impacts?		
a	Land acquisition resulting in loss of income from agricultural land, plantation or other existing land-use.		
b	Land acquisition resulting in relocation of households.		
c	Any reduction of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood).		
d	Any displacement or adverse impact on tribal settlement(s).		
e	Any specific gender issues.		
3	Will the project create significant / limited / no Social impacts during the construction stage?		
a	Flooding of adjacent areas	Low Impact	
b	Improper storage and handling of substances leading to contamination of soil and water		
c	Elevated noise and dust emission.		
d	Disruption to traffic movements		

S. No.	Screening Criteria	Assessment of Category (High/ low)	Remarks /Explanatory note for categorization
e	Damage to existing infrastructure, public utilities, amenities etc.		
f	Failure to restore temporary construction sites		
g	Possible conflicts with and/or disruption to local community		

## ANNEXURE VIII KEY DIFFERENCES BETWEEN RFCTLARR ACT 2013 AND WORLD BANK OPERATIONAL POLICY

Sr.l No.	Topics/Issues /Areas	World Bank OP4.12	RFCTLAR&R	Remarks / Measures taken to address in ESMF
1	Application of LA	Direct economic and social impacts that both result from Bank-assisted investment projects. Applies to all components of the project that result in involuntary resettlement, regardless of the source of financing.	<b>Section 2</b> Applicable to projects where government acquires land for its own use, hold and control, including PSU and for public purpose; for PPP where ownership of land continues to vest with govt; private companies where 80% of <b>land owners</b> <sup>9</sup> have given consent or 70% in case of PPP.	
	Principle of avoidance	Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project design	Alternatives to be considered as Act in chapter II, point # 4 (d) says "extent of land proposed for acquisition is the absolute bare minimum needed for the project; and (e) says land acquisition at an alternate place has been considered and found not feasible.	In line with bank OP 4.12
	Linkages with other projects	OP 4.12 applies to all components of the project that result in involuntary resettlement, regardless of the source of financing. It	No such provision	The ESMF will be applicable for all components of the project that or any linked project

<sup>9</sup> Land Owner – whose land and immovable property acquired and land assigned by state or central govt. under any scheme (Section 3 c (i) and (v))

		also applies to other activities resulting in involuntary resettlement that in the judgment of the Bank, are (a) directly and significantly related to the Bank-assisted project, (b) necessary to achieve its objectives as set forth in the project documents; and (c) carried out, or planned to be carried out, contemporaneously with the project.		necessary to achieve its objective.
2.	Application of R&R	Same as above	In addition to the above, <b>Section 2(3)</b> land purchased by private company as prescribed by Govt. or when part acquired by govt	Provision of OP 4.12 to apply.
3.	Affected area	Involuntary take of land resulting in loss of shelter, loss of assets or access to assets, loss of income sources or means of livelihood	<b>Section 3(b):</b> Area notified for 'acquisition'	Provisions of OP 4.12 will be applicable
4.	Family		<b>Section 3(m)</b> includes person, his and her spouse, minor children, minor brothers and sisters dependent. Widows, divorcees, abandoned women will be considered as separate family.	The definition of family given in RFCTLAR&R Act 2013 will be followed for both titleholders and non-titleholders.

5.	Affected family for eligibility	All adversely affected people whether have formal legal rights or do not have formal legal rights on land	<p><b>Section 3 (a):</b> whose land and other immovable property acquired.</p> <p><b>(b)&amp;(e):</b> Family residing in affected area such as labourers, tenants, dependent on forest and water bodies, etc. whose primary source of livelihood is affected due to acquisition</p> <p><b>(c)</b> Scheduled tribes and other forest dwellers whose rights recognized under the Forest Dwellers Act 2006.</p> <p><b>(f)</b> Family assigned land by state or central government under any schemes</p> <p><b>(g)</b> Family residing on any land in urban area that will be acquired or primary source of livelihood affected by acquisition.</p>	
6.	Cut-Off date	Date established by the borrower and acceptable to the Bank. It is the date of census.	<p><b>Section 3 c (ii), (iv) (vi):</b> Families residing for preceding 3 yrs or more prior to "acquisition of land".</p>	<p>Provisions of OP 4.12 will be followed as RFCTLAR&amp;R Act has no such provision for people living on public land. Moreover, RFCTLAR&amp;R Act requires proof of residing in the project area at least</p>

				three years prior to initial notice on LA.
7.	Non-application of Chapter II	Stand-alone SIA for all investments	<b>Section 6(2):</b> Irrigation projects where EIA is required under other laws, provisions of SIA not applicable.	Provision of OP 4.12 will be followed.
7.	Consultation – Phase I during preparation	Consultation a continuous process during planning and implementation	<b>Section 4(1)</b> date issued for <i>first consultation</i> with PRIs, Urban local bodies, Municipalities, etc. to carry out SIA.  <b>Section 5:</b> Public hearing of SIA in affected area. Provide adequate publicity of date and time.	Provisions of OP 4.12 will be followed. The draft and final SIA will be disclosed in public as per the provision given in RFCTLAR&R Act, 2013.
8.	Time duration to prepare SIA and SIMP	Draft Social Assessment, Resettlement Action Plan and or Social Management Framework prepared before appraisal.	<b>Section 4 (2): within six months</b> from the date of its commencement.	No gap found. RFCTLAR&R Act specifies a timeframe which is followed by the client.
9.	Disclosure – Stage I	To be disclosed before appraisal.	<b>Section 6(1):</b> Translated in local language available in PRI institutions and local urban government bodies; district administrative offices and websites of concerned government agency.	No gap found.
10.	Formation of Expert Group to appraise SIA and SIMP	Appraised by Bank staff	<b>Section 7(1):</b> Constitute a multi-disciplinary Expert Group include members of	No gaps found.



			decentralized govt Institutes (PRIs, ULBs).	
11.	Time stipulated for Group to submit its report	Before the decision meeting for appraisal	<b>Section 7(4):</b> Submit its report <b><i>within two months from the date of its constitution</i></b>	No gaps found.
12.	Scope of work of the Expert group	Social Assessment, resettlement action Plan reviewed and appraised by Bank staff and approved by Regional safeguard advisor	<b>Section 7 (4) (a&amp;b):</b> assess whether it serves any public purpose or not; if social costs outweigh potential benefits then should be abandoned;  <b>Section 7 (5) (a&amp;b):</b> if serves public purpose, then it has considered minimum land acquisition, and alternate options to minimize displacement; potential benefits outweigh social costs	No gap found.
13.	Consultation – Phase II during appraisal	In practice consultation workshops are organized in project affected areas at district and state level.	<b>Section 2 (2):</b> Prior consent of 80% and 70% of land owners in PPP and where private company has approached the govt to acquire balance land has been obtained,	No gap found.
14.	Disclosure – Stage II	Information dissemination through the planning and implementation	Section 7 (6): recommendations of expert group under 7(4&5) to be made public in local language in district and block administrative office and PRIs	No gap found.

15.	Minimize impact on multi-crop land	Select feasible design that has minimal adverse impact.	<p><b>Section 10:</b> In case multi-crop land is to be acquired under exceptional circumstances, the area to be acquired cannot exceed aggregate of land of all projects in district or state. The area to be acquired cannot exceed the total net sown area of the district or state.</p> <p>Wasteland equivalent to twice the area acquired will be developed.</p>	No gap found.
16.	Information dissemination of preliminary notice	Continuous part of the preparation and participation	<p><b>Section 11 (1), (2) &amp; (3):</b> Notice published in local language and meetings called of gram sabhas, municipalities to provide full information about the purpose of the project, summary of SIA and particulars of administrator appointed for R&amp;R' summary of R&amp;R scheme</p>	No gap found.
17.	Updating land records	To be part of RAP	<p><b>Section 11 (5):</b> Once established that the land is required for public purpose, accordingly notice to be issued <b><i>under section 19 following which land records to be updated within two months</i></b></p>	No gap found.

18.	Census and preparation of R&R schemes	To be part of RAP including both titleholders and non-titleholders	<b>Section 16 (1) (2):</b> carry out census of affected people and their assets to be affected, livelihood loss and common property to be affected; R&R scheme including time line for implementation.	RFCTLAR&R Act takes only titleholders into account. Provision of OP 4.12 to be followed.
19.	Information dissemination and Public hearing - Stage III	Consultation throughout the process is mandatory	<b>Section 16(4) &amp; (5):</b> mandatory to disseminate information on R&R scheme including resettlement area and organize public hearing on the Draft R&R scheme in each Gram Sabha, Municipality and consultations in Scheduled area as required under PESA.	Provisions of OP 4.12 to be followed.
20.	Approval of R&R Scheme	As part of RAP prior to appraisal	<b>Section 17 &amp; 18:</b> Draft R&R Scheme to be finalized after addressing objections raised during public hearing and approved.	No gap found
21.	Final declaration of R&R Scheme	Approved RAP including budgetary provisions to implement it	<b>Section 19 (2):</b> Only after the requiring body has deposited the money will the govt issue the notice along with <b>19(1)</b> .	No gap found.
22.	Time period stipulated.	Included in RAP - Time line synchronized with Government's procedures or adopts innovative methods to reduce the time which is based operated on	<b>Section 19 (2):</b> the entire process to update land records, disseminate information, preliminary survey, census, hearing of objections, preparation of R&R schemes and approval,	No gap found.

		the principles of participation and transparency.	deposit of money must <b>complete within 12 months</b> from the date on which section 11, the preliminary notice issued.  <b>Section 19 (7):</b> If the final declaration not made within 12 months of section 11 (1), the process will lapse, except under special circumstances.	
23.	Preparation of land acquisition plans	Included in RAP.	<b>Section 20:</b> Land marked, measured for preparation of acquisition plans.	No gap found.
24.	Hearing of claims		<b>Section 21(1) (2):</b> Notices issued indicating govt's intension to take possession of land and claims on compensation and R&R can be <b>made not less than one month and not more than six months</b> from the date of issue of section 21(1).	
25.	Time period stipulated for declaring the award		<b>Section 25:</b> It is required to announce the award <b>within 12 months of issue of Section 19 (final declaration to acquire land, approved R&amp;R scheme)</b> after completing land acquisition plans, hearing of objection, settling individual claims for declaration of the award. If award not made within the	

			stipulated time, the entire proceedings will lapse.	
26.	LA Act 1984 deem to lapse and RFCTLAR&R is applicable		<b>Section 24:</b> where award is not declared under section 11, or where made five years ago but land not taken in possession or where award declared but money not deposited in the account of majority of beneficiary.	No gap found.
27.	Methodology for determining market value for land	Full replacement Cost	<b>Section 26 and First Schedule:</b> Recognizes 3 methods and whichever is higher will be considered which will be multiplied by a factor given in Schedule First; compensation given earlier will not be considered; if rates not available floor price can be set; steps to be taken to update the market value.	No gap found.
28.	Valuation of structures	Full Replacement cost	<b>Section 29 (1)</b> without deducting the depreciated value.	Provisions of OP 4.12
29.	Solatium and interest		<b>Section 30(1)</b> 100% of the compensation amount <b>Section 30(3):</b> 12% per annum on the market rate from the date of notification of SIA to the date of ward or land taken over	No gap found.
30.	R&R Award	Total cost included in RAP to resettle and rehabilitate the	<b>Section 31, Second Schedule:</b> A family as a unit will receive R&R grant over	No gap found

		affected persons and assist in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher	and above the compensation and those who are not entitled to compensation.  <b>Second Schedule:</b> Homeless entitled to constructed house, land for land in irrigation projects in lieu of compensation, in case of acquisition for urbanization 20% of developed land reserved for owners at a price equal to compensation' jobs or onetime payment or annuity for 20 years' subsistence grant, transportation, land and house registered on joint name husband and wife, etc.	
31	Transparency		<b>Section 37(1):</b> Information of each individual family including loss, compensation awarded, etc. will be available on the website.	No gap found.
38.	Possession of land	Taking of land and related assets may take place only after compensation has been paid and, where applicable, resettlement sites and moving allowances have been provided to the displaced persons.	<b>Section 38(1):</b> Land will be taken over by the government within three months of compensation and 6 months of R&R benefits disbursed; infrastructure facilities at resettlement sites will be completed within 18 months from the date of award made under section 30 for compensation; in case of irrigation and hydel projects	No gap found.

			R&R completed six months prior to submergence.	
39.	Multiple displacement		<b>Section 39:</b> Additional compensation equivalent to compensation determined will be paid to displaced	No gap found.
31.	Acquisition for emergency purpose	Not permeable in bank funded projects	<b>Section 40 (5):</b> 75% additional compensation will be paid over and above the compensation amount	Provisions of OP 4.12 will be followed.
32.	Prior consent before acquisition and alienation	Mandatory to carry out Free, Prior, Informed Consultation with Indigenous people.	<b>Section 41(3)</b> Mandatory to get consent from Gram Sabha, Panchayat, Autonomous Councils in Scheduled areas.	No gap found.
33.	Development plans for SC and ST	Indigenous Peoples' Development plan required along with RAP.  Land for land for is an option across all sectors.	<b>Section 41:</b> Separate development plans to be prepared, settle land rights before acquisition; provision of for alternate fuel fodder, non-timber produce on forest land to be developed within 5 years; 1/3 <sup>rd</sup> compensation amount to be paid as first instalment and rest at the time of taking possession; ST to be resettled within Scheduled area; land free of cost for community purpose; land alienation will be null and void and ST and SC considered for R&R benefits; fishing rights restored in irrigation and hydel projects; if wish to settle outside the	No gap found.

			<p>district additional benefits to be provided in monetary terms; all rights enjoyed under other laws will continue.</p> <p><b>Second Schedule:</b> additional provisions for SC&amp;ST for land for land in irrigation projects, additional sum over and above the subsistence grant,</p>	
34.	Institutional arrangement	Institutional arrangement must be agreed upon and included in RAP, IPDP.	<p><b>Section 43-45:</b> Appointment of administrator, R&amp;R Commissioner, when more than 100 acres of land is to be acquired, R&amp;R Committee will be formed at project level, social audit to be carried out by Gram Sabha and Municipalities.</p>	No gap found.
35.	Change of land use	Compensation and R&R assistance should be disbursed before taking physical possession of land.	<p><b>Section 46(4):</b> Land will not be transferred to the requisitioning authority till R&amp;R is not complied with in full</p>	No gap found.
36	Monitoring and Evaluation	Indicators and monitoring system included in RAP and IPDP	<p><b>Section 48-50:</b> Set up National and State level Monitoring Committee to review and monitor progress</p>	No gap found
37.	Authority to settle claims		<p><b>Section 51-74:</b> The Authority will be set up settle any legal disputes that arise from acquisition and R&amp;R, the aggrieved party can</p>	No gap found



			move to the high court thereafter.	
38.	Exempt from tax and fee	Project to bear all taxes and other expenses if new assets are purchased by the PAP	<b>Section 96:</b> Compensation and agreements will not be liable to tax	No gap found
39.	No change in status of land acquired		<b>Section 99:</b> Once the land is acquired for a particular purpose, its purpose cannot be changed	No gap found
40.	Return of unused land		<b>Section 101:</b> If the acquired land remains unused for 5 years, then it will be returned to original owner, heir or included in land bank	No gap found
41.	Distribution of increased value of land transferred		<b>Section 102:</b> 40% of appreciated value of acquired land will be distributed to owners provided no development has taken place.	No gap found

## **ANNEXURE IX CHECKLIST FOR PREPARING GENDER ACTION PLAN**

<b>Focus of intervention</b>	<b>Data to be collected</b>	<b>Data source</b>
Policy checklist	<p>i. What are the requirements of the national gender equality policy, if any, and the executive support provided to it?</p> <p>ii. Which ministry focal point or unit is responsible for advocacy and gender inclusion at the policy and project level?</p> <p>iii. Does the Energy sector strategy address gender issues (labour issues, e.g. promotion of gender in labour-based work, participation of women in prioritization and design of works, measures to eliminate discriminatory labour or contracting practices, HIV/AIDS prevention and treatment) in its works and contracts?</p> <p>iv. Do solar policy and planning procedures explicitly take gender into account: identification of gender gaps and gender-specific needs, capacities, constraints, and opportunities inclusion of socio-economic empowerment as an integral element?</p> <p>v. Are women and men civil society stakeholders consulted on policies and programs; included in teams analysing policy and strategy; included in decision making?</p> <p>vi. Is there a system for monitoring the implementation of gender and other components of sector policies and strategies?</p> <p>vii. Sex disaggregation of beneficiary data and key gender indicators outreach and capacity building on gender and other social dimensions grants for addressing gender issues?</p> <p>viii. Are there training sessions on gender including gender-sensitive planning?</p> <p>ix. Is stakeholder consultation facilitated?</p> <p>x. Is there participation of implementing agencies or community organizations?</p>	<p>Contract documents;</p> <p>Ministry of New and Renewable Energy; Ministry of Women and Child Development;</p> <p>Park developer</p>

Focus of intervention	Data to be collected	Data source
	<p>xi. Are gender sensitization workshops held for men and women of power ministry / department staff and implementing agencies, and do they consider knowledge gaps in gender elements in the sector?</p> <p>xii. How many women are represented on gender boards and in works prioritization and decision-making forums related to the planning, implementation, monitoring, and evaluation of projects?</p>	
Project cycle: Project identification, preparation, and design	<p>i. Conduct a rapid assessment to identify and quantify potential gender-related issues and impacts affecting access, risks, benefits, and participation</p> <p>ii. Identify disadvantaged or vulnerable groups, including who they are, where they live, and their socioeconomic characteristics (scheduled castes, women-headed households, widows, disabled)</p> <p>iii. Examine the impacts of project on these groups</p> <p>iv. Identify the gender-specific implications of land acquisition and resettlement</p> <p>v. Identify gender-specific implications of employment opportunities to be created under the project</p> <p>vi. Identify gender-specific constraints in receiving information and providing feedback and complaints on the project</p> <p>vii. Discuss identified gender and other social issues in the project</p> <p>viii. Include both females and males affected by the project in stakeholder consultations</p> <p>ix. Use separate focus groups to enable women to voice their views separately from men</p> <p>x. Analyse the data collected to highlight gender differences in uses and the underlying causes of women's and men's project related problems</p>	<p>Stakeholder and beneficiary assessments: user satisfaction survey, project concept note, social assessments (household surveys and focus group discussions in project influence area), mid-term and end term evaluation surveys</p>

Focus of intervention	Data to be collected	Data source
	<p>xi. Examine relevant inter-sectoral linkages, such as access to health services, HIV/AIDS prevention, and access to markets and schools</p> <p>xii. Ensure that analysis of gender differences in needs, use, constraints, and access are included in the terms of reference for the social assessment</p> <p>xiii. Identify the gender-related issues that need to be addressed to ensure the effectiveness and sustainability of the project</p> <p>xiv. Develop approaches for addressing the gender-related issues identified and creating opportunities for equal access to project benefits for men and women, including training, organizational capacity building, grants programs, targets for women's participation</p> <p>xv. Develop indicators for measuring progress on gender-related issues within the relevant project components (e.g. construction works, institutional arrangements, land acquisition and resettlement benefits, privatization, livelihood restoration, awareness building, consultations, complaint handling)</p>	
Project cycle: Methodology	<p>i. Desk review (secondary literature)</p> <p>ii. Review available information (e.g. statistics, gender analysis, documents of previous solar projects, if available or other projects involving acquisition for non-linear projects) in the project area and the socioeconomic profile of the target population</p> <p>iii. Review the relevant legal framework (e.g. inheritance law), policy framework (e.g. resettlement and rehabilitation), and institutional framework (e.g. current administrative system for land acquisition, compensation disbursement, grievance handling, awareness creation) and their gender implications</p> <p>iv. Review government programs for encouraging equal opportunities and participation of women in the project influence area</p> <p>v. Household surveys (primary survey)</p>	Other projects in the country/state and gender policy documents, household surveys, national sample survey, latest census data, participatory rapid appraisal of target area,

Focus of intervention	Data to be collected	Data source
	<ul style="list-style-type: none"> <li>vi. Draw up gender-disaggregated socioeconomic and cultural profiles and identify the problems faced by and needs of the target population</li> <li>vii. Conduct group discussions, random interviews, and transect walks to study the activity pattern</li> <li>viii. Collect quantitative information</li> <li>ix. Participatory methodologies (e.g. participatory rapid appraisal)</li> <li>x. Collect qualitative information that cannot be collected through surveys (socio cultural norms, behavioural questions)</li> <li>xi. Define ways in which men and women beneficiaries and other stakeholders, especially poor women, can equally participate in the project</li> <li>xii. Map out the target areas and assess which are the most disadvantaged areas and sections of society (widows, female-headed households, disabled men and women) in terms of access to services and poverty level</li> <li>xiii. Identify major stakeholder groups and their positions</li> <li>xiv. Staffing</li> <li>xv. Ensure adequate gender balance in field teams</li> <li>xvi. Select field team members with gender awareness, local knowledge, cultural understanding, and willingness to listen</li> </ul>	<p>focus group discussions, consultations with beneficiaries</p>
Project cycle: Data collection	<ul style="list-style-type: none"> <li>i. Socioeconomic profile: Gender-disaggregated data</li> <li>ii. Demographic: Gender, sex ratio, caste, marriageable age, female-headed households, migration trend, household size</li> <li>iii. Economic: Income level and source, expenditure pattern and decision making, access to land and resources</li> <li>iv. Health: Population growth rate, infant and adult mortality rate, availability of medical facility, reproduction-related decision making, HIV/AIDS awareness</li> <li>v. Education: Literacy, school enrolment and dropout ratio, child labour</li> </ul>	<p>District, block, and village census data, national sample survey data, health survey data, household surveys, focus group</p>

Focus of intervention	Data to be collected	Data source
	<p>vi. Status of women: Political representation and awareness, socio cultural perceptions and practices of men and women, domestic violence, trafficking, gender-discriminatory policies and laws, gender roles, responsibilities and gender division of labour in productive areas (e.g. agriculture, income-generating activities) and reproductive areas (e.g. household chores, child care), and time allocation for each responsibility</p> <p>vii. Fuel, fodder, water and sanitation</p> <p>viii. Availability, quantity, and quality of fuel and fodder, who collects fuel, fodder, and water for the family, sources of drinking and agricultural water, how men and women store and use water collected, dry season management, how far away these resources are located, time spent on collection of the resources, mode of transport used to collect the resources, availability of sanitation service (chargeable or not, who runs it)</p> <p>ix. Access, control, constraints</p> <p>x. How men and women differ in their access to and control of land, agricultural inputs, extension, markets, employment opportunities, and credit</p> <p>xi. Whether external assistance is provided to improve access and control, and by whom</p> <p>xii. Participation</p> <p>xiii. Factors affecting the level of participation of men vs. women, incentives and constraints, means of information dissemination about the project preferred by men vs. women, labour demand for men vs. women, which modes of participation men and women favour (e.g. decision making in planning, cash contribution, labour contribution for construction, training, financial management, organizational management)</p> <p>xiv. Perception of benefits and impacts</p> <p>xv. Men's and women's perceptions of positive and negative impacts of the project, how negative effects can be mitigated</p>	<p>discussions, behavioural surveys, observation</p>

Focus of intervention	Data to be collected	Data source
Project implementation : Gender action plan	<p>i. Prepare gender action plan. Under this:</p> <p>ii. Undertake quality social and gender analyses. Identify constraints to participating and benefiting men and women; develop strategies for each component to ensure that men and women participate and benefit equally</p> <p>iii. Revisit gender design strategies at inception to develop a detailed gender action plan. The plan needs to be tested and reviewed early in implementation; identify detailed activities, targets, resources, and responsibilities for implementation</p> <p>iv. Gender action plan must be fully owned and understood by the executing agency. Use a participatory and flexible approach to developing the plan; a strong rationale that is directly linked to overall project objectives is needed for targeting and working with women</p> <p>v. Identify realistic targets linked to loan objectives. Targets and strategies should enable step-by-step progress, bringing incremental changes and challenging culture without threatening it; linking targets to loan objectives helps all stakeholders to understand the rationale for focusing on women and helps monitoring of participation and benefits.</p> <p>vi. Include gender capacity building in the gender action plan. Both formal training and ongoing support and mentoring are needed for developing skills, ownership, and commitment.</p> <p>vii. Provide adequate skills and resources for implementation of gender action plan. Long-term gender specialists in the executing agency or project team and adequate resources for implementation of actions; nongovernmental organizations and other agencies contracted to implement project activities should have a demonstrated gender capacity.</p> <p>viii. Monitor and follow up gender-related targets and activities. Systematic follow-up to ensure that policy reforms and gender actions are implemented; routine monitoring</p>	<p>Gender expertise,</p> <p>Discussion and participation with beneficiaries, separate focus group</p> <p>discussions with men and women, government departments, labour and employment laws, provisions in project and budget, learning approaches from good practice cases</p>

Focus of intervention	Data to be collected	Data source
	and reporting; gender-sensitive indicators and gender-related risks must be included in project logical frameworks.	
Project implementation : Participation strategy	<p>i. Develop a participation strategy for men and women during project implementation and monitoring and evaluation:</p> <p>ii. Avoid overly high expectation of women's participation and develop a practical schedule for participation</p> <p>iii. Planning: Conduct women-specific consultation to take their views and suggestions on the design. Any mechanism established during the project design, such as grievance mechanisms, should have adequate representation of women</p> <p>iv. Construction: Ensure work conditions that are conducive to women's participation (e.g. gender-equal wage rates, construction season, toilet and child care facilities)</p> <p>v. Training options: Identify ways to link up with income generation, literacy, and other activities to support an integrated approach to poverty reduction and women's empowerment</p> <p>vi. Staffing, scheduling, procurement, and budgeting: Hire female project staff</p> <p>vii. Consider seasonal labour demand in scheduling civil works</p> <p>viii. If appropriate, set a minimum percentage of female labourers and prohibit the use of child labourers in the civil works contract</p> <p>ix. Ensure adequate and flexible budgeting to allow a learning approach (e.g. training budget, consulting service budget for women's organizations)</p>	<p>Gender expertise,</p> <p>Discussion and participation with beneficiaries, separate focus group</p> <p>discussions with men and women,</p> <p>government departments, labour and employment laws, provisions in project and budget, learning approaches from good practice cases</p>
Project cycle: Impact	<p>i. Establish whether men and women perceive positive and negative impacts of the project differently, and assess how the negative effects can be mitigated</p> <p>ii. Consider whether the benefits are likely to be distributed equitably</p>	<p>Project monitoring reports, audits, group discussions,</p>



Focus of intervention	Data to be collected	Data source
	<p>iii. For disadvantaged or vulnerable groups, find out who they are, where they live, what are their socioeconomic characteristics (scheduled castes, women-headed households, widows, disabled), and how the project will affect them</p> <p>iv. Assess the gender-specific implications of the following:</p> <ul style="list-style-type: none"> <li>- land acquisition and resettlement: extent of land being acquired</li> <li>- utility relocation: what and where</li> <li>- tree cutting: how many and local dependence</li> <li>- diversion of forest land: how much and local dependence</li> </ul>	household survey, land tenure details
Monitoring and Evaluation: Feedback mechanism	<p>i. Develop a feedback mechanism in which both males and females have a voice</p> <p>ii. Disaggregate all relevant indicators by gender, such as number of women gaining access to credit, increase in women's income, and career prospects for project-trained women</p> <p>iii. Integrate sex-disaggregated beneficiary data and relevant measures of gender equality into the baselines and other routine monitoring and evaluation processes</p> <p>iv. Measure the impacts of the project components on women and men</p> <p>v. Assess the value added by women's participation in the project</p>	Focus group discussions, project monitoring reports
Monitoring and Evaluation: Gender informed indicators	<p>i. Develop gender-informed results indicators for monitoring. These include:</p> <p>ii. Increased income, employment, and entrepreneurship. Number of women and men employed in sector, number of women and men employed in solar power project; increased women's and men's income from produce marketed using project services.</p> <p>iii. Time saving and increased productivity. Reduced women's and men's time for domestic work (collection of</p>	Review of gender-informed results indicators

Focus of intervention	Data to be collected	Data source
	<p>water, fuel wood, food crop collection, fodder, etc.); increased productive time used for economic activities.</p> <p>iv. Improved affordability. Percentage increase of income among women and men; increased participation in decision making; number of women and men participating in community decision meetings; reduced incidence of harassment, crime, and human trafficking; increased awareness of HIV/AIDS transmission and prevention; number of women and men leading committees; number of women and men managers in agencies; women control their income and establish bank accounts in their names; increased recognition of women's contributions to the household and community</p>	

## ANNEXURE X CONSULTATIONS IN SAMPLE PROJECTS

Location for Consultation	Issues Covered / Raised by Participants	How it would be Addressed
Proposed Solar Park Site – Pavagada		
Selected five villages: Thirumani, Balasamudra, Vollur, Kyathaganacherlu, Rayacharlu	Opportunity for employment generation for the village land owners and the agricultural labour - Semi-skilled / unskilled	The local community members will be preferred for employment during construction.  Those losing livelihood will be provided opportunities for alternative livelihood.
	Opportunities for employment generation for women and girls.  Improved health, education and transport services  Economic and social empowerment of women and girls	Vocational centres, establishment of home-based income generation activities  Development of health centres, health camps and up gradation of schools for secondary and higher education  Formation of self-help groups, linkages with markets and banking facilities, awareness campaigns to address issues of child marriage and other social ills.
Number of stakeholders consulted:  70 stakeholders	The annual lease rate is low in comparison to adjoining areas for similar projects	Rates will be finalized in consultation with the local community and district administration.  Additional public disclosure about the criteria for calculation etc to be made known to stakeholders.
	What other benefits for the village / land owners	Developers will carry out developmental activities in the villages as part of CSR. The activities will be identified in consultation with the community.
	Stakeholder expects better power supply	The government may consider to include a small percentage of power produced by

Location for Consultation	Issues Covered / Raised by Participants	How it would be Addressed
	situation in villages after the implementation of solar power plant	the developer to be allocated for the local population or alternatively, the conditions could be included in the agreements for the developer to install roof-top solar power panels for the local villagers as part of the CSR budget of the company
	What would be the payment schedules and how will the timely payments be ensured	The lease will be paid annually with an increment of 5% every two years. Project to make community aware about the mechanisms to be put in place for ensuring timely payment of lease rentals payable to them.
	Impact of dust on standing crops during construction phase	Contactor will ensure watering of construction site / tracks on regular basis.
Proposed Solar Park Site – Rewa		
Selected five villages: Badwar, Barseta Desh, Barseta Pahar, RamNagarPahar and Etar Pahar	What will be the rate for acquiring land	The land owners will be paid double the circle rate as per the provisions of the state policy.
	<p>Opportunities for employment for women and girls</p> <p>Access to water, sanitation, health and education services</p> <p>Economic and social empowerment of women and girls</p>	<p>Vocational centres and home-based employment generation activities</p> <p>Installation of hand pumps, active participation in implementation of government schemes like 'Swachh Bharat' for effective roll out and improved access to health facilities and higher education.</p> <p>Formation of self-help groups, linkages with markets and banking facilities, awareness campaigns to address issues of</p>

Location for Consultation	Issues Covered / Raised by Participants	How it would be Addressed
		child marriage and other social ills.
Number of stakeholders consulted: 55 stakeholders	What impact the project will have on the surrounding areas due to radiation.	The solar panels do not have any adverse impacts on the health due to radiations. The Project will undertake awareness campaigns about the solar panels and how it works on regular basis.
	How will the access to the private land parcels ensured which are not included in the solar park	The easement rights shall be ensured while preparing the detailed layout plans for the solar park.
	Impact on surface water sources	Ensure that the existing drainage and surface water bodies are not altered during construction stage. Water from such sources should only be withdrawn after getting NOC from local panchayat.
	What will happen to houses falling within the proposed site?	Project will prepare a resettlement action plan which will provide for mitigation measures for all adverse impacts including relocation. The impacted structures will be compensated at replacement value.
	Access to forest area for collection of NTFP	Project to ensure that community has access to forest areas.
Proposed Solar Park Site – Mandsaur		
Project Villages: Gujarkhedi(uninhabited) and Runija Villages;	What kind of employment opportunities would be available for the semi-skilled and unskilled labourers during the	RUMSL (solar park developer) has taken the initiative and prepared a list of unemployed youth along with their qualifications and contact numbers. The same is shared with the EPC / NTPC for

Location for Consultation	Issues Covered / Raised by Participants	How it would be Addressed
	construction and operations stage	potential requirement during the construction and operations stage activities.
	<p>Opportunities for employment for women and girls</p> <p>Access to water, sanitation, health and education services</p> <p>Economic and social empowerment of women and girls</p>	<p>Vocational centres and home-based employment generation activities</p> <p>Installation of hand pumps, active participation in implementation of government schemes like 'Swachh Bharat' for effective roll out and improved access to health facilities and higher education.</p> <p>Formation of self-help groups, linkages with markets and banking facilities, awareness campaigns to address issues of child marriage and other social ills.</p>
<p>Number of Stakeholder consultations conducted:</p> <p>50 stakeholders / villagers including women</p>	<p>The setting up of the proposed plant would lead to blocked access to a locally known cultural site and loss of grazing land for animals.</p>	<p>Of the 553 ha only 8 ha of land is given on patta, rest all is government land. The 9 families who have been allotted patta would be provided with alternative land parcels on Patta.</p> <p>Access to the proposed site would be blocked due to safety concerns. Access can be provided through the plant premises on request if required. The villages in vicinity of the proposed project sufficient grazing lands.</p>
	<p>Some of the major water bodies falling within the proposed site are being used by locals to meet their water demands for various activities.</p>	<p>The developer/EPC contractor has confirmed the local community that no water would be drawn from these surface water bodies for solar park related activities and these have also been excluded from the site fencing based on the consultation inputs. The project boundaries have undergone changes post</p>

Location for Consultation	Issues Covered / Raised by Participants	How it would be Addressed
		the start of the project implementation.
	The approach road to site passes through a cluster of houses mainly belonging to the SC category on the outskirts of the village. This can have serious safety concerns due to movement of heavy machinery and vehicles	<p>The developer in coordination with the EPC contractor has agreed to provide additional signage and other safety measures near the cluster.</p> <p>The EPC contractors shall also undertake development works i.e. construction of public toilets etc. from their CSR budgets near these housing clusters.</p>

## ANNEXURE XI- GRIEVANCE REDRESSAL FORMATS

### ENVIRONMENTAL AND SOCIAL GRIEVANCE FORM

<b>Complainant Name</b>	
<b>Contact Details</b>	Address   Contact No.:
<b>Location of Complaint</b>	
<b>Details of Complaints</b>	
<b>Directions</b>	
<b>Confidentially Requested</b>	Yes <input type="checkbox"/> <input type="checkbox"/>
<b>Signature of Complainant</b>	<b>Date:</b>
<i>Reference No.:</i>	<i>For official use only</i>
<i>Date Received:</i>	<i>For official use only</i>
<i>Complaint taken by:</i>	<i>For official use only</i>
<i>Complaint assigned</i>	<i>For official use only</i>
<i>Date of complaint Acknowledged:</i>	<i>For official use only</i>
<i>Complaint referred to</i>	<i>For official use only</i>



## ANNEXURE XII FORMAT FOR GRIEVANCE REDRESSAL MECHANISM REGISTER

Sl. No.	Name of the Complainant	Unique complaint number	Address & Contact No.	Gist of the Complaint	Forwarded to whom	Whether grievance redressed or not	If yes, Gist of disposal	If rejected, gist of reasons	If not attended reasons

### Monthly status Report on Environmental and Social Grievance Redressal: -

Sl. No.	Name of the unit	No. of pending complaints at the end of previous month	No. of complaint received during the month	Action initiated during the month	Completed during the month	No. of complaints pending at end of month	No. of grievance redressed	No. of dismissal	Total	Remarks

## ANNEXURE XIII PERFORMANCE INDICATORS- ASSESSMENT METHODOLOGY AND EXPECTED OUTPUTS

### Monitoring process

#### Monitoring Project Implementation Process, Input and Output

Progress	Assessment Methodology	Expected Output
Implementation Progress		
Notices under land acquisition process	Structured Schedule, informal and formal discussion	Timely notices to the affected families
Dissemination of information on project and social issues	Check the registers with contractors for queries	Adequate knowledge on project and its various components
Consultations conducted under the project with PAPs and others	Check the minutes of meetings registers with the PAPs. Verify copies on agreements made on issues raised and discussed.	Awareness and information on the project and participation in the project.
Consultations on R&R Policy and Distribution of R&R Policy of the project	Check the registers with the PAPs. Verify copies on agreements made on issues raised and discussed.	Awareness on R&R Benefits
Information on modes of valuation of assets, payment schedules and disbursement modes	Check the registers with the PAPs. Structured Schedule, informal and formal discussion	Awareness on methods of valuation, satisfaction with the payment schedules, disbursement modes
Needs assessment and training programs for income generation	Structured Schedule, informal and formal discussion	Awareness and satisfaction with the training programs for income restoration
Services of the NGO	Structured Schedule, informal and formal discussion	Proper knowledge, guidance and assistance in rehabilitation and resettlement

Progress	Assessment Methodology	Expected Output
Functioning of the Grievance redressal mechanism	Check the records of the NGO, State Nodal Agency and contractors for the complaints registered	Appropriate and timely action on the grievances of the affected people
Consultations for the identification of the Community Development Works	Check the minutes of meetings registers with the PAPs. Verify copies on agreements made on issues raised and discussed.	Participation in decision making process and satisfaction with the identified areas of development
Financial progress		
Amount disbursed for acquisition of land, structure, trees, etc.	Structured Schedule, informal and formal discussion	PAPs purchased land equivalent or more than land loss of same quality
Amount disbursed for R&R assistance.	Structured Schedule, informal and formal discussion	New house constructed, new land purchased, new productive assets purchased, created some income source to offset the loss of income
Amount disbursed for extension of development programmes, training and capacity building.	Structured Schedule, informal and formal discussion	Alternative income restoration programs initiated and lost income restored.
Fees paid to NGO for implementation of RAP and consultants for M&E activities	Structured Schedule, informal and formal discussion	Timely implementation
Physical progress		
Total land Acquired	Structured Schedule	Progress of land acquisition
Number of PAFs relocated	Structured Schedule	Progress of resettlement
Number of PAFs R&R Assistance	Structured Schedule	Progress on Economic Rehabilitation

Progress	Assessment Methodology	Expected Output
Social well being		
Area and type of house and facility in case of relocation	Core Rapid Appraisal	Resettlement
Health conditions, morbidity and mortality rates, if relocated or pollution due to construction	Structured Schedule	Social well being
Communal harmony if relocated in another revenue village	Rapid Appraisal	Resettlement
Women time disposition and decision making power for women groups trained for alternative livelihood	Participatory Appraisal	Women Empowerment
Increase in literacy level due to project intervention; drinking water, schools, health facilities, and other community infrastructures if relocated and enhanced by the project	Structured Schedule	Social well and improved social status.
Increased annual Household income and expenditure due to project intervention	Structured Schedule	Improved income Economic Status

## ANNEXURE XIV TERMS OF REFERENCE FOR CONCURRENT MONITORING AND EVALUATION

### a. Aim and Objectives

The aim of the monitoring is not only to ensure smooth implementation of the R&R program, but also to ensure that the implementing authority/contractor have followed the steps provided in RAP and approved policy of the project authority. The monitoring and evaluation will provide an assessment of RAP implementation to enable timely adjustments of implementation setup and also to verify whether the objectives of resettlement have been achieved or not.

Individual Consultant can be hired by project implementing agency for concurrent monitoring and evaluation of the project.

### b. Scope of work

The scope of work for M&E consultant would be:

- (a) to ensure timely implementation of Resettlement Action Plan (RAP) without deviation
- (b) to assess whether the implementation of the RAP is as per the R&R policy and RAP document
- (c) to evaluate whether the social development objectives of the project have been achieved

### c. Consultant Qualification

He/She should be a post-graduate, preferably in social sciences, and should have experience of working in international funding projects. He/She should have about 5 years' experience in implementing R&R and rural development works. He/She should have held management position in previous assignments should possess participatory management skills and must have good knowledge of the local language. The team leader should have working knowledge of land acquisition process.

### d. Duration of Service

The consultant will be contracted for a period of twelve months from the date of appointment.

#### Data, Services and Facilities to be provided by the Client

The client will provide the copies of the social assessment report, RAP, R&R policy, the list of the PAFs, the land acquisition plan and any other relevant reports/data. All facilities and support required in the performance of the assignment shall be extended to the consultants.

### e. Deliverables

The consultant shall provide following deliverables:

S. No.	Output	Timeframe
1	Monthly progress report	1 <sup>st</sup> week of Every month

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2	Project Completion Report	At the end of 12 <sup>th</sup> month from the date of signing of contract
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## ANNEXURE XV BATTERY ENERGY STORAGE SYSTEM CONSIDERATION

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### SAFETY CONSIDERATION FOR BESS

Safety consideration has two aspects. First, which could be included in all projects (e.g. risk analysis and incident preparedness) and second are those that are specific to technology type or application environment and other project specific factors. Safety consideration should be given due consideration during entire span of project from planning to commissioning and until decommissioning; by creating processes and procedures that will ensure a safe life cycle for energy storage deployments.

#### A. Addressing Safety in Planning

One of the first steps in development of Battery Energy Storage System (BESS) is identifying and quantifying the need for energy storage. When assessing the identified need for services on a given electrical system, consider the environments where an energy storage device could be installed. Factors such as population density, available footprint, local weather, electrical power constraints, proximity to the nearest fire station, and availability of water may be accounted for when evaluating a site. If there are insufficient resources or non-ideal conditions at any one site, multiple sites can be considered for smaller systems with aggregated functionality. Identified needs could include a short list of unacceptable outcomes. Many unacceptable outcomes can be derived from environmental and safety regulations like, events such as arc flash or blast in excess of the available worker PPE, or chemicals spilling into nearby river in excess of EPA regulations. Additional unacceptable outcomes can be derived from the associated level of financial risk or potential for loss of reputation such as in the event of a fire that spreads to nearby structures. Understanding these boundaries helps to contextualize specifications and make safety requirements meaningful.

#### B. Addressing Safety in Procurement

Along with information about physical dimensions, performance, and cost, a set of requirements to procure and install an energy storage system and then operate that system should also include requirements that ensure that the system is safe and that its operation over time remains safe. The requirements should also address potential safety related incidents and the specific actions that must be taken if they should occur. These specifications afford users an opportunity to mitigate risk and will aid in ensuring that equipment supplied is safe, that the system is effectively commissioned and deemed safe, and that the user can ensure system is continued to be operated safely.

Functions and the associated performance of equipment is captured in two areas that can be referenced for ease in developing specifications.

1. Codes, Standards and Regulations (CSR): Mature CSRs are effective ways of reducing and eliminating risk. Compliance with CSRs is considered evidence of a safe ESS installation.
2. Analysis of Safety: It is used wherever there is gap in the field of applicable CSRs. There are many techniques available for analyzing safety in complex technological systems including Failure Modes

and Effects Analysis (FMEA) and Systems Safety Analysis (SSA). When applied correctly, a safety analysis can provide a complete picture of how a device or system will operate under normal, abnormal, and foreseeable abuse conditions. This information allows project developers and designers to make informed decisions about what safety critical functions.

### **C. Addressing Safety in Deployment and Integration**

Key aspect to ensuring a safe installation is commissioning, which entails verification that the ESS and all associated controls, detection devices, shutoffs, etc. are functional and will operate under all anticipated conditions. Developer and supplier should be asked to provide a defined set of commissioning requirements for review and approving. Commissioning Plan should address following issues.

Documentation of completed Control Assurance Plan (CAP). Verification that safety critical control points are within compliance. CAP should include accuracy and delay compliance thresholds, recorded values, and testing interval. Simulated out-of-range inputs should be used to verify appropriate input or signal sanitization. The CAP should also stipulate data recording requirements and how stale data is handled for each point.

Documentation of completed Measurement Assurance Plan (MAP). Verification that safety critical measurements are within compliance. The MAP should include accuracy and delay compliance thresholds, recorded values, and testing interval. Simulated out-of-range measurements should be used to verify appropriate alarms and warnings before operation. MAP should also stipulate data recording requirements and how stale data is handled for each point.

Internal or External Communication Loss. If there is a loss of safety critical measurement or control, the system should gracefully shut down (e.g. loss of temperature measurement). If measurement or control is not safety critical (As determined in the FMEA and System Safety Analysis) then the system can continue to operate (e.g. loss of connection to off-site data backup).

### **D. Addressing Safety in Operations and Maintenance**

Plans for inspecting, servicing, repair and renovation as well as any addition to the system (e.g. installation of additional storage capacity). Procurement specification should require Energy Storage supplier, developer, or integrator to deliver a complete operation and maintenance manual. This manual should provide instructions for all required operating and maintenance activities, the timing for these activities, and who will perform them. This manual should also include conditions under which the system will have met end of warranty, service life, and operational life.

### **E. Addressing Safety in Decommissioning**

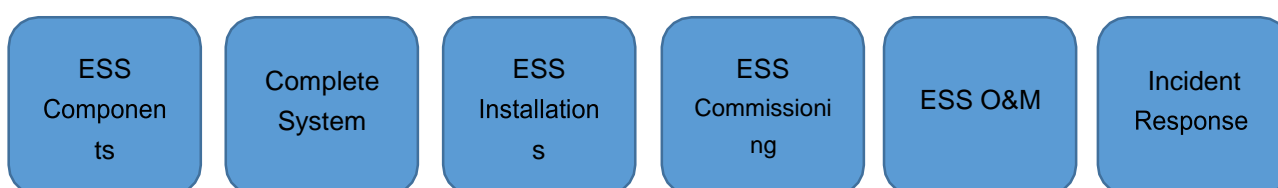
After the system has reached the end of its operational life, system has to be decommissioned, disposed of or materials can be recycled. For this reason, it is recommended that the energy storage supplier, developer, or integrator be required to develop a decommissioning and disposal plan. This plan should explain the procedure for decommissioning, including any hazards it may present, as well as the steps to disconnect the system from external automated control systems. It should elaborate



who is responsible for disposal and recycling, what costs this will incur, how articles should be packaged for disposal, and who is responsible for shipping the materials to the disposal or recycling site.

### Reference Codes, Standards and Regulations (CSR) for Battery Energy Storage System (BESS)

Following CSRs should be considered for the integration of energy storage to the distribution system and when preparing specifications and other documents necessary planning, design, construction, installation, commissioning, operations, maintenance and decommissioning of ESS. Additionally, these documents should be considered for providing for safety of personnel and property during these activities and responding to incidents that may occur that are attributable to or could affect the system. Partial potential CSR sources for applicability are shown in figure below



## ESS System Safety Prescription

### 1 Energy Storage System (Individual Components)

Safety criteria for ESS components (e.g., battery, inverter, controls, etc.) are intended to ensure the design and construction of each individual component meets the relevant safety-related metrics. The supplier of each component should design and construct the respective component to the standard and subject it to whatever testing is required by the relevant standard for that component. If the component satisfied the provisions of the standard and related testing criteria, then the individual component should be considered in compliance with the standard. Standards covering ESS components are of primary relevance to component manufacturers in deploying the component and to developers in specifying and procuring safe components. Manufacturers of complete ESS “products” or those that assemble an ESS on site from various components would benefit when using components that comply with relevant standards. Standards for Energy Storage System Components are listed in

Standards for ESS Components (Source: EPRI)

Energy Storage System Components	Standard
Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker	UL 489

Enclosures	
Electrochemical Capacitors	UL 810A
Lithium Batteries	UL 1642
Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources	UL 1741
Batteries for Use in Stationary Applications	UL 1973

## 2 Energy Storage System (Integrated Components)

Considering ESS as an assembly of components, a standard for a complete ESS “product” is likely to refer to various components and component standards. The complete ESS standard then simply ties together lower level requirements with industry best practices for safe system design. One approach these standards take is to specify that the components meet relevant component standards and specify documentation as to the acceptability of their combination as a safe ESS. Another is to consider the ESS “product” as a black box and evaluate the entire ESS against a holistic standard. If the ESS “product” satisfies the provisions of the standard and related testing criteria and metrics, then the components of the ESS is considered in compliance with the standard. A standard for the product would provide both prescriptive design and construction requirements as well as testing requirements for specific issues with certain allowable limits.

Those issues would include but not be limited to:

Documentation of thermal management system adequacy

Documentation of thermal abuse limits

Documentation of adequate enforcement of thermal limits (including below freezing)

Documentation of electrical shock and arc flash hazards, required clearances, etc.

Documentation of electrical abuse limits

Documentation of adequate enforcement of electrical limits

Documentation of mechanical abuse limits (vibration, and shock)

Documentation of adequate enforcement of mechanical limits

Thermal run-away propagation prevention adequacy

A complete system standard will document the safety of the ESS as a delivered product and its intended uses. Third-party certification programs inspect the initial design and ongoing

production of the ESS to ensure compliance is both established and maintained. In addition, certification programs would review and assess the administrative and quality control aspects associated with the manufacturer of safety critical components. A system standard will reference and impose the requirements of applicable component standards. This will help the customer determine whether the operational environment imposed by the system is consistent with predictable and safe component behaviour.

Standards for ESS Types (Source: EPRI)

Energy Storage System Type	Standard
Stationary Energy Storage Systems with Lithium Batteries – Safety Requirements (under development)	IEC 62897
Recommended Practice and Requirements for Harmonic Control in Electric Power Systems	IEEE 519
Recommended Practice and Procedures for Unlabeled Electrical Equipment Evaluation	NFPA 791-2014

### 3 Installation

The installation of an ESS, as pre-packaged equipment, a matched set of components, or a mix-matched assembly of components involves two key topical areas: procedures and physical requirements. Procedures cover worker safety, transportation, handling, and functions associated with the act of installing the ESS and its component parts. Physical requirements cover the safety of the final installation in terms of the surrounding environment, buildings, and other systems, electrical protection, access, egress and other safety-related issues. Below Standards for ESS Installation lists standards for Energy Storage Project Design, Deployment and Operations.

Standards for ESS Installation (Source: EPRI)

Energy Storage System Installation	Standard
Transportation Testing for Lithium Batteries	UN 38.3
Safety of primary and secondary lithium cells and	IEC 62281

batteries during transport.	
Shipping, receiving and delivery of ESS and associated components and all materials, systems, products, etc. associated with the ESS installation.	DOT Regulations
Competency of Third Party Field Evaluation Bodies	NFPA 790
Fire and smoke detection	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Fire suppression	NFPA 1, NFPA 13, NFPA 15, NFPA 101, NFPA 850, NFPA 851, NFPA 853, NFPA 5000, IBC, IFC, state and local codes
Fire and smoke containment	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Fire alarm	NFPA 72
Protection of Electronic Computer/Data Processing Equipment	NFPA 75
Clean Agent Fire Extinguishing Systems	NFPA 2001
Ventilation, exhaust, thermal management and mitigation of the generation of hydrogen or other hazardous or combustible gases or fluids	NFPA 1, IEEE/ASHRAE 1635, IMC, UMC, state and local codes
Egress (operating and emergency)	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Access (operating and emergency)	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Working space	OSHA 29 CFR 1910.305(j)(7) and OSHA 29 CFR 1926.441 (if applicable), NFPA 70E, Article 320

Physical security	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Illumination (operating and emergency)	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Fire department access	NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Anchoring and seismic protection	NFPA 5000, IBC, state and local codes
Buildings, enclosures and protection from the elements	IEC 60529, UL 96A, NFPA 5000, IBC, state and local codes
Signage	ANSI Z535, IEEE C-2, NFPA 1, NFPA 70E, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Emergency shutoff	IEEE C-2, NFPA 1, NFPA 101, NFPA 5000, IBC, IFC, state and local codes
Spill containment, neutralizing and disposal	NFPA 1, IPC, UPC, IFC, IEEE1578, state and local codes
Electrical safety	IEEE C-2 (National Electrical Safety Code), NFPA 70E, FM Global DS 5-10, DS 5-1, DC 5-19
Communications networks and management systems	IEC 61850, DNP3, Modbus
Seismic Requirements, Design, and Testing	IBC (International Building Code), IEEE 693, ACI 318-05, ACSE 7-10

#### 4 Commissioning

The commissioning of an ESS occurs after installation and inspection to ensure it operationally

complies with the applicable codes, standards, rules, and regulations in addition to any contractual obligations for performance of the ESS (e.g., efficiency, delivered power, availability, life, etc.). Essentially, commissioning ensures that the system operates as expected.

Commissioning plan can be developed along the lines of Standards given in Table below

Standards for ESS Commissioning (Source: EPRI)

Energy Storage System Commissioning	Standard
Recommended Practice for Commissioning of Fire Protection and Life Safety Systems	NFPA 3
Building and Systems Commissioning	ICC 1000

## 5 Operations and Maintenance

The operations and maintenance of an ESS involves two key topical areas: qualification of operators, and the operations and maintenance (O&M) manual. Qualification of operators involves training and certification associated with those personnel who will be working with the ESS. The O&M manual dictates the processes and technical requirements for working on ESS during operation as well as the schedule and instructions for maintenance.

The energy storage supplier and developers may consider re-commissioning the system on a regular basis to verify the safe operation, control, and shutdown of the system under normal and incident response situations. In order to ensure efficient operation, the customer may consider requiring that the energy storage provider develop a qualification program to train operation and maintenance personnel. Standards for ESS O&M lists down Standards for operations and Maintenance.

Standards for ESS O&M (Source: EPRI)

Energy Storage System Operations & Maintenance	Standard
Hazardous materials storage, handling and use	NFPA 400
Standard on Maintenance of Electrical Equipment	NFPA 70B

## 6 Incident Preparedness

The ability to respond to an incident associated with an ESS involves two key topical areas: procedures,

and automated systems. Standards for Incident Preparedness lists down standards ensuring the competency of those personnel doing response and then those standards and related documents associated with facilitating the response activity itself.

Standards for Incident Preparedness (Source: EPRI)

Incident Preparedness	Standard
Standard for Technical Rescuer Professional Qualifications	NFPA 1006
Standard for Fire Fighter Professional Qualifications	NFPA 1001
Standard for Fire Department Occupational Safety	NFPA 1500
Standard System for the Identification of the Hazards of Materials for Emergency Response	NFPA 704
Guide for Substation Fire Protection	IEEE 979
Fire Fighting	Emergency Planning and Community Right-to-Know Act (EPCRA)
Fire and Explosion Investigations	NPFA 921
Fire Safety Concepts Tree	NFPA 550

## **ANNEXURE-XVI 100 MW(AC) Solar PV Project (200MWp DC capacity) along with 50MW/150 MWh Battery Energy Storage System at Rajnandgaon, Chhattisgarh (Baseline)**

### **Location Characteristics:**

Solar Energy Corporation of India (SECI) Limited is proposed to develop 100MW Solar Photo Voltaic Project with up to 150MWh Battery storage project at District Rajnandgaon, Chhattisgarh. The Coordinates of the Project Location is Lat: 21°5'32.89"N, Long 80°50'30.37"E. The total land area identified at this stage is 377.423 ha. The power generated through the project is propose to be evacuated through overhead 132kV transmission line of length 33 km approx. to the nearest 132 kV CSPTCL's Substation at Thelkadi, Chhattisgarh.

### **1.1 Description of Environment**

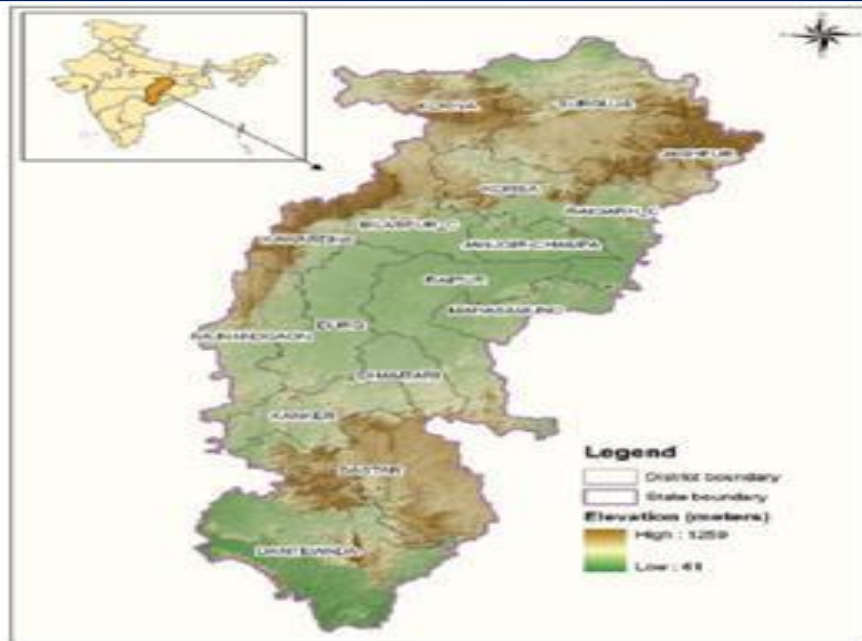
Rajnandgaon district is situated in the western part of newly created Chhattisgarh state, the district lies between latitude 20°70"- 22°29" North latitude and 80°23" to 81°29" East longitude covering an area of 8172.33 sq.kms. Its greatest length in the north-south is about 185 kms, while its width in the east-west extends about 80 kms. It is surrounded by Kawardha district in north, Durg district in the east; Bastar district is the in south and Garchiroli, Bhandara (Maharashtra) and Balaghat (Madhya Pradesh) districts in the west. The District headquarter Rajnandgaon is on the Mumbai - Howrah line of southeastern railways. The National Highway no. 6 (Great Eastern Road) also passes through the town of Rajnandgaon. The nearest airport to the District is at Mana (Raipur), about 80 kms away. All-important places within the district are well connected by a network of the state highways and all weather roads. The district is divided into 8 tehsils and 9 blocks for its administrative functioning and revenue collections. It is further divided in 1 Nagar Palik Nigam, 2 Nagar Palika , 5 Nagar Panchayat , 9 Janpad Panchayat , 692 Gram Panchayat. Rajnandgaon town (N 21°5' E 81°2') is the district Headquarters.

### **1.2 Topography, Physiography and Geology**

Based on regional topography Chhattisgarh region is divided into three regions, the Northern Hills, the Central Plains and the Bastar Plateau. The central Chhattisgarh basin is characterised by two major landform types, the gently sloping Chhattisgarh Plain and the undulating land. The elevation of the plain ranges from about 250 m on the eastern margin to about 330 m in the west. The gentle gradient of the Chhattisgarh Plain is largely due to its geological structure with flat to gently dipping Cuddapah sedimentary formations. The geological structure of Chhattisgarh state mainly consists of Achaeon and Cudappah rocks but Dharwad, Gondwana, Deccan Trap and old Alluvial Laterite rock systems are also found in some pockets of the State. Geological and elevation maps of Chhattisgarh State are given in



Source: Mines Department, Government of Chhattisgarh



**Map 2: Elevation Map of Chhattisgarh**

*Source: Water Policy for Drought Proofing Chhattisgarh, S. Gupta, Institute for Human Development, 2002*

Soil of various types found in the area can be broadly be placed under three groups (i) deep black soil (ii) yellow soil and (iii) red lateritic soil.

### 1.3. Seismicity

Chhattisgarh has very low rates of seismic activity. In recent years, tremors from earthquakes in neighboring states have been felt, most notably in 1969. The Bureau of Indian Standards (BIS) updated the seismic hazard map of India in 2000<sup>3</sup>. The main change was merging of Zones I & II. As per this updating, the entire Chhattisgarh state falls in Zone II as shown in **Map 3**. It reveals that the project region falls in Zones II low to moderate risk zone.



**Map 3: Seismic Zone Map**

*Source: IS 1893 (Part 1) 2002*

## 1.4 Rainfall

Rainfall data was collected for Raipur IMD station, which is the nearest IMD station in the project area. On an average, 1289 mm of rainfall is received annually mainly from south-east monsoon in the project area (**Table 4**). The region is classified as heavy rainfall area. Normally rains start in June and continue up to October. Nearly 94.5 % of annual rainfall is received during June to October months. About 2.3% of the normal rainfall is received during the winter season. On an average, there are about 62.3 rainy days in a year.

*Table 4 : Rainfall in the Project Area*

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
6.7	12.3	24.6	15.7	18.8	189.8	381.0	344.7	230.2	53.9	7.4	3.7	1288.8
(0.8)	(1.0)	(1.7)	(1.6)	(1.9)	(9.3)	(16.0)	(15.7)	(9.7)	(3.6)	(0.6)	(0.4)	(62.3)

Note: Values given in parentheses are no. of rainy days

*Source: IMD Station Raipur, (1951 to 1980)*

## 1.5 Groundwater Hydrology

Ground water is the dominant water source in the area. The sources of recharging of ground water are mostly from precipitation (rainfall) and partly from flowing water bodies and ponds. Hand pumps are commonly used to draw the water from ground in the villages. Static water levels vary along the stretch of project area. First or upper ground water aquifer lies in the range of 5 to 15 m below ground level (bgl). The ground water level in the area show a decline of 1.2 m to 1.5 m from post monsoon to pre monsoon period.

## 1.6 Climatology

The climate of the project area is characterized by intensely hot dry summer and well distributed rainfall, in south-west monsoon season and winter. Generally, the project area experiences the following four seasons in a year:

- The summer season (also known as pre-monsoon season) starts around Holi festival in March but the mercury rises to the peak in May and first week of June with the mean daily maximum temperature at about 40°C, and the mean daily minimum at about 26°C.

- The rainy season starts around mid-June and continues up to September.
- The winter season starts around the last week of November and continues up to February.
- The intervening period October and November, is the Post-monsoon season or retreating monsoon period.

#### a) Temperature and Relative Humidity

The mean daily maximum temperature varies from 27.3oC to 42.0oC, while the mean daily minimum temperature varies from 13.2oC to 28.3oC. Data collected from IMD indicates that May is hottest month. Relative humidity is highest during July to September months (85 to 87% at 8:30 hr and 76 to 78% at 17:30 hr) and lowest during April and May months (39% at 8:30 hr and 23% at 17:30 hr).

#### b) Wind Pattern

Wind pattern in the area along the project road is given in **Table 5**. Along the project road, the prevailing winds are blown from SW – W sector towards NE – E sector during morning and evening hours from March to September. During February to October months, wind blow from NE and E direction to SW and W direction. Calm period is low and observed for 6 to 57% of the time.

*Table 5 Wind Pattern*

Sl. No.	Months		N	NE	E	SE	S	SW	W	NW	Calm
1	January	I	21	22	8	4	6	3	2	3	31
		II	22	11	5	2	4	7	6	5	38
2	February	I	20	18	7	5	9	7	3	6	25
		II	20	8	3	2	5	11	14	12	25
3	March	I	16	15	6	5	10	13	10	7	18
		II	16	7	4	2	5	15	19	14	28
4	April	I	7	6	4	4	11	25	21	9	13
		II	9	5	3	3	7	16	26	16	15
5	May	I	9	4	4	3	11	25	24	14	6
		II	13	6	3	4	7	13	22	23	9
6	June	I	3	2	1	2	7	36	34	9	6
		II	9	3	3	4	10	25	27	14	5

7	July	I	1	1	2	1	8	43	33	4	7
		II	3	2	3	2	10	33	34	7	6
8	August	I	2	2	2	2	9	37	35	6	5
		II	2	3	3	2	6	31	36	8	9
9	September	I	8	7	5	3	8	20	23	10	16
		II	11	10	6	4	6	19	19	10	15
10	October	I	17	22	10	5	7	6	4	5	14
		II	13	26	14	6	4	4	3	3	27
11	November	I	26	27	9	3	3	2	2	1	27
		II	17	24	7	3	2	1	1	2	43
12	December	I	20	22	7	5	5	1	0	2	38
		II	17	15	4	2	1	1	1	2	57

All values are percentage of the total time. Source: IMD Station Raipur (1951 to 1980)

**Note:** I and II indicate observations at morning (8.30 hrs) and evening hours (17.30 hrs), respectively.

## 1.7 Flora and Fauna

**FLORA :** The floral species found in around the Project area are reported below:

Table 6 Floral Species

Sn.	Botanical Name	Vernacular Name	Occurrence
I.	<b>Trees</b>		
1.	<i>Acacia nilotica</i>	Babool	Very Frequent
2.	<i>Acacia leucophloea</i>	Reunjha	Frequent
3.	<i>Acacia catechu</i>	Khair	Frequent
4.	<i>Aegle marsupium</i>	Bel	Occasionally
5.	<i>Azadirachta indica</i>	Neem	Very Frequent
6.	<i>Albizia procera</i>	Safed sirish	Very Frequent
7.	<i>Albizia lebbeck</i>	Kala sirish	Very Frequent
8.	<i>Ailanthus excelsa</i>	Maharukh	Very Frequent
9.	<i>Butea monosperma</i>	Palash	Occasionally
10.	<i>Cassia fistula</i>	Amaltas	Frequent

11.	<i>Careya arborea</i>	Kumbhi	Occasionally
12.	<i>Diospyros melanoxylon</i>	Tendu	Abundant
13.	<i>Emblica officinalis</i>	Amla	Occasionally
14.	<i>Eucalyptus sp</i>	Nilgiri	Frequent
15.	<i>Ficus glomerata</i>	Gular	Frequent
16.	<i>Lagerstroemia parviflora</i>	Senha	Frequent
17.	<i>Leucaena leucocephala</i>	Subabul	Abundant
14.	<i>Mangifera indica</i>	Aam	Frequent
15.	<i>Madhuca indica</i>	Mahua	Occasionally
16.	<i>Shorea robusta</i>	Sal	Occasionally
17.	<i>Syzygium cumini</i>	Jamun	Frequent
18.	<i>Terminalia arjuna</i>	Arjun	Abundant
19.	<i>Terminalia tomentosa</i>	Saja	Frequent
20.	<i>Tamarindus indica</i>	Imli	Occasionally
21.	<i>Tactona grandis</i>	Sagun	Occasionally
22.	<i>Zyziphus jujuba</i>	Ber	Abundant
<b>II.</b>	<b>Herbs and Shrubs</b>		
23.	<i>Achyranthes aspera</i>	Apmarga	Very Frequent
24.	<i>Asparagus racemosus</i>	Satavari	Occasionally
25.	<i>Argemone mexicana</i>	Satyanashi	Abundant
26.	<i>Abrus precatorius</i>	Gunja	Abundant
27.	<i>Careya herbacea</i>	Chhoti kumbhi	Occasionally
28.	<i>Calotropis procera</i>	Ark	Frequent
29.	<i>Datura metel</i>	Dhatura	Occasionally
30.	<i>Ipomoea batata,</i>	Besharam	Occasionally
31.	<i>Lantana camara,</i>	Raimunia	Frequent
32.	<i>Sida acuta</i>	Baraira/Bala	Occasionally
33.	<i>Solanum surattense</i>	Mokoi	Occasionally
34.	<i>Urena lobata</i>	Lotloti	Occasionally

MAMMALS		
Latin name	Common name	WPA Schedule
<i>Bandicota indica</i>	Large bandicoot Rat	V
<i>Funambulus palmarum</i>	Three striped squirrel	IV
<i>Herpestes edwardsi</i>	Indian grey mongoose	IV
<i>Lepus nigricollis</i>	Indian hare	IV

सूर्य सदैव SUN FOR EVER		
	Common Indian field	
<i>Mus booduga</i>	mouse	V
<i>Mus musculus</i>	Home Mouse	V
<i>Nosokia indica</i>	Bandicoot rat	V
<i>Rattus rattus</i>	Common Indian rat	V
<i>Suncus murinus</i>	House shrew	V
<b>AMPHIBIANS</b>		
<i>Bufo melanostictus</i>	Common toad	IV
<i>Fejervarya limnocharis</i>	Rice field frog	IV
<i>Hoplobatrachus tigerinus</i>	Indian Bull frog	IV
<i>Rana cyanophlyctis</i>	Skipper frog	IV
<i>Hyla arborea</i>	Tree frog	IV
<i>Polypedates maculatus</i>	Common tree frog	IV
<i>Bungarus caeruleus</i>	Common Indian Krait	IV
<i>Chameleo zeylanicus</i>	Chameleon	IV
<i>Chrysopelea taprobanica</i>	Tree Snake	IV
<i>Calotes versicolor</i>	Garden lizard	IV
<i>Dryphis nasutus</i>	Whip Snake	IV
<i>Eutropis carinata</i>	Indain grass Skink	IV
<i>Eutropis multifasciata</i>	Common skink	IV
<i>Hemidactylus flaviviridis</i>	Indian wall lizard	IV
<i>Ptyas mucosa</i>	Dhaman / Indian Rat snake	IV



<i>Typhlops diardii</i>	Giant Blind Snake	IV
<b>BIRDS</b>		
<i>Acridotheris tristis</i>	Common myna	IV
<i>Actitis hypoleucos</i>	Common Sandpiper	IV
<i>Aegithinia tiphia</i>	Common Iora	IV
<i>Artamus fuscus</i>	Ashy Woodswallow	IV
<i>Bubulcus ibis</i>	Cattle Egret	IV
<i>Caprimulgus affinis</i>	Savanna Nightjar	IV
<i>Chalcophaps indica</i>	Emerald Dove	IV
<i>Charadrius dubius</i>	Little Ringed Plover	IV
<i>Charadrius hiaticula</i>	Common Ringed Plover	IV
<i>Columba livia</i>	Blue rock pigeon	IV
<i>Coracias benghalensis</i>	Indian roller	IV
<i>Corvus splendens</i>	House crow	V
<i>Coturnix coturnix</i>	Common Quail	IV
<i>Cuculus canorus</i>	Common Cuckoo	IV
<i>Cuculus micropterus</i>	Indian Cuckoo	IV
<i>Cypsiurus balasiensis</i>	Asian Palm Swift	IV
<i>Dendrocitta vagabunda</i>	Indian tree pie	IV
<i>Dendrocopus marhatensis</i>	Maratha Woodpecker	IV
<i>Egretta garzetta</i>	Little egret	IV

Elanus caeruleus	Black-winged Kite	IV
Eudynamys scolopaceus	Common Koel	IV
Falco tinnunculus	Common Kestrel	IV
Halcyon pileata	Black-capped Kingfisher	IV
<i>Halcyon smyrnensis</i>	White-Breasted King fisher	IV
Haliastur indus	Brahminy Kite	IV
Hierococcyx varius	Common Hawk Cuckoo	IV
Himantopus himantopus	Black-winged Stilt	IV
Hydrophasianus chirurgus	Pheasant-tailed Jacana	IV
Ictinaetus malaiensis	Black Eagle	IV
Lalage melanoptera	Black-headed Cuckoo shirke	IV
Lanius cristatus	Brown Shrike	IV
<i>Merops orientalis</i>	Little Green Bee Eater	IV
Microcarbo niger	Little Cormorant	IV
<i>Milvus migrans</i>	Common Black kite	IV
<i>Motacilla alba</i>	White wagtail	IV
<i>Passer domesticus</i>	House sparrow	IV
<i>Perdica asiatica</i>	Bush quail	IV
Pericrocotus cinnamomeus	Small Minivet	IV
Pericrocotus roseus	Rosy Minivet	IV
Psilopogon haemacephalus	Coppersmith Barbet	IV

<i>Psittacula cyanocephala</i>	Blossom headed Parakeet	IV
<i>Pycnonotus cafer</i>	Red-vented bulbul	IV
<i>Rhipidura albicollis</i>	White-throated Fantail	IV
<i>Saxicolodites fulicata</i>	Indian robin	IV
<i>Streptopelia capicola</i>	Ring-necked dove	IV
<i>Streptopelia chinensis</i>	Spotted dove	IV
<i>Streptopelia tranquebarica</i>	Red Collared Dove	IV
<i>Streptopelia tranquebarica</i>	Spotted-necked Dove	IV
<i>Sturnus contra</i>	Pied myna	IV
<b>Butterflies</b>		
<i>Precis lemonias lemonias</i>	Lemon pansy	IV
<i>Precis hierta hierta</i>	Yellow Pansy	IV
<i>Tros aristolochiae</i>	Common rose	IV
<i>Euploea corecor</i>	Common Crow	IV
<i>Dananus aglea</i>	Glassy Blue Tiger	IV
<i>Precis orithya</i>	Blue pansy	IV
<i>Neptis hylas</i>	Common sailor	IV
<i>Papilio demoleus</i>	Lime butterfly	IV
<i>Catopsilia crocale</i>	Common emigrant	IV
<b>Other insects</b>		
<i>Anax imperator</i>	Emperor Dragonfly	Not listed

<i>Tettigonia viridissima</i>	Common Grasshopper	Not listed
<i>Hieroglyphus banian</i>	Rice grasshopper	Not listed
<i>Pecilocerus pictus.</i>	Common painted	Not listed
<i>Nephotettix apicalis</i>	Paddy Jassids	Not listed
<i>Hyblea purea</i>	Skeletonizer or Teak Defoliator	Not listed
<i>Spodoptera mauritia</i>	Swarming caterpillar	Not listed
<i>Rhopalosiphum maidis</i>	Aphids	Not listed

Table 7 Fauna Species

## FAUNA

The faunal species found in around the Project area are reported below:

It is also evident from the lists that there were no endemic or endangered species of flora and fauna around the Project site.

### 1.8 Socio - Economic

Rajnandgaon district is situated in the western part of newly created Chhattisgarh state, the district lies between latitude 20°70"- 22°29" North latitude and 80°23" to 81°29" East longitude covering an area of 8172.33 sq.kms. Its greatest length in the north-south is about 185 kms, while its width in the east-west extends about 80 kms. It is surrounded by Kawardha district in north, Durg district in the east; Bastar district is the in south and Garchiroli, Bhandara (Maharashtra) and Balaghat (Madhya Pradesh) districts in the west. The District headquarter Rajnandgaon is on the Mumbai - Howrah line of southeastern railways. The National Highway no. 6 (Great Eastern Road) also passes through the town of Rajnandgaon. The nearest airport to the District is at Mana (Raipur), about 80 kms away. All-important places within the district are well connected by a network of the state highways and all weather roads. The district is divided into 8 tehsils and 9 blocks for its administrative functioning and revenue collections. It is further divided in 1 Nagar Palik Nigam, 2 Nagar Palika , 5 Nagar Panchayat , 9 Janpad Panchayat , 692 Gram Panchayat. Rajnandgaon town (N 21°5' E 81°2') is the district Headquarters.

### **1.8.1 DEMOGRAPHIC PROFILE OF RAJNANDGAON DISTRICT**

#### ***Literacy Rate***

The total literacy rate of Rajnandgaon district was 75.96% in 2011 which is greater than average literacy rate 70.28% of Chhattisgarh. Population-wise, out of total 1,008,379 literates, males were 561,355 while females were 447,024. Also the male literacy rate was 85.4% and the female literacy rate was 66.7% in Rajnandgaon district.

#### ***Sex Ratio***

The Sex Ratio of Rajnandgaon district is 1,015. Thus for every 1000 men there were 1,015 females in Rajnandgaon district. Also as per Census 2011, the Child Sex Ratio was 986 which is less than Average Sex Ratio (1,015) of Rajnandgaon district.

#### ***Population Density***

The total area of Rajnandgaon district is 8,070 km<sup>2</sup>. Thus the density of Rajnandgaon district is 190 people per square kilometer. As per the initial provisional data of Census 2011, around 159 sq. km. area is under urban region while 7,911 sq. km. is under rural region.

#### ***Urban/Rural Population***

As per the Census 2011 out of total population of Rajnandgaon, 17.73% people lived in urban regions while 82.27% in rural areas. The total figure of population of urban population was 272,512 out of which 136,643 were males while remaining 135,869 were females. In rural areas of Rajnandgaon, male population was 626,212 while female population was 638,409.

### **1.9 Land Requirement**

The state of Chattisgarh experiences a power deficit during the peak hours of the day. The rationale for developing the solar PV power plant with BESS is to meet this deficit by installing reliable solar power. The land under consideration is government owned (Department of Energy, Chhattisgarh) and may be transferred/ leased to SECI through CSPDCL to develop the Solar PV project. The proposed project falls under the villages listed in Table 8. It is also proposed to construct a transmission line of length 33 km approx. the exact route shall be determined at later stage by conducting a detailed route survey analysis.

**Table 8 List of Villages**

Sl. No	Name of Village	Name of Block	Land in Hectare
1	Dhaba	Dongragaon	63.042
2	Khoka	Dongragaon	44.414
3	Rangakhetra	Dongragaon	8.079
4	Amlidih	Dongragaon	40.560
5	Dhundera	Dongragarh	25.111
6	Oredabandh	Donragaon	53.336
7	Girgaon	Dongragaon	52.878
8	Tolagaon	Dongragaon	51.092
9	Margaon	Dongragaon	19.668
10	Dhudwa	Rajnandgaon	19.243
<b>Total</b>			<b>377.423</b>

## 1.10 Demographic Profile of Project Affected Villages

### 1.10.1 Dhaba Village

Dhaba is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 276 families residing. The Dhaba village has population of 1284 of which 648 are males while 636 are females as per Population Census 2011.

In Dhaba village population of children with age 0-6 is 177 which makes up 13.79 % of total population of village. Average Sex Ratio of Dhaba village is 981 which is lower than Chhattisgarh state average of 991. Child Sex Ratio for the Dhaba as per census is 1082, higher than Chhattisgarh average of 969.

Dhaba village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Dhaba village was 79.40 % compared to 70.28 % of Chhattisgarh. In Dhaba Male literacy stands at 88.81 % while female literacy rate was 69.67 %. Details are presented in **Table 9**.

**Table 9 Demographic profile of Dhaba Village**

Particulars	Total	Male	Female
<b>Total No. of Houses</b>	276	-	-
<b>Population</b>	1284	648	636
<b>Child (0-6)</b>	177	85	92
<b>Schedule Caste</b>	88	36	52
<b>Schedule Tribe</b>	527	273	254
<b>Literacy</b>	79.40%	88.81%	69.67%
<b>Total Workers</b>	681	364	317
<b>Main Worker</b>	277	-	-
<b>Marginal Worker</b>	404	180	224

### 1.10.2 Kohka Village

Kohka is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 283 families residing. The Kohka village has population of 1334 of which 639 are males while 695 are females as per Population Census 2011.

In Kohka village population of children with age 0-6 is 192 which makes up 14.39 % of total population of village. Average Sex Ratio of Kohka village is 1088 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Kohka as per census is 1043, higher than Chhattisgarh average of 969.

Kohka village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Kohka village was 81.09 % compared to 70.28 % of Chhattisgarh. In Kohka Male literacy stands at 90.28 % while female literacy rate was 72.70 %. Details are presented in **Table 10**.

**Table 10 Demographic Profile of Kohka Village**

Particulars	Total	Male	Female
<b>Total No. of Houses</b>	283	-	-
<b>Population</b>	1334	639	695
<b>Child (0-6)</b>	192	94	98
<b>Schedule Caste</b>	212	102	110
<b>Schedule Tribe</b>	363	175	188
<b>Literacy</b>	81.09%	90.28%	72.70%
<b>Total Workers</b>	747	372	375
<b>Main Worker</b>	318	-	-

### 1.6.3 Renga Kathera Village

Renga Kathera is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 217 families residing. The Renga Kathera village has population of 1096 of which 535 are males while 561 are females as per Population Census 2011.

In Renga Kathera village population of children with age 0-6 is 130 which makes up 11.86 % of total population of village. Average Sex Ratio of Renga Kathera village is 1049 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Renga Kathera as per census is 1281, higher than Chhattisgarh average of 969.

Renga Kathera village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Renga Kathera village was 79.09 % compared to 70.28 % of Chhattisgarh. In Renga Kathera Male

literacy stands at 88.49 % while female literacy rate was 69.88 %. Details are presented in **Table 11**.

**Table 11 Demographic Profile of Renga Kathera Village**

Particulars	Total	Male	Female
Total No. of Houses	217	-	-
Population	1096	535	561
Child (0-6)	130	57	73
Schedule Caste	80	28	52
Schedule Tribe	635	320	315
Literacy	79.09%	88.49%	69.88%
Total Workers	639	322	317
Main Worker	90	-	-
Marginal Worker	549	272	277

#### 1.10.4 Amlidih Village

Amlidih is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 206 families residing. The Amlidih village has population of 1160 of which 587 are males while 573 are females as per Population Census 2011.

In Amlidih village population of children with age 0-6 is 154 which makes up 13.28 % of total population of village. Average Sex Ratio of Amlidih village is 976 which is lower than Chhattisgarh state average of 991. Child Sex Ratio for the Amlidih as per census is 1000, higher than Chhattisgarh average of 969.

Amlidih village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Amlidih village was 79.03 % compared to 70.28 % of Chhattisgarh. In Amlidih Male literacy stands at 87.84 % while female literacy rate was 69.96 %. Details are presented in **Table 12**.

**Table 12 Demographic Profile of Amlidih Village**

Particulars	Total	Male	Female
Total No. of Houses	206	-	-
Population	1160	587	573
Child (0-6)	154	77	77
Schedule Caste	12	7	5
Schedule Tribe	0	0	0
Literacy	79.03%	87.84%	69.96%
Total Workers	550	337	213
Main Worker	460	-	-
Marginal Worker	90	47	43



### 1.10.5 Odarbandh Village

Odarbandh is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 83 families residing. The Odarbandh village has population of 409 of which 202 are males while 207 are females as per Population Census 2011.

In Odarbandh village population of children with age 0-6 is 51 which makes up 12.47 % of total population of village. Average Sex Ratio of Odarbandh village is 1025 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Odarbandh as per census is 1040, higher than Chhattisgarh average of 969.

Odarbandh village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Odarbandh village was 77.37 % compared to 70.28 % of Chhattisgarh. In Odarbandh Male literacy stands at 87.57 % while female literacy rate was 67.40 %. Details are presented in **Table 13**.

Table 13 Demographic Profile of Odarbandh Village

Particulars	Total	Male	Female
<b>Total No. of Houses</b>	83	-	-
<b>Population</b>	409	202	207
<b>Child (0-6)</b>	51	25	26
<b>Schedule Caste</b>	5	3	2
<b>Schedule Tribe</b>	202	92	110
<b>Literacy</b>	77.37%	87.57%	67.40%
<b>Total Workers</b>	277	134	143
<b>Main Worker</b>	229	-	-
<b>Marginal Worker</b>	48	21	27

### 1.6.6 Girgaon Village

Girgaon is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 167 families residing. The Girgaon village has population of 841 of which 433 are males while 408 are females as per Population Census 2011.

In Girgaon village population of children with age 0-6 is 108 which makes up 12.84 % of total population of village. Average Sex Ratio of Girgaon village is 942 which is lower than Chhattisgarh

state average of 991. Child Sex Ratio for the Girgaon as per census is 770, lower than Chhattisgarh average of 969.

Girgaon village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Girgaon village was 84.04 % compared to 70.28 % of Chhattisgarh. In Girgaon Male literacy stands at 91.94 % while female literacy rate was 75.90 %. Details are presented in **Table 14**.

**Table 14: Demographic Profile of Girgaon Village**

Particulars	Total	Male	Female
<b>Total No. of Houses</b>	167	-	-
<b>Population</b>	841	433	408
<b>Child (0-6)</b>	108	61	47
<b>Schedule Caste</b>	11	6	5
<b>Schedule Tribe</b>	322	165	157
<b>Literacy</b>	84.04%	91.94%	75.90%
<b>Total Workers</b>	460	244	216
<b>Main Worker</b>	278	-	-
<b>Marginal Worker</b>	182	4	178

### 1.6.7 Tolagaon Village

Tolagaon is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 113 families residing. The Tolagaon village has population of 585 of which 286 are males while 299 are females as per Population Census 2011.

In Tolagaon village population of children with age 0-6 is 67 which make up 11.45 % of total population of village. Average Sex Ratio of Tolagaon village is 1045 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Tolagaon as per census is 861, lower than Chhattisgarh average of 969.

Tolagaon village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Tolagaon village was 83.78 % compared to 70.28 % of Chhattisgarh. In Tolagaon Male literacy stands at 90.80% while female literacy rate was 77.24 %. Details are presented in **Table 15**.

Table 15 Demographic Profile of Talagaon Village

Particulars	Total	Male	Female
Total No. of Houses	113	-	-
Population	585	286	299
Child (0-6)	67	36	31
Schedule Caste	145	78	67
Schedule Tribe	83	39	41
Literacy	83.78%	90.80%	77.24%
Total Workers	392	192	200
Main Worker	330	-	-
Marginal Worker	62	26	36

#### 1.6.8 Margaon Village

Margaon is a medium size village located in Dongargaon Tehsil of Rajnandgaon district, Chhattisgarh with total 332 families residing. The Margaon village has population of 1769 of which 848 are males while 921 are females as per Population Census 2011.

In Margaon village population of children with age 0-6 is 284 which makes up 16.05 % of total population of village. Average Sex Ratio of Margaon village is 1086 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Margaon as per census is 1152, higher than Chhattisgarh average of 969.

Margaon village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Margaon village was 74.88 % compared to 70.28 % of Chhattisgarh. In Margaon Male literacy stands at 85.75 % while female literacy rate was 64.76 %. Details are presented in **Table 16**.

Table 16: Demographic Profile of Margaon Village

Particulars	Total	Male	Female
Total No. of Houses	332	-	-
Population	1769	848	921
Child (0-6)	284	132	152
Schedule Caste	338	165	173
Schedule Tribe	506	250	256
Literacy	74.88%	85.75%	64.76%
Total Workers	848	484	364
Main Worker	802	-	-
Marginal Worker	46	20	26

### 1.6.9 Dundera Village

Dundera is a medium size village located in Dongargarh Tehsil of Rajnandgaon district, Chhattisgarh with total 370 families residing. The Dundera village has population of 1917 of which 951 are males while 966 are females as per Population Census 2011.

In Dundera village population of children with age 0-6 is 290 which makes up 15.13 % of total population of village. Average Sex Ratio of Dundera village is 1016 which is higher than Chhattisgarh state average of 991. Child Sex Ratio for the Dundera as per census is 921, lower than Chhattisgarh average of 969.

Dundera village has higher literacy rate compared to Chhattisgarh. In 2011, literacy rate of Dundera village was 71.42 % compared to 70.28 % of Chhattisgarh. In Dundera Male literacy stands at 82.63 % while female literacy rate was 60.58 %. Details are presented in **Table 17**.

Table 17: Demographic Profile of Dundera Village

Particulars	Total	Male	Female
Total No. of Houses	370	-	-
Population	1917	951	966
Child (0-6)	290	151	139
Schedule Caste	100	54	46
Schedule Tribe	578	277	301
Literacy	71.42%	82.63%	60.58%
Total Workers	1129	565	564
Main Worker	1042	-	-
Marginal Worker	87	28	59

