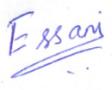
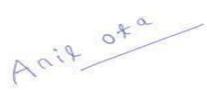


Volume I Non-Technical
Summary of Environment
and Social Impact
Assessment of 10 MW Solar
Power Project, Sawargaon,
Maharashtra

Cleantech Solar

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1. Introduction

This is the Environmental and Social Impact Assessment (ESIA) report for the construction and operation of a 10 MW alternating current solar photovoltaic (PV) plant and 3.5 km transmission line in *Village Sawargaon, Taluk Tuljapur* (Sub District) under District *Osmanabad* in the state of Maharashtra (hereinafter referred to as 'Project'/ Proposed Project'). Total land required for the Project is 49.01 acres. The total land area required for the Project has been procured and the registration of the land parcels were underway. Land for the transmission line was yet to be identified.

The Project is being undertaken by a Special Purpose Vehicle (SPV), M/s Greenzest Solar Private Limited has been formed for the execution of this Project, through its India based asset company, Cleantech Solar Energy India Private Limited (hereinafter referred to as 'CSE' or 'Cleantech'). The Project has agreed a Power Purchase Agreement (PPA) with Cavi Elettrici e Affini Torino (CEAT) Limited.

A 3.5 km long 33kV single circuit transmission line will be constructed from the plant premises to the 33/11kV Sawargaon substation. Access to the land is from a Sawargaon village road, the land is also 15km from the state highway.

As Cleantech intends to seek international finance for the Project, the EISA has been developed in line with the International Finance Corporation (IFC) Performance Standards (PS) as well as national and local regulation requirements.

2. Project Justification

This Project is an investment in renewable energy and will help with the diversification of the energy sector as well as add to increased capacity for the national grid. In addition, the Project is part of the government IPP process and is part of sector reform development. With multiple benefits of clean energy production, employment generation and elevating the standards of rural economies, the Project would prove advantageous to all realms of the society and nation. Hence, the Project with all the chosen options such as site selection, mode of power generation, selections of technology, transmissions lines etc., is appropriate alternative and is beneficial for the region.

3. The Project

The Project will have a power generation capacity of 10 MW and is expected to be operational for a period of 25 years and potentially longer. Construction is expected to take approximately 4-5 months. Basic Project components for a solar power plant include: Solar PV array, transformer, inverter, substation, transmission line, associated infrastructure (office building, control room, guard room etc.). An overhead transmission line will be constructed approximately 3.5 km from solar power plant to the 33/11kV Sawargaon substation located towards the South of the Site and operated by Maharashtra State Electricity Distribution Company Limited (MSEB).

Total land required for the Project is approximately 49.01 acres. It was stated by the land aggregator that the total area of the land required (49.01 acres) for the Project has been procured. Four (04) land parcels belonging to seven (07) families comprising of eleven (11) land sellers has been identified and procured for the Project. Registration of the land parcels were underway during the time of the site visit. The Transmission Line (TL) route measuring 3.5 kilometres from Project site to 33/11 kV Sawargaon Substation, Sawargaon village has been finalized. However, the negotiations with the land owners for one-time compensation and its disbursement is yet to be undertaken.

3.1 Project Phases

The Project would involve three phases:

- Site preparation and construction;
- Operational; and

- Decommissioning.

Site preparation and construction will involve the clearance of vegetation, installation of fencing and levelling of the Site and preliminary earthworks. The Site will be marked out, safety and security fencing installed, the access road will be upgraded, and internal Site access tracks will be constructed. The EPC contractor will engage approximately 100 workers and labourers in the unskilled category during its entire construction phase of activities. In the skilled category, approximately twenty (20) workers will be required for the construction of the Project. Consultations with the EPC Contractor indicated that most of the manpower requirement in unskilled and semi-skilled categories will be sourced from the local area and will comprise of youth from the neighbouring villages. However, the skilled workers would be from outside. As informed by KEC no labour camp would be set up for any workers. The solar PV power plant will be operated on a 24 hour, 7 days a week basis. The Project Proponent will engage approximately 10 semi-high skilled employees and 5 unskilled employees during the operation phase.'

The following impacts activities were assessed:

| Pre-Construction and Construction Phase | Operation Phase | Decommissioning Phase |
|---|--|--|
| <ul style="list-style-type: none"> • Land Procurement • Site Clearance • Sourcing and Transportation of Construction Materials and Equipment • Storage and Handling of Raw Materials and Debris • Civil Works (PV Modules Foundations, Access Road, Construction etc.) • Erection of Solar Modules and Laying of Transmission Lines | <ul style="list-style-type: none"> • Land Use • PV Panel Operation • Site Maintenance and Security • Waste Management • Material Handling and Storage • Washing of Solar Panels • Water Requirement for Employees • Repair and Maintenance of Solar Panels | <ul style="list-style-type: none"> • Removal of PV Panels • Removal of Foundations • Removal of Access Roads • Site Restoration and Rehabilitation • Waste Management • Material Handling and Storage • Water Requirement for Employees • Loss of Employment |

4. Project Baseline

Primary baseline information was collected on site from Project area and area of influence (Aol). Existing information sourced from scientific literature (both published and unpublished), engineering studies, technical reports and community socioeconomic studies were used wherever available.

Area in the 5-kilometre (km) radius from the Project is considered as Aol of the Project, for primary data collection. Aol cover Project area, area traversed by Project transmission line, and Sawargaon village. Primary data was collected for one (01) week duration in the month of April 2019. Environmental monitoring was undertaken for ambient air quality, Ground water quality, ambient noise levels, soil quality and traffic survey.

Consultations were conducted during the stakeholder engagement process involved focus group discussions and natural interviews.

Buffer area of 5 km radius from Project site cover total of 78.84square km area. 54.52% of the total area is dominated by agricultural land and only 0.67% is under built up area. 33.19% of the total area was noted under fallow land, as second dominant land cover class, and 5.49% is dominated by open land.

Ground and Surface water monitoring results in the Project area, have been analysed as provided below:

- Maximum parameters in ground water and surface water were noted to be within acceptable limits of drinking water standards.
- However, turbidity in the all the surface water samples along with GW1 were higher than the permissible drinking water standards. Water sample of on-site dug well (GW2) was observed to be slightly hard with relatively high values of TDS (924 mg/L), Total Hardness (636 mg/L), Calcium (160 mg/L), Magnesium (57mg/L), Chloride (167 mg/L) and Sulphate (98 mg/L). As per the CPCB classification of water (section 3.5.2, table 3-7),

- Both the surface water samples do not qualify for drinking water due to turbidity, hardness, Total Coliform and Faecal Coliform.
- Toxic chemical elements such as Lead, Mercury and Arsenic, Polyaromatic Hydrocarbons and Polychlorinated Biphenyls were not detected in the water samples;

Ambient air quality at the Project area was noted to be below National Ambient Air Quality Standards (NAAQS), as defined by MoEF&CC. However, PM10 and PM2.5 were detected at the locations monitored, however observed to be below NAAQS.

Noise levels in the Project area were noted below the national standards during day and night time. However, maximum day value in Sarvargaon Village (NQ3) was observed to be 47.3 dB(A) and night value in Pangardarwadi Village (NQ1) was observed to be 39.6 dB(A).

Soil samples were collected from Project site (SQ1) and farm land West of the Project Boundary (SQ2). Soil texture of SQ1 and SQ2 is found to be clayey as per USDA (United States Department of Agriculture) Soil Texture Triangle. Consequently, permeability and porosity, of SQ1 was way higher than that of SQ2. Phosphorus was higher in SQ1 whereas Potassium contents was higher in SQ2. SQ2 being clayey, CEC was noted to be 307 meq/100gm.

As per the traffic monitoring results for peak hours in morning and evening, maximum number of two wheelers was noted to be in use by the communities in Project area. Approximately 51% of the two wheelers are on road in a day. After two wheelers, four wheelers are in use with approximate percentage of 27% during morning and evening time. With reference to the PCU factor calculated, vehicles on road were noted in order of six wheelers > four wheelers > two wheelers, during morning and evening peak hours, both.

The proposed Project was observed to be located in mixed land parcels (fallow land and cultivable land) in Sawargaon village. The Project site was observed to be surrounded by cultivable land parcel. The south end of the site boundary a natural slope towards East is observed. Project area was observed to have number of natural rains fed surface water bodies. The drainage of the study area is of the ordinary dendritic pattern because rivers and streams have developed a branch like system. One (1) first order stream was noted to be passing from north to south of the Project. Another first order stream is passing adjacent to the north west and South east boundary of the Project.

According to the Primary Census Abstract 2011, the population of Osmanabad District is 1,657. The Osmanabad District is in the Aurangabad Division. The district headquarter is located at Osmanabad city. Osmanabad district has 8 towns, 8 tehsils (sub districts) and 733 villages spread over Paranda Mandal (96 villages), Bhum Mandal (96 villages), Washi Mandal (54 villages), Kalamb Mandal (94 villages), Osmanabad Mandal (127 villages), Tuljapur Mandal (123 villages), Lohara Mandal (47 villages) and Umarga Mandal (96 villages).

As per the 2011 census, the study area, covering 4 villages within the 5 km radius has a total of 2450 households and a population of 11,605. The Dahiwadi village is the closest to the Project site and has a population of 1356. Kathi is the most populous villages within the study area accounting for total population of 6,875 and a sex ratio of 904 (the lowest). Kathi and Dahiwada villages account for the highest proportions of SC (18.3 %) and ST (1.84 %) population respectively. Villages Dahiwadi and Kathi account for the highest (78.14 %) and lowest (67 %) literacy rates respectively. Dahiwadi also accounts for the highest female literacy rate (68.78 %) whereas village Kathu accounts for the lowest female literacy rate (28.7 %).

Within the study area, Dahiwadi (78.14 %) has the highest literacy rate which is higher than the tehsil (75.66 %) and the district (76.33 %) respectively. At 67 %, Kathi accounts for the lowest literacy rate; and at 28.7 %, Kathi accounts for the lowest female literacy rate as compared to 66.06 % at the tehsil level (Tuljapur) and 70.51 % at the district level (Osmanabad).

The workforce population in Osmanabad district comprises of 46.6% (773916). Majority of the workforce population of the district comprises of main workforce population with 90.6% (701894). The female participation in the main workforce population is at 37% (260237).

The workforce population of Tuljapur Taluka comprises of 45.2% (126288) of the total population. Main workforce population comprises of 88.4% (111655) of total workforce population. The female participation in the main workforce population is at 34.9% (260237) in Tuljapur Taluka.

At the village level, Sawargaon village has 53.3% (2773) of the population engaged as workforce population. Main Workforce population comprises of 92.1% (2554) wherein the female population comprises of 41.1%(1050).

Social Consultation

Consultations with land sellers belonging to the Sawargaon village indicated that the proposed Project land has not been under cultivation over some years. Owing to the fertility of land declined in a drastic manner. As a result of declining fertility, most of the land parcels have become uncultivable.

The key expectations of land sellers from the proposed solar power Project include: -

- Employment to the local youth;
- Uninterrupted power supply; and
- Improvement of road and school infrastructure in Pillayarkulam and other neighbouring villages.

5. Potential Impacts and Mitigation Measures

Identified impacts, have been appraised through social and environmental components, related to Project activities. The appraisal criteria are classified according to spread, duration, intensity and nature of the impacts. Severity levels have been sub classified under each criterion with specifics outlining the limits of each severity level. Following impacts have been identified during the ESIA:

Table 5-1: Impact Identification Matrix – Pre-Construction, Construction, Operation & Decommissioning Phase

| Project Activities | Receptors/Resources | | | | | | | | | |
|---|-------------------------------|-------------------------------|--------------|----------------------------------|-----------------------------------|----------|---------------------|--|-------------------|--------------------------|
| | Aesthetics and Visual impacts | Air and Ambient Noise Quality | Soil Quality | Surface and Ground water Quality | Surface and Ground water Quantity | Land Use | Traffic & Transport | Occupational Health and Safety Hazards | Ecological Impact | Social-Economical Impact |
| Pre-Construction and Construction Phase | | | | | | | | | | |
| Land Procurement and Loss of Land Area | | | | | | | | | | |
| Site Clearance, Site Levelling and Grading | | | | | | | | | | |
| Sourcing and Transportation of Construction Materials and equipment | | | | | | | | | | |
| Storage and Handling of Raw Materials and Debris | | | | | | | | | | |
| Establishment and Use of Labour Camp | | | | | | | | | | |
| Civil Works (PV Module foundations, access road construction etc.) | | | | | | | | | | |
| Erection of Solar Modules | | | | | | | | | | |
| Laying of Transmission Lines | | | | | | | | | | |
| Handling and Disposal of Wastes | | | | | | | | | | |
| Increased Community Expectations | | | | | | | | | | |
| Labour Rights and Welfare | | | | | | | | | | |
| Influx of Migrant Workers | | | | | | | | | | |
| Increased Traffic Movement | | | | | | | | | | |
| Operation Phase | | | | | | | | | | |
| PV Panel Operation and Maintenance | | | | | | | | | | |
| Repair and Maintenance and Security | | | | | | | | | | |
| Handling and Disposal of Wastes | | | | | | | | | | |

| Project Activities | Receptors/Resources | | | | | | | | | |
|-------------------------------------|-------------------------------|-------------------------------|--------------|----------------------------------|-----------------------------------|----------|---------------------|--|-------------------|--------------------------|
| | Aesthetics and Visual impacts | Air and Ambient Noise Quality | Soil Quality | Surface and Ground water Quality | Surface and Ground water Quantity | Land Use | Traffic & Transport | Occupational Health and Safety Hazards | Ecological Impact | Social-Economical Impact |
| Material Handling and Storage | | | | | | | | | | |
| Washing of Solar Panels | | | | | | | | | | |
| Water Requirements for employees | | | | | | | | | | |
| Local Economy | | | | | | | | | | |
| Upgradation of Local Infrastructure | | | | | | | | | | |
| Decommissioning Phase | | | | | | | | | | |
| Removal of PV Panels | | | | | | | | | | |
| Removal of Foundations | | | | | | | | | | |
| Site Restoration & Rehabilitation | | | | | | | | | | |
| Waste Management | | | | | | | | | | |
| Water Requirement for Employees | | | | | | | | | | |
| Loss of Employment | | | | | | | | | | |

Mitigation measures for each identified impact have been provided, along with the overall significance of the impact, before and after the mitigation measures.

An Environmental and Social Management and Monitoring Plan (ESMMP) has been developed to ensure that social and environmental impacts, risks and liabilities identified during the ESIA process are effectively managed during the operation and closure of the proposed Project. The ESMP also aligns the schedule for implementation of management plans. The ESMP delineates the monitoring and management measures to avoid and/or minimize such impacts by allocating management responsibility and suggesting skill requirement for implementation of these measures. ESMP is provided in the Volume III of the ESIA Report.

The mitigation measures that are included in this report become set Project commitments, which will be implemented by the Cleantech as part of ESMP.

6. Conclusion

Based on the ESIA study undertaken in accordance with IFC's Performance Standards, the proposed Project can be categorized as **Category B** i.e., Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and can readily addressed through corrective action plan.