

Update Report of ESIA study for 250 MW Solar Power Project,

Ananthapuramu, Andhra Pradesh

EXECUTIVE SUMMARY

E.1 Context Setting

Ayana Renewable Power Pvt. Ltd (ARPPL) had completed the Environmental and Social Impact Assessment (ESIA) study of the proposed 250 MW Solar Power Project in Ananthapuramu, Andhra Pradesh, India, as per IFC guidelines in December 2018, through a third party consultant 'M/S Opensense Labs Private Limited' (hereinafter referred to as 'OSL').

AiIB is, at present, evaluating a potential investment opportunity into the project. In April 2020, Ayana submitted the ESIA report to AiIB for a review. AiIB completed the review and shared comments on the ESIA Report with Ayana.

Ayana engaged ERM for alignment the ESIA Study to AiIB's comments and the requirements of AiIB's E&S Framework. The work was awarded to ERM in the last week of May 2020 with a quick turnaround time for the deliverable of ten (10) days from Service Order. The assignment was completed basis desk based assessment of the data shared (no site visit included), telephonic conversation / video conferencing for discussions with Ayana's corporate and site team, other related interactions with relevant stakeholders on land securing process and compensation.

ERM undertook desk-based review of available documents for the Project from 28th May to 5th June 2020.

E.2 Project and Entities Involved

Ayana Renewable Power Pvt. Ltd ('Ayana' or 'ARPPL' or 'Client') has been set up to develop renewable energy generation capacities in India and its neighbouring countries.

Ayana (ARPPL) through its special purpose vehicle (SPV) Ayana Ananthapuramu Solar Power Ltd (AASPL) is developing the 250 MW Solar Power Plant within the 1500 MW solar power park at N.P Kunta Mandal of Ananthapuramu District of Andhra Pradesh Andhra Pradesh.

The solar power park is named Ananthapuramu Ultra Mega Solar Park (1500 MW) and is managed by Andhra Pradesh Solar Power Corporation Pvt. Ltd. (APSPCL). Out of the total 1500 MW, about 1000 MW capacity solar power plants have already been commissioned within the Park by several Independent Power Producers (IPP) and are currently operating and evacuating energy. APSPCL is responsible for providing land that is free of encumbrance, on lease of 25 years for generating and distributing power along with other allied infrastructure such as developing and managing transmission line, access road, water supply through pipeline from a water reservoir constructed within the solar park.

APSPCL was incorporated in the year 2014 under Companies Act 2013 as a joint venture company between SECI (Solar Energy Corporation of India), APGENCO (Andhra Pradesh Power Generation Corporation Limited) and NREDCAP (New and Renewable Energy Development Corporation of Andhra Pradesh Limited). The objective was to plan, develop and operate solar parks in state of Andhra Pradesh under MNRE scheme for development of solar parks and Ultra Mega Solar power projects in the country, notified on 12th December 2014. In line with this, APSPCL was designated as Solar Power Park Developer (SPPD) by MNRE for facilitation and implementation of Ultra Mega Solar Park. Power Purchase Agreement was executed between AASPL and NTPC Ltd. on 17th July 2018.

E.3 Project Overview

The proposed 250 MW solar plant is located in NP Kunta and P. Kothapalli villages of NP Kunta Mandal of Ananthapur District of Andhra Pradesh. At present, the Project is under construction stage. The proposed site is situated approximately 30 km West of Kadiri town. Bangalore is the closest airport located at road distance 180 km from the project site. The rail connectivity to the site is through the Kadiri Railway Station under south central railway zone which is at a distance of approximately 31 km from the site. The project site entrance is situated right on State Highway 34 connecting district of Anantapur and Kaddpa of Andhra Pradesh.

Tata Power Solar System Ltd. (TPSSL) has been appointed as the Construction phase contractors. The O & M contractors have not been finalised at this stage.

The power generated will be evacuated to 33/220kV Pooling Station at 33kV and further will be evacuated to 400/220kV PGCIL Substation.

Total land area of 1274 acres has been allotted on lease basis by APSPCL. Ayana will require 1250 acres of land for commissioning 250 MW solar project. 1274 Acres of land has been allotted to Ayana which includes unusable

area of 24 Acres. The unusable area includes area of land covered with small hill, natural drain and unsuitable slopes for the project.

The Project aims to commission first 50 MW by September 2020, next 100 MW by October 2020, balance 100 MW by November 2020 and balance DC capacity of 125 MW by Dec'20.

E.4 Applicable Reference Framework

The following reference framework is applicable to the Project:

- Applicable environmental and social regulations and policies in India and the State of Andhra Pradesh.
- International Standards includes the following:
 - IFC Performance Standards (2012);
 - IFC/World Bank General EHS Guidelines (2007);
 - IFC/World Bank EHS Guidelines for Electric Power Transmission and Distribution (2007); and
 - Asian Infrastructure Investment Bank (AIIB) Environmental and Social Framework (ESF).

E.4.1 Applicability to IFC Performance Standards and AIIB E & S Standards

The following IFC Performance Standards and AIIB E & S standards are applicable to the Project:

S.No.	Description of IFC PS and AIIB E & Standards	Objectives and Applicability to Project
1.	<p>PS-1 of IFC Performance Standards 2012 Assessment and Management of Environmental and Social Risks and Impacts. The client will establish and maintain a Social and Environmental Management System appropriate to the nature and scale of the project and commensurate with the level of social and environmental risks and impacts.</p> <p>AIIB E&S Standards ESS 1: Environmental and Social Assessment and Management</p>	<p>Applicable This PS and AIIB E & S standard aims to assesses the existing social and environmental management systems of Ayana and to identify the gaps with respect to their functioning, existence and implementation of an environmental and social management plan (ESMP), a defined EHS Policy, organization chart with defined roles and responsibilities, risk identification and management procedures as well as processes like stakeholder engagement and grievance management..</p> <p>ARPPL team is required to have an Environmental and Social Management System (ESMS) at the Corporate level which shall be applicable for all its projects. The ESMS shall include (but not limited to) the following elements:</p> <ul style="list-style-type: none"> ■ An EHSS policy ■ Site Screening mechanism and site selection criteria. ■ Identification procedure of risks, impact assessment and EHS&S management procedures for all phases of its projects. ■ Framework for developing site specific E&S management programs. ■ Organizational structure for ESMS implementation ■ Training and capacity building. ■ Monitoring and review mechanism. <p>Schedule for periodic review and update of ESMS.</p>
2.	<p>PS-2 of IFC Performance Standards 2012 Labour and Working Conditions</p> <p>AIIB E&S Standards ESS-1 - Environmental and Social Assessment and Management</p>	<p>Applicable The project activities will involve hiring of skilled, semi-skilled and unskilled labourers during the construction phase and solar plant staff during the operation phase. The project will have to develop a human resource policy and ensure non-discrimination and equal opportunity, protection of the workforce and occupational health and safety. Therefore, PS 2 and ESS-1 is applicable to the Project.</p>

3.	<p>PS-3 of IFC Performance Standards 2012 Resource Efficiency and Pollution Prevention</p>	<p>Applicable PS-3 covers the use resources and materials as inputs and wastes that could affect human health. The objective of PS-3 are: to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; to promote more sustainable use of resources, including energy and water, and to reduce project related GHG emissions. Key themes covered under PS-3 are: pollution prevention, resource conservation and energy efficiency, wastes, hazardous materials, emergency preparedness and response, greenhouse emissions, pesticide use and management. This PS will assess how Ayana intends to minimize pollution related impacts, what management plans and systems are in place, and what measures it plans to take to conserve and use resources more efficiently. The Project construction activities will lead to increased fugitive dust emissions and loss of vegetation in the area. The project activities will also lead to increase in ambient noise level during the construction phase, which may have potential impact on the nearest settlements situated within 1 km from the project. Furthermore, the project activities will involve generation of waste and involve abstraction of water from bore wells and reservoirs. Therefore, PS 3 is applicable to the Project.</p>
4.	<p>PS-4 of IFC Performance Standards 2012 Community Health, Safety and Security</p>	<p>Applicable This PS-4 requires due diligence to anticipate and avoid adverse impacts on the health and safety of the affected community during the project life from both routine and non-routine circumstances. It also requires to ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected Communities. Key areas of compliance screened under PS-4 includes: infrastructure/equipment safety, hazardous material safety, natural resource issues, exposure to disease, emergency preparedness and response, and security personnel requirements. The project would affect the health and safety of the communities adjacent to it during construction phase. Movement of large trailers and vehicles used during construction phase may pose risk of accident and injury to local community settlements along the route of operations as well as the labours engaged in the construction work. Therefore, PS 4 is applicable to the Project.</p>
5	<p>PS-5 of IFC Performance Standards 2012 Land Acquisition and Involuntary Resettlement AIB E&S Standards ESS- 2: Involuntary Resettlement</p>	<p>Not Applicable This Performance standard and ESS-2 is not applicable for the project as there is no physical displacement understood to have happened due to project related land procurement.</p>
6	<p>PS- 6 of IFC Performance Standards 2012 Biodiversity Conservation and Sustainable Management of Living Natural Resources</p>	<p>Not Applicable Since, the solar power site is not passing through any natural habitats. There is no national ecological protected area and internationally recognized Key Biodiversity area, Important Bird Area within 10 km of the project footprint. Therefore, PS 6 is not applicable to the project.</p>

7	PS- 7 of IFC Performance Standards 2012 Indigenous Peoples AIIB E&S Standards ESS-3: Indigenous Peoples of AIIB Environmental & Social Standards 2016.	Not Applicable This PS and AIIB ESS-3 is not applicable for the project as it is not set up in a Schedule V area or has Indigenous population (referred to Scheduled Tribes (ST) in India), that is being impacted due to land procurement or other project activities.
8	PS- 8 of IFC Performance Standards 2012 Cultural Heritage	Not Applicable: For the purposes of PS-8, cultural heritage refers to (i) tangible forms of cultural heritage; (ii) unique natural features or tangible objects that embody cultural values; and (iii) certain instances of intangible forms of culture that are proposed to be used for commercial purposes. The requirements of PS-8 apply to cultural heritage regardless of whether or not it has been legally protected or previously disturbed. This PS is understood to be not applicable for the project as the Project site is not located near any cultural heritage or legally protected sites.

E.4.2 Project Categorisation and Justification

The IFC and AIIB categories are similar in nature and based on the assessment of said categories the Project has been categorised as **Category B** based on the following reasoning:

Land use related impacts are restricted to construction phase as impact are mainly in the form of clearing of vegetation from land prior to construction activities. The potential for alteration of land use of the proposed site has been assessed as moderate owing to likely alteration of water holding and erosion pattern.

- A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags. Use transformer oil which is also categorised as hazardous waste will be generated from the plant. If improperly managed, solid waste could create impacts on soil quality. However, the impact magnitude has been assessed as small as such impacts are manageable through effective hazardous and other waste management measures.
- It is understood that APSPCL is not expected to provide water supply for construction purposes. Ayana is required to obtain necessary approvals/ permission from local authorities to install bore well or to obtain access to water from nearest reservoir by tankers. Additionally, use of water resource is also expected during operation phase for module cleaning activities. APSPCL is responsible for supplying water to the project proponent along with other solar power project developers. This may put additional stress on water resources, therefore, the impact significance during operation phase has been assessed as moderate. It must be noted that additional mitigation measures by the project proponent such as optimizing water usage, sensitization of water use, regular inspection of water leaks, recycling/ reuse to the extent possible and opting for dry and semi dry module cleansing mechanisms may reduce the overall impact.
- Construction activities will increase fugitive dust emissions during site clearance and other activities such as increased plying of vehicles will increase vehicular emissions. However, the construction activities are expected to span over a short period of time (~6 months), and therefore, impact significance on air quality has been assessed as small. The air emissions during operation phase of the project are expected to be limited to occasional use of DG units.
- Based on ambient noise monitoring conducted for the project (as part of ESIA Study 2018), the noise level in the project area is within CPCB permissible limit. No settlements are located within 1 km of the project site. Hence, the receptor sensitivity is assessed to be low. Impact significance over the construction period has been assessed as negligible owing to limited presence of sensitive receptors within the project vicinity and as construction activities are expected to span over a short period of time. Noise during operation phase is expected to be limited to occasional plying of vehicles to and from the site, and running of project related utilities.
- As per the primary and secondary ecological assessment undertaken as part of ESIA Study (2018), the impact magnitude on habitat, based on Habitat-Impact Assessment Criteria is assessed as negligible. Based on species sensitivity value, project construction activity is not expected to cause substantial change in the population of the species or other species dependent on it. Based on Species-Impact Assessment Criteria the impact magnitude on species was also assessed to be Negligible.
- The Project is situated on 1274 Acres of land allotted to Ayana, out of the approximately 7181 Acres of land for 1500 MW ultra -solar power park. AASPL was not involved in acquisition and procurement of

land. APSPCL was responsible for providing encumbrance free land to AASPL. The land lease agreement was signed between APSPCL and AASPL on 23rd October 2018, for a period of 25 years. Based on the review of document, consultation with MRO and limited landowners, it is understood that the Project did not lead to any physical displacement. However, mitigation measures have been recommended for AASPL to ensure that compensation paid by APSPCL was paid as per legal requirement. In addition, mitigations measure are recommended for improving livelihoods of land losers through skill development activities and employment opportunities.

E.5 Baseline Conditions

E.5.1 Environmental Baseline

Anantapur district has a semi-arid climate, with hot and dry conditions for most of the year. Chitravati River is around 25 km from the project site. The project area does not fall within any sensitive receptors viz. Wild Life Sanctuaries, Biosphere Reserves, National Parks etc. There are no archaeological and historical monuments in, along or near (2.5 km) the project site.

There are few natural *nallas* (water drain) within the project boundary and will not be altered or impacted by the project activities. The Galiveedu reservoir adjacent to the project boundary will not be affected as the drainage (watershed) patterns; structures will not be disturbed and will remain as is. The land required for construction of 250 MW solar park i.e. 1250 acres will be excluding these lands and are marked as unusable land. Total land allotted to Ayana is 1274 acres (24 acres unusable land).

The ground water in the district is in general suitable for both domestic and irrigation purposes. The Electrical Conductivity ranges from 569 to 9980 micro Siemens/cm at 25°C. Fluoride concentration in some locations of the district is more than permissible limit. In some places, it is not suitable for drinking due to the presence of Nitrates. A total of 993 Fluoride affected villages exist in the district. The proposed project falls in NP Kunta Mandal where the electrical conductivity is within the permissible limits and is suitable for both domestic and irrigation purposes.

The site experiences semi-arid climate with extreme summer and moderate winters. Incidence of drought occurs due to inadequate and erratic distribution of rainfall in space and time. The district experiences the temperature variation between 25°C and 43°C. The year is divided in to summer season from March to May, monsoon season from June to September, post-monsoon season from October to November. The district receives an average annual rainfall of 668mm.

E.5.2 Social Baseline

The area of up to 5 km radius from the project boundary (250 MW AASPL solar plant area) has been demarcated as study area for the project by considering the extent of project impact. This includes Nambulipulikunta (N.P. Kunta) and Pedaballikothapalle (P. Kothapalle) villages falling within 5 kms from the Project boundary.

The study area has a total population of 7,657. NP Kunta village is the larger in terms of population than P. Kothapalle village. The sex ratio in the study area is 1002, which is significantly higher than the state, district and Mandal level sex ratio. The SC population in the study area is about 10.02 % and 3.02 % ST population.

There is only 1 private pre-primary school (1) in the study area. There are 8 Government-run primary schools and 7 private run primary school. There are 4 government run middle schools. There are 2 government run senior secondary schools.

As per the limited virtual consultations and 2018, ESIA report, it is understood that agriculture is the mainstay of the local economy of the study area. However, due to lack of irrigation facility and erratic rainfall, people are diversifying their sources of livelihood.

The WPR (Work Participation ratio)1 of the study area is 52.94 %. This figure suggests the study area villages have moderate employment rate and as less than 50 % of the people are unemployed in the study area.

Approximately 40 % of the total land is under agriculture use. However, more than 90 % of the land is characterised as unirrigated land. According to the ESIA report, 2018, majority of households cultivated groundnut in the year 2016, prior to giving away lands to the Project. A large proportion of the area was affected by drought and majority of the land was left uncultivated. Community reported lack of irrigation facilities and erratic rainfall in the region for the past six years that has affected agricultural practices negatively. Ground water was available at a depth of more than 400 ft below ground level. The virtual consultations also suggested that the extent of rainfall has reduced significantly over the last decade, which makes agriculture less viable in the area.

At the village level, there are no Community Health Centres (CHC) in the study area. There is only 1 Primary Health Centre (PHC) in NP Kunta village. There are no Maternity and child Welfare centres or TB clinics in the study area.

E.5.3 Ecology baseline

The project area does not fall within 10 km radius of any significant sensitive receptors like Wild Life Sanctuaries, Biosphere Reserves, and National Parks etc. Removal of herbaceous vegetation from the soil and loosening of the top soil generally causes soil erosion. However, such impacts are primarily confined to the project site during initial periods of the construction phase and would be minimized through adoption of mitigation measures like paving and surface treatment and water sprinkling.

The proposed project site is dry and arid in nature comprising dry, thorny scrubs mixed with pockets of private agriculture land. The rainfall in the area is scanty. The primary floral survey was limited to record site specific floral species (woody trees/ small tree species as well as ephemeral ground vegetation).

During the ecological survey conducted as a part of ESIA Study 2018, a few of the forest mammals eg. deer, rabbits, Antelope were sighted by the survey team during site visit. Domestic animal like cow, sheep, buffalo and goat are reported in the study area, as per 2018 ESIA. The birds like Crows, Parrots, Doves, Weaver birds and Mynas were more common among birds. In addition, none of the species are on the International Union for the Conservation of Nature's (IUCN) Red List of Threatened Species under endangered category.

E.6 Stakeholder Engagement

During the ESIA, ERM identified/profiled the various stakeholders of the project, such as the Land sellers/users of private/patta land, government land and assigned land, Contractors N.P. Kunta and P. Kothapalle Gram Panchayats (GPs, Civil Society/ Local NGOs, Regulatory Authorities such as Renewable Energy Development Corporation of Andhra Pradesh, Andhra Pradesh Power Generation Corporation, Andhra Pradesh Solar Power Corporation Pvt. Ltd., District /Tehsil Administration, Contractual Labourer, Other Projects in the Solar Park and in nearby area areas and developed an understanding of their stakes, interests and influences on the project as per the IFC and AIB's standards. This assists in understanding stakeholder views on the project and in identifying issues that should be taken into account in the prediction and evaluation of impacts.

As per ESIA report, 2018 by '*M/S Opensense Labs Private Limited*', following feedback was provided by local community and other stakeholders:

- Interaction with Local community of N.P Kunta village:
 - The community was aware of the Project and expected that it will contribute to the socio-economic development of the area;
 - Villagers from NP Kunta were informed that one of the family members would be given employment after the completion of proposed project.
 - The main perception and notion of the local population of the project area is "due to the installation of solar power plant there will be increase in employment opportunities, there will be an increase in their income and their standards of living will increase.
 - Few members from the community were concerned over payment of land compensation. Members of community informed that they do not have ownership of the land (no documents) however they were enjoying rights over the land and are claiming compensation for the land.
 - As per the ESIA report the NGOs and social workers were observed to be supportive to the project but were not fully aware of the same. They felt that the land being allotted for the project was not of any significant use due to the barren, undulating, rocky infertile and general lack of irrigation facilities;
 - Expectation of better engagement of local community, employment opportunities and financial benefit to local people with the upcoming project;
 - The Solar power plant would give enough recognition to the drought affected region of Ananthapur district.

E.7 ARPPL Grievance Redressal Mechanism (GRM) Procedure

The formalised Grievance Redressal Mechanism adopted by ARPPL shall be extended for all its SPVs, including AASPL. This GRM is developed as part of IMS manual of ARPPL and aims to understand community expectations and manage any local concerns or grievances in a systematic and transparent manner. AASPL has a special Grievance Cell comprising of all top management persons and site Managers. The cell is established for addressing the grievances of third party/ stakeholders, project staff and contracted staffs that has direct contact with project

affected communities. The GRM mentions that information for filing a grievance shall be displayed at site and details of lodging complaint is provided.

E.8 Key Identified Impacts

E.8.1 Construction phase

Change in Land Use: The main impact on land use could be mainly from clearing of vegetation from land prior to construction activities. The potential for alteration of land use of the proposed site is moderate as it can alter water holding and erosion pattern.

Topography: Due to undulating topography, study area exhibit presence of micro drainage channels. Though the solar power project does not require levelling of land, construction of access road for the project purpose could potentially alter topography but the chances of that are miniscule.

Soil environment: There will be clearance of vegetation that covers the top soil, site levelling and grading during the construction phase. These activities will largely affect the top layers of the soil and loss of top soil quality is envisaged but the effects can be reversed over time.

Waste generation: General construction waste generated onsite will comprise of concrete, steel cuttings/filings, packaging paper or plastic etc. Municipal solid wastes consisting of food waste, plastic, glass and waste paper will also be generated by the construction workforce at canteen facility. A small proportion of the waste generated during construction phase will be hazardous and will include waste fuel, grease and waste oil containing rags.

Water requirement: Approximately 10 KL/Month water will be required for construction activities. It is understood that during the construction phase, Ayana is required to make its own arrangements to source water for construction activities. APSPCL is not expected to provide water supply for construction purposes. As reported, presently, the water is being procured by EPC contractor through water tankers. Approximately 2000 litres of water per day is used for domestic purpose for which packaged water is procured from nearby villages. It is also reported that Ayana has plans to install bore wells at the site for emergency purpose. According to CGWB study for Anantapur district, NP Kunta Mandal where the project site falls is categorised as "semi critical" in terms of ground water development. Requisite permissions from CGWA will be a obtained prior to installation of any borewells.

In addition, Veligallu reservoir which shares boundary with Ananthapuramu solar power park is considered to be one of the sources of water for the project.

Air Quality: Air quality in the study area will be impacted in the form of fugitive dust emissions from construction/installation activities, vehicular emissions and exhaust emissions from DG sets. However, the construction activities are going to occur for a small period (~6 months).

Ambient Noise: Based on ambient noise monitoring conducted for the project, the noise level in the project area is within CPCB permissible limit. No settlements are located within 1 km of the project site.

Community and Occupational Health and Safety: The construction phase activities such as installation of solar PV panels, construction of transmission lines and substations and movement of material and personnel may result in impacts on the health and safety of the workers and the community. These activities will involve the use of heavy machinery and live transmission power lines. These will be consistent across project life cycle (construction, operation and decommissioning stages) and therefore the impacts would be similar in nature.

Vegetation Clearance and Construction Activity: The Project site is located in dry and arid in nature comprising dry, thorny scrubs mixed with pockets of private agriculture land. Considering the fact that the site is already in construction phase and vegetation clearance has already been done, displacement of some species (reptiles, smaller mammals etc.) could have already happened.

Reduction of Land-holding and loss of agricultural income- The Project is being developed by AASPL is situated on 1274 Acres of land allotted to Ayana, out of the approximately 7181 Acres of land for 1500 MW ultra - solar power park. The land lease agreement was signed between Andhra Pradesh Solar Power Corporation Pvt. Ltd. and AASPL on 23rd October 2018, for a period of 25 years. As per the data provided, 3.6% of land for the Solar Park is purchased from private land sellers, while the rest is Government land and Assigned Land³. The land procurement for the Solar Park was under the scope of APSPCL, along with assistance from the state government and District Revenue Department of Ananthapuramu, as per The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation & Resettlement Act, 2013 (No. 30 of 2013) – Andhra Pradesh. As per information collected during primary socio-economic survey and presented in 2018 ESIA report, approximately 1200 families are getting directly or indirectly affected by the overall project activities. It is understood that the Project did not result in any Physical displacement.

Impact on local economy and employment: It is understood that the Project will generate approximately 700-800 skilled and unskilled jobs during construction phase and most of the workers will be locally sourced.

Labour Influx: During the construction phase and operation phase, it is estimated that the project will require approximately 700-800 unskilled labourers. As reported majority of them will be sourced from the local labour pool. It is understood that the labour camp will be constructed in NP Kunta village, i.e. 1.5 km from the Project boundary. If migrant labour are hired, there is a high likelihood of regular interaction between the local community and migrant labourers. If not monitored; these interactions may create interpersonal and communal conflicts due to differences in cultures, beliefs, social practices, food habits etc. moreover, these interactions can also lead to spread of transferable diseases.

E.8.2 Operational phase

Soil environment: In the operation phase, soil compaction and erosion may occur due to vehicle movement, which only happens during the occasional maintenance activities.

Waste generation: The waste generated from project includes domestic solid waste at SCADA building and substation and hazardous waste like waste oil and lubricants and oil containing jutes and rags will be generated during maintenance activities.

Water Environment: Water requirement during O&M phase is primarily for module cleaning. As mentioned earlier in this report, it is estimated approximately 1.5 litre water per module will be utilised and 18 cycles per year for 11,20,000 modules will be undertaken. Therefore, 30,240 KL water will be required annually for module cleaning. For domestic purpose, approximately 1500 litre per day and 548 KL per year will be required. APSPCL will arrange and provide the necessary water supply for operation and maintenance of solar power plant from date of commissioning. APSPCL has connected natural drains and man-made canal with its reservoir to collect rain water. The APSPCL reservoir is also connected with Veligallu reservoir. As APSPCL is responsible for supplying water to other solar power project developers as well which may put stress on water resources. At present, the use of dry cleaning and semi dry cleaning mechanisms for module cleaning have not been considered. Appropriate test runs may provide more information on feasibility of implementing such solutions. Such technologies may significantly reduce overall water consumption during the operation phase.

Additionally, use of water resource is also expected during operation phase for module cleaning activities. APSPCL is responsible for supplying water to the project proponent along with other solar power project developers. This may put additional stress on water resources, therefore, the impact significance during operation phase has been assessed as moderate. It must be noted that additional mitigation measures by the project proponent such as optimizing water usage, sensitization of water use, regular inspection of water leaks, recycling/ reuse to the extent possible and opting for dry and semi dry module cleansing mechanisms may reduce the overall impact.

Employment: During the operations phase, the requirement for unskilled and semi-skilled labour is expected to drastically reduce and restrict to maintenance work of the facility, 24 hour security, bush and undergrowth cleaning and housekeeping activities. Therefore, the operation phase will lead to loss of employment.

Ecology: Transmission line from the Pooling Substation to the Grid Substation is passing through a corridor scrublands, so risk of mature tree cutting is almost nil. Furthermore, baseline has already established that the study area only provides habitat for only Least Concerned Species.

E.8.3 Decommissioning phase

Soil environment: Soil in the study area will be affected due to soil compaction due to the increased vehicular and workforce movement, dismantling and storage of plant components on the adjacent land, removal of internal electric lines/ poles etc. and waste generated in form of dismantled plant components and demolition debris from plant foundations, storage yard and substation complex.

Water Environment: Water during the decommissioning phase will be consumed by labourers for drinking and domestic purposes. The source of water is not known at this stage. However, since Ayana has plans to install borewells at site, it is anticipated that groundwater may be abstracted for meeting the water requirement. According to CGWB study for Anantapur district, NP Kunta Mandal where the project site falls is categorised as "semi critical" in terms of ground water development. Also, there is a potential for contamination of groundwater and surface water resources resulting from improper management of sewage and accidental spills/leaks at the storage areas.

Air quality: Air quality in the study area will be impacted in the form of fugitive dust emissions from construction/installation activities, vehicular emissions and exhaust emissions from emergency DG sets. The biggest source of emissions in the decommissioning phase is the fugitive dust emissions from demolition activities. The demolition activities are likely to occur for a very small period of time.

Ambient noise: During decommissioning phase of the project, noise will generate from movement of vehicles carrying dismantled structure and equipment.

Economy and employment: The major social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income

E.8.4 Key cumulative impacts

The project site falls under Ananthapuramu Ultra Mega Solar Park having a 1500 MW capacity. The solar park comprises of solar power developers such as Tata Power Solar (500 MW) and Softbank Power, Sprng Energy etc however the same is yet to be finalized. All of the above highlighted impacts may have a heightened effect in the study area due to the presence of other solar power Projects.

E.9 Mitigation Measures and ESMP

For the purpose of providing site specific mitigation measures to mitigate key identified impacts from the Project, an ESMP has been developed. The ESMP specifies the standards and controls required to manage and monitor environmental and social impacts during construction and operation phases. To achieve this, the ESMP identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative effects on the physical, natural and social environment. This is in accordance to IFC Performance Standards 1 and AIB standards which emphasizes the importance of managing social and environmental performance throughout the lifecycle of the Project.

E.9.1 Organisational Structure

At the Site level, during operation phase, ARPPL will depute a Site Manager/ Plant Head. Ayana's Plant Head will be responsible for managing the environment and social performance of the Site, in compliance with the Company's IMS system and the applicable legislation and shall also be responsible for reporting the EHS compliance status to the corporate office. The Plant head will be supported by the Site Incharge/ Safety Supervisor of the O&M Contractor. During construction phase, Ayana's Site Incharge will be supported by a Project Management Contractor Safety Supervisor, who will be responsible to oversee EPC's work progress and report the overall EHS status of the site during construction phase.

E.9.2 Roles and Responsibilities

ARPPL will majorly play a role of supervisor to oversee the project performance pertaining to environment, health, safety and social issues.

E.9.3 Inspection, Monitoring and Audit

Inspection and monitoring of the environmental impacts of the Project activities will increase the effectiveness of ESMP. Through the process of inspection and auditing, ARPPL will ensure that the conditions stipulated under various permits are followed. The inspections and audits will be done by EPC contractor (during construction phase), ARPPL's QHSE department and by external agencies/experts. The entire process of inspections and audits should be documented. The inspection and audit findings are to be implemented by the site in-charge.

E 9.3.1 Report and Documentation

ARPPL will develop and implement a programme of regular reporting through the stages of the project lifecycle. The personnel delegated EHS roles shall be required to fully comply with the monitoring programme in terms of timely submissions of reports as per acceptable level of detail. Reporting will be done in form of environmental check list, incident record register, training records, and environmental and social performance reports (weekly, monthly, quarterly, half yearly, yearly etc.).

E 9.3.1.1 External Reporting and Communication

QHSE head is responsible for ensuring that communication with regulatory agencies and stakeholders are maintained as per the requirement. All complaints and enquiries are to be appropriately dealt with and records should be maintained in a Complaint/Enquiry Register by the delegated staff of EHS.

E 9.3.1.2 Internal Reporting and Communication

According to ARPPL's Integrated Management System and QHSE Manual, EHS personnel/ PMC supervisor at site will share inspection and audit findings with their suggested measures regularly to the Site In-Charge. Site In-Charge will further share the EHS findings to the QHSE department for their consideration. The EHS audit findings are also to be communicated within the staff working on the project. To maintain an open communication between the staff and management on HSE performance the followings are being used:

Monthly compliance reports will be shared by the contractors during construction and operation period. The compliance will be verified against applicable laws, IMS and other conditions as required by the contract.

E 9.3.2 Documentation

Documentation is an important step in the implementation of the ESMP, Ayana will establish a documentation and record keeping system in keeping with their IMS, to ensure recording and updating of documents as discussed in the ESMP. Responsibilities have to be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained and that document control is ensured through access by and distribution to, identified personnel in form of the following:

- Master Environment Management System document;
- Legal Register;
- Operation control procedures;
- Work instructions
- Incident reports;
- Emergency preparedness and response procedures;
- Training records;
- Monitoring reports;
- Auditing reports; and
- Complaints register and issues attended/closed.

E 9.3.3 ESMP Review and Amendments

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

Following a review, Site in charge in coordination with personnel delegated EHS will be responsible for making the amendments in the ESMP and seeking approval from the Regional and Corporate heads. The amended ESMP will be communicated to all the staff on the project.

E.9.4 Purpose of the ESMP

The purpose of ESMP is to:

- Provide an institutional mechanism with well-defined roles and responsibilities for ensuring that measures identified in ESIA designated to mitigation potentially adverse impacts are implemented.
- List all suggested mitigation measures and control technologies, safeguards identified through the ESIA process.
- Provide Project monitoring program for effective implementation of the mitigation measures and ascertain efficacy of the environmental management and risk control systems in place; and
- Assist in ensuring compliance with all relevant legislations at local, state and national level for the Project.

E.9.5 Mitigation measures

The relevant mitigation measures to all the impacts identified during the impact assessment study have been presented in Section 6 (Impact Assessment) and Table 7.1 (Environmental and Social Management Plan) of the ESIA report for the Project. Key Mitigation measures for construction operation and decommissioning phases are summarized below.

- Land use:
 - Construction activities should be restricted to designated area;
 - On completion of construction activities, land used for temporary facilities such as stockyard if any should be restored to the extent possible; and

- The land use in and around permanent project facilities should not be disturbed

- **Soil:**

- Site clearance, piling, excavation and access road construction will not be carried out during the monsoon season to minimize erosion and run-off.
- Vehicles will utilize existing roads to access the site.
- EPC Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site;
- Designated areas should be provided for Solid Municipal Waste and daily collection and period disposal should be ensured;
- Construction and Demolition Waste should be stored separately and be periodically collected by an authorized treatment and storage facility
- All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from natural drainage channels
- A log book should be maintained for quantity and type of hazardous waste generated
- In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste.

Water:

- Authorized water tankers should be hired if water is abstracted from nearby reservoirs
Obtain permission from Rural Development Department, Government of Andhra Pradesh if groundwater is planned to be abstracted
- Regularly monitor the ground water quality and maintain logbook for water consumption.
- Prepare and implement water conservation scheme e.g., rainwater harvesting at the project site.
- Operation Phase
- Options for dry and semi dry module cleaning techniques should be explored and studies for implementation of the same at site should be considered to reduce overall water demand for the project during operation phase.

Air Quality:

- The speed limit of the heavy vehicles should be maintained.
- All the vehicle should have valid PUC certificate.
- Occupational Health and Safety
- All workers (regular and contracted) should be provided with training on Health and Safety management system of the EPC contractor during construction stage and company's EHS policies and procedures during the operation stage;

Landholding and Employment:

- Ensure, to the extent practicable, that compensation was paid as per section 26 of LAAR Act 2013 (to land owners whose land was acquired by government), payment to Private land owners for AASPL parcel is made available and the compensation was not paid below market price;
- Explore possibilities of employment of locals, land sellers, erstwhile Assigned land users during construction phase of the project;

- Ensure inclusion of members of land seller households for project, in the Skill Development program being conducted and other community development activities by AASPL.

Labour Influx:

- To the extent possible, locate the labour camp(s) within the project footprint area identified;
- Adequately monitor the contractor's compliance to the applicable rules and regulations;
- Development of the labour camp in keeping with the IFC Worker's Accommodation Guideline;
- Provide adequate sanitation and waste management facilities including, such as safe drinking water, proper waste collection and disposal system, etc.;
- Undertake health awareness among the local community,
- Provide the local community an understanding of the project activities and the possible health and safety risks associated with the same as part of the engagement process;
- Implement on-site vector control measures;
- Access to the local community to the grievance redressal mechanism for the project;
- Implement ARPPL's policy of non-discrimination and prevent unequal distribution of project benefit.

Ecology:

- Project related activities should be avoided during the night time.
- General awareness regarding wildlife should be enhanced through trainings, posters etc. among the staff and labourers;
- Strict prohibition should be implemented on trapping, hunting or injuring wildlife within the subcontractors and should bring a penalty clause under contractual agreements;
- Camp and kitchen waste should be collected and disposed in a manner that it does not attract wild animals;
- A minimum possible number of routes should be authorized for use during construction by the labourers and staff, speed limited of the vehicles plying in these routes should be kept 15-20 km/hr to avoid road kill;
- Strict prohibition on use of fuel wood and shrubs from nearby areas as kitchen fuel;
- Temporary barriers should be installed on excavated areas;
- Stage-wise re-vegetation with local species should be undertaken immediately after completion of construction work; and
- Minimise vegetation removal or trimming to the extent possible at Solar Farm site including internal access roads, pooling substation area, yards, and other ancillary facilities;
- Construction noise should be minimized by usage of acoustic enclosures and lubrication of equipment's where feasible.

E.10 Conclusion

The Project is a green energy project which will generate 250 MW power through solar energy after commissioning. During the construction phase, the project and its key components such as site office building, external transmission lines, internal transmission line, etc. are likely to have minor to negligible impacts on baseline environmental parameters such as soil, noise, water, air, after suggested mitigation measures are implemented. The impact on land use (conversion from agricultural to industrial land) would have moderate impact. The E&S impacts during operation phase are likely to be minor to negligible. The social impacts from the Project are assessed to be in terms of loss of land and agricultural income and community health and safety impacts but beneficial in terms of local employment and overall local area development.

The Environmental and Social Management Plan (ESMP) describes mitigation measures for impacts specific to Project activities and also discuss implementation mechanism. To conclude, the implementation of ESMP/ Management plans will help Ayana in complying with its internal E&S requirements as well as national/state regulatory framework in addition to AIB's ESP and ESS requirements.