Environment and Social Due Diligence Report

October 2015

IND: Accelerating Infrastructure Investment Facility in India
–Sandland Real Estates Pvt. Ltd.

Prepared by

India Infrastructure Finance Company Limited for the Asian Development Bank

Due Diligence Report on Environment and Social Safeguards

By

India Infrastructure Finance Company Limited (IIFCL)

(A Govt. of India Enterprise)

Sub Project: 25 MW Sandland Real Estates Pvt. Ltd.

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Due Diligence Report on Environment and Social Safeguards

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PROJECT BACKGROUND:

1. SUB-PROJECT TITLE:

1. The Project includes engineering, construction, installation and commissioning of the 25MW solar PV power plant in in Banaskantha District in the State of Gujarat.

2. SUB-PROJECT BACKGROUND:

2. Sandland Real Estate Private Limited (SREPL) was incorporated on February 25, 2010 to setup a 25 MW solar photovoltaic power project at village Alwada and Khimat, District Banaskantha in the state of Gujarat (India). The project is implemented under the Solar Power Policy, 2009 of Gujarat. Thin Film PV solar cells shall be used in the project to generate electricity. Sandland Real Estate Pvt. Ltd. ("the company") has already signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat, for sale of power generated from the project. The project implementation started in July 2011 and the project was commissioned on 1st April 2012.

3. The project is located at 24°31'27.1"North altitude and 72°12' 12.27" East longitudes. The site is located in Alwada and Khimat in Banaskantha District in the State of Gujarat, India. The surface topography is almost flat. Hence, limited site preparation/ leveling activity is needed to make the land flat as per the requirements of solar PV power plant. The entire area is shadow free as there are no shading elements like mountains, large sand dunes, etc. on the site. **Figure 1** depicts the map of the region indicating the project location.

4. The salient features of the project and the project cost have been detailed in below as **Table 1**.

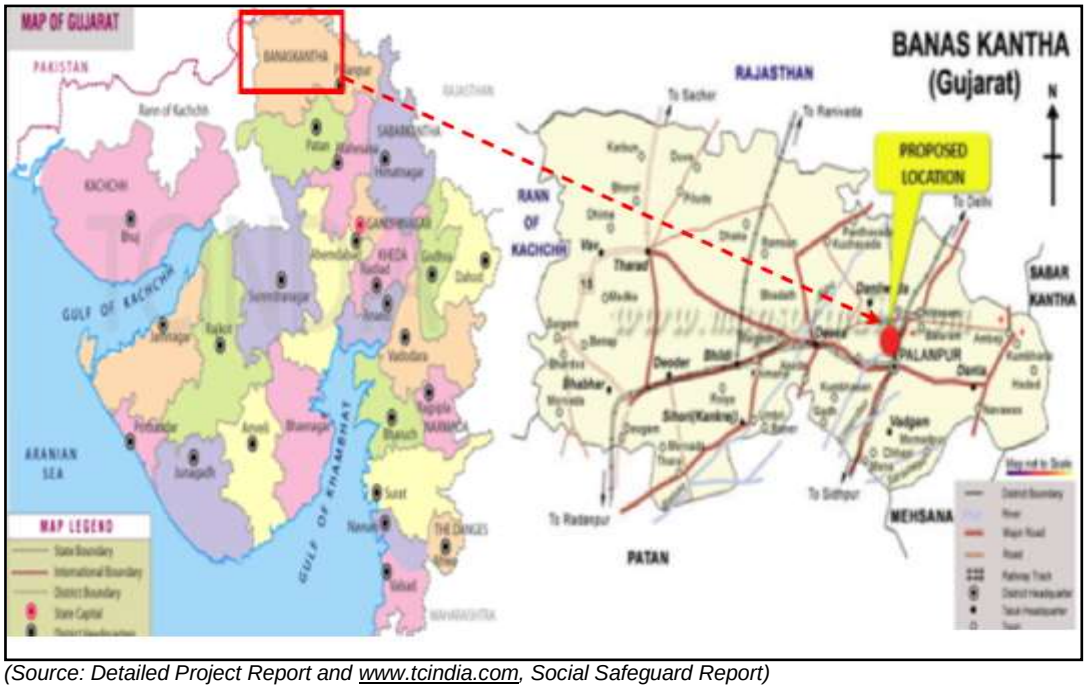
Table 1: Project Salient Features

Sl. No.	Particulars	Details
1.	Project site	Sandland
2.	Village Name	Alwada and Khimat
3.	District Name	Banaskantha
4.	Name of the state	Gujarat
5.	Latitude	24°31'27.1"North
6.	Longitude	72°12' 12.27" East
7.	Road Accessibility	Road connectivity via Ahmedabad
8.	Nearest Airport	Ahmedabad
9.	Nearest City	Ahmedabad
10.	Land required (Hectares)	84.58
11.	Water requirement (LPD)	15,500
12.	Annual Global Irradiance (kWh/m2)	2035
13.	Type of PV module	Thin Film
14.	Proposed Capacity (MW)	25 MW
15.	Total no of PV modules (Number)	243664

16.	Inverter model	Sunny central 800KW Phase 3 CPU
17.	Annual electricity supplied to grid (MWh)	45366. 600
18.	Annual Plant Load factor (%)	20.72
19.	Project Cost (in Rs.)	362.84 crore

Source: Environment and Social Safeguard Reports

Figure 1: District map of Gujarat and Banaskantha district marking the project location



(Source: Detailed Project Report and www.tcindia.com, Social Safeguard Report)

3. TECHNICAL DESCRIPTION:

5. The selected location for the proposed project lies in 'Hot and Dry' climate zone of India. The instantaneous ambient temperature over the location reaches more than 45^0C in summer; however the intensity of solar radiation is also very high. From the land type, meteorological study and annual behaviour of solar radiation over the location near village Alwada, Banaskantha, Gujarat, the Thin Film solar PV technology has been identified as the most feasible technology.

Solar PV Module: The rated capacity of proposed solar PV power plant will be 25 MW. The 25MW power plant is a combination of three sections. The modules are First solar, Du Pont Appollo, and Moser Baer Solar type.

Inverter: 800 kW AC capacity inverter of world's leading inverter manufacturer (SMA) has been selected for the analysis. The Model Sunny Central 800CP inverter is found best suited for the proposed capacity. The cumulative capacity of the inverters is 25 MW AC.

Solar PV Array: The 25MW power plant will be a combination of three sections. Two sections shall be of 5 MW capacities and one section shall be of 15MW capacity. 15MW section shall be a combination of three sub sections of 5MW each. Each 5MW PV system will be combination of 6 sub units of 800kW PV systems**.**

4. CONCESSIONAIRE:

6. Sand Land Real Estate Pvt. Limited has signed a 25 year Power Purchase Agreement (PPA) on November 29, 2010 with Gujarat Urja Vikas Nigam Limited (GUVNL), Gujarat's state-owned electricity holding company with permission from Government of Gujarat, for sale of power generated from the project. As per the PPA dated 29th November, 2010, the location of the proposed project was Golivada village, Taluka Kankrej, District Banaskantha. Subsequently, Supplemental PPA was signed for change of project site location to Village Alawada & Khimat, Taluka Dhanera, District BanasKantha vide Ref No. GUVNL/COM/Solar/Solar_II/ Sand Land/1457 dated 15th July, 2011.

5. EPC CONTRACT:

7. Engineering, Procurement and Construction ("EPC") work for the Project has been carried out by Moser Baer Engineering and Constructions Ltd. (MBECL). The EPC contract was entered into with MBECL on 20th June, 2011.

6. O&M ARRANGEMENT:

8. SLREPL has entered into the operations and maintenance contract for the project with M/s. Moser Baer Engineering and Constructions Ltd. (MBECL) for a period of 25 years from the Service commencement date.

7. IIFCL FUNDING:

9. The total project cost of Sandland Real Estate Private Limited (SREPL) is Rs. 362.84 crore. IIFCL has sanctioned and disbursed an amount of Rs. 66.64 crore to Sandland Real Estate Private Limited on 6th May 2014.

DUE DILIGENCE ON ENVIRONMENTAL SAFEGUARDS

8. ENVIRONMENT SAFEGUARD COMPLIANCE REVIEW:

8.1 BACKGROUND INFORMATION ON THE SUB-PROJECT:

10. Moser Baer Clean Energy Limited (MBCEL) is a renewable energy development company, with a focus on the implementation of grid connected solar photovoltaic (PV) projects worldwide. It is India's largest solar power development company with a presence in key international markets. Moser Baer Clean Energy Limited (MBCEL) was incorporated in September 2008 with a strategy to undertake development of solar power projects worldwide. MBCEL is a project developer, owner and operator of solar power projects.

11. MBCEL has set up Sand Land Real Estate Pvt. Limited, project with a 25 MW capacity in company's energy group's 5th project. Sandland Real Estate Private Limited (SREPL) was incorporated on February 25, 2010 to setup a 25 MW solar photovoltaic power project at Village Alwada and Khimat, District Banaskantha in the State of Gujarat (India). The project is implemented under the Solar Power Policy, 2009 of Gujarat State. Thin Film PV solar cells have been used in the project to generate electricity. Sandland Real Estate Pvt. Ltd. ("the company") has signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat, for sale of power generated from the project. The project implementation started in July, 2011 and the project was commissioned on 1st April, 2012.

12. Detailed environmental impact assessment has not been carried out for this project as at the time of initiation of any infrastructure project in India, the Environmental Impact Assessment (EIA) Notification, 2006 (as amended subsequently) needs to be considered to assess if Environmental Clearance (EC) is required or not. As per Office Memorandum No. J-11013/41/2006-IA.II (I) dated 13th May, 2011 issued by MoEF & CC (Ministry of Environment & Forests and Climate Change),Govt. of India, it has been stated that the Solar Photovoltaic Power Projects are not covered under the ambit of EIA Notification, 2006 and hence, no environmental clearance is required. Hence, the Solar Power PV Project does not require preparation of Environmental Impact Assessment Report and exempted from obtaining Environmental Clearance from Central Government or State Level Environmental Impact Assessment Authority.

13. Initial Environmental Examination Safeguards Report (IEE, August 2012) has been prepared by M/s. SREPL with reference to the Safeguards requirements of ADB's Safeguards Policy Statement (SPS), 2009 and also addresses requirements of IFC Environment, Health and Safety Guidelines. The objective of the IEE study is to identify site specific various types of environmental impacts and mitigation measures taken up project developer at project site during construction phase as well as operation phase. **Appendix A** attached with IEE report details about environmental impacts arisen due to project development during Pre-construction/Construction and Operation phases and mitigation measures taken up developer including compliance status of project w.r.t. ADB's Safeguards Policies. The IEE study for Sandland Solar Project indicates that the benefits from the implementation of this solar power project are significant and long term in nature and environmental impacts caused due to project are limited to site specific, largely reversible and were readily addressed through mitigation measures. Copy of the IEE report is attached as **Appendix-I**.

14. The Environmental safeguard due-diligence study has been carried out for the project on the basis of understanding project scope based on information and documents provided by Concessionaire. The following documents were referred in order to prepare Environmental Safeguards Due-Diligence Report:

- Initial Environmental Examination Report(IEE) ;
- Project Statutory Approvals;
- HSE Manual for SREPL;
- Sample Copy of HSE Weekly Report (Accident/Incident Report) ;
- SREPL's Waste Handling Procedures;
- Compliance status of EMP during Construction and O&M Phase ;
- Sample Copy of Environmental Quality Monitoring Report during O&M phase;
- SREPL's Guidelines of EHS Clauses for EPC work Sub-contractors;
- Minutes of Meetings for Public Consultation related with CDM studies;
- Sample copies of Safety committee Meetings covering Corrective and Preventive Actions;
- Details of Grievance Handling Mechanism;

9. VISIT TO SUB-PROJECT LOCATION:

15. As part of the preparation of the ESDDR, the sub-project was jointly visited by the Environmentl and Social safeguard specialists of IIFCL and O&M Team of Concessionaire on 22nd September, 2015 for field verification of Environmental safeguards implementation. The site visit photographs are given in **Photo Plate-I**.

16. 25 MW Solar Plant site is located at the lands of Khimat and Alvada villages falling under Dhanera Taluka of Banaskantha district in Gujarat state (4 -5 hrs road journey from Ahmedabad City). The project is in operational stage since April 2012. Total no. of staff working in O&M Phase of plant site are 14 no. under Technical staff category and 21 no. as security guards under Non-technical staff category. Rest non-skilled staff for purposes like vehicle driving, for grass cutting; plantation etc. is hired from time to time based on the requirement as informed by project developer.

17. At the time of site visit, plant was operational and Technical staff was seen working in control room. Using the Thin Film Solar PV Technology, M/s. SREPL has installed amorphous silicon Thin-films manufactured by Moser Baer & Dupont (installed for 5 MW capacities from each) and First Solar (Thin Film based on CdTe installed for 15 MW capacity) for converting sunlight into electrical power. Solar Modules obtained from different manufacturers are mounted in separate areas and not mixed up. The modules are mounted in rows and electrically connected with underground cables. The electrical output from the PV arrays is fed via cables to a bank of inverters that convert the direct current (DC) generated by the PV arrays into alternating current (AC) and control the entire system.

18. The power generated from the Sandland solar power plant is being evacuated through a 66kV transmission line to Khimat Sub-Station of GETCO, situated about 2.5 km from the project site. Transmission line was seen passing over adjacent agricultural fields and it

comprises 13 no. of Electrical Towers throughout the distance of 2.5 km upto nearby sub-station as informed by site team.

10. ENVIRONMENTAL SENSITIVITY AND DUE DILIGENCE FOR SANDLAND SOLAR PROJECT:

19. The environmental sensitivity of the Sandland Solar project has been assessed by reviewing the Initial Environmental Examination Report (IEE), prepared by Project developer to meet the requirements of the specified reference frameworks, Compliance Monitoring and Health & Safety related documents during construction and O&M phase, site visit observations and discussion with the concessionaire. IEE report prepared for the project for Environmental Safeguards is attached as **Appendix-I**. The environmental sensitivity assessment is given below:

- The project is located at 24°31'27.1"North Latitude and 72°12' 12.27" East longitudes. The site is located in Alwada and Khimat villages in Banaskantha district in the state of Gujarat, India.
- The surface topography of the site is almost flat. Hence, limited site preparation/ leveling activity was needed to make the land flat as per the requirements of solar PV power plant. The entire area is shadow free as there are no shading elements like mountains, large sand dunes, etc. on the site.
- The project site is not located in or near a sensitive ecosystem. Review of the IEE report confirmed the absence of unique or ecologically significant flora and fauna. The nearest wildlife sanctuaries, Ambaji Balaram Wildlife Sanctuary and Jessore Sloth Bear Sanctuary are more than 40 km away from the project site.
- As per IEE Report, the presence of any archaeological and heritage sites have not been reported near project site.
- The proposed project site is primarily agricultural land. The land acquired for the solar project site is totally private land (84.58 Hectares) and has been purchased on a voluntary basis (willing seller-willing buyer basis) from the land owners. A third party (land arranger) was appointed by the Company for helping in the purchase of land for the project.
- The solar power project site falls in Seismic Zone – 4 that is classified as High Damage Risk Zone. Therefore as reported in IEE report, applicable seismic coefficients have been applied during the detailed design and engineering phase of the project to withstand the impacts of earthquakes in the area, if any.
- As reported in IEE study, the water requirement for the project is minimal. The main consumption of water in the project is for cleaning of the solar modules with minimal requirement for domestic usage. The total water requirement at the project site is about 15,500 litres per day. As per IEE report, water has been sourced locally from nearby villages during construction and the water requirement during the operational phase is sourced from Outside vendors as informed during site visit. Cleaning of modules doesn't generate any harmful effluent and doesn't require further recycling or disposal. Hence, the water disposed off from module is allowed to seep into ground.

- As per Environmental Quality Monitoring report for the period of May 2013, The Ambient Air Quality & Noise Quality Parameters at project site are within the stipulated limits of National Environmental Quality standards. During construction phase also, as reported in IEE report, ambient air quality measurements along the project road and in the vicinity were within the limits of the revised National Ambient Air Quality Standards. Overall, the impact of generated noise on the environment during construction period has been insignificant, and localized in nature.
- As mentioned in IEE report, Soak-pits have been constructed at the project site for the collection of waste water generated from the labour camps and site office during construction as well operation phase of the project.
- The project is located adjacent to existing main public road, so no new roads would be required as a part of this project.
- As informed by project developer, No separate formal public consultation meeting during pre- construction stage was done; however local people views and opinion were taken on informal basis.
- As per information received, all compliances and HSE related monitoring work (pre & post commissioning) is undertaken by Corporate & Site EHS Team in the form of monthly safety meetings as well as weekly EHS reports.
- Project developer has developed a specific Procedure & Guidelines for Waste Material Handling (Hazardous/Non- Hazardous) for SREPL site. Removal of broken modules by vendors is part of SREPL's module procurement contract from supplier.
- During construction phase, the impacts has been localized and mainly confined to the areas of waste generation and their storages on project site. As per IEE report, the significance of impacts is assessed as minor.
- As informed by project developer, EMP Budget of INR 0.2 to 0.5 Million/annum has been allocated for environment protection works during operation phase for this project;
- The selected location for the proposed project lies in 'Hot and Dry' climate zone of India. The instantaneous ambient temperature over the location reaches more than $45^{O}C$ in summer; however the intensity of solar radiation is also very high. From the land type, meteorological study and annual behaviour of solar radiation over the location near village Alwada in Banaskantha, Gujarat, the Thin Film solar PV technology has been identified as the most feasible technology.
- The Sandland solar project will generate CDM benefits in terms of the annual emission reductions for the entire crediting period of 10 years which is expected to be 43162 tCO2 per annum.

10.1 ENVIRONMENTAL SENSITIVITY ASSESSMENT FOR POWER TRANSMISSION LINE ASSOCIATED WITH SANDLAND SOLAR PROJECT:

20. The power generated from the proposed solar power plant would be evacuated through a 66kV transmission line to Khimat Sub-Station of GETCO, situated about 2.5 km from the project site. As the project is planned under the Solar Power Policy (2009) of the state of Gujarat, and as per the terms of Power Purchase Agreement, it is the responsibility of GETCO to arrange, provide and maintain the power transmission evacuation facilities upto the 66 kV switchyard of the project. However, in the interest of meeting the commissioning schedule for the project, it was agreed between GETCO and the Company that the Company would manage the construction of transmission lines under the overall supervision and approval of GETCO. GETCO will reimburse the transmission line expenses to SPVs on the basis of GETCO SOR (schedule of rates) while the supply of towers, overhead conductors and other items issued as free issue items for such works.

21. To that effect, the Company has awarded transmission line contract to contractors who are nominated and approved by GETCO. Under these contracts, the works have been executed by GETCO approved contractors and in line with GETCO's existing policies and frameworks. The transmission line was made operational on 20th March, 2012.

Table 2: Brief summary related with Environmental Sensitivity for Transmission Line associated with Sandland Solar Project

Sr. No.	Aspect	Description
1.	**Route Particulars**	
i)	Length (KM)	2.5 kms
ii)	Land acquired for towers and corridor ROW	Nil. Only permission for Right of Way has been obtained from the affected land owners.
iii)	Land acquired for access roads along transmission corridor	Nil.
iv)	Width of RoW for transmission line	4 meter to 5 meter
v)	Terrain	Flat with gentle slope
	Hilly/Plain	Plain
	Agriculture/Waste Land	Agricultural Land (Private): 70% Govt. Land : 30%
	Wet/Marshy	Nil
	Estuarine	Nil
	Other Type of Land	Yes (Dry land)
2.	**Environmental/Social Details**	
i)	Name of District / District details (through which transmission line pass)	Banaskhanta district, Gujarat

ii)	Town/Village falling in corridor route Alignment (Nearby)	The line is routed in such a way to avoid villages and fixed nature of settlements
iii)	House/residences within transmission line RoW	None
iv)	Type of forest /ecological sensitive area affected:	The transmission line does not pass through any Reserve / Protected /Mangrove / Wild life area /any other environmentally sensitive area
v)	Type of Fauna and Flora noticed along corridor route; presence of any endangered species	No endangered species of fauna or flora are present
vi)	Historical or cultural monuments affected	None
vii)	Ground clearance of the transmission line	10 m after sag
3.	**Interference with other utilities**	
i)	Railway	Nil
ii)	Other Transmission Line Corridors intercepting the project line route	Nil
iii)	River Crossing	Nil
iv)	Road Crossing	The transmission line crosses across the road near to Village Khimat in Banaskantha District.

22. Clarification was obtained from project developer regarding HSE practices implemented in the transmission line construction related with project for which Project developer has informed that even though the transmission line development work was supervised by SREPL for GETCO, the HSE aspects were still under the preview of GETCO only. SREPL had no role in defining and auditing the HSE work related to transmission line development.

11. CATEGORIZATION OF SUB-PROJECT:

23. The sub-project can be classified into Category B based on ADB's EA requirements as per their Safeguard Policy Statement (2009).

12. STATUS OF REGULATORY CLEARANCES:

24. It is required that the sub-project meets the requirements of appropriate Indian legislations by considering appropriate obligations and guidelines of Regulatory Authorities. The sub project should have necessary national and local environmental clearances as well as permits and approvals for project implementation and suitable environmental management plan has been

applied. The statutory clearances required related with environmental aspects and to be obtained from other regulatory authorities as part of the solar project development, was assessed and current status of availability of such clearances are given in Table below:

Table 3: Status of Regulatory Clearances Obtained Related with Environment Safeguards

Sl. No.	Clearances Required	Statutory Authority	Current Status of Clearance
1.	Environmental Clearance	Ministry of Environment and Forests and Climate Change, New Delhi	Not Applicable as the Solar project development is not listed in Schedule I of the MoEF & CC's EIA Notification 2006, that lists projects or activities requiring prior environmental clearance and hence this is exempted from obtaining the same.
2.	Forest Clearance	MoEF &CC (Regional Office) and State Forest Dept.	Not applicable as the project doesn't affect any forest land.
3.	Provisions under National Biodiversity Act,2002	National Biodiversity Authority	Not Required as project site does not lie within 10km of any National Park, Wild Life Sanctuary or biodiversity rich area etc.
4.	Consent for Establishment (CTE)	Gujarat Pollution Control Board, Mehsana District, Regional Office-Palanpur, Gujrat State	Consent to Establishment (CTE) under Section 25 of Water Act, 1974 and Section 21 of Air Act, 1981 has been obtained from Gujarat Pollution Control Board during Construction Phase.
5.	Consent for Operate (CTO) and Authorization for management & handling of Hazardous Waste	Gujarat Pollution Control Board, Mehsana District, Regional Office-Palanpur, Gujrat State	Consolidated Consent & Authorisation (No Objection Certificate) under Section 25 of Water Act, 1974, Section 21 of Air Act, 1981 and Hazardous Waste (Management & Handling Rules, 1989) has been obtained from Gujarat Pollution Control Board during Operation Phase. Consent Order No.: W-12580, Date of Issue: 03/03/2012, Validity upto 01/02/2017.
6.	Fire Safety Permission	Chief Officer, Palanpur Municipal Corporation	Sandland Solar project has obtained certificate for Fire safety for its plant site.

7.	Labour License	Office of Assistant Commissioner of Labour, Palanpur ,Banaskantha District, Gujarat State	The Contractor, i.e. Hindustan EPC Company Limited has obtained License under Contract Labour (Regulation & Abolition) Act, 1970 for doing the contract work of O&M services.

25. As per HSE Manual prepared for the project, its mentioned that Occupational Health & Safety related legislations viz. Labor Act, Factories – Act, Workmen Compensation Act, Child Labor (Prohibition and Regulation) Act, Contract Labour Act, Employees state Insurance Act, Labour Laws and Minimum Wages Act etc. are followed and closely monitored. As informed by developer, all workers on company payroll are covered under group health insurance policy and contract labours are covered by the respective contractors only. Copies of Consents obtained from Gujarat Pollution Control Board, Labour License & Fire Safety Permission (in local language) are given in **Appendix-II**. M/s. SREPL is regularly submitting annual and monthly reports to Gujarat State Pollution Board for which sample copy of Monthly report is also attached under **Annexure-II**.

13. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE:

26. During Project Construction, M/s. SREPL held meetings and public consultations with the residents of Alwada and Khimat villages. The concessionaire made a presentation on the proposed project, development prospects, project impacts and measures to mitigate possible negative impacts. The prospects of improving social and economic status of the region as a result of a successful project implementation as well as corporate social responsibility (CSR) activities of the concessionaire were also discussed. As informed by the concessionaire, various CSR activities are being carried out in the affected villages in consultation with the local people, for which the details are given in Social Safeguards Section of this Due-Diligence study.

27. As reported in IEE report under Chapter 9 related with Consultation and Participation, Concessionaire has conducted stakeholder consultations for seeking feedback and observations/comments from local communities around the project site in the form of informal consultations conducted in the month of July 2011 and Formal consultations for CDM studies on 21st December, 2011 which was attended by 65 people from community. All the questions asked by stakeholders were satisfactorily explained to the participants by the project promoter. The project promoter explained about the technical details, feasibility of the project activity and its impacts on environment. The stakeholders appreciated the project promoter for the environmental friendly measures. Considering the comments made by the stakeholders, no significant negative impacts due to the project activity had been identified. Attendance sheet & Minutes of meetings for public consultation conducted under CDM study has been attached as **Appendix-III**.

28. **Grievance Redressal Mechanism:** Environmental and social grievances of affected people are handled in Sandland project in accordance with the project grievance redressal

mechanism defined under the HR policy for contractors. This mechanism was established prior to construction and will remain active throughout the life cycle of the project. A Grievance Redressal Committee (GRC) was formed at the project site to ensure addressal of affected people's grievances, on both environmental and social concerns, and facilitate timely project implementation. The GRC comprises of Project head, Liasoning officer – Site In charge/Admin and Land seller/Local Community Member. For record keeping purposes, grievance redressal registers are maintained at the various locations of the plant as decided by the local HR Head. A register contains information such as date, time, location, names of person and grievance details. As per IEE report, at Sandland site, the only request from local community was for the renovation of village temple which was addressed by the M/s. Sandland SPV. There were no grievances related to land acquisition as reported in IEE report.

14. ALTERNATIVE ANALYSIS:

29. As per IEE report, comparative analysis of alternatives for the project has been done in terms of site location and power generation technology available, no project scenario, etc. The following alternatives have been considered:
    - Layout design and/ or technology alternatives;
    - Location alternatives; and
    - No-Go alternative;

30. **Location Alternatives**: In order to assess the optimum feasibility of the solar energy projects for power generation in the state, a comprehensive site assessment has been conducted by the Company for the project, keeping following points under consideration : Higher solar radiation intensity, Land availability, Connectivity and accessibility, Shading aspects, Water availability, Power evacuation facilities (nearest available substations of GETCO). Also, the land available for acquisition for the project was not suitable for agriculture due to high salinity and also involved no displacement of any person.

31. The state of Gujarat comprises high wasteland and high annual solar radiation. The Gujarat Energy Development Agency (GEDA), the State Nodal Agency of Ministry of New and Renewable Energy (MNRE), Government of India has developed state solar power policy to promote generation of green and clean power, and productive use of waste lands, thereby engendering a socio-economic transformation and creation of environmental consciousness among citizens. The policy provides for efficient use of conventional energy, proactively establish and promote sustained use of new and non- conventional energy sources and applications to reduce emissions and related impacts of climate change. Also the Gujarat Electricity Regulatory Commission has made it mandatory for distribution licensees in the state to purchase a fixed percentage of their total power procurement through renewable energy sources, both solar and non solar.

32. **Consideration of Design/ Technology Alternatives:** As per the technical assessment undertaken across the Solar PV technologies, the Thin film solar PV technology appears to be the most feasible option for the proposed location because of its high temperature tolerance, effectiveness of producing electricity in diffuse solar radiation conditions, low shading losses and most cost effective option and modularity, etc.

33. In the case of an alternative renewable energy based project based on biomass or wind, the availability of surplus biomass for the first, and an optimal wind power potential for the latter is a basic requirement for finalizing the project location. Wind based energy projects would also require acquisition of suitable land area for installation and operation of windmills. In the case of biomass projects, it has been noted that the smooth functioning of the project becomes a challenge due to non -availability of trained manpower during the operation and maintenance phase.

34. **No-Go Alternative**: Fast economic growth of the state of Gujarat has resulted in increase in electricity consumption by the industrial and commercial sectors. With the current available capacity, Gujarat is not in a position to meet its requirement either in terms of energy requirement or peak capacity requirement. The alternatives for power generation in the case of a 'no project scenario' or No-Go Alternative would significantly depend on the fossil fuel based energy (comprising almost 70% of the energy in the Indian grid). This would result in higher greenhouse gas as well as air emissions from the generation of same amount of power due to consumption of higher carbon intensive fossil fuels such as coal, diesel, etc.

35. Based upon abovementioned criteria, considering various factors such as- proven high annual solar radiation in Gujarat state; favorable environmental and social settings; lowest GHG emissions in the project life cycle; availability of high waste lands, governmental support, and local community's acceptance of solar energy projects over the last decade in the region, solar energy based power generation is the most appropriate alternative in the region of Banaskantha district of Gujarat state.

15. IMPLEMENTATION OF EMP DURING CONSTRUCTION & OPERATION PHASE OF SANDLAND SOLAR PROJECT:

36. The IEE report assessed various existing environmental parameters in and around the project and the actions taken to minimize any significant negative impact. As informed by project developer, adequate mitigation actions have been undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures is also being carried out during the implementation phase of the project.

37. All the issues such as acquisition of land, ecology, influx of people during construction phase, shelter and sanitation, the equipment and machineries, environmental health and safety, Occupational hazard, social and environment management and monitoring plan have been dealt in detail in the respective sections of the IEE Report prepared for Environmental Safeguards. However, these are briefly enumerated below to have a quick assessment of the situation.

Table 4: Brief Assessment of Environmental Impacts due to development of SREPL project and adopted Mitigation Measures

Environmental Parameter	Level of	Reason	Adopted Mitigation Measures

	Impact		
Impact on Air Environment	Low	Insignificant air emissions during the construction phase while no emissions are envisaged from the process/operation as it's a solar based power project	• Sprinkling of water • Proper handling of excavated soil
Impact on Water Environment	Low	• Plant will require a very low amount of water for cleaning of modules and domestic consumption. • No hazardous effluent is envisaged to be discharged from the plant that may have an impact.	• In the case of wet cleaning of solar panels , the amount of water needed is insignificant • SREPL water requirement is only 15,500 litres per day and is being sourced from local vendors. • Domestic effluent is discharged in soak pits. • Workers are encouraged to maintain cleanliness at the project site
Impact on Land Environment	Medium	Impact of change in land use	• CSR activity is being undertaken by the Company based on community consultations • Giving priority in jobs to the local people with first priority given to the project affected families
Impact on Noise Environment	Low	• No sources of noise within the project area except the diesel generator (DG) sets which have been used only during the construction phase of the project • As no sensitive locations in the vicinity of the project site.	• DG Sets with acoustic enclosures have been used at the project site during the construction stage to maintain the noise level within permissible limits.
Impact on Ecology	Low	• As no ecologically sensitive place lies within 10 km radius from the project site	• Although there is no significant Vegetation cover within the study area, few no. of plantation has been carried out at plant site.

Impact on Socio-economic Environment	Low	• The peak labour population has been approximately 650-700 labourers for three months during the construction phase and might have an impact on the social fabric of the area surrounding the project.	• The project will not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the lands where the project's solar power generation facility are being constructed, that is not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups. • Construction labours have been housed in temporary construction camps specially developed for this purpose with all basic amenities. • The social impact of migrant labour on local community has been temporary in nature as it was restricted to the construction phase of the project. After construction phase, the areas acquired by labour colonies have been reverted to the status of pre-construction phase. Therefore, conflict of the migrating labour with Locals has not taken place.

Source Document: SREPL's IEE document on Environmental Safeguards and Information obtained from Project Developer

38. Details of anticipated impacts and mitigation actions undertaken by Project developer during Operation phase of Sandland solar project has been provided under Appendix A : Environmental Compliance Audit Report attached with IEE study (Page no. 55). This Appendix highlights the environmental compliance status & mitigation measures taken during Pre-construction, construction, and Operation phases of SREPL project As per Environmental Quality Monitoring report for the period of May 2013, The Ambient Air Quality & Noise Quality Parameters at project site are within the stipulated limits of National Environmental Quality standards during O&M Phase. Copy of Environmental Quality Monitoring Report is attached as **Appendix- IV**.

15.1 CONTRACTUAL OBLIGATIONS RELATED WITH HSE IMPLEMENTATION:

39. As informed by project developer, M/s. SREPL has laid upon guidelines for execution of Environment, Health, Safety & Social Accountability Compliances by its sub-contractors which were awarded the job of various types of Construction related work during Sandland project development. As per these guidelines, all contractors were required to obtain a "Contractor's Risk Policy" for their employees and a duly signed copy of the same submitted

to EHS/Project Department. Under contractual obligations, Contractors were required to comply with EHS compliance of SREPL including all EHS related statutory requirements (like Workmen Compensation Act, 1923, & ESIC Act & their rules, Contract Labour Act, 1970, Minimum Wages Act, 1948, Building and Other construction workers Act, 2009 etc.).Copy of SREPL's Guidelines document for execution of Environment, Health, Safety & Social Accountability Compliances is attached as **Appendix-V**.

15.2 WASTE MATERIAL HANDLING PROCEDURE AT PROJECT SITE:

40. M/s. SREPL has established and maintained a system for collection ,storage and disposal of all material/waste generated inside the project premises, in safe and environmental friendly manner. Project/Plant Head is responsible to ensure that agreement is carried out with approved vendors regarding EH&S requirements related with safe storage of Hazardous materials/wastes and disposal or recycling of waste materials. Removal of broken solar modules by vendors is part of SREPL's module procurement contract from supplier. The procedure defines separate storage of hazardous wastes like used oil, empty chemical containers, oil soaked clothes etc. in designated hazardous waste storage area. Copy of SREPL's Waste Material handling procedure and Solar Modules Contractor's module collection and recycling program are attached as **Appendix-VI**.

41. During site visit, project O&M team informed that Transformer oil in itself has a life of approx. 8-10 years. It's only been 3 years, since the project has been operational & no waste oil of significant quantum is generated till date at SREPL site. Minor quantity of waste oil has accumulated stored in a container which generates during Transformer oil testing activity as on annual basis, transformer oil is checked for its efficiency for which small quantity of oil is taken out from Transformer and oil volume is maintained with fresh oil.

16. ENVIRONMENT, HEALTH AND SAFETY MANAGEMENT SYSTEM AT SANDLAND SOLAR PROJECT:

42. M/s. SREPL has developed Health, Safety and Environment (HSE) Management System for managing the HSE issues at project site for Sandland Solar project. This document works as a guidance manual for implementing good industry practices w.r.t. environmental management, worker safety and accident/hazard prevention at work site. HSE Plan adopted by M/s. SREPL has been attached as **Annexure-VII**. This document defines about organizational capacity in HSE area at corporate as well as project site level and monitoring & reporting requirements for EHS compliance at top management level through structured meeting forums e.g. Management review, Monthly & weekly EHS meetings, Safety Committee meetings etc.
43. HSE Plan also outlines the safety instructions to be observed by all contractors and procedure for Accident reporting & investigation. For dealing with the situation of emergency , emergency facilities/ equipment are described which are mainly emergency control centre, fire-fighting facilities, medical facilities, communication facilities, alarm system, Roles & responsibilities and information flow at the time of emergency , Mock drill procedures etc.

16.1 PERIODIC SAFETY MEETINGS AND INCIDENT MANAGEMENT SYSTEM:

44. To overview safety management system in Sandland project, Monthly Safety committee meetings are conducted in the presence of plant Manager in which different safety related aspects are discussed with planned corrective & preventive actions. Target dates for issue closure are set which are followed and closure status is discussed in next periodic meeting. Minutes of Meetings for safety committee for the month of May/June/July 2014 and September 2015 are enclosed as **Appendix-VIII.**

45. Accident monitoring system is in place to assess the rate of accidents in project site and to take the preventive measures. This monitoring is essential to judge the effectiveness of site safety measures implemented during O& M phase of project. Weekly EHS reporting system is developed which gives details of EHS observations noticed and closed, weekly EHS deviations, status of fire extinguishers, water consumption records, Incident/accident reporting, in-house training details. Weekly EHS report summary data for the month of July to August 2014 and September 2015 has also been attached under **Appendix-VIII**. All accidents/incidents/near misses are investigated & reported in predefined format for which date-wise EHS Observation record register is also maintained.

46. Till date, No major accident/incident has been reported from Sandland Solar Power site as informed during site visit. EHS manual and weekly EHS report also includes details on accident/incident reporting format.

47. **EHS & S Training**: As informed by project developer, regular training programmes are conducted at project site related to Environment, Health & Safety for which topic details and attendance sheet of staff undergone training are also attached under **Appendix-VIII**.

17. OVERALL INSTITUTIONAL FRAMEWORK FOR ENVIRONMENT AND SAFETY MANAGEMENT PLAN:

48. As per information received from project developer, all compliances and HSE related monitoring work (pre & post commissioning) is undertaken by Corporate & Site EHS Team. For the purpose, project developer already has separate EHS team at corporate as well as site level. At corporate level, Head-EHS and other members are part of team. At site level, Site Manager and EHS Coordinators are responsible. Project developer has informed that, on monthly basis monitoring, audit and review of EHS performance is carried out jointly with site team. EMP Budget of INR 0.2 to 0.5 Million/annum has been allocated for Environment protection works during operation phase for this project. The organizational structure for project management showing actual names and designation of persons involved in environment & safety implementation during operation phase of Sandland project at corporate & site level is shown under **Appendix-IX.**

18. CDM BENEFITS DUE TO SANDLAND SOLAR PROJECT DEVELOPMENT:

49. As per IEE report prepared for Sandland Solar Project, this project would generate approximately 45376.8 MWh of electricity and displace equivalent amount of electricity from the NEWNE grid which otherwise would have been generated by the fossil fuel based power plants. According to the methodology AMS ID.(approved small scale methodology published by CEA regarding Baseline Carbon Dioxide Emission Database for NEWNE grid), Baseline Emissions of the project is the CO_2 emissions avoided by the project considering the grid is emission intensive. The project is expected to generate approximately 43162 CERs on an annual basis over the next 10 years (crediting period).

19. SITE VISIT OBSERVATIONS:

50. A site visit was undertaken by IIFCL's Environmental and Social Safeguard specialists on 22nd September, 2015 to review the implementation of environmental safeguards at the project site. During the site visit, following staff was mainly consulted regarding environmental safeguards related measures implemented at solar plant site:

    1. Mr. Sanjay Dubey, Site O&M In-charge for SREPL Project
    2. Mr. Harendra Mishra, Site EHS Coordinator
    3. Mr. Krishan Kapil, Manager-EHS & CDM (HPPPL Corporate Office)

51. Based on the discussions with abovementioned officials, site observations are given below:

- Currently project is running in O&M Phase and plant site was having boundary wall from each side.
- M/s. SREPL has established SCADA system (Supervisory control and Data Acquisition) at plant site for having better control of processes of plant site including fire emergency system which is proposed to be linked to control system at Head office.
- Work related to installation of fire sensors and smoke detectors at various places in solar plant site was going on and fire alarm system is proposed to be developed at site.
- For cleaning of solar modules, M/s. SREPL is implementing water sprinkler system(at 3.5 bar pressure) in 5 MW plant area and later on, may install sprinkler system throughout the plant as it will help the site team to clean the solar panels of entire plant in one go (4-5 hrs). Currently, by manual procedure, site team is not able to achieve the module cleaning target in one cycle and module cleaning is the continuous activity throughout the month. Each solar panel undergoes three cycles of cleaning in a month.
- As informed by project developer, at present, there are no hazardous wastes generated at plant site. Disposal of broken solar modules, if any during O&M phase,

will be done through approved vendors. Regarding waste oil disposal, developer informed that Transformer Oil has life of approx.. 8-10 years and since its only three years of operation period, so significant quantum of waste oil is not generated.

- Fire –fighting Extinguishers were seen placed at various locations in solar plant site like within Main office building, near switchyard area and Transformers locations.
- Project staff is provided with necessary PPEs while working at site near Electrical equipment and safety sign boards showing electrical and fire safety hazards are displayed at main office building.
- First aid Box is maintained at plant site having all the necessary medicines including anti snake venom injections & serum and emergency vehicle is 24 hrly available at site.
- Waste segregating bins with color codes were placed near main office building for storage of recyclable, domestic and hazardous waste, if any.
- Project developer has done few plantation near main office building with low height trees and on plant site boundary and informed that plantation is done continuously at site since project operations has started. Survival rate of plants was observed to be very low.
- O&M staff is provided with drinking water & sanitation facility at project site. Domestic sewage is disposed in soak pits. Most of the Project staff is staying at Dhanera and bringing food from their homes.
- Water for cleaning of solar modules is procured through local vendors and cleaning is done in night shifts. No wastewater is generated due to cleaning as its immediately absorbed by ground.
- Project person informed that local people are employed in project for few maintenance related activities like module cleaning, grass cutting, plantation etc..
- Project developer is maintaining grievance redressal register at site and doing community development activities as per public demand.

52. The site visit photographs regarding the environmental safeguard measures implemented during operation phase are given in **Photo Plate-I**.

20. CONCLUSIONS AND RECOMMENDATION:

53. Based upon the review of available safeguards documents & information shared by M/s. SREPL, it is concluded that the concessionaire has undertaken considerable efforts towards environmental safeguard measures. The conclusions for the sub-project are given below:

- The sub-project has been prepared by M/s. SREPL as per its own funding requirement and not in anticipation to ADB operation.
- The development of this solar project has no major significant environmental impacts.

- Solar project development is not listed in Schedule I of the MoEF & CC's EIA Notification 2006, that lists projects or activities requiring prior environmental clearance and hence this is exempted from obtaining the same.
- The sub-project does not affect any eco-sensitive zones as declared by MoEF &CC. Also the project does not pass through any national park or wild life sanctuary area. No historical or cultural monuments are affected due to this solar project.
- The sub-project has obtained most of the permits/consents applicable as per regulatory requirements for development of solar project during construction & Operation phase.
- As per IEE report prepared for the project, the concessionaire has informed the local people about solar project development on informal basis and put in place grievance handling mechanism to address stakeholder's grievances, if any.
- Under IEE report, various existing environmental parameters in and around the project have been assessed and details of the actions taken to minimize any significant negative impact. As informed by project developer, adequate mitigation actions have been undertaken in line with set of recommended mitigation measures as defined under IEE Report and for implementation of same, regular monitoring was also being carried out during the construction phase of the project.
- Concessionaire has confirmed that Periodical environmental management and monitoring during the project operation phase is being carried out by project site as well as Corporate HSE team.
- As already mentioned, the project activity will contribute to generation of 25 MW of clean power into the state grid. This will not only boost the economic and industrial development of the area but will also contribute towards energy security.

54. Based on the due diligence findings, it can be deduced that the sub-project has no significant environmental safeguard issues. The Sub-project, therefore, does not appear to involve any kind of reputational risk to ADB funding on environmental safeguards and recommended for funding.

21. MONITORING BY IIFCL:

55. As observed during site visit, few areas have been identified which can help in improvement regarding implementation of environmental safeguards measures at Sandland Solar Power Plant facility which has been shared with Project Developer regarding preparing action plan with timeline for follow-up and further monitoring. During IIFCL's periodical supervision, IIFCL shall monitor environmental safeguard measures implemented at project site by the concessionaire and shall share the implementation status of same with ADB under Annual safeguards performance report. As part of the periodic supervision, following areas have been identified for action plan implementation:

Table 5: Action Plan for Identified Monitoring Parameters with Proposed Timeline

Sl. No.	Monitoring Parameter	Action Plan by Project Developer	Tentative Timeline for Implementation
1.	Project developer is planning to use Ground water to meet project's water requirements for which Ground water usage permission is required to be obtained from CGWB office of Gujarat state.	Project developer has initiated the process of obtaining permission for Ground water usage from the concerned regulatory authority.	March 2016
2.	During site visit, it was observed that broken solar modules (including First solar make) were not properly stored on designated places/ concrete platforms in plant site.	Proper arrangements for storage of scrap modules are under development at Sandland solar site. Further, intimation to respective supplier of M/s. First solar has already been communicated for disposal. Discussion with E-waste vendor is on-going & disposal of all scrap modules of Moser Baer & DuPont modules shall also be completed.	December 2015
3.	Plant site doesn't maintain good housekeeping practices like storage of waste materials/wires/empty containers, maintenance of internal roads, presence of wild plants and long grass below solar panels endangering safety of working staff.	Condition of Sandland site deteriorated due to continuous & heavy rain during the June, July & Aug, 2015 months, because of which grass cutting related activity got delayed. Status for	December 2015

		the same will be improved.	
4.	As observed during site visit, security guards staying at site were not provided with sanitation facilities.	Sanitation facilities for security personnel were already present, however due to damaged condition, it was temporarily closed. The same shall be made operational sooner.	November 2015

DUE DILIGENCE ON SOCIAL SAFEGUARDS

22. DUE DILIGENCE OF SOCIAL IMPACTS:

56. The Social safeguard due diligence study of Sandland Real Estate Private Limited has been carried out by reviewing the documents made available by the Concessionaire. The documents reviewed for the due diligence study are as below:

- Social Safeguard report (attached as **Appendix X**);
- Details of Community development activities provided by the concessionaire;
- Information pertaining to Grievance Redressal Mechanism for the project.

23. VISIT TO PROJECT LOCATION AND DISCUSSION WITH CONCESSIONAIRE:

57. A site visit was undertaken by the Environmental and Social safeguard specialists of IIFCL on 22nd September, 2015 for field verification of environment and social safeguards related aspects of the project. During the site visit, the IIFCL safeguard specialist had a detailed discussion with the O&M team of the project. The site visit photographs are given in **Photo Plate-I**.

24. CATEGORIZATION OF SUB-PROJECT:

58. The sub-project can be classified into Category C based on ADB's Safeguard Policy Statement (2009).

25. PUBLIC CONSULTATION:

59. As per the Social Safeguard Report, during the project construction, the concessionaire held meetings and public consultations with the residents of Alwada and Khimat villages. The concessionaire made a presentation on the project, development prospects, project impacts and measures to mitigate possible negative impacts. The proceeding of the consultation along with the attendance sheet has been attached as **Appendix III**. The prospects of improving social and economic status of the region as a result of a successful project implementation as well as corporate social responsibility (CSR) activities of the concessionaire were also discussed during such consultations.

60. During the preparation of Social Safeguard report, discussions were undertaken on an informal basis with a group of 7-8 community members from Alwada and Khimat villages. The villagers confirmed that they were made aware of the project by the concessionaire. They indicated their satisfaction with the project which will bring more jobs to the village and opportunities to set up small businesses for construction and operational workers.

26. LAND ACQUISITION IN THE SUB-PROJECT:

26.1 LAND REQUIREMENT FOR THE PROJECT:

61. As per the Social Safeguard report, the total land required for the Project's solar power generation facility was 84.58 Hectares (ha). The land has been acquired from two villages namely, Alwada (52.06 Ha) and Khimat (32.52 Ha) from 52 major landowners. Out of the total land area, the PV module array has been established in 62.32 ha, while 0.81ha was required for the balance structures such as the control room and switchyard. The remaining 21.45ha is an open area including road coverage.

26.2 LAND OR RIGHT OF WAY (ROW) REQUIREMENTS FOR ASSOCIATED FACILITIES:

62. As per the power purchase agreement (PPA) signed with GUVNL, the power evacuation is at 66kV connecting to GETCO State Transmission Utility (STU) system. The power generated from the solar power plant is evacuated through a 66kV transmission line (approximately 2.5 km in length) to Khimat Sub-Station of GETCO. As per the PPA, it is the responsibility of GETCO to arrange, provide and maintain the power transmission evacuation facilities upto the 66 kV switchyard of the project. However, in the interest of meeting the commissioning schedule for the project, it was agreed between GETCO and the concessionaire that the concessionaire would manage the construction of transmission lines under the overall supervision and approval of GETCO. GETCO will reimburse the transmission line expenses to SPVs on the basis of GETCO SOR (schedule of rates) while the supply of towers, overhead conductors and other items issued as free issue items for such works.

63. The Construction of the 66kV 2.5km Transmission Line from project site to Sub-Station of GETCO at Khimat was reimbursed by GETCO which required the setting up of 13 towers. The transmission line is routed in such a way that it avoids villages and any settlements and no house/residences is falling within transmission line RoW. Each tower footing required 75sq.m. of land. For setting up of transmission towers, 17 landowners have been compensated. A total compensation of around INR 1.7 million has been paid or approximately INR 0.13mn per tower footing. The period of payments to landowners and tower erection was in December 2011 to February-March 2012. No further land acquisition or involuntary resettlement issues are expected from the use of the substations which has been in existence for more than 10 years. The transmission line was completed on 20th March 2012.

27. RESETTLEMENT IMPACT IN THE SUB-PROJECT:

64. As mentioned in the Social Safeguard Report, there were no permanent or temporary inhabitants dwelling on the site . The project site is located far from the coast line and no banders or fishing communities were affected. The project also did not require land acquisition of gauchar or grazing land or any state-owned wastelands. Thus, the project did not have involuntary resettlement impacts.

28. IMPACT ON INDIGENOUS PEOPLE:

65. As mentioned in the Social Safeguard Report, the project construction and operation do not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the lands where the project's solar power generation facility has been constructed was not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups.

29. LAND ACQUISITION PROCESS AND COMPENSATION FOR LAND ACQUISTION:

66. The land acquired for the project site is totally private land and has been acquired from private parties on the basis of bilateral contracts on a mutually agreeable rate. A third party (land arranger) was appointed by the Company for helping in the purchase of land for the project and land was acquired on the principle of willing buyer-willing seller. As mentioned in the Social Safeguard report, the land transfer to the project has been done as per section 55 of the Saurashtra Gharkhed Tenancy Settlement and Agriculture Land Ordinance 1949 (as amended in 1997) applicable in Gujarat. Section 55 outlines the provisions for the Sale of land for bonafide industrial purpose. The provision of "Transfer of Property Act 1882" was also followed and was duly taken care at the time of execution of Sale Deeds.

67. The land was purchased from fifty two (52) major land owners in Awada and Khimat. The compensation rate offered and paid to the land owners on an average was INR 197 per square metre of land which was more than the existing Government circle rates of INR 65 to 75 per square metre of land depending upon the time of purchase. The payment of compensation and land registration process was completed during the period from May 2011- January 2012.

30. GREIVANCE REDRESSAL:

68. As mentioned the social safeguard report, the concessionaire also has a grievance redressal mechanism in place which provides an effective approach for complaints and resolution of issues made by the affected community in a reliable way. This mechanism was established prior to construction and will remain active throughout the life cycle of the project. A Grievance Redressal Committee (GRC) was formed at the project site to ensure affected people's grievances, on both environmental and social concerns, are adequately addressed and facilitate timely project implementation. The GRC comprises of Project head, Site In charge and Admin Incharge. Admin Incharge is the focal point for registering of grievances by local communities.

69. As mentioned in the Social Safeguard report, the only request from local community was for the renovation of village temple which was addressed by the concessionaire by shifting the deity near to the boundary wall after discussion with the villagers. A copy of grievance register is attached as **Appendix XI**. There was no grievance related to land acquisition.

31. EMPLOYMENT GENERATION AND INCOME RESTORATION:

70. As mentioned in the Social Safeguard report, discussions with land owners on a sample basis indicated that the land sold for the project was not much productive for them because of

the higher salt concentration in the soil. As per the land owners, the sale of land came as an opportunity to earn income from an otherwise unproductive land. The payment provided against the land purchased has helped these farmers to find alternative land in a more fertile area or start an alternate livelihood. Mostly cash crops such as cotton are cultivated in the region.

71. Apart from this, as mentioned in the social safeguard report, the concessionaire has given preference to the local labour during project construction stage. It also had a standard clause in the contractor's agreements, binding the contractor to comply with the local labour laws and covered ILO standard. Minimum wages were paid to the workers at site as per the applicable minimum wages in Gujarat. All eligible workers were covered under ESI (Employees State Insurance) & EPF (Employees Provident Fund) schemes. The workers were paid equal wages for similar kind of work regardless of gender. The concessionaire has strict policy in place not to employ anyone below the age of 18 years. These policies and procedures conform to the provisions of the relevant ILO standards. The HR policy for contract workers also restricts the employment of child labour by contractors.

72. It has also been confirmed in the Social Safeguard report that the concessionaire employed local workers for various activities during the operation stage of the project.

73. It has also been confirmed by the concessionaire that for any non-technical works, preference is given to the local villagers. In general, for activities like module cleaning, security and other non-technical jobs, local villagers are engaged on regular basis. In a year, approximately 18-20 people from local villages are being engaged for module cleaning work and 15-18 people are engaged for security or other non-technical works. The engagements of local villagers are done through local contractors.

32. COMMUNITY DEVELOPMENT ACTIVITIES:

74. As informed by the concessionaire, various CSR activities is being carried out in the affected villages in consultation with the local people, for which the details are given in **Table 5** below:

Table 5: Details of Community Development Activities done under CSR

CSR activity	Details of the activities
Upgradation of village drainage system	Maintenance of village drainage systems are under the purview of local municipal corporation, however the concessionaire on regular basis, in consultation with local villagers or Panchayat heads, undertake various minor drainage system related rectification work. If need arises, on villagers behalf, the concessionaire also follow up with local municipal agencies for any such kind of activity.
Supply of teaching aids, books, and uniforms to schools.	The concessionaire also regularly, invite school children and teaching staff at the project site and abreast them about various possible Environmental impacts from a coal fired power plants and benefits of a solar power plant. Regular Environmental awareness camps and training session are also organized at sites.

Maintenance of village street lighting	Maintenance of village street lighting are under the purview of local municipal corporation, however the concessionaire on need basis follow up with the concern agencies for all grievance of local community for street lighting related issues. If any minor electrical maintenance is required, they engage specific electrical personal available at site. Sandland Team has also taken initiative & repaired the street solar light at village "Khimat" Govt. hospital nearby Sandland site (Approx-3 Km) on 04-04-2014.
Women Empowerment Programme	The concessionaire is committed to give preference to Women for any non-technical Labour requirements at site. They also conduct informal training session on various health related or any other hygiene related activities on timely basis.

33. SITE VISIT OBSERVATION:

75. A site visit was undertaken by the Environmental and Social Safeguard Specialists of IIFCL on 22nd September, 2015 for field verification of environment and social safeguards related aspects of the project. During the site visit, the project O&M team, which included Mr. Sanjay Dubey, Project Manager (O&M), Mr. Harendra Mishra, EHS Coordinator and Mr. Krishna Kapil, Manager (CDM & EHS officer, Head Office), were consulted regarding environmental and social safeguards related measures implemented at the project sites. It was observed and noted during the site visit that:

- The O&M team of the project employs 14 technical staffs, 21 security guards.
- Each solar module is cleaned every 10 days and local labours are engaged for cleaning these modules.
- The concessionaire is in the process of installing sprinklers for module cleaning. The sprinklers are installed near the panels, only at a few panels. One sprinkler is installed at every 2 mtrs. As informed by the concessionaire, the advantage of installing sprinklers is that they use less time for cleaning and covers a wider area.
- The water drainage system near the Sandland site is natural drainage & was pre-existing prior to site commissioning. It was informed by the concessionaire during the site visit that during commissioning & operational phase, all measures have been adopted to avoid any disturbances to natural flow of water in the present system. They regularly conduct minor maintenance work on need basis to maintain the natural water flow system. The drainage system is connected to the nearby Banas river, which is approx. 3 km away.
- There was a temple at the project boundary and it was requested by the villagers that since the project boundary wall has blocked their access to the temple so the deity should be shifted near the boundary wall (inside the Boundary wall) so that they can access the same to perform their religious rituals. The concessionaire has shifted the deity near the boundary wall and also provides access to the same whenever it is required by the local villagers.
- A 'Quick Response Transport (QRT)' vehicle is also available on site in case of any emergency.

- As noted during the site visit, security guards staying at site were not provided with sanitation facilities. It has been explained by the concessionaire that sanitation facilities for security personal were already present, however due to few breakdown & damaged condition it was temporarily closed. The concessionaire has ensured that the necessary corrective action would be taken by them by November 2015.

34. CONCLUSION AND RECOMMENDATION:

76. Based upon the available documents of Sand Land Real Estate Pvt. Ltd., it is concluded that the concessionaire has undertaken adequate social safeguard measures during the operation of the project. The conclusions for the sub-project is given below:

    - The sub-project have been prepared by the Government of Gujarat as per the national and state government requirement and not in anticipation to ADB operation.
    - Sand Land Real Estate Pvt. Ltd. is in operation from 1st April 2012.
    - The land for the project has been purchased by concessionaire at the rates which was more than the existing Government circle rates.
    - The project did not had any impact on the settlement area and no cultural and community property was affected due to the project.
    - Employment opportunities have been provided to the local people for various O&M activities. The concessionaire engages local labours for cleaning of modules and grass cutting at the site.
    - Concessionaire has undertaken community development activities based on the demands raised by the local people.
    - The concessionaire should provide sanitation facility to the security guards staying at the project site.

77. The Sub-project, therefore does not appear to involve reputational risk to Asian Development Bank funding on social safeguards and is thus recommended for funding.

35. MONITORING BY IIFCL:

78. As noted during the site visit, security guards staying at site were not provided with sanitation facilities. The concessionaire has ensured that the necessary corrective action would be taken by them by November 2015. IIFCL shall monitor the implementation of the necessary corrective action as per the timeline committed by the concessionaire during the periodic monitoring of the project.

Annex-2 : Attendance sheet (1)

SANDLAND REAL ESTATES PVT. LTD.

Regd. Office: 192, Sheikh Menon Street, Zaveri Bazaar, Mumbai – 400002
Contact: 022 – 2267 4460, Email: slrepl.gujarat25@gmail.com

Project: 25MW Solar PV Power Plant by SLREPL
Activity: CDM Local Stakeholder Meeting
Venue: Alavada Village, Dhanera Tehsil, Banaskantha District, Gujarat, India
Date & Time: 21st Dec 2011, 11:00a.m

Attendance Sheet:

S.No	Name (नाम)	Occupation (व्यवसाय)	Address and contact Number (पता और टेलीफोन नंबर)	Signature
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SANDLAND REAL ESTATES PVT. LTD.

Regd. Office: 192, Sheikh Menon Street, Zaveri Bazaar, Mumbai – 400002
Contact: 022 – 2367 4460, Email: slrepl.gujarat25@gmail.com

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SANDLAND REAL ESTATES PVT. LTD.

Regd. Office: 192, Sheikh Menon Street, Zaveri Bazaar, Mumbai – 400002
Contact: 022 – 2367 4460, Email: slrepl.gujarat25@gmail.com

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43	[illegible]	[illegible]	[illegible]	[illegible]
44	[illegible]	[illegible]	[illegible]	[illegible]
45	[illegible]	[illegible]	[illegible]	[illegible]
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(4)

SANDLAND REAL ESTATES PVT. LTD.

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59	[illegible]	[illegible]	[illegible]	
60	[illegible]	[illegible]	[illegible]	
61	[illegible]	[illegible]	[illegible]	
62	[illegible]	KPMG, CDM Consultant	[illegible]	
63	Krishan K. Gupta	Sandland	[illegible]	
64	Mukesh Bhatt	Sand Land		
65	[illegible] Sarpanch	Vacchadal		

ANNEX S-4: RESETTLEMENT SCREENING CHECKLIST*

Impact	Not Known	Yes	No	Indication of scope (no. of affected persons, land area, land use, structures, etc.)
Is the prospective subproject company (PPC) undertaking or likely to undertake any land acquisition?			√	The project is in operation stage and the land purchased for Sand Land Real Estates Pvt. Ltd. was 84.58 Hectares. The project does not require any further land acquisition.
Is the PPC acquiring land through willing buyer to willing seller transactions?			√	The project is in operation stage and do not require any further land acquisition. However, the land for the project was acquired through willing buyer to willing seller transactions.
Does the PPC have any agreements or is it likely to enter into agreements with the government for provision of sites or land or rights to land?			√	
Is any of the land used by the PPC (or likely to be used by the PPC) compulsorily acquired?			√	
Will any PPC activities involve restrictions of use on adjoining land?			√	
Are the sites for land acquisition known?			N/A	The project is in operation stage and do not require any further land acquisition.
What is the ownership status of the land?				The PPC purchased the land from the landowners.
Are non-titled persons present?			N/A	
Will tenants, lessees, share farmers, or other third party users be affected?			N/A	
Will there be loss of housing?			N/A	
Will there be loss of crops, trees, and other fixed			N/A	

assets?				
Will there be loss of incomes and livelihoods?			N/A	
Will access to facilities, services, or resources be lost?			N/A	
Will there be loss of businesses or enterprises?			N/A	
Will any social or economic activities be affected by land use related changes?			N/A	
If involuntary resettlement impacts are expected:				
Are local laws and regulations compatible with DFI's involuntary resettlement policy?				N/A
Will land be acquired through the government or by the PPC?				N/A
Do PPC agreements with the government (if any) specify involuntary resettlement will be conducted in accordance with international standards?				N/A
Does the government executing agency/PPC have sufficient skilled resources for resettlement planning and implementation?				N/A
Are training and capacity building required prior to resettlement planning and implementation?				N/A

** The land acquisition was already completed and the project was under operation stage before IIFCL's involvement in this project.*

ANNEX S-5: TRIBAL PEOPLES EFFECTS SCREENING CHECKLIST

Impact on Tribal Peoples	Not Known	Yes	No	Remarks or identified problems, if any
Are there tribal groups present in project locations?			√	
Do they maintain distinctive customs or economic activities that may make them vulnerable to hardship?				Not Applicable
Will the subproject restrict their economic and social activity and make them particularly vulnerable in the context of project?				Not Applicable
Will the subproject change their socioeconomic and cultural integrity?[1]				Not Applicable
Will the subproject disrupt their community life?				Not Applicable
Will the subproject positively affect their health, education, livelihood, or social security status?				Not Applicable
Will the subproject negatively affect their health, education, livelihood, or social security status?				Not Applicable
Will the subproject alter or undermine the recognition of their knowledge, preclude customary behaviors, or undermine customary institutions?				Not Applicable
In case there is no disruption of tribal community life as a whole, will there be loss of housing, loss of land, crops, trees, and other fixed assets owned or controlled by individual tribal households?				Not Applicable

[1] That is, undermine their production systems and the maintenance and transmission of their cultural patterns.

Initial Environmental Safeguard Report

25 MWp Sandland Solar Power Project

August 2012

Prepared by

Dr. Manoj Misra
Sr. MANAGER – Corporate EHS

Verified By

Kishor Bhardwaj
HEAD Corporate – EHS & S

Abbreviations

ADB	-	Asian Development Bank
CER	-	Certified Emission Reduction
EIA	-	Environment Impact Assessment
ESCA	-	Environment and Social Compliance Assessment
ESMMP	-	Environment and Social Mitigation and Monitoring Plan
GETCO	-	Gujarat Energy Transmission Corporation Limited
GPCB	-	Gujarat Pollution Control Board
GRC	-	Grievance Redressal Committee
GUVNL	-	Gujarat Urja Vikas Nigam Limited
IEE	-	Initial Environmental Examination
IFC	-	International Finance Corporation
NAAQS	-	National Ambient Air Quality Standards
Nallah	-	Drain or Stream
PPA	-	Power Purchase Agreement
PV	-	Photo Voltaic
SIPC	-	Salinity Ingress Prevention Circle
SREPL	-	Sandland Real Estate Private Limited

Standard Weights and Measures

ha (hectare) – 10,000 square meters
km (kilometer) – 1,000 meters
kV – kilovolt (1,000 Volts)
kW – kilowatt (1,000 Watts)
kWh – kilowatt-hour
MWp – Mega Watt Peak
MU – Million Units

Contents

Executive Summary

Background

Sandland Real Estate Private Limited (SREPL) was incorporated on February 25, 2010 to setup a 25 MWp solar photovoltaic power project at village Alwada and Khimat, District Banaskantha in the state of Gujarat (India). The project is implemented under the Solar Power Policy 2009 of Gujarat. Thin Film PV solar cells shall be used in the project to generate electricity. Sandland Real Estate Pvt. Ltd. ("the company") has already signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat, for sale of power generated from the project.

Objectives

The objectives of the proposed IEE study include:

- Identify the major issues that may arise as a result of proposed works on biophysical, socio-economic and cultural environment of the project area;
- Recommend site specific environmental impact mitigation measures, prepare and implement environmental monitoring plan for the project, and
- Addressing the requirements of ADB's Safeguard Policy Statement and IFC Environment, Health and Safety Guidelines.

Study Methodology

The findings and conclusions of the report are based on the analysis of the information collected during field visits in the project area and data collected through secondary sources such as Forest Atlas and published GOIs data from 2001 population census statistics data, as well as relevant project documentation received from regulatory authorities such as Gujarat Energy Transmission Corporation Limited (GETCO), Gujarat Pollution Control Board (GPCB), and other Government Departments.

Baseline Environmental Condition

The project site is not located in or near a sensitive ecosystem. Review of the secondary literature and site visits confirmed the absence of unique or ecologically significant flora and fauna. The nearest wildlife sanctuaries, Ambaji Balaram Wildlife Sanctuary and Jessore Sloth Bear Sanctuary are more than 40 km away from the project site. (*Source:http://www.gujaratforest.org/wildlife-balaram1.htm; http://www.gujarattourism.com/showpage.aspx?contentid=223&webpartid=1250*)

The water requirement for the project is minimal. The main consumption of water in the project is for cleaning of the solar modules with minimal requirement for domestic consumption. The total water requirement at the project site is estimated to be about 15,500 litres per day.

The total land required for the Project's solar power generation facility is 84.58 Hectares (ha). The land acquired for the project is totally private land and has been purchased on a voluntary

basis (willing seller-willing buyer basis) from the land owners. The land purchased for the project is classified as agriculture land but the fertility of the land has been degraded over a period of time due to problem of high salt concentration in the soil and low content of organic carbon and nitrogen. (*Source:http://agri.gujarat.gov.in/gujarati/boards_corporations/gs-agri-mark board/agri_profile/alluvial_soils.htm ; http://agri.gujarat.gov.in/informations/daps/banaskantha.pdf*). As per the land owners, the sale of land came as an opportunity to earn income from an otherwise unproductive land. The payment provided against the land purchased has helped these farmers to find alternative land in a more fertile area or start an alternate livelihood.

The solar power plant will be using the following associated facilities for the project: access roads, transmission lines and sub-station. The project will utilize the existing access roads used by the surrounding villages; no new roads will be built as part of this project. The power generated from the proposed solar power plant would be evacuated through a 66KV transmission line to Khimat Sub-Station of GETCO, situated at a distance of 2.5 km from the project site. The substation of GETCO at Khimat is existing for more than 10 years.

There were no permanent or temporary inhabitants dwelling on the site as confirmed by interviews with the local community/village residents during the site visit. Also, the land where the Project's solar power generation facility has been constructed is not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups. The project is therefore expected to be classified as category C for both involuntary resettlement and IPs.

Legal policies and institutional framework

This report has been prepared with reference to the ADB`s Safeguards Policy Statement (SPS) that specifies safeguards requirements on applicable environment and social legislation.

MoEF in its Office Memorandum No. J-11013/41/2006-IA.II (I) dated 13th May, 2011 stated that the Solar Photovoltaic Power Projects are not covered under the ambit of EIA Notification, 2006 and hence, no environmental clearance is required. Hence, the Solar Power PV Projects does not require preparation of Environmental Impact Assessment Report and pursuing Environmental Clearance from Central Government or State Level Environmental Impact Assessment Authority. However, the project has either complied with or has taken steps to ensure compliance with the other relevant national and local statutory regulations applicable on the proposed project

Benefits due to Proposed Project

The proposed Project brings in multifold advantages. Not only will it produce clean, pollution free energy, it will also generate employment opportunity to the people living in and around that area. Thus, generation of allied employment and income generation activities will improve the quality of life of the community.

CDM benefit

The project is expected to generate approximately 43162 CERs on an annual basis over the next 10 years (crediting period).

Potential Environmental and Social Impacts

The IEE report comprises of baseline data on existing conditions on physical and biological environment, and social environment together with the anticipated environmental impacts and proposed mitigation measures. Field surveys were undertaken to assess physical and biological environment and data collection from secondary sources has been done to support the findings of the field survey. The field studies were supported by review of secondary data.

All the issues such as acquisition of land, ecology, influx of people during construction phase, shelter and sanitation, the equipments and machineries, environmental health and safety, occupational hazard, social and environment management and monitoring plan have been dealt in detail in the respective sections of the Report. However these are briefly enumerated below to have a quick assessment of the situation.

Environmental Parameter	Level of Impact	Reason	Proposed Mitigation Measures
Air Impact	Low	Insignificant air emissions during the construction phase while no emissions are envisaged from the process/operation as it's a solar based power project	► Sprinkling of water ► Proper handling of excavated soil
Water	Low	► Plant will require a very low amount of water for cleaning of modules and domestic consumption. ► No hazardous effluent is envisaged to be discharged from the plant that may have an impact.	► In the case of wet cleaning of solar panels , the amount of water needed is insignificant ► SREPL water requirement will only be 15,500 litres per day and will be sourced from bore wells at site ► Domestic effluent shall be discharged in soak pits. ► Workers shall be encouraged to maintain cleanliness at the project site
Land	Medium	Impact of change in land use	► CSR activity will be undertaken by the Company based on community consultations ► Giving priority in jobs to the local people with first priority given to the project affected family
Noise	Low	► No sources of noise within the project area except the diesel generator (DG) sets which would be used only during the construction phase of the project and would be acoustically enclosed ► As no sensitive locations in the vicinity of the project site.	DG Sets with acoustic enclosures to be used at the project site during the construction stage to maintain the noise level within permissible limits.
Ecosystem	Low	► As no ecologically sensitive place lies within 10 km radius from the project site	Although there is no significant vegetation cover within the study area, plantation activities will be

			carried out.
Socio-economic	Low	► The project will not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the lands where the project's solar power generation facility are being constructed are not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups. ► The peak labour population is approximately 650-700 laborers for three months during the construction phase and may have an impact on the social fabric of the area surrounding the project. However, this impact is envisaged to be insignificant due to the following reasons: ► Temporary labour colonies, equipped with basic amenities, will be provided ► The impact is temporary in nature as it is restricted to the construction phase of the project. After construction phase, the areas acquired by labour colonies shall be reverted to the status at the preconstruction phase. Therefore, conflict of the migrating labour with locals will not take place.	A Resettlement Framework will be adopted by the Company to mitigate involuntary resettlement impacts (if any). Construction labour will be housed in temporary construction camps specially developed for this purpose with all basic amenities.

Conclusions

The IEE study of the proposed PV based Solar power project indicates that the benefits from the implementation of the proposed solar power project are significant and long term in nature. The study also establishes that the adverse impacts, if any, can be easily mitigated or avoided. The proposed Solar PV project falls under **'Category-B'** as per ADB's Environmental Categorization due to limited adverse environmental impacts and these are limited to site specific, largely reversible and can be readily addressed through mitigation measures.

The Environmental Compliance Audit Report attached as Appendix A determines the project's compliance with respect to the ADB Safeguard Policies and defined monitoring and mitigation plan.

CHAPTER 1: INTRODUCTION

1.1 Background

Sandland Real Estate Private Limited (SREPL) was incorporated on February 25, 2010 to setup a 25 MWp solar photovoltaic power project at village Alwada, District Banaskantha in the state of Gujarat (India). The project is implemented under the Solar Power Policy 2009 of Gujarat. Thin Film PV solar cells shall be used in the project to generate electricity. Sandland Real Estate Pvt. Ltd. ("the company") has already signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat, for sale of power generated from the project.

Table.1: Project details

Sl. No	Particulars	Descriptions
1	Project site	Sandland
2	Village Name	Alwada & Khimat
3	District Name	Banaskantha
4	Name of the state	Gujarat
5	Latitude	24°31'27.1"North
6	Longitude	72°12' 12.27" East
7	Road Accessibility	Road connectivity via Ahmedabad
8	Nearest Airport	Ahmedabad
9	Nearest City	Ahmedabad
10	Land available (Hectares)	84.58
11	Water requirement (LPD)	15,500
12	Annual Global Irradiance (kWh/m2)	2035
13	Type of PV module	Thin Film
14	Capacity (MW)	25 MWp
15	Total no of PV modules (Number)	243664
16	Inverter model	Sunny central 800KW 3 Phase PCU

17	Annual electricity supplied to grid (MWh)	45366. 600
18	Annual Plant Load factor (%)	20.72
19	Project Cost (Million INR)	3628.4

1.2 Need for the Project

Fast economic growth of the state of Gujarat has resulted in increase in electricity consumption by the industrial and commercial sectors. With the current available capacity, Gujarat is not in a position to meet its requirement either in terms of energy requirement or peak capacity requirement. Energy requirements of the Gujarat state has increased from 53693 MU in FY 2001-02 to 70412 MU in FY 2009-10 with an energy shortfall of 3149 MU in FY 2009-10.

The Electricity Act 2003 stipulates minimum percentage of energy to be derived out of renewable energy sources which shall be binding on all states. Also the Gujarat Electricity Regulatory Commission has made it mandatory for distribution licensees in the state to purchase a fixed percentage of their total power procurement through renewable energy sources, both solar and non solar.

1.3 Purpose/Objectives of IEE

The purpose of conducting IEE is to provide information about the general environmental settings of the project area, identify impacts of the project activities on bio-physical, socio-economic and cultural environment of the project, recommend site specific environmental mitigation measures, prepare and implement environmental monitoring plan for project area and to make sure that IEE addresses the requirements of the following:

- ADB's Safeguard Policy Statement, July 2009
- Relevant host country laws, regulations, applicable treaties and agreements
- IFC Environment, Health and Safety Guidelines for Electric Power Transmission and Distribution, April 2007
- IFC Environment, Health and Safety General Guidelines, April 2007

The assessment of the project has been carried out for both positive and negative impacts. It is expected that the adoption of green power generation technology will not have any significant adverse impact on the environment. The project, apart from generating clean power will also carry associated socio-economic benefits for the local community.

1.4 Methodology and approach of IEE

The following activities were undertaken for the purpose of conducting IEE:

- Data collection from secondary sources such as Forest Atlas and published GOIs data from 2001 population census statistics data, as well as from authorities such as Gujarat Energy Transmission Corporation Limited (GETCO), Gujarat Pollution Control Board (GPCB), and other Government Departments.

- Preparation of checklist for collecting project related information against applicable guidelines

- Review of national and local laws / regulations and procedures relating to land acquisition, resettlement and rehabilitation etc.

- Review of land allocation documents, permits and other relevant documents

- Field visits to collect data relevant to the study area

- Interviews on a sample basis with the following stakeholders:
  - Employees at the site
  - Land owners
  - Contract labour including their family members staying at the labour camps
  - Local community people around the site

CHAPTER 2: LEGAL POLICIES AND INSTITUTIONAL FRAMEWORK

Due to ever-increasing demand for energy, the Government of India is taking up concerted efforts to meet energy requirements by lowering the demand-supply gap and strategically developing energy security of the country. India has formulated strategies to explore the potential of all renewable energy resources like hydro, wind and solar along with biomass.

There are a number of drivers which are attracting investment for utilization of the solar energy to produce electricity. Some of these are highlighted below:

- Government of India has announced Jawaharlal Nehru National Solar Mission which envisages setting up of Solar Power Projects of 20,000MW capacity by 2022.
- State Regulatory Commissions have specified a percentage of the total purchases to be made from non-conventional energy sources (Renewable Purchase Obligation).
- The Government of Gujarat, in order to promote grid connected solar energy generation, has come out with Solar Power Policy-2009 which is operational up to 31.04.2014. The Government of Gujarat has allotted 716 MW of Solar Power projects to 34 national and international project developers against 500 MW.
- There are a number of benefits like reduced dependence on fossil fuels, flexible in terms of location and least impact on environment. Moreover, there is a huge unexplored potential in terms of solar radiance available in the state of Gujarat.

In view of the above, the 25 MWp Solar Power Project of SREPL being implemented in the state of Gujarat is in line with the Indian government's policies around promotion of solar energy projects to provide clean and sustainable energy for the nation.

2.1 Regulatory Framework

This section provides a brief summary of India's relevant national environmental legislation. Ministry of Environment and Forests (MoEF) is the nodal agency for drafting the new environmental legislations and giving the Environmental Clearance (EC) to the projects.

MoEF in its Office Memorandum No. J-11013/41/2006-IA.II (I) dated 13th May, 2011 stated that the Solar Photovoltaic Power Projects are not covered under the ambit of EIA Notification, 2006 and hence, no environmental clearance is required. Hence, the Solar Power PV Project does not require preparation of Environmental Impact Assessment Report and pursuing Environmental Clearance from Central Government or State Level Environmental Impact Assessment Authority.

For the Gujarat State, the State Level Environment Impact Assessment Authority (SEIAA) and the State Level Expert Appraisal Committee (SEAC) were constituted vide the MoEF, GOI, Notification No. S.O.948 (E) dated 12-06-2007 and the Gujarat State, Forests and Environment Dept. Resolution No. ENV/10.2006/176/P dated 25/07/2007. In addition, the Gujarat State Pollution Control Board's guidelines for project proponents apply to all state projects.

Apart from the above, other relevant national and local statutory regulations that are to be followed by proposed project are summarized below:

- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment Protection Act, 1986, Rules there under (with amendments)
- The Ozone Depleting Substances (Regulation and Control) Rules, 2000
- The Indian Forest Act, 1927 as amended
- Batteries (Management and Handling) Rules, 2001
- National Environmental Appellate Authority Act 1997
- The Wildlife (Protection) Act 1972
- Noise Pollution (Prevention & Control) Rules 2000
- Hazardous Wastes (Management, Handling and Tran-boundary movement) Rules, 2009
- Solar Power Policy-2009 of Gujarat
- Land Acquisition Act, 1894 and its subsequent amendment
- Minimum Wages Act, 1948
- Child Labour (Prohibition and Regulation) Act, 1986
- Contract Labour (Regulation and Abolition) Act, 1970
- National Rehabilitation and Resettlement Policy, 2007
- Factories Act, 1948
- Workers Compensation Act, 1923

2.2 ADB's Environmental and Social Assessment Framework

This report has been prepared with reference to ADB`s Safeguards Policy Statement (SPS) that specifies environmental and social safeguards requirements to the proposed project.

2.2.1 ADB's Safeguard Policy Statement (2009)

ADB's safeguard policies (SR) as per the Safeguard Policy Statement of 2009 are generally understood to be operational policies that seek to avoid, minimize or mitigate adverse environmental and social impacts. The policy framework consists of three operational policies on the environment, Indigenous people and involuntary settlement. All the three safeguard policies involve a structured process of impact assessment, planning and mitigation to address adverse environmental and social effects of projects throughout the project cycle.

SR1 on the environment requires that environment must be considered at all stages of the project cycle from project identification through implementation. This section provides a detailed description of the environmental assessment and review process for project loans in terms of activities that take place during the project cycle. The environmental assessment requirements depend on the environment category (either A, B, C or FI). A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse and often reversible through mitigation. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. A proposed project is classified as category FI if it involves investment of ADB funds through a financial intermediary.

As per the SPS (2009), the SREPL Solar project is likely to fall under the environmental category "B" project.

SR 2 on Involuntary Resettlement requires that all impacts (physical and economic displacement) brought about by land acquisition be mitigated properly following the principle of replacement value. The objectives are to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. SR 2 discusses the objectives, scope of application, and underscores the requirements for undertaking the social impact assessment and resettlement planning process, preparing social impact assessment reports and resettlement planning documents, exploring negotiated land acquisition, disclosing information and engaging in consultations, establishing a grievance mechanism, and resettlement monitoring and reporting.

In order for the Project to meet the requirements of SR 2, a Social Safeguard Compliance Audit report would be prepared covering the land acquisition process for the solar power plant site through the private land owners on a willing seller-willing buyer mode. If there would be any involuntary resettlement impacts, a resettlement plan will be prepared based on the following principles:

- Any disruption with regard to human habitation and areas of cultural significance (if any) to be avoided
- Compensation for temporarily affected assets (if any)to be based on replacement rates and shall be paid prior to initiation of the project
- Meaningful consultations with affected people in the issues of land acquisition, or loss of livelihood, if any, shall be conducted
- Employment opportunities to be provided to project affected people and local villagers during project construction activities
- Establish a grievance redressal mechanism to receive and facilitate resolution of the concerns of affected persons (if any)

SR 3 on Indigenous Peoples require that the Indigenous people are identified and if present, they should benefit from the development projects and the project should avoid or mitigate potentially adverse effects on indigenous people caused by the Project.

A survey would be conducted of the project site and the areas in the vicinity to identify if there are any project affected families from the declared scheduled tribes or other designated tribal communities. The Company will explore to the maximum extent possible alternative project designs to avoid negative impacts on relocation of ST (if any) that will result in adverse impacts on their identity, culture, and customary livelihoods.

2.2.2 ADB's Gender and Development Policy (1998)

ADB Policy on Gender and Development (GAD) requires projects to consider gender issues in all aspects of ADB operations, accompanied by efforts to encourage women's participation in

the decision-making process in development activities. In this project, the GAD policy will be taken into consideration during the planning of community development programmes in the nearby villages.

2.2.3 ADB's Social Protection Strategy (2001)

The Social Protection Strategy requires that projects comply with applicable labour laws, and take the following measures to comply with the core labour standards for the ADB financed portion of the Project:

a) Carry out activities consistent with the intent of ensuring legally permissible equal opportunity fair treatment and non discrimination in relation to recruitment and hiring, compensation, working conditions and terms of employment for its workers (including prohibiting any form of discrimination against women during hiring and providing equal work for equal pay for men and women engaged by the Borrower);
b) Not restrict its workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment;
c) Engage contractors and other providers of goods and services:
   i. who do not employ child labour or forced labour;
   ii. who have appropriate management systems that will allow them to operate in a manner which is consistent with the intent of (a) ensuring legally permissible equal opportunity and fair treatment and non discrimination for their workers, and (b) not restricting their workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment; and whose subcontracts contain provisions which are consistent with paragraphs (i) and (ii).

The Company shall develop HR policies and procedures applicable for employees including contract workers to ensure compliance with ADB's Social Protection Strategy and applicable labour laws.

2.2.4 The IFC Performance Standards

The IFC Performance Standards apply to private sector projects and provide project participants with instruments to structure, design, construct and manage the operations of projects in an environmentally and socially acceptable manner, while providing measures to avoid or mitigate adverse environmental and social impacts resulting from the projects. These Performance Standards are intended to focus on outcomes rather than process, thereby stressing the implementation of sound environmental and social management systems that achieve desired outcomes, including the mitigation of adverse impacts.

The following Performance Standards are applicable to the project:

- Social & Environmental Assessment and Management Systems
- Labour and Working Conditions
- Community Health and Safety
- Land Acquisition and Involuntary Resettlement

The proposed practices to be adopted at the project site to ensure compliance with the IFC standards have been discussed in the following chapters.

CHAPTER 3: PROJECT DESCRIPTION

3.1 Project Overview

The project involves setting up of a 25 MWp Solar PV Power Project, at villages Alwada and Khimat, District Banaskantha, in the state of Gujarat, India. The Company has already signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat. The power generated from the proposed solar power plant would be evacuated through a 66KV transmission line to Khimat Sub-Station of GETCO. The GETCO Substation is existing for more than 10 years.

3.2 Project location

The project is located at 24°31'27.1"North Latitude and 72°12' 12.27" East longitudes. The site is located in Alwada and Khimat villages in Banaskantha district of the state of Gujarat, India. The surface topography is almost flat. Hence, limited site preparation/leveling activity is needed to make the land flat as per the requirements of solar PV power plant. The entire area is shadow free as there are no shading elements like mountains, large sand dunes, etc. on the site. Figure 1 and 2 depicts the map of the region indicating the project location.

Figure 1: District map of Gujarat and Banaskantha district marking the project location (Source: Detailed Project Report and www.tcindia.com)

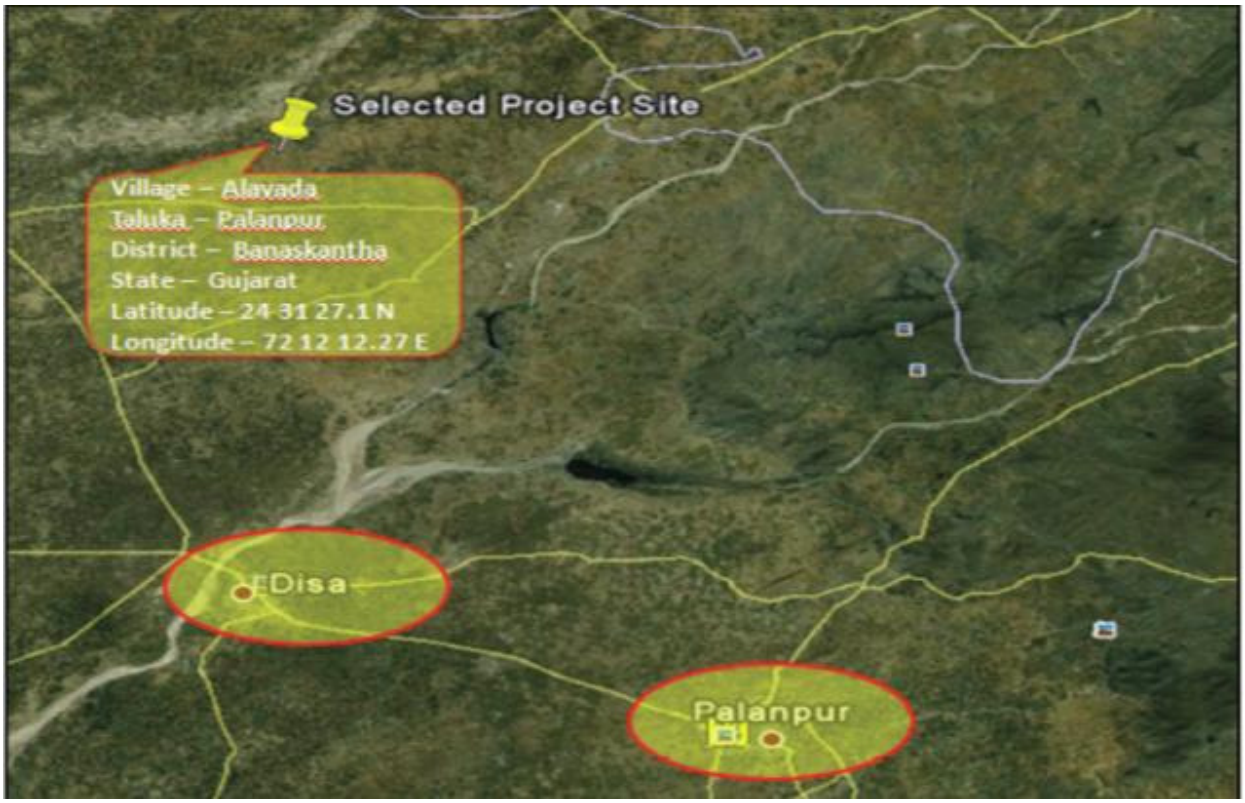

Figure 2: Satellite view of Village Alwada (Banaskantha), Gujarat (Source: Detailed Project Report)

3.3 Connectivity

The selected project location has well established connectivity and accessibility through road, rail, air and port.

Air : Palanpur has an airstrip, but the nearest commercial airport is at Ahmedabad situated about 135 km from the project location

Rail : Palanpur Junction railway station comes under the Western Railways and is connected to all major cities of India.

Road : Palanpur is well connected to National Highways 14 and 8. State highway SH 41 connects it with Ahmedabad

Port : The nearest port is Dholera port, however the district is connected to Kandla port via NH 15

3.4 Access Road

The project is located adjacent a currently existing main public road, so no new roads would be required as a part of this project. The company plans to construct a 6 m wide road inside the plant for heavy vehicle movement and around 3 m wide road along the boundary wall for the movement of light vehicle.

Figure 3: Photographs showing the location of the plant adjacent to the existing public road

3.5 Technical description

The selected location for the proposed project lies in 'Hot and Dry' climate zone of India. The instantaneous ambient temperature over the location reaches more than 45^{O}C in summer; however the intensity of solar radiation is also very high. From the land type, meteorological study and annual behavior of solar radiation over the location near village Alwada, Banaskantha, Gujarat, the Thin Film solar PV technology has been identified as the most feasible technology.

Solar PV Module: The rated capacity of proposed solar PV power plant will be 25 MWp. The 25MW power plant is a combination of three sections. The modules are First solar, Du Pont Appollo, and Moser Baer Solartype.
Inverter: 800 kW AC capacity inverter of world's leading inverter manufacturer (SMA) has been selected for the analysis. The Model Sunny Central 800CP inverter is found best suited for the proposed capacity. The cumulative capacity of the inverters is 25 MWp AC.

Solar PV Array: The 25MW power plant will be a combination of three sections. Two sections shall be of 5 MW capacities and one section shall be of 15MW capacity. 15MW section shall be a combination of three sub sections of 5MW each. Each 5MW PV system will be combination of 6 sub units of 800kWp PV systems**.**

3.6 Land requirement

The land requirement for the Project's Solar Power Plant depends upon the technology deployed, conversion efficiency and solar radiation incident in the Project location. 84.58 Hectares of land is available for the 25 MWp Solar PV Project. The area break-up is provided below:

Table 2: Project Area break-up details

Particulars	Area in hectare
Total plant area	84.58
PV module area	62.32
Balance of plant	0.81
Open area	21.45

Table 3: Land Ownership Status

Use of land	Private Land	Govt. Land	Forest Land	Total
Total Project Area	84.58	Nil	Nil	84.58
Acquisition Status	Total land required for the project has been acquired			84.58

The land acquired for the project site is totally private land and has been purchased on a voluntary basis (willing seller-willing buyer basis) from the land owners. A third party (land arranger) was appointed by the Company for helping in the purchase of land for the project.

3.7 Water requirement

The water requirement for the project is minimal. The main consumption of water in the project is for cleaning of the solar modules with minimal requirement for domestic usage. The total water requirement at the project site is about 15,500 litres per day.

Table.4: Water requirement

Particulars	Data values
Water Consumption Per MW (Crystalline Silicon) required for Cleaning for Module	600 Litres /day
Water Consumption for domestic usage construction phase	500 Litres / day
Total water usage for Sandland project (20MW)	15,500 Litres /day

During construction, water would be sourced locally from nearby villages. The water requirement during the operational phase would be sourced from bore wells at site.

SREPL will make efforts to conserve water through optimal utilization during the operation phase of the project.

3.8 Waste water treatment and disposal system

Water is required for the cleaning purpose of solar PV modules to remove accumulated dust. The water required for the cleaning purpose is minimal and whatever minimal water is discharged through the cleaning process is absorbed in the ground. Also, water discharged in the process does not include any hazardous chemical or material. For storm water drainage during rainy season, an internal drain has been constructed connecting to the natural storm water canal adjacent to the site. This natural canal meets river Sunon approximately 3 km from the site.

Another source of waste water is from basic sanitation facilities provided to the workers at the labour camp and site office. Soak-pits would be constructed at the project site for the collection of waste water generated from the labour camps and site office. During operation phase of the project, waste water generated from the domestic purposes would be discharged into the soak-pits.

3.9 Power transmission line

The power generated from the proposed solar power plant would be evacuated through a 66kV transmission line to Khimat Sub-Station of GETCO, situated about 2.5 km from the project site. As the project is planned under the Solar Power Policy (2009) of the state of Gujarat, and as per the terms of Power Purchase Agreement, it is the responsibility of GETCO to arrange, provide and maintain the power transmission evacuation facilities upto the 66 kV switchyard of the project. However, in the interest of meeting the commissioning schedule for the project, it was agreed between GETCO and the Company that the Company would manage the construction of transmission lines under the overall supervision and approval of GETCO. GETCO will reimburse the transmission line expenses to SPVs on the basis of GETCO SOR (schedule of rates) while the supply of towers, overhead conductors and other items issued as free issue items for such works.

To that effect, the Company has awarded transmission line contract to contractors who are nominated and approved by GETCO.

Under these contracts, the works have been executed by GETCO approved contractors and in line with GETCO's existing policies and frameworks. The transmission line was made operational on 20th March 2012.

Sr. No.	Aspect	Description
1	**Route Particulars**	
i)	Length (KM)	2.5 kms
ii)	Land acquired for towers and corridor ROW	Nil. Only permission for Right of Way has been obtained from the affected land owners.
iii)	Land acquired for access roads along transmission corridor	Nil
iv)	Width of RoW for transmission line	4 meter to 5 meter
v)	Terrain	Flat with gentle slope

	Hilly/Plain	Plain
	Agriculture/Waste Land	Agricultural Land (Private): 70% Govt. Land : 30%
	Wet/Marshy	Nil
	Estuarine	Nil
	Other type of land	Yes (Dry land)
2	**Environmental/Social Details**	
i)	Name of District / District details (through which transmission line pass)	Banaskhanta district, Gujarat
ii)	Town/Village falling in corridor route alignment (Nearby)	The line is routed in such a way to avoid villages and fixed nature of settlements
iii)	House/residences within transmission line RoW	None
iv)	Type of forest (if applicable): Reserve / Protected / Mangrove / Wild life area / any other environment sensitive area	The transmission line does not pass through any Reserve / Protected /Mangrove / Wild life area /any other environmentally sensitive area
v)	Type of Fauna and Flora noticed along corridor route; presence of any endangered species	No endangered species of fauna or flora are present
vi)	Historical or cultural monuments affected	None
vii)	Ground clearance of the transmission line	10 m after sag
3	**Interference with other utilities**	
i)	Railway	Nil
ii)	Other Transmission Line Corridors intercepting the project line route	Nil
iii)	River Crossing	Nil
iv)	Road Crossing	The transmission line crosses across the road near to Village Khimat, Banaskhanta District.

3.10 Project Implementation schedule

An implementation schedule, outlining the sequence of major activities and the time required for engineering, construction, installation and commissioning of the 25 MWp solar PV power plant is provided below. The solar plant was commissioned on 01 April 2012.

Table.5: Implementation schedule of project

Activity	July'11	Aug'11	Sep'11	Oct'11'	Nov '11	Dec'11	Jan'12	Feb12	March'12
Sandland									
Foundations									
Module Availability at site									
Structure Availability									
Structures and Module Erection									
Inverters Shipment									
Inverters at Site									
Inverters Erection									
TL availability									
Testing and commissioning									
Erection by Areva									
Date of Commissioning (1 April 2012).*									★

* However, 18 MW solar power plant was ready for commissioning but for transmission line on 27th January, 12

3.11 CDM benefit

In 1997, Kyoto Protocol ("Protocol") linked to United Nations' Framework Convention on Climate Change resolved to reduce the greenhouse gases (GHGs) responsible for global warming. As an effort to minimize the global warming, Protocol sets binding targets for thirty-seven industrialized countries, five per-cent below GHG emission levels prevailing in 1990, between 2008 and 2012. The Protocol established three market-based mechanisms allowing developed countries to meet the emission reduction targets.

Clean Development Mechanism (CDM) is one of the three project based mechanisms formulated under the Protocol. CDM establishes a win-win situation for both developed countries as well as developing countries.

As a part of the renewable energy source, solar power projects are eligible to generate (CERs) under the approved small scale methodology (AMS ID). Crediting period of the CERs for the projects could be a fixed 10 year crediting period or a variable crediting period of 7 years not extending beyond 3 such periods (21 years). Approach to calculate CERs required to be followed under AMS ID is mentioned below

Baseline Information:

As per the AMS ID, Baseline Emission factor / Emission Intensity of the NEWNE grid is calculated in line with Combined Margin (CM) approach providing weightages to Operating Margin (OM) and Build Margin (BM) emission factors. Central Electricity Authority (CEA), a statutory body incorporated under the Ministry of Power, Govt. of India, annually publishes "Baseline Carbon Dioxide Emission Database". As part of the Baseline Carbon Dioxide Emission Database, OM and BM for both NEWNE and Southern grids are disclosed publicly. For the most recent year, CEA in its publication "Baseline Carbon Dioxide Emission Database - Version 07" has released the required data. The process of calculation of CM emission factor for NEWNE grid is given below:

Table.6: Estimation of Baseline emission factor (tCO2/MWh)

Particulars	**Unit**	**2008-09**	**2009-10**	**2010-11**	**Weighted Average**	**Weight**	
Simple Operating Margin (incl. Imports)	tCO_2/MWh	1.01	0.98	0.97	0.98	0.75	0.74
Net generation	GWh	421,802.63	458,043.08	476,986.72			
Build Margin (not adjusted for imports)	tCO_2/MWh			0.86	0.86	0.25	0.21
Combined Margin (incl. Imports) (Wt. Avg of OM & BM)	tCO_2/MWh						0.95
Baseline Emissions Factor	tCO_2/MWh						**0.95**

Electricity Generation:

As mentioned in the document earlier, Project will operate at a load factor of 20.72% which in turn is expected to generate 45376.8 MWh (Net).

Baseline Emission (BE):

Project would generate approximately 45376.8 MWh of electricity and displace equivalent amount of electricity from the NEWNE grid which otherwise would have been generated by the fossil fuel based power plants. According to the methodology AMS ID., Baseline Emissions of the project is the CO2 emissions avoided by the project considering the grid is emission intensive. An annual baseline emission for the project is outlined below:

Table.7: Emission reduction calculation (tCO2/MWh))

	Unit	Value
Net electricity	MWh	45376.8
Combined margin	tCO_2/MWh	0.9523
Baseline emissions	tCO_2	43162

Emission reductions (ERs):

Eligible CERs is the difference between Baseline Emission, Project Emission and Leakage of the Project. Project Emissions and Leakages are attributed to the onsite emissions due to the construction and operation of the project. Since the project is a renewable energy project with no on-site combustion of fossil fuel, project emissions and leakage are considered nil. Therefore, the annual emission reduction eligible for the project are equivalent to annual baseline emission computed above.

The annual emission reductions for the entire crediting period of 10 years are expected to be 43162 per annum.

CHAPTER 4: Environmental and Social Baseline Status

The proposed site is located at villages Alwada and Khimat, District Banaskantha of Gujarat State in India. Banaskantha district is one of the 26 districts of Gujarat state in Western India. Palanpur city is the administrative centre of this district. The district covers an area of 10,751 sq km. The baseline conditions of the region are as follows:

4.1 Physical resources

4.1.1 Topography

Terrain is almost flat in the project area, and is located at an elevation of 189 m. There is no significant difference in the land leveling across the area.

4.1.2 Geology

The district has rich mineral reserves including limestone, marble, granite, building stone and china clay. It accounts for almost the entire marble reserves (99.3%) of the State of Gujarat. Banaskantha contributes 15% to the total production of limestone in Gujarat. (*Source: http://www.vibrantgujarat.com/images/pdf/banas-kantha-district-profile.pdf)*

4.1.3 Soil

The soil in Banaskantha District in general is neutral. Electricity conductivity is low. Organic carbon and nitrogen content is low while phosphorus and potash content of the soil is medium. So, overall, the soil fertility indices are not good from the point of view of agriculture. The type of soil ranges from alluvial sandy to sandy loam. The original alluvial material in the Banaskantha district has been overlain by the sandy material which has been brought by the winds blowing through the desert of Kutch. This sand which is impregnated with salts has imparted salinity to the areas where it has been deposited. The remnants of original parent material in small disintegrated pieces are often visible in these soils.
(*Source:http://agri.gujarat.gov.in/informations/daps/banaskantha.pdf ; http://agri.gujarat.gov.in/gujarati/boards_corporations/gsagrimarkboard/agri_profile/alluvial_soils.htm#asc)*

4.1.4 Land use

The proposed project site is primarily agricultural land. Few shrub thickets were also observed on the project site.

Figure 4: Photographs showing the Project Land

4.1.5 Earthquake zone

The solar power project site falls in Seismic Zone – 4 that is classified as High Damage Risk Zone. Therefore, applicable seismic coefficients have been applied during the detailed design and engineering phase of the project to withstand the impacts of earthquakes in the area, if any. The following figure depicts the earthquake hazard risk zonation of the project site.

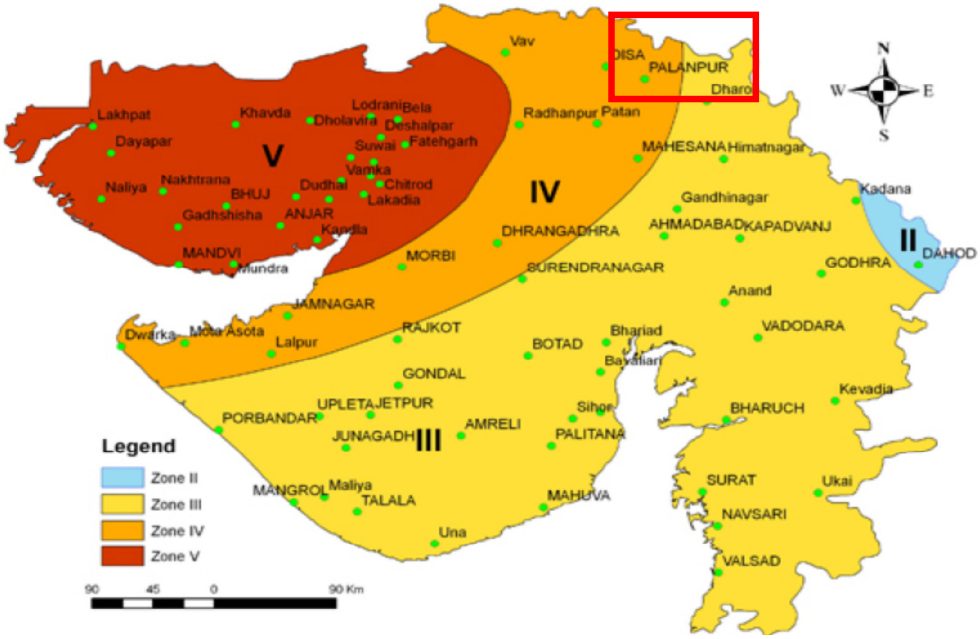

Figure 5: Seismic Zoning Map of Gujarat state depicting project area in Zone IV (Source: Institute of Seismological Research (ISR), Government of Gujarat)

4.1.6 Wind Zone

The proposed project alignment falls under range where wind power density is between 200-250W/sq.m

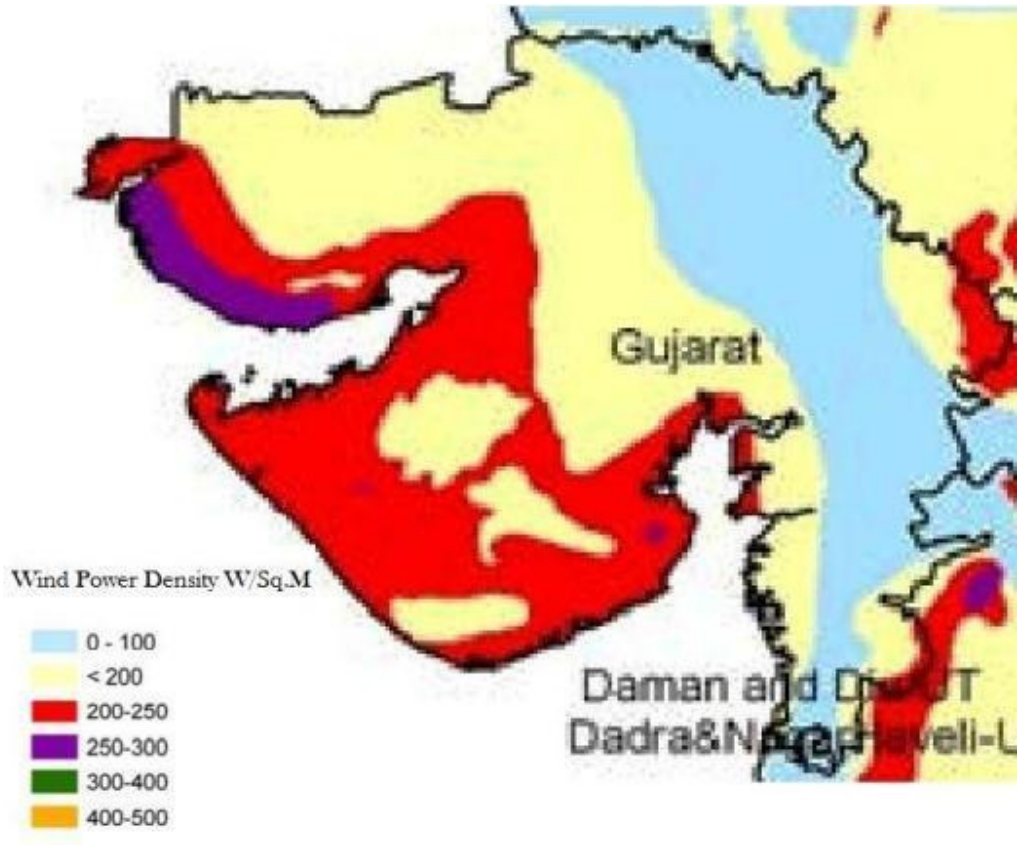

Figure 6: Wind Power Density Map of Gujarat State (Source: Centre for Wind Energy Technology, Chennai, February 2010 sourced from Indian Windpower 2010 Directory)

4.1.7 Climate

The district is hot and humid in summer, with an average temperature of 42℃ and hot sandy winds. The average temperatures in winter range between 5-15℃. Climate is dry with temperatures reaching 45℃ in summer (*Source: Detailed Project Report).*

4.1.8 Rainfall

The average rainfall is 20-30 inches per season.

4.1.9 Water resources

The main rivers traversing the district are Banas, Saraswati and Sepu.

Majority of people/farmers in the region are sourcing water from the bore wells dug at several locations.

4.1.10 Air Quality and Noise

The Ambient Air Quality measurements along the project road and in the vicinity shall remain within the limits of the revised National Ambient Air Quality Standards. Overall, the impact of generated noise on the environment during construction period is insignificant, reversible and localized in nature.

4.2 Ecological resources

The project site is not located in or near a sensitive ecosystem. Review of the secondary literature and site visits confirmed the absence of unique or ecologically significant flora and fauna. The nearest wildlife sanctuaries, Ambaji Balaram Wildlife Sanctuary and Jessore Sloth Bear Sanctuary are more than 40 km away from the project site.

Major agricultural crops

In Banaskantha district, the major source of livelihood for farmers includes rain-fed agriculture and animal husbandry. Many farmers carry out animal husbandry as supportive activity. Popular crops grown in this district include bajra, maize, tobacco, castor oil seeds, jowar, potatoes and pysillium. The district contributes 46.80% to the total potato production of the State. (*Source: http://www.vibrantgujarat.com/images/pdf/banas-kantha-district-profile.pdf).*

The soil is saline and low in organic carbon and nitrogen content.

4.3 Socio – economic status

The total land acquired by SREPL falls within the villages namely Alwada and Khimat in Banaskantha District, Gujarat State. The villagers belong to the Hindu community. The prominent castes include Kshatriyas, Vaishya, Krushak, and Brahmins.

All the landowners from whom land was purchased belonged to the Hindu community other than Scheduled tribes..

Village-Alwada

Alwada is mid-sized village located in the district of Banaskantha, Gujarat (India). Alwada is located at a distance of 31 km from its district Banaskantha and 157 km from its State Capital Gandhinagar. Based on the population, it is found that Alwada village has a healthy sex ratio. Majority of the village population consists of the Hindu community. The Hindu castes in the village include Nagar Brahman, Darbari etc. Majority of the households rely on agriculture as their main source of income in the village.

Population Details

Total Population	**3,528**
• Male Population	1,828
• Female Population	1,700

Village- Khimat

Khimat is a populated village in Dhanera Taluk, Banaskantha District, Gujarat State. Khimat is 16.8 km far from its Taluk Main Town Dhanera and around 25 km distance from its District Main City Banaskantha. It is located 148 km distance from its State Main City Gandhinagar. As per the records of Census 2001, the village has a population of about 6959 persons living in around 1183 households. Population wise, the village has a healthy sex ratio. Majority of the village population consists of the Hindu community. The Hindu castes in the village include Nagar Brahman, Darbari etc. Majority of the households rely on agriculture as their main source of income in the village.

Population Details

Total Population	**6,959**
• Male Population	3,684
• Female Population	3,275

Demographic details of the Banaskantha District as per Census 2001:

Total Population	2504,244
• Male Population	1,297,404
• Female Population	1,206,840
Total Workers	
• Main Workers	830,579
• Marginal Workers	261,622
• Non-Workers	1,412,043
Literate Population	1,037,619
• Literacy Rate	50.97
• Literate (Male)	699,080
• Literate (Female)	338,539
Number of SC (Largest Three)	
• Bhambi etc.	158,332
• Bhangi etc.	39,435
• Mahyavansi	33,884
Number of ST (Largest Three)	
• Bhil etc.	203,077
• Generic Tribes etc.	1,830
• Padhar	185

The Project construction and operation will not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the lands where the Project's solar power generation facility are being constructed are not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups. The project is therefore expected to be classified as category C for both involuntary resettlement and IPs.

CHAPTER 5: Potential Environmental and Social Impacts and Their Mitigation and Monitoring Plan

For developing the Environmental and Social Mitigation and Monitoring Plan (ESMMP) the key physical, biological and socio-economic environmental components have been identified. The impacts of various project activities on these environmental components during pre-construction, construction, operation and decommissioning phase of the project along with its mitigation action planned and monitoring frequency have been identified in this section.

5.1 Pre-Construction phase

No significant environmental impacts are envisaged during the Pre-construction phase of the project. The activities and their anticipated impacts during the pre-construction phase include the following:

5.1.1 Acquisition of land

The land acquired for the project site is totally private land and has been purchased on a voluntary basis (willing seller-willing buyer mode) from the land owners. The land acquired for the project is agricultural land but was not much productive for the land owners because of the salt concentration in the soil.

Potential impact	Mitigation action plans	Monitoring frequency	Responsibility
Loss of land, livelihood, assets, etc	▸ The Company shall conduct meaningful consultations with affected people in the issues of land acquisition, or loss of livelihood, if any ▸ Compensation for land and any existing assets shall be negotiated on the basis of current Gujarat government norms ▸ Avoid farming season wherever possible for the acquisition ▸ Giving priority in jobs to the local people with first priority given to the project affected family	Continuous throughout the land acquisition process	Land acquisition team and HR/Admin team

5.1.2 Temporary use of project land for storage of project equipments, materials, etc.

The mobilization of construction equipment and construction materials shall require space for storage and parking of construction vehicles and equipment. Space shall also be required for construction material storage yards, disposal sites, and labour camps to avoid environmental impact and public inconvenience.

Potential impact	Mitigation action plans	Monitoring frequency	Responsibility
Impact on soil and water	▸ The equipment and construction material shall be placed at least 500m away from water bodies (if any), natural flow paths and residential areas ▸ Equipment and materials shall be stored at designated areas with concrete flooring to avoid any spillages which may lead to soil or ground water contamination.	Continuous during pre-construction	EHS team

5.1.3 Site Clearing and Leveling

Before initiating the construction work, clearing of the vegetation cover (shrubs, bushes etc., if any) and leveling work shall be carried out. The site clearing work may lead to loss of vegetation cover and topsoil to some extent in the plant area. It is proposed to construct line drains for storm water collection to minimize the soil erosion. Apart from localized construction impacts at the plant site, no adverse impacts on soil in the surrounding area are anticipated. Also, as the proposed project land is flat, it is less susceptible to erosion.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Soil erosion	▸ Planning and designing the development within the natural constraints of the site; ▸ Minimizing the area of bare soil exposed at one time (phased grading); ▸ Avoiding the unnecessary clearing of the site, ▸ The topsoil in non-built up areas would be restored and such portions of the site would be replanted with appropriate plant species to stabilize soil	Continuous	EHS team/Civil Department
Air pollution	▸ Water sprinkling shall be practiced ▸ Construction machinery shall be properly maintained to minimize exhaust emissions of CO, SPM and Hydrocarbons.	Continuous	EHS team

5.1.5 Establishment of labour camp

Provision of civic amenities for construction labour and movement of truck drivers for transporting construction material shall be provided at the site. The labour camps at the project site will be temporary in nature and the human excreta will not be significant to cause contamination of ground water. Adequate drinking water facilities, sanitary facilities and drainage in the temporary sheds of the construction workers should be provided to avoid the surface water pollution. Provision of adequate washing and toilet facilities should be made obligatory. This should form an integral component in the planning stage before commencement of construction activity.

Potential impact	Mitigation action plans	Monitoring frequency	Responsibility
Health Risks	► Provision of separate mobile toilet facilities for men and women shall be made. ► The domestic effluent shall be properly disposed off in soak pits. ► Contractor shall provide garbage bins to all workers' accommodation for dumping wastes regularly in a hygienic manner in the area	Continuous	EHS team and the Contractor
Chances of spread of sexually transmittable diseases like AIDS	► Awareness programmes to be conducted regularly for workers on AIDS, and other health related issues. ► Health checkup facilities for employees and contract workers	During Construction	Medical representative at site
Water pollution	► Separate Mobile Toilet facilities shall be made available for male and female workers. The domestic effluent shall be properly disposed off in soak pits.	Continuous	Contractor
Land contamination	► Basic sanitary facilities shall be provided for the workers staying at the labour camp and at the project site. ► Dustbins shall be provided at the camp by the contractor	Continuous	Contractor

5.2 Construction phase

The activities and their anticipated impacts during the construction phase included the following:

5.2.1 Construction of internal roads, and development of other areas

Internal roads and boundary wall shall be constructed at the site. Foundations of the solar panels, LT houses and switchyard shall also be constructed at the site.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Impact on Air quality-- The impact on air quality will be for short duration and confined within the project boundary and is expected to be negligible outside the plant boundaries. The impact will, however, be reversible, marginal and temporary in nature.	► Activities like digging and filling are to be avoided in conditions of very high wind and covers to be provided for loose construction material at construction site ► Construction equipments are to be properly maintained to minimize exhaust emissions ► Water sprinkling shall be practiced	Continuous Six monthly Continuous	EHS team Contractor Contractor
Impact on Water quality	► The construction will be more related to mechanical fabrication, assembly and erection; hence the water requirements would be meagre. Soak pits will be made for disposal of sanitary sewage generated by the workforce. The overall impact on water during construction phase due to proposed project is likely to be short term and insignificant. ► Also, consumption of water should be monitored and attempt should be made to avoid spills / wastages and ensure optimal consumption	During planning layout and construction work	EHS and Civil team

5.2.2 Movement of vehicles

Vehicle movement shall prevail at the site to transfer the material and workers at site. Apart from this, third party vehicles delivering the material and equipments shall also be there.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Air pollution	▸ All the vehicles entering the site to be asked to have updated PUC (Pollution under control) certificate. ▸ Vehicle speed is to be restricted to 15km/hour at site ▸ Trucks/dumpers are to be covered by tarpaulin sheets during off site transportation of friable construction materials and spoil ▸ Maintenance of vehicles shall be carried out regularly ▸ Sprinkling of water shall be practiced at the site	Continuous	Contractor and EHS team
Soil contamination	▸ Proper maintenance of vehicle shall be carried out to avoid any leakage of oil or grease	Annually	Contractor and O&M team
Water contamination	▸ Proper maintenance of vehicle shall be carried out to avoid any leakage of oil or grease	Annually	Contractor and O&M team
Safety risks	▸ Vehicle speed is to be restricted to 15km/hour at site ▸ Necessary safety trainings shall be provided to the drivers of construction vehicles for speed restrictions and do's and don'ts to be followed during movement of construction vehicles	Continuous	Contractor & EHS team

5.2.3 Excavation and drilling

Excavation and drilling shall be carried out at site for the construction of foundation and base of solar panels, LT houses, security rooms, admin building, switchyard, etc.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Occupational health hazards	▸ Provision of adequate personal protective equipment like safety helmets, face masks, safety shoes, safety goggles etc. for the safety of	Continuous	EHS team / Contractor and Civil team

	workers ► Training shall be imparted to workers on occupational safety and technical aspects of job undertaken by them		
Air pollution	► Water sprinkling at regular intervals during excavation and drilling activities shall be practiced to avoid generation of dust.	Continuous	Contractor
Noise pollution	► Regular maintenance of plant equipment shall be carried out ► Noise prone activities are to be restricted to the extent possible during night time. ► Personal protective equipments shall be provided for workers performing drilling at site	Annually Continuous Continuous	EHS team and Contractor

5.2.4 Use of D.G sets

D.G sets shall be used at site to provide electricity to labour camps in the night time. Also, in case of non-availability of power from grid, D.G sets shall be used to provide electricity at the site for construction activity.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Air pollution	► D.G set to be optimally used with proper orientation and adequate stack height ► Stack monitoring carried out on regular basis. ► Proper maintenance of the DG Set carried out on regular basis	At time of installation Annually Annually	EHS team / Contractor
Noise pollution	► Acoustic enclosures are to be provided with the D.G sets to minimize the noise levels	Installation period	EHS team

5.2.5 Storage of diesel

Diesel shall be stored on-site so as to ensure availability for D.G sets.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Soil contamination	► A covered area shall be defined for storage of HSD with concrete flooring	Planning stage	Stores in-charge and EHS team

Safety risks	► The diesel storage area shall not be proximity of the labour camps ► Inflammable substance shall not be allowed at the project site.	Continuous	Security guard and EHS team

5.2.6 Handling of broken solar panels

During transportation, handling, installation and operation, there is a chance of damage to the solar PV panels. These damaged panels are required to be handled with care owing to presence of traces of metals like cadmium, selenium, etc. and presence of recoverable materials like glass, aluminum and semi-conductor materials.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Land contamination	► Broken or damaged solar panels shall be immediately shifted to a designated area in scrap yard to avoid any type of land contamination. A photograph is to be taken of the broken panel at the site to cater to Insurance settlement claims ► The storage area shall have a concrete base	Continuous	Site in-charge and EHS team
Health risks	► PPE shall be provided to the workers handling the broken solar panels ► The workers at site shall be apprised about the potential health risks associated with handling of solar panels	Continuous	Site in-charge, EHS and HR team

5.2.7 Handling of waste

Both hazardous and non-hazardous waste shall be generated during the construction activity. All the waste shall be properly managed in order to minimize the following potential impacts:

Potential impact	Mitigation action	Monitoring frequency	Responsibility
► Air Pollution ► Soil Contamination ► Water Contamination	► The excavated material generated will be reused for site filling and leveling operation to the maximum extent possible. ► The scrap metal waste generated	Continuous	EHS team and Scrap Committee

	from erection of structures and related construction activities will be collected and stored separately in a stack yard and sold to local recyclers. ► Food waste and recyclables viz. paper, plastic, glass etc will be properly segregated and stored in designated waste bins/containers. The recyclables will be periodically sold to local recyclers while food waste will be collected and composted at site ► Hazardous waste viz. waste oil etc will be collected and stored in paved and bunded area and subsequently sold to authorized recyclers. Necessary manifest for the same will be maintained.	Continuous Within 90 days	
Safety risks	► Adequate PPE's shall be identified and provided to the workers at site.	Continuous	EHS team

5.2.8 Installation and operation of Concrete mixing machines

Concrete mixing machines shall be installed on temporary basis at the project site.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Noise pollution	► Noise shielding to be used where practicable and fixed noise sources to be acoustically treated for example with silencers, acoustic louvers and enclosures. ► Provision of make shift noise barriers near high noise generating equipment to minimize horizontal propagation of noise	At the time of installation	Technical team

5.2.9 Construction labour management

There will be certain number of migrant labours which shall be staying at the site with/without their families and there would be influx of labour from vicinity of the project site. Appropriate facilities shall be arranged for the labour.

Potential impact	Mitigation action	Monitoring	Responsibility

		frequency	
Child labour and forced labour	▸ Provision of clause in contractor's agreement that bans child labour and forced labour at project site. ▸ Adequate procedures to avoid or prevent hiring/entry of child labour at the project site	Continuous	HR and EHS team
Health and safety risks	▸ Temporary creche facility may be provided in case of migrant laborers children residing in the camps to ensure safety	Continuous	HR and EHS team
Water wastage	▸ Emphasis shall be given on optimization of water usage and supply of potable drinking water for labour camps	Weekly	Contractor
Pressure on forest produce	▸ Fuel shall be made available to construction workers so as to reduce pressure on forest produce or local fuel wood resources	Weekly	Admin team / Contractor

5.3 Operation phase

Solar power projects are environment friendly and easy to operate as most of the procedures are automated and requirement of manpower is minimal. Therefore, no significant negative impacts are envisaged during the operation phase of the project.

5.3.1 Switchyard operation

A dedicated team shall be deployed at the site for the switchyard operation which shall be responsible to pass on the electricity to the sub-station. Since it is a high voltage area, safety precautions are required to be undertaken.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Safety risks	▸ Regular safety training shall be imparted to employee on electrical safety ▸ Rubber mats to be provided near all high voltage areas ▸ Cardiopulmonary resuscitation (CPR) charts to be displayed in the switchyard area	Continuous At the time of installation	Technical team
Soil contamination	▸ Regular maintenance and monitoring of the transformers shall be carried out to avoid leakage of transformer oil	Annually	Technical team

5.3. 2 Use of ground water resources

Minimal quantity of water would be required for the purpose of cleaning solar panels and for domestic use by the employees including contract works employed during the operational phase. The water requirement would be sourced from bore wells at site.

Potential Impact	Mitigation Action	Monitoring Frequency	Responsibility
Depletion of Ground water	▸ A water meter shall be installed at water intake works to monitor total water consumption ▸ Water reduction measures through periodic checking of pipeline leakages ▸ Spills / wastages to be avoided and ensure optimal consumption	Monthly Weekly	EHS Team EHS Team

5.4 Decommissioning phase

The project has an expected lifetime of 30 years after which the project shall be decommissioned. The site may further be used for similar power project which will not require much of remediation. However, if the site is used for some other purpose land restoration shall be an important exercise.

A decommissioning plan has been prepared for the project activity and the key impacts envisaged due to the decommissioning activities are highlighted below:

5.4.1 Removal and disposal of Solar panels

Solar panels shall be removed after the end of the lifetime and shall be disposed in accordance of a pre-defined procedure.

Potential impact	Mitigation action	Monitoring frequency	Responsibility

Safety risks	► Safety shoes, helmet and gloves shall be provided to the workers involved in removal of solar panels	Before initiation	EHS team and contractor
Soil contamination	► The removed solar panels shall be immediately shifted to designated storage area to avoid contact with soil ► In case of breakage or damage to solar panels, the panels shall be immediately shifted to a designated area in scrap yard to avoid any type of land contamination.	Continuous	EHS team

5.4.2 Restoration of area

If the project site is not intended to be used for similar type of project, the same shall be restored to its natural state.

Potential impact	Mitigation action	Monitoring frequency	Responsibility
Land degradation	► All the excavated construction material/debris from the foundations shall be disposed in a pre-determined landfill and shall not be disposed at the project site ► Re-vegetation shall be done as appropriate of the exposed area. ► All the waste generated till date shall be disposed in accordance of the applicable legislation	Continuous	Civil team and contractor EHS team EHS team

5.5 Budgetary estimates for implementing ESMMP:

An estimated budget of INR 0.2 to 0.3 million is planned for conducting assessments on an annual basis for Soil, Air, Noise & Water quality from third party agency (i.e. an approved NABL Laboratory) during the operational phase of the project

5.6 Organization Structure for Environmental management of project

SREPL has an EHS Department at Corporate and business unit level, headed by Senior Manager - EHS who is responsible for day-to-day implementation of the Project. The EHS department is responsible for coordinating and implementing all environmental and social activities at the project site. During project implementation, the EHS department will be responsible for reflecting the occurrence of new and significant impacts resulting from project

activities and integrating sound mitigation measures into the environment mitigation and monitoring plan.

The EHS head is responsible for implementing safeguard issues associated with the project through a qualified EHS team consisting of managers, engineers and supervisors.

- The duties of the EHS department at corporate level are to:
- Monitor the implementation of mitigation measures during pre-construction, construction, operation and de-commissioning phases of the project
- Prepare standard operating procedures (SOP) for different project sites.
- Advise and coordinate field unit's activity towards effective environment management practices
- Co-ordinate with the Ministry of Power, GPCB, and other concerned agencies to obtain relevant permission, clearances for the projects with respect to environment, health and safety.

The duties of the EHS department at site level are to:

- Implement the EHS manual guidelines and environmental good practices at site.
- Advise and coordinate the contractor(s) activity towards effective management of environment, health and safety aspects.
- Train all SREPL employees including contract workers at site to make them aware on various EHS practices and guidelines to be followed at site.
- Carrying out internal EHS audits at defined intervals, identify the existing EHS gaps at the site and report the findings of the audit to the EHS head.

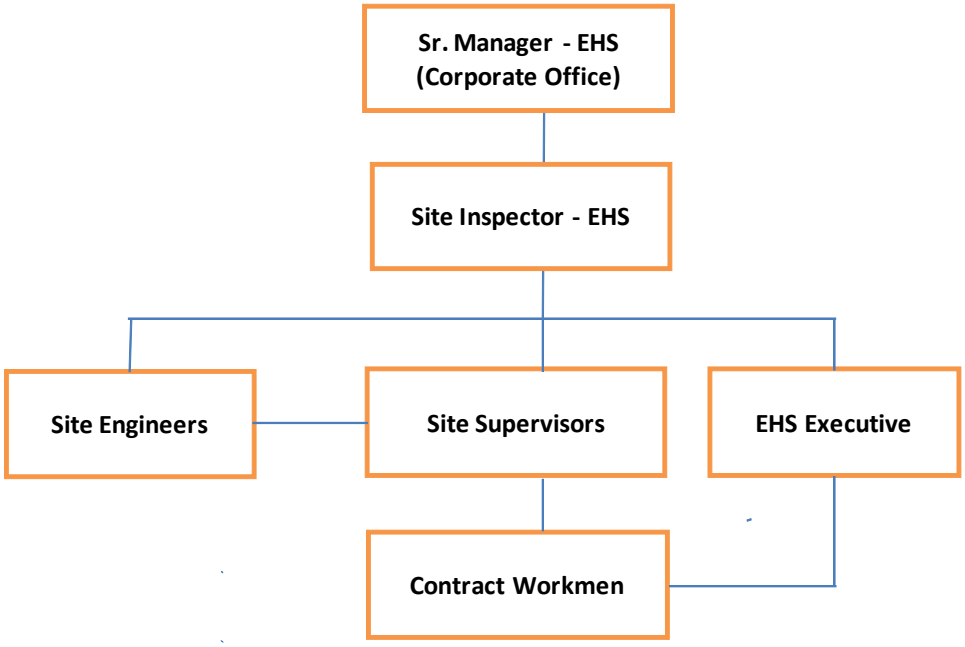

Figure 7: Organization Structure of Environment Management Unit for project

SREPL is fully committed to its environmental and social responsibility and discharges this responsibility in adherence to principles of good corporate governance guidelines. Its staff and contractors are fully committed to their environmental responsibility and discharge their responsibility within SREPL's EHS guidelines and operational framework.

CHAPTER 6: Environmental Impact specific to construction of the transmission line

As per the terms of PPA, it is the responsibility of GETCO to arrange, provide and maintain the power transmission evacuation facilities upto the 66 KV switchyard of the project. However, in the interest of meeting the commissioning schedule for the project, it was agreed between GETCO and the Company that the Company would manage the construction of transmission lines under the overall supervision and approval of GETCO. To that effect, the Company has awarded transmission line contract to contractors who are nominated and approved by GETCO. Under these contracts, the works have been executed by GETCO approved contractors and in line with GETCO's existing policies and frameworks. The transmission line was completed on 20th March 2012.

The transmission line for the project has been routed so as to avoid interference with threatened flora and fauna, environmentally sensitive areas as well as human settlements. Thus, the potential impacts from construction of transmission line are insignificant and temporary in nature. These impacts and the mitigation measures taken up at the site during the construction phase are as follows:

S. No.	Potential Impact	Mitigation action	Monitoring Frequency	Responsibility of Implementation	Responsibility of Supervision
1	Soil erosion, Air Pollution due to clearing of vegetation (shrubs, bushes)	Avoiding the unnecessary clearing of the vegetation	At time of land clearing	GETCO approved Contractor	SREPL
2	Air and Noise Pollution due to Transportation of equipment to site	► Minimize vehicular trips to the extent possible ► Proper maintenance of vehicles to minimize air and noise emissions	Continuous	GETCO approved Contractor	SREPL
3	Soil Movement, Air Emissions due to Excavation, digging of pits	Minimal quantity of waste would be generated during the construction period due to the	Continuous	GETCO approved Contractor	SREPL

		excavation of the tower foundations. The excavated soil would be backfilled after the construction work.			
4	Air Emissions, Noise Pollution due to Structural work/Mechanical Work	PPEs to be used by the workers	Continuous	GETCO approved Contractor	SREPL
5	Wastage of water resources due to use of water for construction activities	▸ Optimized utilization of water for construction purpose ▸ Emphasis shall be given on optimization of water usage and supply of potable drinking water for labour working at construction site	Continuous	GETCO approved Contractor	SREPL
6	Physical hazards related to working at height due to Erection of towers, line stringing	▸ Safety practices to prevent physical hazards to employees should be employed ▸ Training imparted to employees on regular basis ▸ PPEs to be provided to workers	Continuous	GETCO approved Contractor	SREPL
7	Issues related to construction labour management (Limited number of contractual workforce (maximum of 10-15) are employed	▸ Provision of clause in contractor's agreement that bans child labour and forced labour at project site.	Continuous	GETCO approved Contractor	SREPL

	during construction phase)	Adequate procedures to avoid or prevent hiring/entry of child labour at the project site			

CHAPTER 7: Analysis of Alternatives

In order to assess the optimum feasibility of the solar energy projects for power generation in the state, a comprehensive site assessment has been conducted by the Company for the project, keeping following points under consideration : Higher solar radiation intensity, Land availability, Connectivity and accessibility, Shading aspects, Water availability, Power evacuation facilities (nearest available substations of GETCO).

The state of Gujarat comprises high wasteland and high annual solar radiation. The Gujarat Energy Development Agency (GEDA), the State Nodal Agency of Ministry of New and Renewable Energy (MNRE), Government of India has developed state solar power policy to promote generation of green and clean power, and productive use of waste lands, thereby engendering a socio-economic transformation and creation of environmental consciousness among citizens. The policy provides for efficient use of conventional energy, proactively establish and promote sustained use of new and non- conventional energy sources and applications to reduce emissions and related impacts of climate change.

As per the technical assessment undertaken across the Solar PV technologies, the Thin film solar PV technology appears to be the most feasible option for the proposed location because of its high temperature tolerance, effectiveness of producing electricity in diffuse solar radiation conditions, low shading losses and most cost effective option and modularity, etc. Also, the land available for acquisition for the project was not suitable for agriculture due to high salinity and also involved no displacement of any person.

Although India's generation and distribution capacity has grown significantly over the last decade, the electricity consumption has also steadily increased and many parts of the country continue to suffer power shortages both in terms of unmet demand during peak periods and an overall energy shortage. Also, under the Electricity Act, 2003, the State Electricity Regulatory Commissions (SERCs) set targets for distribution companies to purchase certain percentage of their total power requirement from renewable energy sources. This target is termed as Renewable Purchase Obligation (RPO). This project is expected to help in achieving both the demand-supply gap in energy requirement and RPO requirement.

The alternatives for power generation in the case of a 'no project scenario' would significantly depend on the fossil fuel based energy (comprising almost 70% of the energy in the Indian grid). This would result in higher greenhouse gas as well as air emissions from the generation of same amount of power due to consumption of higher carbon intensive fossil fuels such as coal, diesel, etc.

In the case of an alternative renewable energy based project based on biomass or wind, the availability of surplus biomass for the first, and an optimal wind power potential for the latter is a basic requirement for finalizing the project location. Wind based energy projects would also require acquisition of suitable land area for installation and operation of windmills. In the case of biomass projects, it has been noted that the smooth functioning of the project becomes a challenge due to non availability of trained manpower during the operation and maintenance phase. Thus, there are no additional environmental and social benefits even when other

renewable energy projects are considered as alternatives. Rather, the project alternative offers a power source to meet India's increasing energy demands through clean energy, zero displacement or negative impacts on people and fauna / flora, with temporary environment and social impact during the construction phase alone. However, the robust environment and social mitigation and management plan that has been set out for the project is expected to address the temporary impacts as identified

CHAPTER 8: Grievance Redressal Mechanism

Environmental and social grievances are handled in accordance with the project grievance redressal mechanism defined under the HR policy for contractors. The Grievance Redressal Mechanism (GRM) for the project provides an effective approach for complaints and resolution of issues made by the affected community in a reliable way. This mechanism was established prior to construction and will remain active throughout the life cycle of the project. Open and transparent dialogue will be maintained with project affected persons as and when needed, in compliance with ADB safeguard policy requirements.

The major objectives of the Grievance Redressal Mechanism System are to:

- create a platform / process for prevailing proactive IR;
- make people accountable for timely redressal of grievances;
- establish a robust process for addressing contract worker grievances;
- create a healthy working atmosphere and drive active engagement at contract worker level;
- have a strategy, supporting long-term business requirements at site;
- prevent minor disagreements developing into more serious disputes later on;
- defend against legal intervention

A Grievance Redressal Committee (GRC) was formed at the project site to ensure affected person's grievances on both environmental and social concerns are adequately addressed and facilitate timely project implementation. The GRC comprises the following members:

- Project head;
- Liasoning officer – Site In charge/Admin;
- Land seller /local community representative

Plan for handling grievances

Visit to villages are made by company representative to capture project affected families grievances on continuous basis and record the same through public and individual meetings. Compliance status of previous points is shared with public on periodic basis.

Record keeping

For record keeping purposes, grievance redressal registers are maintained at the following locations on site:

- Register No. 1: Kept in Time Office.
- Register No. 2 onwards: Kept at various locations of the Plant as decided by the local HR Head.

The register contains information such as date, time, location and names of villager and the grievances, if any. The record also maintains about the information provided or discussed against the grievance.

Communication was made to all contractor staff regarding the 'Dos' and 'Don'ts' and they were apprised about the discipline amenable with the local customs and traditions during their association with the project.

The labour has also been communicated that they can register their grievances in grievance redressal registers. These grievances are studied, analysed and appropriate solution to the queries/grievances provided to the concerned worker within 3 working days. In-Charge Time Office generates a monthly MIS of all grievances registered along with their resolution / response provided and send the same to the respective unit HR Head.

Grievance Redressal Mechanism for Local Community

- The Project Head is responsible for capturing, identifying, maintaining enquiries associated with community grievance in a register, and communicating progress to the concerned community member.

- A Register contains information such as date, time, location and names of villager and grievance; if any. The record will summarize what information was provided to or discussed with the individual land seller.

- At the Sandland site, the only request from local community was for the renovation of village temple which was addressed by the Sandland SPV. There were no grievances related to land acquisition.

CHAPTER 9: Consultation and Participation

During project construction, the Company held meetings and public consultations with the residents of Alwada & Khimat village. The Company made a presentation on the proposed project, development prospects, project impacts and measures to mitigate possible negative impacts. The prospects of improving social and economic status of the region as a result of a successful project implementation as well as corporate social responsibility (CSR) activities of the Company were also discussed. The CSR activities proposed by the Company and to be taken up during the operational phase of the project include:

- Upgradation of village drainage system.
- Supply of teaching aids, books, and uniforms to schools.
- Maintenance of village street lighting
- Women Empowerment Programmes

A summary of stakeholder consultations conducted for seeking feedback and observations or comments from local communities around the project site is provided:

a. Informal consultations conducted in the month of July 2011
b. Formal consultation as per CDM conducted on 21 December 2011 which was attended by 65 people from nearby community

Photographs showing the CDM stakeholder consultations held in 21 December 2011

During the site visit, discussions were undertaken on an informal basis with a group of 7-8 community members from Alwada and Khimat villages who confirmed that they were made aware of the project by the Company. Some persons in the village had already been contracted as security guards for the project. They indicated their satisfaction with the project which will bring more jobs to the village and opportunities to set up small businesses for construction and operational workers.

Photographs showing the site visit consultations held in February 2012

CSR programme for community during operation phase

The Company has set out a budget of approximately INR 0.4 – 0.5 Million per annum to operationalize the CSR programme during the operation phase of the project. These programmes shall be structured, based on an identification of the community and shall be spearheaded by the Project Incharge at site.

CHAPTER 10: Conclusion and Recommendations

As already mentioned, the project activity will contribute to generation of 25 MWp of clean power into the state grid. This will not only boost the economic and industrial development of the area but will also contribute towards energy security.

This report assessed various existing environmental parameters in and around the project and the actions taken to minimize any significant negative impact. It is observed that the planned measures are already being implemented at the project site during the pre-construction and construction phase.

The project site is not located in a sensitive ecosystem, and is not significant from the historical and cultural perspective. It has been observed that most of the land purchased for the project is agricultural land but the land has lost its fertility over the period of time due to high water table and salt ingression. This nature of the project site coupled with the clean nature of solar power generation ensures that the Project will not cause any significant adverse environmental and social impacts during construction and operation. The same is evident from the observations delineated in the previous sections of the report.

The main project associated impacts are associated with clearing of shrub vegetation, waste management and management of labour camps at the site. Moreover, most of the associated impacts are limited to the extent of construction phase and are temporary in nature. Adequate mitigation actions are undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures shall also be carried out during the implementation phase of the project.

In fact, various initiatives proposed in the project's ESMMP such as the green belt development, community development programmes, etc. are likely to enhance the environmental and economic development in and around the project area. The company may take initiatives to further strengthen its process/procedures on waste management with special emphasis on handling of broken solar panels and handling and storage of oils/chemicals. Safety Toolbox talks may be conducted on a regular basis at the site to encourage safety amongst workers.

Based on the MoEF Guidelines of Government of India the proposed project does not require an environmental clearance. Considering the above, the project meets the classification criteria for category B, in accordance with ADB's Safeguard Policy Statement 2009.

Appendix A: Environmental Compliance Audit Report

The project got commissioned on 01 April 2012. Internal audits were carried out by the corporate EHS team to assess the compliance status against the defined environmental and social mitigation and monitoring action plan in the IEE. Based on the assessment, it was observed that most of the potential adverse environmental and social impacts were mitigated to an acceptable level by implementation of the mitigation measures identified in the ESMMP. Provisions are being made in the project to cover the environmental mitigation and monitoring requirements across each of the project phases. The observations and recommendations, if any, are delineated below:

1.1 Pre-Construction phase

All the defined mitigation actions were found to be implemented in the pre-construction stage of the project activity to an acceptable extent. A snapshot of the actions undertaken is given below:

Anticipated Impact	Mitigation actions undertaken
Loss of land, livelihood, assets, etc	► Formal and informal stakeholder consultations were carried out with the local community to provide an overview of the project activity and to understand their needs and concerns; ► Appropriate compensation was provided to the land owners in line with prevailing rates. ► The Company has engaged local people to the extent practically possible for services like tractors, cars for employee transport, etc The Company had offered employment opportunity to few of the family members of the project affected landowners ***Photograph of formal stakeholder consultation workshop*** 
Recommendations	None

Anticipated Impact	Mitigation actions undertaken

Land and water contamination	▸ A designated area has been defined for storage of project equipment and material and the floor of the storage area has been concretized. ▸ Procedure has been defined for storage and handling of material and the measures required to be undertaken in case of a spill ▸ Separate mobile toilets were established at the site for men and women; Soak pits have been constructed at the site to dispose off the waste water generated at the site.
Recommendations	None

Anticipated Impact	Mitigation actions undertaken
Soil erosion	▸ Grading has been done in phases to minimize the area of bare soil exposed at one time ▸ The unnecessary clearing of the site has been avoided. ▸ The topsoil in non-built up areas has been restored and such portions of the site has been replanted with appropriate plant species to stabilize soil ▸ An internal drain has been constructed for storm water collection to minimize soil erosion. ▸ External boundary wall has been constructed to protect the internal soil
Recommendations	None

Anticipated Impact	Mitigation actions undertaken
Air pollution	▸ Practice of water sprinkling was evident during the site visit
Recommendations	None

Anticipated Impact	Mitigation actions undertaken
Health risk	▸ First aid training has been provided to few of the workers at the site. The training certificates were available for verification at the site. Records of regular health and safety related awareness programs are also available at the site.
Recommendations	None

1.2 Construction phase

All the defined mitigation actions were found to be adequately implemented in the pre-construction stage of the project activity. A snapshot of the actions undertaken is given below:

Anticipated Impact	Mitigation actions undertaken
Air pollution	▸ The layout of the internal roads was made before hand and the

	construction of the roads started along with the leveling of land. All the dug soil was properly covered to avoid the contact with wind and water sprinkling was regularly practiced; ► The speed limit has been set to 15 km/hr within the project site and all the suppliers are encouraged to carry a PUC (Pollution under control) certificate. ► Trucks/dumpers used for transportation of materials are covered by tarpaulin sheets ► Practice of water sprinkling was evident during the site visit ► Stack height in line with the legislative requirement was maintained for the D.G sets used at the project site ► Ambient air quality monitoring was carried during the construction period. *Please see Appendix A (Attachment 1) for the Ambient Air Quality Monitoring Records.*
Recommendations	None

Anticipated Impact	Mitigation actions undertaken
Air Pollution, Soil and water contamination	► The excavated material generated at the site has been completely reused for site filling and leveling operation ► The scrap metal waste generated from erection of structures and related construction activities has been collected and stored separately in a stack yard and sold to local recyclers. ► Food waste and recyclables viz. paper, plastic, glass has properly segregated and stored in designated waste bins/containers. The food waste is being collected and composted at site ► Hazardous waste viz. waste oil etc has been collected and stored in paved and bunded area and subsequently sold to authorized vendors. Broken solar panels are stored separately in the storage; Diesel is also kept in the store ► A waste management plan is in place for handling and disposal of the broken solar cells and handling and storage of oils/chemicals
Recommendations	► Awareness amongst the workers at site about handling of broken solar panels may be enhanced ► On-site storage of diesel shall be minimized ► Regular maintenance of vehicle may be carried out to avoid any leakage of oil or grease

Anticipated Impact	Mitigation actions undertaken
Health & Safety risks	► Vehicle speed at site is restricted to15km/hour ► Use of PPE was evident during the site visit ► During interview most of the workers handling solar cells and hazardous waste were aware of the procedures to handle the same up to an acceptable level ► Workers are checked at the entrance for inflammable material, if

	any, and if found in possession are allowed to enter the premises only after confiscation of the same at the security gate and after being given a warning ▸ Training records of workers on occupational safety were available at the site
Recommendations	▸ PPE usage may be further strengthened by regular tool box talks or regular awareness sessions ▸ Procedures for handling broken solar cells and hazardous waste may be displayed at site.

Anticipated Impact	Mitigation actions undertaken
Noise pollution	▸ Regular maintenance of plant equipment is being carried out ▸ Noise prone activities are restricted to the extent possible during night time. ▸ Personal protective equipments are provided to workers performing drilling activities at site. Training records of workers on occupational safety were available at the site ▸ Acoustic enclosures provided with the D.G sets to minimize the noise levels ▸ Noise monitoring tests has been done during the construction phase of the project. The noise level as per the monitoring record is within the permissible limits. *Please see Appendix A (Attachment 2) for the noise monitoring records.*
Recommendations	▸ None

Anticipated Impact	Mitigation actions undertaken
Resource (fuel wood) depletion- Use of local fuel wood for domestic/cooking purposes	▸ Labour should be made aware on the optimum use of fuel-wood for cooking
Recommendations	▸ None

Transmission line related measures during the construction phase

The transmission line for the project has been routed so as to avoid interference with threatened flora and fauna, environmentally sensitive areas as well as human settlements. Thus, the potential impacts from construction of transmission line are insignificant and temporary in nature. All the mitigation actions planned during the construction of the transmission line were found to be adequately supervised by SREPL

The mitigation measures undertaken during the construction of the transmission line are highlighted below:

Appendix A: Environmental Compliance Audit Report

Anticipated Impact	Mitigation actions undertaken
Soil erosion, Air Pollution due to clearing of vegetation (shrubs, bushes)	▸ The unnecessary clearing of the vegetation has been avoided by the contractor. ▸ The minimal quantity of soil excavated during the clearing of vegetation has been backfilled immediately to prevent soil erosion
Recommendations	▸ None

Anticipated Impact	Mitigation actions undertaken
Air and Noise Pollution due to Transportation of equipment to site	▸ Proper maintenance of vehicles to minimize air and noise emissions has been carried out by the contractor. ▸ Noise prone activities are restricted to the extent possible during night time. ▸ Use of personal protective equipment like ear plugs, mufflers is enforced for the contractor's workmen by SREPL
Recommendations	▸ None

Anticipated Impact	Mitigation actions undertaken
Soil Movement, Air Emissions due to Excavation, digging of pits	▸ Small scale excavation has been carried out for pole foundation work. The excavated material was backfilled and compacted after the construction work to prevent soil erosion or air emissions.
Recommendations	▸ None

Anticipated Impact	Mitigation actions undertaken
Air Emissions, Noise Pollution due to Structural work/Mechanical Work	▸ Use of personal protective equipment like ear plugs, mufflers, dust masks, safety boots etc. is enforced for the contractor's workmen by SREPL ▸ Training has been imparted to contract workers by the contractor on a regular basis ▸ Workplace safety Instructions displayed at the site for awareness of the workers
Recommendations	▸ None

Anticipated Impact	Mitigation actions undertaken
Wastage of water resources due to use of water for construction activities	► Water requirements for the project has been monitored and attempts were made to avoid spills / wastages to ensure optimal utilization ► Awareness programme regarding conservation of water has been conducted for the workers ► Potable drinking water for labour working at construction site has been provided
Recommendations	► None

Anticipated Impact	Mitigation actions undertaken
Physical hazards related to working at height due to Erection of towers, line stringing	► Safety practices to prevent physical hazards to employees have been employed at site ► Appropriate type of PPEs has been provided to workers at site and adequate monitoring is done to ensure consistent use of PPEs by the workers ► Safety Induction Training is mandatory for workers at site. Workers have also been trained on emergency preparedness
Recommendations	► Safety Toolbox talks to be conducted on a regular basis at the site

Anticipated Impact	Mitigation action undertaken
Issues related to construction labour management [limited number of contractual workforce (maximum of 10-15) are employed during construction phase]	► Provision of clause in contractor's agreement that bans child labour and forced labour at project site. ► Adequate procedures in place such as verification of valid age documents such as school leaving certificate, voter's identity card etc. to avoid or prevent hiring/entry of child labour at the project site

1.3 Operation phase

Anticipated Impact	Mitigation actions undertaken
Water depletion	► Regular monitoring has been done to avoid spills / wastages to ensure optimal utilization of water
Recommendations	► Procedure may be adopted to recycle/reuse the collected water.

Appendix A: Environmental Compliance Audit Report

Anticipated Impact	Mitigation actions undertaken
Soil contamination	▸ Maintenance schedule of the transformers was available at the site
Recommendations	▸ Maintenance of transformer shall be carried out as per the schedule

Anticipated Impact	Mitigation actions undertaken
Safety risks	▸ Rubber mats are provided near all high voltage electrical equipments ▸ CPR charts are displayed in the switchyard area ▸ Appropriate signage board have been displayed at the switchyard to warn employees / visitors of possible dangers
Recommendations	▸ Training calendar shall be chalked out to impart knowledge to employees on electrical safety

Anticipated Impact	Mitigation actions undertaken
Weeding practices	▸ Removal of weeds (if any), growing beneath the solar modules and used as fodder for livestock of nearby villages
Recommendations	▸ Clearing of weeds growing within the project area to be carried out as and when required

1.4 Decommissioning phase

A decommissioning plan was available at the site. The same shall be cross checked with the activities undertaken at the time of decommissioning.

1.5 Applicable Environmental Laws, Regulations and Standards- Compliance Status

SREPL has taken all necessary steps to ensure compliance with the environmental statutory regulations applicable on the project.

1.6 ADB's Environmental and Social Assessment Framework

The project status assessed against the ADB Safeguard Policy is specified below:

ADB's Social Safeguard's	Objective	Status

Appendix A: Environmental Compliance Audit Report

Policy (2009)		
SR 1	**SR1** on the environment requires that environment must be considered at all stages of the project cycle from project identification through implementation.	As per the requirements of SPS (2009) and assessments based on IEE conducted at the site, the SREPL Solar project is likely to fall under the environmental category "B" project.
SR 2	**SR 2** on Involuntary Resettlement requires that all impacts (physical and economic displacement) brought about by land acquisition be mitigated properly following the principle of replacement value.	In order for the Project to meet the requirements of SR 2, a Social Safeguard Compliance Audit has been undertaken to assess the social impacts of the project in and around the project location. No major impacts could be envisaged during the social compliance audit process. Also, there were no permanent inhabitants dwelling on the site as confirmed by interviews with the local community during the site visit. For details, please refer Social Safeguard Compliance Audit Report.
SR 3	**SR 3** on Indigenous Peoples require that the Indigenous people are identified and if present, they should benefit from the development projects and the project should avoid or mitigate potentially adverse effects on indigenous people caused by the Project.	As per the survey of the project site and the areas in the vicinity, there were no identified project affected families from the declared scheduled tribes or other designated tribal communities. The Project area also does not fall within the "Scheduled Area" of the state (which is determined by the Fifth Schedule of the Constitution on the basis of preponderance of tribal population; compactness and reasonable size of the area; underdeveloped nature of the area; and marked disparity in economic standard of the people). For details, please refer Social Safeguard Compliance Audit Report.

ADB's Social Protection Strategy (2001)	The Social Protection Strategy requires that projects comply with applicable labour laws, and take measures to comply with the core labour standards for the ADB financed portion of the Project.	All the applicable labour laws requirements have been met during different phases of the project. The Company has HR Policies and procedures in place to ensure compliance with the applicable labour laws. Also, regular monitoring is done at the site to check the compliance status of the applicable labour laws and ADB requirements.

Photos: Sandland Site

Photographs above showing the project area

Appendix A: Environmental Compliance Audit Report

Photograph showing the use of PPEs by the workers at site

Photograph showing the safety day celebration at site

Photographs of Safety Committee Meeting held at the site

Appendix A: Environmental Compliance Audit Report

Photographs showing the installation of fire extinguishers, sand buckets at the project office building at site and the display of no smoking instruction and installation of suggestion box for workers

Photograph showing the display of restricted area/danger signage for the workers near the electrical area (Also displayed in local language)

Appendix A: Environmental Compliance Audit Report

Attachment 1: Ambient Air Quality Monitoring Record (Conducted by government recognized laboratory)

Pollutant	Near LT room no.6 [on 24 hrs basis]	Near LT room no.2 [on 24 hrs basis]	Near switch yard [on 24 hrs basis]	Standards defined under legislation	
				Annual basis	24 hour basis
Sulphur Dioxide (SO_2)	35	37	30	<60	<100
Particulate Matter <PM_{10} (ug/m^3)	78	70	76	<40	<60
Particulate Matter <$PM_{2.5}$ (ug/m^3)	42	48	43	<40	<80
Nitrogen dioxide	48	45	34	<40	<80
Ozone	29	24	22	<100	<180
Lead as Pb	B.D.L	B.D.L	B.D.L	< 0.5	< 1
Carbon Monoxide	< 1	< 1	< 1		
Ammonia as NH_3	37	30	35		
Benzene	B.D.L	B.D.L	B.D.L		
Benzeno	B.D.L	B.D.L	B.D.L		
Arsenic	B.D.L	B.D.L	B.D.L		
Nickel	B.D.L	B.D.L	B.D.L		

Appendix A: Environmental Compliance Audit Report

Attachment 2: Ambient Noise Monitoring Record (Conducted by government recognized lab)

Monitoring station	Day	Night	Standard
Near LT room no.12	50.25	41.24	75 (Day) / 70 (Night)
Near LT room no.05	55.89	43.65	75 (Day) / 70 (Night)
Near switch yard	58.96	44.01	75 (Day) / 70 (Night)
Near LT room no.17	52.32	43.29	75 (Day) / 70 (Night)
Near LT room no.09	58.96	44.01	75 (Day) / 70 (Night)
Near LT room no.11	52.32	43.29	75 (Day) / 70 (Night)
Near main gate	58.96	44.01	75 (Day) / 70 (Night)
Near LT room no.07	52.32	43.29	75 (Day) / 70 (Night)

Social Safeguards Report

25 MWp Sandland Solar Power Project

August 2012

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Verified By

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HEAD Corporate – EHS & S

Contents

1. Introduction

1.1 Project Description

Sandland Real Estate Pvt Ltd was incorporated on February 25, 2010 to setup a solar PV power project with capacity of 25 MWp at village Alwada and Khimat, District Banaskantha in the state of Gujarat (India). The project is implemented under the Solar Power Policy 2009 of Gujarat. Thin Film PV solar cells shall be used in the project to generate electricity. Sandland Real Estate Pvt Ltd ("the company") has already signed a PPA for 25 years with Gujarat Urja Vikas Nigam Limited (GUVNL) with permission from Government of Gujarat, for sale of power generated from the project.

Table.1: Project details

Sl. No	Particulars	Descriptions
1	Project site	Sandland
2	Village Name	Alwada and Khimat
3	District Name	Banaskantha
4	Name of the state	Gujarat
5	Latitude	24°31'27.1"North
6	Longitude	72°12' 12.27" East
7	Road Accessibility	Road connectivity via Ahmedabad
8	Nearest Airport	Ahmedabad
9	Nearest City	Ahmedabad
10	Land available (Hectares)	79.72
11	Water requirement (LPD)	15,500
12	Annual Global Irradiance (kWh/m^2)	2035
13	Type of PV module	Thin Film
14	Proposed Capacity (MW)	25 MWp
15	Total no of PV modules (Number)	243664
16	Inverter model	Sunny central 800KW Phase 3 CPU
17	Annual electricity supplied to grid (MWh)	45366. 600
18	Annual Plant Load factor (%)	20.72
19	Project Cost (Million INR)	3628.4

A social safeguards review was conducted for the Project on 24 February 2012 to check the project's compliance to the ADB 2009 Safeguards Policy Statement (SPS) – Safeguards Requirements (SR) on 2 Involuntary Resettlement and (SR) 3 on Indigenous Peoples. The review comprised of site visit to the plant area, including the labour camps, canteen facility, the access road leading to the site; informal discussions with few of the landowners and local community members; meetings with the management at Corporate Office in Delhi; and review of available project documentation. The site photos are attached as Attachment1.

1.2 Need for the Project

Fast economic growth of the state of Gujarat has resulted in increase in electricity consumption by the industrial and commercial sectors. With the current available capacity, Gujarat is not in a position to meet its requirement either in energy requirement terms or peak capacity requirement terms. Energy requirements of the Gujarat state has increased from 53693 MU in FY 2001-02 to 70412 MU in FY 2009-10 with an energy shortfall of 3149 MU in FY 2009-10.

The Electricity Act 2003 stipulates minimum percentage of energy to be derived out of renewable energy sources which shall be binding on all states. Also the Gujarat Electricity Regulatory Commission has made it mandatory for distribution licenses in the state to purchase a fixed percentage of their total power procurement through renewable energy sources, both solar and non solar.

1.3 Project Location

The project is located at 24°31'27.1"North altitude and 72°12' 12.27" East longitudes. The site is located in Alwada and Khimat in Banaskantha district of the state of Gujarat, India. The surface topography is almost flat. Hence, limited site preparation/ leveling activity is needed to make the land flat as per the requirements of solar PV power plant. The entire area is shadow free as there are no shading elements like mountains, large sand dunes, etc. on the site. Figure 1 and 2 depicts the map of the region indicating the project location.

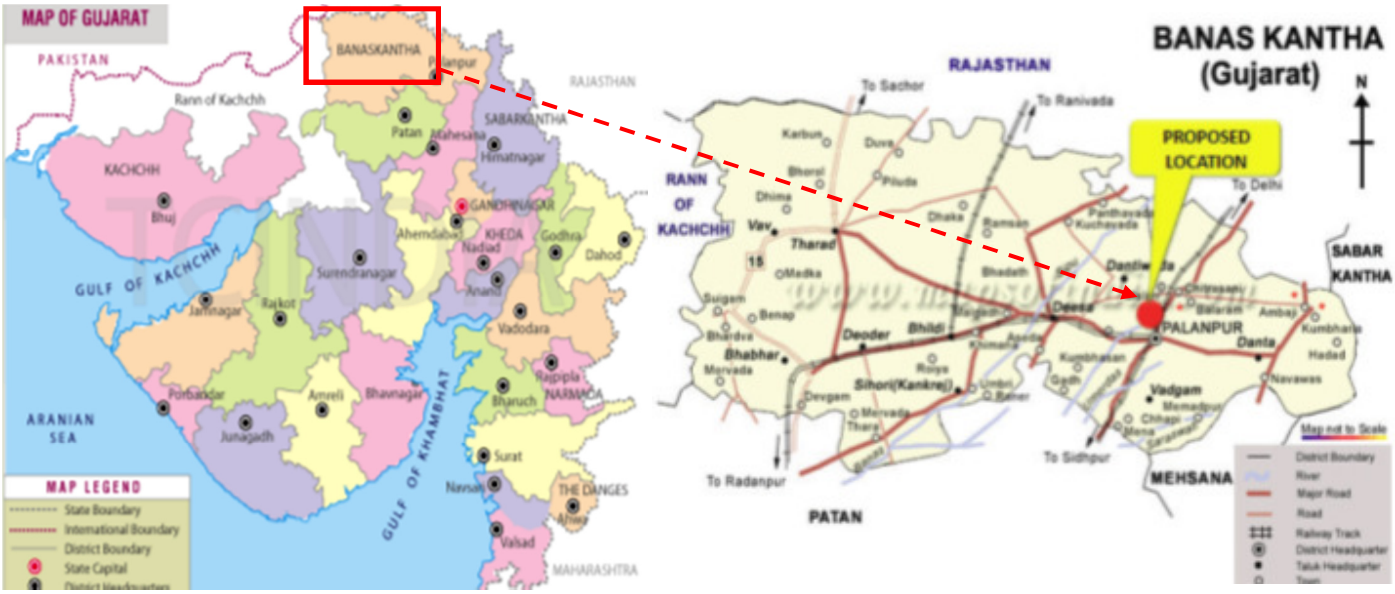

Figure 1: District map of Gujarat and Banaskantha district marking the project location (Source: Detailed Project Report and www.tcindia.com)

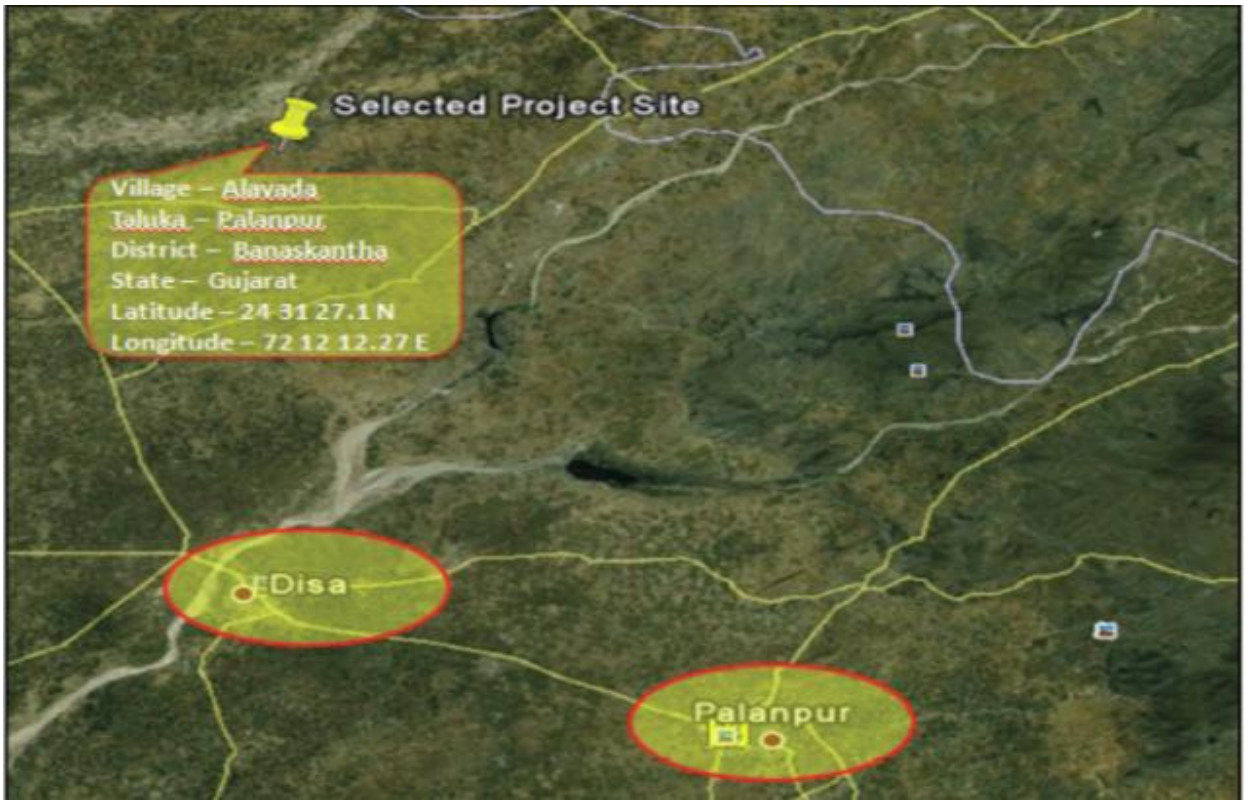

Figure 2: Satellite view of Village Alwada (Banaskantha) , Gujarat (Source: Detailed Project Report)

1.4 Project Implementation Schedule:

An implementation schedule, outlining the sequence of major activities and the time required for engineering, construction, installation and commissioning of the 25MWp solar PV power plant is provided below. The project was commissioned on 01 April 2012.

Table.2: Implementation schedule

Activity	July'11	Aug'11	Sep'11	Oct'11'	Nov '11	Dec'11	Jan'12	Feb12	March'12
Sandland									
Foundations									
Module Availability at site									
Structure Availability									
Structures and Module Erection									
Inverters Shipment									
Inverters at Site									
Inverters Erection									
TL availability									
Testing and commissioning									
Erection by Areva									
Date of Commissioning (1 April 2012)*									

* However, 18 MW solar power plant was ready for commissioning but for transmission line on 27 January, 12

1.5 Objectives and Scope of the Report

This report is prepared to assess the compliance of the 25 MWp solar power project at Sandland with the 2009 ADB Safeguards Policy Statement, Social Analysis in Private Sector Projects, 2009, ADB's Gender and Development Policy, 1998, Social Protection Requirements as per ADB's Social Protection Strategy 2001 and IFC Performance Standards.

The social compliance audit that was conducted on 25 February 2012 at the project site at Sandland, District Banaskantha, Gujarat had the following objectives:

- Identify past or present concerns related to impacts on involuntary resettlement(physical or economic displacement) and ethnic minorities/Indigenous Peoples;
- Determine whetherproject actions were in accordance with ADB's SR2 and SR3 principles and requirements; and
- Prepare a corrective action plan (CAP) containing necessary remedial actions (if any)

1.6 Methodology

The following activities were undertaken for the purpose of conducting this audit:

- Data collection from secondary sources such as Forest Atlas and published GOIs data from 2001 population census statistics data, as well as from authorities such as Gujarat Department of Social Justice and Empowerment, and other Departments.
- Preparation of checklist for collecting project related information against ADB guidelines
- Review of national and local laws / regulations and procedures relating to land acquisition, employment of labour etc.
- Review of land allocation documents, permits and other relevant available documents
- Site visit to the plant area, labour camps, canteen facility etc.
- Interviews on a sample basis with the following:
    - Employees at the site
    - Contract labour including their family members staying at the labour camps
    - Local community people around the site
    - Land owners

2. Audit Findings – Involuntary Resettlement

2.1 Land requirements for the Project

The total land required for the Project's solar power generation facility is 84.58Hectares (ha). The land has been acquired from two villages namely Alwada and Khimat from 52 major landowners. Out of the total land area, the PV module array has been established in 62.32 ha, while 0.81ha was required for the balance structures such as the control room and switchyard. The remaining 21.45ha is an open area including road coverage.

Table.3: Land details

Village	Type of Landuse Prior acquisition	Area in (Hectares)
Alwada	Agriculture	52.06
Khimat	Agriculture	32.52
Total		84.58

2.2 Land acquisition process and compensation

The land acquired for the project site is totally private land and has been purchased on a voluntary basis (willing seller-willing buyer basis) from the land owners. A third party (land arranger) was appointed by the Company for helping in the purchase of land for the project. The land was purchased from fifty two (52) major land owners in Awada and Khimat. The compensation rate offered and paid to the land owners on an average was INR 197 per square metre of land which was more than the existing Government circle rates of INR 65 to 75 per square metre of land depending upon the time of purchase. The payment of compensation and land registration process was completed during the period from May 2011- January 2012.

Discussions with land owners on a sample basis during site visit indicated that the land sold for the project was not much productive for them because of the higher salt concentration in the soil. As per the land owners, the sale of land came as an opportunity to earn income from an otherwise unproductive land. The payment provided against the land purchased has helped these farmers to find alternative land in a more fertile area or start an alternate livelihood. Mostly cash crops such as cotton are cultivated in the region.

2.3 Land or Right of Way (ROW) Requirements for Associated Facilities

The solar power plant will be using the following associated facilities: access roads, transmission lines and sub-station. The project will utilize the existing public roads; no new roads will be built as part of this project. As per the power purchase agreement (PPA) signed with GUVNL, the power evacuation is at 66kV connecting to GETCO State Transmission Utility (STU) system. The power generated from the solar power plant is evacuated through a 66kV transmission line (approximately 2.5 km in length) to Khimat Sub-Station of GETCO. As the project is planned under the Solar Power Policy (2009) of the state of Gujarat, and as per the terms of Power Purchase Agreement, it is the responsibility of GETCO to arrange, provide and

maintain the power transmission evacuation facilities upto the 66 kV switchyard of the project. However, in the interest of meeting the commissioning schedule for the project, it was agreed between GETCO and the Company that the Company would manage the construction of transmission lines under the overall supervision and approval of GETCO. GETCO will reimburse the transmission line expenses to SPVs on the basis of GETCO SOR (schedule of rates) while the supply of towers, overhead conductors and other items issued as free issue items for such works.

The Construction of the 66kV 2.5km Transmission Line from Project site to Sub-Station of GETCO at Khimat to be reimbursed by GETCO which required the setting up of 13 towers. Each tower footing required 75sq.m. of land. For setting up of transmission towers, 17 landowners have been compensated. A total compensation of around INR 1.7 million has been paid or approximately INR 0.13mn per tower footing. The period of payments to landowners and tower erection was in December 2011 to February-March 2012. No further land acquisition or involuntary resettlement issues are expected from the use of the substations which have been in existence for more than 10 years. The transmission line was completed on 20th March 2012.

The Company has awarded transmission line contract to contractors who are nominated and approved by GETCO. Under these contracts the works have been executed under the supervision of GETCO engineers and in line with GETCO existing policies and frameworks.

Table 4 Information on Associated Facilities

Associated Facilities	Responsible Agency	Existing or New	Type of Land
Access Road	Existing Village Road (State Govt.)	Existing	Agriculture
Transmission Line	Owner : GETCO	New till substation. Date of Completion : 20th March 2012	Private Agriculture and Govt. Land
Substation	Owner : GETCO	Existing	

2.4 Extent of Involuntary Resettlement Impacts

There were no permanent or temporary inhabitants dwelling on the site as confirmed by interviews with the local community/village residents during the site visit. The project site is located far from the coast line and no *banders* or fishing communities were affected. The project also does not require land acquisition of *gauchar* or grazing land or any state-owned wastelands. Given the characteristics of the site as described above, the construction and operation of the power generation site is not expected to have involuntary resettlement impacts.

The project has complied with the national laws and regulations on land acquisition and has incorporated ADB's SPS (2009) as follows:

- Meaningful consultations with affected people in the issues of land acquisition, or loss of livelihood, if any, have been conducted

- Employment opportunities have been provided to few of the project affected people and local villagers during project construction activities

- Established a grievance redressal mechanism to receive and facilitate resolution of the concerns of affected persons. Please refer section 5(i) for details on community grievance redressal mechanism.

2.5 Applicable Regulations governing transfer of land to the Project

The land transfer to the project has been done as per section 55 of the Saurashtra Gharkhed Tenancy Settlement and Agriculture Land Ordinance 1949 (as amended in 1997[1]) applicable in Gujarat. Section 55 outlines the provisions for the Sale of land for *bonafide* industrial purpose. The following table shows how the acquisition has complied with the provisions of this ordinance:

Provisions	Status of Compliance
(1) Nothing in section 54 shall prohibit the sale or the agreement for the sale of land for which no permission is required under sub-section (1) of section 65B of the Bombay Land Revenue Code, 1879 in favour of any person for use of such land by such person for a *bonafide*industrial purpose:	
Provided that – (a) The land is not situated within the urban agglomeration as defined in clause (n) of section 2 of the Urban Land (Ceiling and Regulation) Act, 1976.	Not Applicable (NA)
(b) Where the area of the land proposed to be sold exceeds ten hectares, the person to whom the land is proposed to be sold in pursuance of this sub-section shall obtain previous permission of the Industries Commissioner, Gujarat state or such other officer, as the State Government may, by an order in writing, authorize in this behalf,	Permission has been obtained from the Industries Commissioner for the project
(c) The area of the land proposed to be sold shall not exceed four times the area on which construction for a *bonafide* industrial purpose is proposed to be made by the purchaser: Provide that any additional land which may be required for pollution control measures or required under any relevant law for the time being in force and certified as such by the relevant authority under that law shall not be taken into account for the purpose of computing four times the area,	
(d) Where the land proposed to be sold is owned by a person belonging to the Scheduled Tribe, the sale shall be subject to the provisions of section 73AA of the Bombay Land Revenue Code, 1879.	No land has been purchased from person belonging to the Scheduled Tribe. . All the landowners from whom land was purchased were from the Hindu community other than Scheduled Tribe
(2) (a) Where the land is sold to a person in pursuance of sub section (1) (here in after referred to as “the purchaser”), he shall within thirty days from the date of the purchase of the land for a *bonafide*industrial purpose, send a notice of such purchase in such form along with such other particulars as may be prescribed, to the Collector and endorse a copy there of to the Mamlatdar.	The Notice of Collector and endorsement of registered sale deeds are being complied with the completion of land acquisition for the project.

[1] See amendment available from http://www.revenuedepartment.gujarat.gov.in/revenuefinal/gujarati/pdf/gr03_guj_act_no-06_1997.pdf

Provisions	Status of Compliance
(b) Where the purchaser fails to send the notice and other particulars to the Collector under clause (a) within the period specified therein, he shall be liable to pay, in addition to the non-agricultural assessment leviable under this Ordinance, such fine not exceeding two thousand rupees as the collector may, subject to rules made under this Ordinance, direct.	
(c) Where, on receipt of the notice of the date of purchase for the use of land for a *bonafide*industrial purpose and other particulars sent by the purchaser under clause (a), the Collector, after making such inquiry as he deems fit –	
(i) is satisfied that the purchaser of such land has validity purchased the land for a *bonafide*industrial purpose in conformity with the provisions of sub-section (1), he shall issue a certificate to that effect to the purchaser in such form and within such time as may be prescribed,	Certificate will be issued once the process under Section 2A is complete
(ii) is not so satisfied, he shall, after giving the purchaser an opportunity of being heard, refuse to issue such certificate and on such refusal, the sale of the land to the purchaser shall be deemed to be in contravention of Section 54.	

3. Audit Findings: Indigenous Peoples

3.1 Project Context

The total land acquired by SREPL falls within the villages namely Alwada and Khimat in Banaskantha District, Gujarat State. The villagers belong to the Hindu community. The prominent castes include Kshatriyas, Vaishya, Krushak, and Brahmins.

All the landowners from whom land was purchased belonged to the Hindu community.

Village-Alwada

Alwada is mid-sized village located in the district of Banaskantha, Gujarat (India). Alwada is located at a distance of 31 km from its district Banaskantha and 157 km from its State Capital Gandhinagar. Based on the population, it is found that Alwada village has a healthy sex ratio. Majority of the households rely on agriculture as their main source of income in the village.

Based on our discussions with the local community members on a sample basis, it was observed that no person belonging to scheduled tribe was currently residing in the village.

Population Details

Total Population	3,528
• Male Population	1,828
• Female Population	1,700

Village-Khimat

Khimat is a populated village in Dhanera Taluk, BanasKantha District, Gujarat State. Khimat is 16.8 km far from its Taluk Main Town Dhanera and around 25 km distance from its District Main City BanasKantha. It is located 148 km distance from its State Main City Gandhinagar. As per the records of Census 2001, the village has a population of about 6959 persons living in around 1183 households. Population wise, the village has a healthy sex ratio. Majority of the village population consists of the Hindu community. The Hindu castes in the village include Nagar Brahman, Darbari etc. Majority of the households rely on agriculture as their main source of income in the village.

Based on our discussions with the local community members on a sample basis, it was observed that no person belonging to scheduled tribe was currently residing in the village.

Population Details

Total Population	**6,959**
• Male Population	3,684
• Female Population	3,275

Demographic details of the Banaskantha District as per Census 2001:

Total Population	2504,244
• Male Population	1,297,404
• Female Population	1,206,840
Total Workers	
• Main Workers	830,579
• Marginal Workers	261,622
• Non-Workers	1,412,043
Literate Population	1,037,619
• Literacy Rate	50.97
• Literate (Male)	699,080
• Literate (Female)	338,539
Number of SC (Largest Three)	
• Bhambi etc.	158,332
• Bhangi etc.	39,435
• Mahyavansi	33,884
Number of ST (Largest Three)	
• Bhil etc.	203,077
• Generic Tribes etc.	1,830
• Padhar	185

The project construction and operation will not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the lands where the project's solar power generation facility are being constructed are not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups. The project is therefore expected to be classified as category C for both involuntary resettlement and IPs.

4. Consultation and Participation

During project construction, the Company held meetings and public consultations with the residents of Alwada and Khimat villages. The Company made a presentation on the proposed project, development prospects, project impacts and measures to mitigate possible negative impacts. The prospects of improving social and economic status of the region as a result of a successful project implementation as well as corporate social responsibility(CSR) activities of the Company were also discussed. The CSR activities proposed by the Company and to be taken up during the operational phase of the project include:

- Upgradation of village drainage system.
- Supply of teaching aids, books, and uniforms to schools.
- Maintenance of village street lighting
- Women Empowerment Programmes

Photos of the consultation conducted are shown below:

Figure: Stakeholder consultation held on 21 December 2011.

During the site visit, discussions were undertaken on an informal basis with a group of 7-8 community members from Alwada and Khimat villages who confirmed that they were made aware of the project by the Company. They indicated their satisfaction with the project which will bring more jobs to the village and opportunities to set up small businesses for construction and operational workers.

5. Audit Findings: Other Social Considerations

Other social considerations addressed in this review are related to employee engagement, gender relations, provision of facilities for labour force and safety.

a) Employee Engagement

SREPL has an existing human resources policy and manual covering employee benefits, equal opportunity, non discrimination, grievance mechanism and others that needs to be followed at all site locations. These include procedures for hiring and recruiting, probation, training, performance review, promotion, insurance, salary and compensation, resignation, lay-off and retrenchment, leave and vacation, and superannuation, which follow Indian labour laws. The policieshave been displayed at the SREPLsite in local language for the awareness of the workers. Most of the construction labourers at site are employed on contractual basis.Worker committees have also been formed at the site location on health and safety, harassment and abuse and grievance handling for consultation with the workers.

The preference of the Company is to hire local labour during project construction provided they meet the required selection criteria. It also has a standard clause in the contractor's agreements, binding the contractor to comply with the local labour laws and covers ILO standard.

b) Labour Influence

Construction phase

During construction activities, there has been a sizeable influx of population and labour colony is being constructed with basic amenities for the labour working on the project. The peak labour population is approximately 650-700 labourers for three monthsand may have an impact of the social fabric of the area surrounding the project. However, this impact is envisaged to be insignificant due to the following reasons:

- Temporary labour colonies, equipped with basic amenities, have been situated in the areas already acquired for the project.
- The impact is temporary in nature as it is restricted to the construction phase of the project. After construction phase, the areas acquired by labour colonies shall be reverted to the status at the preconstruction phase.

Therefore, conflict of the migrating labour with locals, will not take place during the construction phase.

Operation Phase

No impact on the local life pattern is envisaged due to operational phase of the project.

c) Gender and Development

- No women participated in the stakeholder consultations undertaken with the villagers near the project site.
- However, no adverse impact could be envisaged on women in the nearby villages due to the solar power project. The Company has a standard clause in the contractor's agreements, binding the contractor to comply with the local labour laws. The clause includes the following:
  - Local labour to be hired as much as possible;
  - Ensure labour related regulations are met;
  - In case of outside labour, ensure that their working conditions as well as camps meet local regulations and best practice;
  - Health and safety training of the labour, raising awareness about STDs, HIV and maintaining behavior standards while moving in the community should be a priority
  - Community should be consulted at regular intervals. Any complaints or concerns with respect to labour should be addressed without delay

The project manager ensured compliance jointly with team and contractors during the construction phase of the project.

- The Company has proposed to initiate women empowerment programmes in the nearby villages during the operational phase of the project. However no such initiative has been under taken till now.

- On an average, 5 % of female workers were employed during the construction phase of the project.

- Seven contractual workers are currently employed during the operation phase. Female workers are not employed during the operational phase of the project, as the activity of cleaning the solar panels is carried out during night time only and for security reasons, male workers are employed. Further, as the project site is located at remote location, female workers are not employed for safety reasons. However, during day time, few female workers are employed for housekeeping in the project office and cutting grass in the fields. Currently, 2 female workers are employed for such activities.

- The maximum number of female workers employed during the construction phase of the project was around 40. All the female workers were hired on contract basis.

- Separate accommodation facility has been provided to female workers staying with their families at the labour camp.

- Migrant workers who brought their families during the construction phase of the project were provided separate accommodation facility in the labour camp. In order to ensure health and safety of such workers and their families, the company has a standard clause in the contractor's agreements, binding the contractor to comply with the local labour laws.

d) Working Conditions

- Adequate steps have been taken to prevent accidents and injury to health arising out of, associated with, or occurring in the course of work, by minimizing, so far as is reasonably practicable, the causes of hazards inherent in the working environment
- Regular health and safety trainings are provided to workers at site
- Fire mock drills are being conducted to ensure that all workers in the unit are familiar with the site's overall evacuation procedures
- Separate mobile toilet facilities for men and women, and drinking water facility have been provided to workers at site locations

e) Prohibition of child labour

- No instance of child labour or young worker was observed at the time of the site visit
- The company has strict policy in place not to employ anyone below the age of 18 years.These policies and procedures conform to the provisions of the relevant ILO standards.The HR policy for contract workers also restricts the employment of child labour by contractors

f) Payment of wages

- Minimum wages are paid to the workers at site as per the applicable minimum wages in Banaskantha, Gujarat
- All eligible workers have been covered under ESI (Employees State Insurance) & EPF (Employees Provident Fund) schemes
- The workers are paid equal wages for similar kind of work regardless of gender.

g) Freedom of association

- Workers in the Company are free to join or form trade unions of their own choice and bargain collectively as per the Trade Unions Act, 1926. However, the workers were not associated with any trade union during the construction phase of the project. The Company has developed a parallel means for independent and free association and bargaining for the workers by the formation of worker committees including adequate representation from management and workers. Worker committees have been formed to help workers raise concerns they may have with regard to plant working conditions and also increase their involvement in improving the work environment of the plant.

- Three committees comprising representation from management and workers were formed include
  1) Health & Safety Committee
  2) Anti -Sexual Harassment Committee
  3) Grievance Handling Committee

h) Working Hours

- Workers are not required to work in excess of 48 hours per week at the site location and are provided with at least one day off for every 7 days period on average. This is in compliance with the national laws on working hours. The laws include:

- Contract Labour (Regulation and Abolition) Act, 1970

- The Building & Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996

i) Grievance Management System

Environmental and social grievances were handled in accordance with the project grievance redressal mechanism defined under the HR policy for contractors. The Grievance Redressal Mechanism (GRM) for the project provides an effective approach for complaints and resolution of issues made by the affected community in a reliable way. This mechanism was established prior to construction and will remain active throughout the life cycle of the project. Open and transparent dialogue will be maintained with project affected persons as and when needed, in compliance with ADB safeguard policy requirements.

The major objectives of the Grievance Redressal Mechanism System are to:

- create a platform / process for prevailing proactive Industrial Relations;
- make people accountable for timely redressal of grievances;
- establish a robust process for addressing contract worker grievances;
- create a healthy working atmosphere and drive active engagement at contract worker level;
- have a strategy, supporting long-term business requirements at site;
- prevent minor disagreements developing into more serious disputes later on;
- defend against legal intervention

A Grievance Redressal Committee (GRC) was formed at the project site to ensure affected people's grievances on both environmental and social concerns are adequately addressed and facilitate timely project implementation. The GRC is comprised the following members:

- Project head;
- Liasoning officer – Site In charge/Admin;
- Land seller/Local Community Member

The Company has a robust grievance management system that drives proactive industrial relation (IR) environment, enabling fair opportunity to contract workers to appeal against a grievance through a systematic process.

The process includes the following:

Step 1: Maintenance of Grievance Registers:

Grievance Redressal registers are kept at following locations:

- Register No. 1: Kept in Time Office.
- Register No. 2 onwards: Kept at various locations of the Plant as decided by the local HR Head.

Step 2: Communication of Grievance Redressal Mechanism

- All contract workers informed / communicated to register their Grievances in Grievance Redressal Registers, at the convenient locations.

- These Grievances registered/recorded in the registers studied, analyzed and appropriate solution to query/grievances responded to concerned contract workers by Time Office In-Charge, at least twice a week. The Company shall endeavor to provide resolution to the aggrieved contract worker within 3 days of the grievance registered.

  Grievance Redressal Mechanism for Local Community

- The Project Head is responsible for capturing, identifying, maintaining enquiries associated with community grievance in a register, and communicating progress to the concerned community member.

- A Register containing information such as date, time, location and names of villager and grievance; if any. The record will summarize what information was provided to or discussed with the individual land seller or local community member.

  At the Sandland site, the only request from local community was for the renovation of village temple which was addressed by the Sandland SPV. There were no grievances related to land acquisition.

j) Labour Camps

The labour working on site is provided with temporary labour camps, which are close to the site. The labour camp facility is availed by the migrant workers and workers not residing in the nearby villages. Few of the workers are also staying with their family members including children at the camp. Separate shelters have been provided to such families. The labour camps have been provided with basic amenities like drinking water and electricity facility for the workers.

6. Conclusions and Recommendations

6.1 Conclusions

Based on the review of available documentation and information gathered during the site visit, there are no outstanding compensation issues with respect to the acquisition of land for the Project's solar power generation facility. The Project construction and operation will not in any way affect the dignity, human rights, livelihood systems and culture of the residents of the village. Moreover, the land where the Project's solar power generation facility has been constructed is not owned, used, occupied, or claimed as ancestral domain or asset of any tribal groups.

The information gathered from the available documents and discussions with relevant SREPL staff and affirmation from the SREPL management regarding their continued harmonious relationship with the communities in the Project area are considered sufficient to support the social compliance audit findings relevant to social safeguards. With respect to ADB's SPS, the Project's categorization on involuntary resettlement and indigenous peoples should be categorized as 'C' respectively, and no corrective action plan will be required.

Other social dimensions, such as recruitment of SREPL employees, local labour engagement through contracts and need based CSR initiatives based on community consultation by SREPL, are found to be satisfactory. The company has existing policies and procedures (e.g., human resource policy, contractual arrangements with contractors) to address potential concerns and issues. During implementation of the Project, the Company is expected to apply the same policies and procedures as those the company maintains, and it will be required to monitor and report to ADB on contractor's engagement of local employees and labours following the relevant clauses on contractor's agreement and the Company's human resources policy.

6.2 Recommendations

The need based CSR initiatives based on community consultations may be initiated during the operation phase. Regular Compliance check on the provision of PPE's to the labourers is important safety concern.

Appendix 1. Photos of the site

Photograph showing solar panels at site

Photograph showing switchyard

Photograph showing control room at site