Environment and Social Due Diligence Report

June 2016

IND: Accelerating Infrastructure Investment Facility in India
–Mihit Solar Power Private Limited

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: 74 MW Solar PV Project at Villages Mankhera, Kherakhurd & Jhandakalan, District - Mansa, State - Punjab, India

India Infrastructure Finance Company Limited

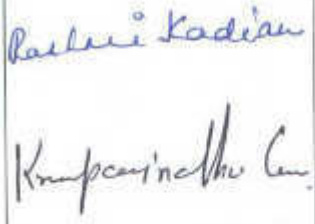
May 2016

ESDDR NO.IIFCL/ESMU/ADB/2016/82 V3

SUB PROJECT: Construction, operation and maintenance of 74 MW Solar (Photovoltaic) Power project at Villages Mankhera, Khera Khurd & Jhandakalan, District - Mansa, State - Punjab, India.

Mihit Solar Power Private Limited

Environmental and Social Safeguards Due Diligence Report (ESDDR)

Prepared by:	**Dr. Rashmi Kadian** Assistant General Manager (Environment Specialist) ESMU, IIFCL **Mr. Krupsindhu Guru** Assistant General Manager (Social Specialist) ESMU, IIFCL	
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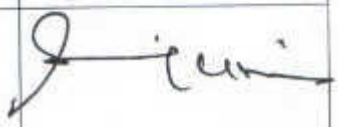
Approved by:	**Mr. Sanjeev Ghai** Chief General Manager IIFCL	

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PHOTOPLATE

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PROJECT BACKGROUND

1. SUB-PROJECT TITLE:

1. The sub-project includes construction, operation and maintenance of 74 MW Solar (Photovoltaic) Power project at villages Mankhera (25 MW), Kherakhurd (25 MW) & Jhandakalan (24 MW), District Mansa, State Punjab, India.

2. SUB-PROJECT BACKGROUND:

2. Acme Cleantech Solutions Pvt. Ltd. (ACSPL) is setting up a 74 MW Solar Photovoltaic project through its Special Purpose Vehicle M/s Mihit Solar Power Private Limited (MSPPL). The 74 MW Solar Photovoltaic Grid Connected Power Project is located at three villages in Tehsil Sardulgarh in District Mansa in the State of Punjab.

3. M/s Mihit Solar Power Pvt Limited (MSPPL) is a 100% SPV of Acme Cleantech Solutions Pvt. Ltd. (ACSPL) through its wholly owned subsidiary Vittanath Power Private Ltd (VPPL). The company has been allocated 74 MW by Government of Punjab. The proposed project is under New and Renewable Sources of Energy (NRSE) Policy – 2012, Punjab.

4. MSPPL has signed an implementation agreement with Punjab Energy Development Agency (PEDA) on 24th March 2015 for setting up the allocated project. Punjab State Power Corporation Limited (PSCPL) has signed the Power Purchase Agreement (PPA) with MSPPL on 31st March 2015. The fixed tariff is Rs 7.16 per kWh for 24 MW and Rs 7.06 per kWh for 50 MW for a period of 25 years.

3. SUB-PROJECT LOCATION:

5. The proposed site is located in three villages, viz., Mankhera (25 MW), Kherakhurd (25 MW) & Jhandakalan (24 MW), District Mansa of Punjab State in India. The project site is very close to Sardulgarh town in Mansa District. The three villages are within a radius of 15 km. Mansa district is located in the southern region of State of Punjab. Mansa district is bordered on the northwest by Bathinda district, on the northeast by Sangrur district, and on the south by Haryana state.

4. SUB-PROJECT TECHNICAL DETAILS:

6. MSPPL has been allocated 74 MW to be developed by Punjab Energy Development Agency (PEDA), Government of Punjab.

7. The power generated from the project will be evacuated through 66 kV transmission lines to 66 kV substation at Sangha from Mankhera (25 MW) and to 66 kV substation at Sardulgarh from Khera Khurd (25 MW) and Jhandakalan (24 MW).

Table 1: Project Description in Brief

Project Owner	Mihit Solar Power Private Limited (MSPPL)
Location of Site	Village Mankhera (25 MW), Khera Khurd (25 MW) and Jhandakalan (24 MW), District Mansa of Punjab State
Project Coordinates	**Village Mankhera (25 MW)** Latitude 29° 58' 43" Longitude 75° 23' 44" **Village Khera Khurd (25 MW)** Latitude 29° 65' 04" Longitude 75° 27' 59" **Village Jhandakalan (24 MW)** Latitude 29° 63' 95" Longitude 75° 22' 44"
Sensitive area	The sub-project is not located in vicinity of any protected area or ecologically sensitive area
Total cost of the project	₹ 523.49 crores
Project capacity	74 MW
Project Operational Date	April 2016
Technology	Grid connected Solar Photovoltaic system
Module Type	Polycrystalline Solar PV modules
Type of land	Private leased land
Power Purchase Agreement	Punjab State Power Corporation Limited (PSPCL)
Power yield per annum	129.75 Million Units per year
Tarrif for purchase of power	7.06 ₹ per kWh (50 MW) and 7.16 ₹ per kWh (24 MW)

5. MAJOR COMPONENTS:

8. **Solar PV Modules**: The proposed project is based on Solar Photo Voltaic technology using Polycrystalline PV modules for power generation. MSPPL is using Talesun make polycrystalline modules for the 74 MW solar PV plant.

9. **Inverter**: The DC electricity generated by the modules is converted to AC in the inverters. The design uses ABB make 1000 KW each inverter. Each site has approximately 5 inverter control rooms.

10. **PV Array layout**: The rated capacity of proposed Solar PV Power plant will be 74 MW. The 74 MW power project is located at three sites. There will be 1,00,000 modules at the two 25 MW sites each, Mankheda and Khera Khurd and 99,000 modules on the 24 MW Jhandakalan site. A seasonal type module mounting system of 5° (summer months) & 29° (winter months) inclination has been chosen for the PV plant.

11. **Power Evacuation**: The project company has signed the power purchase agreement (PPA) with PSPCL under the solar power policy of Government of Punjab. The nearest 66/11 substation is located at Sangha and Sardulgarh. The power from Khera Khurd and Jhandakalan site will be evacuated to Sardulgarh substation and power from Mankhera site will be evacuated to substation at Sangha. The cost of construction of 66 kV transmission line from sub-project sites to sub-stations has been borne by MSPPL and this will be maintained by PSPCL.

6. CONCESSIONAIRE:

12. Punjab State Power Corporation Limited (PSCPL) has signed the Power Purchase Agreement (PPA) with M/s. MSPPL on 31st March 2015 for a period of 25 years. The PPA specifies sale of power generated to Government of Punjab at a tariff of ₹ 7.06 per KWh (50 MW) and ₹ 7.16 per KWh (24 MW) for 25 years.

7. EPC CONTRACT:

13. Engineering, Procurement & Construction (EPC) Contracts have been awarded to M/s Schneider Electric Infrastructure Ltd., M/s Bhandari Engineering Company Pvt. Ltd., M/s Ganges International Pvt. Ltd., M/s Shreyas Civil Engineering Ltd., M/s Beniwal Construction Company Pvt. Ltd., M/s Siemens Limited, M/s Eeco Green Infratech Pvt. Ltd., M/s Eastern Bearing Pvt. Ltd., Sun Energy Infrastructure Pvt. Ltd. and M/s Addwatt Solution Pvt. Ltd. All the contractors are for the civil, electrical and mechanical works at the three sites of the sub-project.

8. IIFCL FUNDING:

14. The total project cost of MSPPL is ₹ 523.49 crores. The total loan amount for the Project is ₹ 382.15 crores. The project has been financed by IIFCL under Direct Finance Scheme. IIFCL has sanctioned an amount of ₹ 104.00 crore towards MSPPL. IIFCL so far has disbursed a total of ₹ 93.60 crore (including ₹ 63.22 crore fund based and ₹ 30.38 crore non fund based disbursement).

9. STATUS OF THE PROJECT:

15. The construction at the sub-project commenced in September 2015. At the time of site visit, foundation work for module installation was complete. 22 MW of solar module installations was complete at Mankhera site, 23 MW module installation was complete at Khera Khurd site and 15 MW was installed at Jhandakalan site. The switchyard, control rooms and inverter control room construction was complete at all three sites. The sub-project has been issued commissioning certificate on 25th April 2016 by Punjab Energy Development Agency.

DUE DILIGENCE ON ENVIRONMENTAL SAFEGUARDS

10. ABOUT THE PROJECT:

16. **Sub Project:** M/s Mihit Solar Power Private Limited (M/s MSPPL), which is 100% SPV of Acme Cleantech Solutions Pvt. Ltd. (ACSPL) through its wholly owned subsidiary Vittanath Power Private Ltd (VPPL) has received allocation from Government of Punjab for development of a 74 MW Solar PV project under Punjab Solar Power Policy. The company has signed Power Purchase Agreement (PPA) for 25 years with Punjab State Power Corporation Limited (PSPCL) with Government of Punjab permission. The sub-project is located in three villages, viz., Mankheda, Jahndakalan and Khera Khurd, located in a radius of about 15 km in District Mansa, Punjab. The nearest 66/11 substations are located at Sangha and Sardulgarh in District Mansa.

11. APPLICABILITY OF ENVIRONMENTAL IMPACT ASSESSMENT NOTIFICATION:

17. It is required that the project meets the applicable national guidelines / regulations relating to the environment, occupational health and safety. The project should have necessary clearances as well as permits and approvals for project implementation and suitable environmental management plans.

18. Solar Power PV Projects are not covered under the ambit of Environmental Impact Assessment Notification, 2006 of Government of India and no environment clearance is required for such projects under the provisions thereof. As Solar PV Projects are not covered under the EIA Notification, 2006 environmental and social impact assessment study was not required and not carried out for MSPPL. Environmental management plans have been prepared and are being implemented at the project level. The purpose of the Environment Management Plan is to provide a framework of procedures required to recognize, address environment management needs of the project, based on the management measures for the project.

12. APPROACH TO THE ENVIRONMENT SAFEGUARDS DUE DILIGENCE REPORT:

19. The Environmental Due Diligence Report reviews the available documents and assesses the compliance of the sub-project with the respect to (i) environmental safeguards & regulatory requirements; (ii) the process of identifying environmental impacts; (iii) Health and Safety; (iv) environmental management measure implementation & institutional arrangement; (v) site visit observations & photographs ; (vi) conclusions and recommendations.

20. The following documents were referred in order to prepare Environmental Safeguards Due-Diligence Report:

- Project Information Memorandum (PIM)
- Detailed Project Report
- Power Purchase Agreement
- Project Statutory Approvals
- Labour License
- Environment Management Plan and its implementation
- Project Environment & Social Management Manual
- Monthly Environment, Safety Reports & other records
- EPC Contract Documents

21. The environmental safeguard due-diligence study was carried out for the sub-project on the basis of site visit observations and understanding project scope based on information and documents provided by Concessionaire. A detailed discussion on the environmental and social safeguards related issues was also carried out with the team of the sub-project at site.

13. POLICY, LEGAL AND REGULATORY REQUIREMENT:

22. As per MOEF's Office Memorandum dated 13th May 2011 (**Appendix-I)**, Solar Photovoltaic Power Projects are not covered under the ambit of EIA Notification, 2006 and no environment clearance is required for such projects under the provisions thereof. As environmental and social impact assessment study was not required for MSPPL as a statutory requirement, such study has not been conducted. Although an Environment Management Plan has been developed for MSPPL, which is being implemented in the construction stage and will be implemented during operation phase as well.

23. Punjab Pollution Control Board has exempted the Solar Photovoltaic Plants irrespective of their capacity, from obtaining consent to establish (NOC)/consent to operate of the Pollution Control Board (copy of office order is attached as **Appendix-II**).

24. MSPPL is required to comply with the applicable guidelines relating to the environment, occupational health and safety in addition to complying with local laws and regulations. The statutory clearances related to environmental aspects obtained/to be obtained from regulatory authorities as part of the MSPPL development were assessed and current status of availability of such clearances are given in **Table 2** below:

Table 2: Status of Regulatory Clearances Obtained related to Environmental Safeguards

S.No.	Clearances	Statutory Authority	Current Status of Clearance
1.	Environmental Clearance	Ministry of Environment, Forests & Climate Change	Not Applicable. As Solar PV project development is not listed in Schedule I of the MoEF&CC's EIA Notification 2006, that lists projects or activities requiring prior

		(MoEF&CC), New Delhi	environmental clearance and hence this is exempted from obtaining the same. MoEF&CC's Office Memorandum dated 13th May 2011 in this regard is enclosed as **Appendix-I**. However, an environmental examination has been done as a part of due diligence for the project for anticipated impacts. Moreover, environmental management plans during construction and operation & maintenance phase have been prepared and are being implemented at the project level.
2.	Forest Clearance	MoEF&CC and State Forest Department	Not applicable since the sub-project does not involve forest land.
3.	Wildlife Clearance	MoEF&CC	The Project area does not lie within an Ecologically Sensitive Area and is not located within 10 km of any National Park/Wildlife Sanctuary. The location of Project does not contravene any international biodiversity or ecosystem conservation conventions. Therefore, it does not require wildlife clearance or permission.
4.	Consent to Establish / Operate	Punjab Pollution Control Board (PPCB), Punjab State	Punjab Pollution Control Board has exempted the Solar Photovoltaic Plants irrespective of their capacity, from obtaining consent to establish (NOC)/consent to operate of the Pollution Control Board (copy of office order is attached as **Appendix-II**).
5.	Authorization under hazardous waste management rules	Punjab Pollution Control Board, Punjab State	Not Applicable, as no hazardous waste generation is expected during operation of the Solar PV Power plant.
6.	The Contract Labor (Regulation	Licensing Officer & Assistant Commissioner of	The Contract Labour (Regulation and Abolition) Act, 1970 requires every principal employer of an establishment to make an

	and Abolition) Rules, 1970	Labour, Govt. of India	application to the registering officer in the prescribed manner for registration of the establishment. The establishment is registered under the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and labour license has been obtained for the project under the said Act and is enclosed as **Appendix-III**.
7.	Approvals for Transmission line	Punjab State Power Corporation Limited, Patiala Approval of Chief Electrical Inspector to Govt. (CEIG), Punjab Electrical Inspectorate	Government Notification & public notice under section 164 of the Electricity Act, 2003 was issued by Punjab State Power Corporation Ltd., Patiala dated 7th September 2015 for Khera Khurd (4.164 km), 1st October 2015 for Mankhera (3.280 km) and 3rd November 2015 for Jhandakalan (8.233 km) (**Appendix III A)**. CEIG approval has been granted for the 66 kV transmission lines which are enclosed as **Appendix III A**.

14. DESCRIPTION OF THE ENVIRONMENT:

25. **Location:** The proposed solar PV plant is located in three villages in Mansa District of Punjab State. The coordinates of the villages are: village Mankhera (25 MW) at Latitude 29° 58' 43" and Longitude 75° 23' 44", village Khera Khurd (25 MW) at Latitude 29° 65' 04" and Longitude 75° 27' 59" and village Jhandakalan (24 MW) at Latitude 29° 63' 95" and Longitude 75° 22' 44". The location has an average elevation of 210 meters above mean sea level. It receives good global horizontal irradiation (GHI) of approximately 4.97 kWh/m^2/day. The climate of Mansa district is classified as sub-tropical, semi-arid and hot which is mainly dry except in rainy months and characterized by intensely hot summer and cold winter. The normal average annual rainfall of the district is 378.2 mm.

26. **Site Assessment:** The site assessment during the Detailed Project Report (DPR) preparation during planning phase of the sub-project has been carried out which essentially cover location, water availability, module cleaning arrangement, construction power, grid availability and shading aspects etc. Solar resource assessment has also been carried out for the sub-project locations.

27. **Topography:** The proposed project area is characterized by flat terrain.

28. **Land:** The land for the sub-project at all three locations has been taken from locals on a lease for 30 years. The total land taken on lease for the three locations for development of 74 MW plant is approximately 422 acres. The land was earlier cultivated by locals. On interaction with the locals, whose land is taken on lease by developer, during the site visit it is inferred that the crop yield of the area was less and uncertain since the water availability was less for irrigation, therefore they have opted to give their land on lease for a steady income source. The ground water in the area is saline therefore unfit for irrigation.

15. ANTICIPATED ENVIRONMENTAL IMPACTS DURING CONSTRUCTION PHASE:

29. This section describes the environmental impacts during construction phase assessed on the basis of available documents and site visit. The impacts are temporary and can be mitigated by taking proper measures. The mitigation measures proposed and being implemented at the site are described in subsequent sections.

30. **Impact on land:** MSPPL is implementing the project on private land taken by the sub-project developer on lease for 30 years from locals. The land was previously used by locals for cultivation, but since the yield was less and uncertain therefore the locals have opted to give the land on lease. The land was cleared of any vegetation, bushes, trees, crop, building etc. before being handed over to the developer by the owner.

31. **Impact on flora and fauna:** The sub-project is not located in any eco-sensitive areas like national park or sanctuaries thereby no presence of rare and endangered species is anticipated. The sub-project is located on private leased land. Developer has informed and as per lease deed signed with the locals, the land was handed over to the developer after clearing. As such no impact is anticipated on the flora and fauna. It was observed during site visit that the area was fenced which will act as a barrier for animals into the sub-project area.

32. **Impact on soil:** The excavation work involved in the sub-project is limited to construction of foundations for module mount, control room, inverter control rooms and switchyard. Soil erosion is anticipated during construction due to excavation and any other procedural activities. The foundation rod including concrete pedestals installation for module mounts require around 1 m deep excavation. The excavated soil is compacted in the foundation. Gravel roads will be constructed after installation of all modules at site.

33. **Impact on water resources**: During construction, water is required at site for various activities. Water is being procured by private tankers from locals. The developer has informed that there is no bore well at site and hence no ground water utilization.

34. **Air Emissions**: Some impact on air quality during construction phase is anticipated. The likely emissions would include fugitive emissions from excavation, filling, material handling, transportation, dust emissions, vehicular emissions, etc. The area does not have industries in close vicinity, therefore, it can be concluded that the ambient air quality would have been good in the area.

35. **Ambient Noise Levels:** During construction phase, the sources of noise pollution will primarily be limited to movement of vehicles transporting construction material and equipment to the site. As such there are no industries in the area, so the noise levels will increase only due to the construction activities; which are temporary in nature.

36. **Impact due to waste disposal:** Waste is anticipated to be generated during construction of the project from wastes like paper, wood, cement bags, packaging material, etc. the office at site is located in portable cabins. Domestic waste is being generated at the site from the toilets for which septic tanks/soak pits have been constructed. The developer informed that the labour of the EPC contractors was housed in nearby villages in rented accommodations. There were no labour camps at the site.

37. **Cultural Sites:** As informed by project developer, no archaeological, heritage, historical or culturally important sites are located close to the project site.

16. ANTICIPATED ENVIRONMENTAL IMPACTS DURING OPERATION PHASE:

38. **Impact on land:** Once the project is commissioned no impact on land is anticipated.

39. **Impact on flora and fauna:** No impact on flora and fauna is anticipated during operation stage. Fencing around the project will act as a barrier for fauna.

40. **Impact on soil:** Soil contamination is anticipated during operation phase due to oil spillage from vehicles.

41. **Impact on water resources**: Except cleaning of the solar PV panels, there is very limited water requirement in solar PV power projects. As informed by the developer no ground water will be used for cleaning purpose which will be arranged locally by tankers. Once the solar PV modules are installed, module cleaning system (pipes) for optimum utilization of water for cleaning and kachha drains will be made for managing storm/rain water.

42. **Air Emissions**: The likely emissions during operation stage would include vehicular emissions.

43. **Ambient Noise Levels:** During operation phase, the sources of noise pollution will primarily be limited to movement of vehicles at the site.

44. **Impact due to waste disposal:** Waste is anticipated to be generated at the project from damaged solar panels. Septic tanks have been constructed for the domestic waste generated from the office, canteen and toilet facility at the site. Approximately 10 engineers and technicians will be present at each site during operation phase of the project.

17. ANTICIPATED ENVIRONMENTAL IMPACTS DUE TO TRANSMISSION LINE:

45. The power from Khera Khurd and Jhandakalan site is evacuated to Sardulgarh substation and power from Mankhera site is evacuated to substation at Sangha through 66 kV transmission line.

46. The transmission line from Mankhera site to Sangha sub-station is of 3.28 km having 15 towers, Khera Khurd is having a total length of 4.164 km having 19 towers and the line from Jhandakalan site to sub-station at Sardulgarh is 8.233 km having 38 towers. The transmission lines are double circuit single string type. The impacts due to transmission line are temporary and are restricted during construction phase only. The impacts of transmission line are given below:

47. **Impact on land**: The developer has informed that the transmission line passes through private land and crop compensation has been given for ROW. The temporary impact on land will be due to excavation and erection of tower. The excavated soil is backfilled in the foundation. The impact on land is temporary during construction phase only and no impact on land or topography is envisaged during operation phase.

48. **Impact on terrestrial ecology**: The developer has confirmed that the transmission line does not pass through any protected area or forest land. The developer has informed that the transmission route has been chosen to avoid vegetation and habitation. No tree has been cut for the entire transmission line. Therefore, the impact on terrestrial ecology is negligible.

49. **Impact on air & noise environment:** During construction phase, the activity of excavation and material movement in vehicles give rise to emissions and dust, which affects the air quality and contribute to noise marginally at the site. These impacts are of low significance and temporary in nature. No impact is envisaged during operation phase.

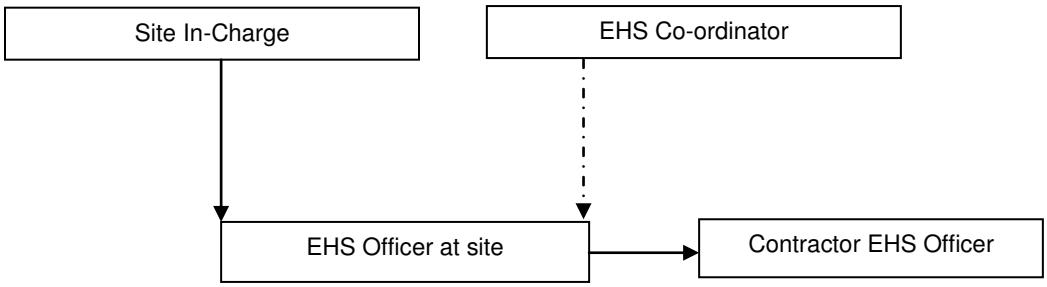
50. **Impact on water quality:** Water need during construction of transmission line would be limited to minimal amounts of water for construction. Water for construction is sourced through private tankers, therefore, no impact is envisaged on water quality and ground water.

18. HEALTH AND SAFETY:

51. Acme has its Global Environment Health & Safety Policy which is applicable on all its projects and is enclosed as **Appendix IV.** Acme has its own Environment and Social Management System (ESMS). The ESMS Manual (**Appendix V)** covers environment, occupational health & safety and social aspects during the commissioning, operation, maintenance & de-commissioning phases of the Solar PV Power Plants within Acme Solar Energy Private Limited.

52. MSPPL has clearly defined the roles and responsibilities of the onsite persons involved in the environmental management at site. HSE Officers were available at all three sites of the MSPPL. The duties of the HSE personnel at site are:
    - Effective implementation of the EMP at site.
    - Effective implementation of the environmental trainings
    - Advise and coordinate the contractor(s) activity towards effective environmental management
    - Maintain environment records, water usage records, safety records etc.

53. The following is the organizational structure in place for the EHS team:



54. Emergency response flow chart for the sub-project is displayed at the sites. Sample chart for Mankhera site is enclosed as **Appendix VI.** The emergency contact numbers are displayed at all three sites.

55. The EPC contracts between MSPPL and various contractors, including those for transmission lines, have specific clauses related to environment and safety. One such sample contract document between MSPPL and M/s Shreyas Civil Engineering is enclosed as **Appendix VII**. The Clause 18 and 19 of the EPC contract deals with the safety and environmental requirements.

56. The contractors have Safety Officer/Engineer at sub-project sites. Monthly safety reports are maintained at sites which also includes training details. Sample of monthly safety report is attached as **Appendix VIII.**

57. Fire safety alarms systems are installed in control rooms. Fire extinguishers can be seen in control rooms and near solar panels too.

58. Developer has informed that all contractors have labour license and insurance. Copy of one such license and insurance are attached as **Appendix IX & X.**

19. ENVIRONMENT MANAGEMENT PLAN DURING CONSTRUCTION AND OPERATION PHASE:

59. The impacts identified during construction and operation phase of the project appear to be insignificant and temporary in nature. However, proper mitigation measures are to be taken to minimize such impacts. The mitigation measures being implemented at the project site as per the information provided by the developer and on the basis of observations during site visit are enumerated in this section. The mitigation measures suggested in the EMP for construction phase are being implemented at the sub-project sites.

60. The EMP for the 74 MW MSPPL is enclosed as **Appendix XI.** Institutional arrangement exists at sub-project to take care of the environmental management, the roles and responsibilities are also defined in the EMP. The organogram for implementation of EMP is given as **Appendix XII.**

Table 3: Mitigation Measures Implemented During Construction Phase

Impact / EMP	Implementation / Compliance / Monitoring
Water Conservation and reuse	The water and drinking water is supplied through tankers and procured from local vendors. The team at site has informed that optimum water is being utilized at site. Monthly drinking water record sheet and water consumption record sheet is maintained at site (**Appendix XIII & XIV**).
Fugitive emission management	Dust generated from vehicular movements is controlled through restricting vehicular speed limits and regular sprinkling of water. Appropriate PPEs (dust masks) are provided to labour.
Environmental Training	Environmental Awareness Training is being provided to target groups comprising of EHS Engineer, Area In-charge and Housekeeping staff through contractors shall be familiar with key onsite environmental concerns and environment management procedures and address the same. The monthly environmental training records are integral part of Monthly Environment reports (**Appendix XV).**

Waste Management & Disposal	Domestic waste generated at the site is disposed in soak pits / septic tanks. The waste generated from the site including plastic waste, paper & carton boxes, wood etc. is stored at designated stock yard and disposed through authorized recyclers / vendors. The monthly records are maintained in the Monthly Waste Reports (**Appendix XVI**). Waste management records are maintained and communicated to Head Office-ACME on a monthly basis.

20. ENVIRONMENTAL SENSITIVITY AND DUE DILIGENCE:

61. The environmental sensitivity of MSPPL including transmission line has been assessed by reviewing the documents, supplemented by field visit and consultation with the concessionaire.

62. The environmental sensitivity assessment is given below:

- The land available for the sub-project is private land. The private land has been leased from the locals for a period of 30 years. The land was earlier used for cultivation, since the crop yield was less and the locals are getting more benefit in the lease. The sites are close to the villages and are surrounded by agriculture fields.
- The sub-project is located at three sites within a radius of 15 km in Tehsil Sardulgarh in Punjab.
- The sub-project sites are not located in any protected area like wildlife sanctuary / national park or in close proximity of any eco-sensitive area.
- During site visit and as per discussions with the sub-project staff, it was informed that no wild animals are sighted in and around the sub-project area.
- The developer has informed that no forest area is getting affected due to the sub-project.
- The developer has informed that no tree has been cut for the project and transmission line ROW. The land for project development at three sites was handed over to the developer by the owner after clearing.
- As informed by the concessionaire, there are no important cultural / heritage sites are getting affected due to the sub-project.
- Labour working at the sites stay in rented accommodation in nearby villages as such there is no labour camp at site.
- The sub-project is exempt from taking Consent to Establish / Operate from the Punjab Pollution Control Board.

- The impacts of the sub-project are temporary in nature.
- All sewage water being generated at the sub-project premises is disposed in septic tanks/soak pits.
- MSPPL has its own Environment, Health and Safety Policy and Environmental & Social Management System which is being implemented at the site.

21. PROJECT AGAINST THE PROHIBITED INVESTMENT ACTIVITIES LIST:

63. The sub - project does not involve any prohibited activity as per the Prohibited Investment Activities List (PIAL) of ADB.

22. CATEGORIZATION OF SUB-PROJECT:

64. The sub-project can be classified as category B based upon ADB's EA requirements as per their Safeguard Policy Statement (2009). This classification is based on the review of the available documents and site visit with respect to the environmental sensitivity due to project activities.

23. SITE VISIT OBSERVATIONS:

65. A site visit was undertaken by IIFCL's Environmental and Social Safeguard Specialists on 16th-17th March 2016. The site visit was undertaken to review the implementation of the project's environmental and social safeguards. The sub-project is under final phase of construction. During the site visit, following staff was mainly consulted regarding environmental safeguards related measures being implemented at the project site:

    (a) Mr. Om Babu Saxena, Site in charge MSPPL, Mankhera site
    (b) Mr. Ambresh Mathur, Site Engineer, MSPPL Mankhera site
    (c) Mr. Devendra Verma, EHS Officer, MSPPL Mankhera site
    (d) Mr. Kripa Shankar, EHS Officer, MSPPL Jhandakalan site
    (e) Mr Navneet Jain, EHS Officer, MSPPL Khaira Khurd site
    (f) Mr. Manish Kumar, Administrative Officer, Khaira Khurd site
    (g) Mr. Vinod Kumar, Electrical Engineer, Khaira Khurd site

66. Detailed discussions were held with Mr. Rohit Kumar Singh, EHS Co-ordinator, Acme at IIFCL Office regarding project in general and environmental safeguards.

67. Locals who have leased land for the sub-project were also consulted informally during site visit. They informed IIFCL staff that they are happy with the sub-project coming up in the area. They

do not have any problems with the project coming up in the area, infact they informed that now they have a steady source of income from leased land.

68. During site visit, the sub-project was in final phase of construction. Based on the discussions with above mentioned officials and visit, the site observations are given below:

- The area is generally surrounded by agricultural fields.
- No tree has been cut at the project site by the developer, as the land was handed over to the developer by locals after clearing.
- The Office of MSPPL at sites is operating from Portable Cabins. Toilets have been constructed at site.
- All sewage water being generated at the sub-project premises is disposed in septic tanks/soak pits.
- In the discussions during the site visit it was informed by the staff that there are no borewells at the site.
- No groundwater is being utilized at site. Water requirement for various activities is being taken care by the private tankers.
- Currently about 100 labour are at site, who are residing in rented accommodations in nearby villages and are mostly locals. There was no labour camp at site.
- Labour was seen wearing PPEs.
- Emergency contact numbers were displayed at various locations.
- Fire fighting systems were in place.
- No oil is being stored at site.
- No oil spillage was observed at the site.
- The foundation work for module installation, control rooms and inverter control rooms were complete.
- The module mounting was in progress.
- Safety officers / engineers were present at the site and understood their commitments.
- On discussions with the site staff, it was observed that tool box talk and job safety analysis is done for labour as well as staff.
- The area was fenced and vehicle movement in the premises was restricted.
- Records of various trainings and EMP implementation are being maintained at the site.

- Module cleaning system (pipes), gravel roads and drains for storm water/rain water will be constructed after module mounting and other works are over.
- General housekeeping was good at sites. The waste and scrap material was stocked at designated areas and it was informed by staff at site that every 2-3 days the material is being lifted / taken by authorised dealers.

69. The site visit photographs are given in **Photoplate - I.**

24. CONCLUSIONS AND RECOMMENDATIONS:

70. It is concluded from the above environmental examination that the proposed MSPPL, 74 MW solar PV power project in Mankhera, Khera Khurd and Jhandawalan Villages is unlikely to pose any adverse irreversible environmental risks given the nature of the activities and absence of any legally protected areas and cultural heritage sites located within and/or in close proximity to the sub-project. However, the sub-project activities have reversible environmental impacts which have been managed with structured EMPs in place.

71. Based upon the available documents and site visit, it is concluded that the concessionaire has undertaken adequate environmental safeguard measures. The conclusions for the sub-project are given below:

- The sub-project has been prepared by the Government of Punjab as per the national and state government requirements and not in anticipation to ADB operation.
- The sub-project is under final phase of construction.
- The project site is not located in an ecologically sensitive area.
- The land for the project development is private leased land.
- The project involves any forest land.
- Developer has informed that no vegetation clearing was required for the sub-project as the land was handed over to the developer by locals after clearing.
- The concessionaire has undertaken appropriate safety measures at the project site.
- The sub-project has the required approvals for project implementation.
- Environment & Social Management System at MSPPL has been developed and implemented by keeping in view the requirements of the sub-project.
- The sub-project will also have a positive GHG emission reduction due to non-emission of pollutants during operation.

- The institutional arrangement available for the implementation of Environment, Health & Safety appears to be adequate.
- The main impacts were on land environment, water resources and waste management. However, most of the associated impacts were limited to the extent of construction phase and are temporary in nature. The EMPs are undertaken to minimize any negative impact.
- During site visit and discussion with the project developer, the implementation of EMP was found to be adequate.
- This nature of the project site coupled with the clean nature of solar power generation ensures that the sub-project will not cause any significant adverse environmental impacts during construction and operation. The same is evident from the site visit.

72. Based on the site visit and 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.

DUE DILIGENCE ON SOCIAL SAFEGUARDS

25. PURPOSE OF THE SOCIAL SAFEGUARDS DUE DILIGENCE:

73. The Social Safeguards Due Diligence Report (SSDDR) has been carried out by India Infrastructure Finance Company Limited (IIFCL) in consultation with the Concessionaire, Mihit Solar Power Private Limited (MSPPL) to assess the Social safeguards adequacy of the project with the applicable National Policies. The report has been prepared as per the documents/information received from the concessionaire and on the basis of site visit organized during 16th and 17th of March 2016. The information given in the SSDDR is agreed and confirmed by the Concessionaire.

26. PROJECT AGAINST THE PROHIBITED INVESTMENT ACTIVITIES LIST:

74. The sub - project does not involve any prohibited activity as per the Prohibited Investment Activities List (PIAL) of ADB.

27. SOCIAL SAFEGUARD DUE DILIGENCE STUDY:

75. The Social safeguard due diligence study of Mihit Solar Power Pvt. Ltd. (MSPPL) has been carried out by reviewing the documents made available by the Concessionaire and by conducting a site visit. The documents/reports reviewed as part of the due diligence study includes the following:

- Power Purchase Agreements;
- Detailed Project Report (DPR);
- Project Information Memorandum (PIM)
- Lease Deed;
- Farmers details

28. VISIT TO PROJECT LOCATIONS AND DISCUSSION WITH CONCESSIONAIRE:

76. A site visit was undertaken by the Environmental and Social Safeguard Specialists of IIFCL on 16th and 17th of March, 2016 for field verification of environment and social safeguards related aspects of the project. During the site visit, the project construction team was consulted regarding environmental and social safeguards measures implemented at the project site. Following construction personnel and village representatives were consulted during the site visit:

- Mr.Omm Babu, site in charge MSPPL, Mankhera Site;
- Mr. Ambresh Mathur, Site incharge, MSPPL Mankher Site;

- Mr. Devendra Verma, EHS Officer, MSPPL Mnkhera Site;
- Mr. Kripa Shankar, EHS Officer, MSPPL Jhandakalan Site;
- Mr. Navneet Jain, ESH Officer, MSPPL, Khaira Khurd Site;
- Mr. Manish Kumar, Administrative Officer, Khaira Khurd Site;
- Mr. Vinod Kumar Electrical Engineer, Khaira Khurd Sie;
- Mr. Bhupender Singh, Agricultural Land owner, Mnkheda;
- Balbinder Singh, Agricultural Land owner, Mankheda.

77. The site visit photographs are given in **Photo Plate-I**.

29. JUSTIFICATION FOR SUB-PROJECT SITE SELECTION:

78. Punjab State Power Corporation Ltd. (PSPCL), the State Nodal Agency of Punjab Government, has developed state solar power policy to promote generation of green and clean power under New and Renewable Sources of Energy (NRSE) Policy – 2012, Punjab. 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.

79. In order to assess the optimum feasibility of the solar energy project for power generation, a comprehensive site assessment has been conducted by the Company for the project, by considering the following points:

    - Higher solar radiation intensity;
    - Land availability, Connectivity and accessibility;
    - Shading aspects;
    - The project location is located away from the settlement are;
    - The land identified at this location did not involve displacement of any person;
    - No Tribal People affected;
    - No Common Property resources affected;
    - Land availability, Connectivity and accessibility;
    - Higher solar radiation intensity;
    - Power evacuation facilities (nearest available substations of Sangha and Sardulgarh which comes under PSPCL).

80. As per the technical assessment undertaken across the Solar PV technologies, the crystalline solar PV technology appeared to be the most feasible option for this location because of the land type, meteorological study and annual behavior of solar radiation over the location near at villages Mankhera (25 MW), Kherakhurd (25 MW) & Jhandakalan (24 MW), District Mansa, State Punjab, India.

81. The land leased for the project was not very productive due to salinity and thus was not suitable for agriculture. The land identified at this location did not involve displacement of any

person. Moreover, no new road was required to be built as part of this project as the project could utilize the existing village roads.

82. Thus, considering all the above mentioned characteristics, the current location was selected for setting up Solar Power plant.

30. LAND LEASE DEED AND COMPENSATION:

83. The total land required for the construction of 74 MW solar power project at villages Mankhera (25 MW), Kherakhurd (25 MW) & Jhandakalan (24 MW), is approx. 422 Acres. The land leased for the project was totally private land and has been rented on a voluntary basis (willing seller-willing buyer) from the land owners. A third party (land arranger) was appointed by the subproject developer for helping in the process of land leased for the project.

84. ***Project Affected People:*** land has been rented by execution of lease deed. Bilateral lease deed has been executed with Seventy four (74) land owners. In Jhande Kalan location 32 land owners are affected, in Khaira Khurd 33 land owners and in Mankhera site only 9 land owners are affected. The details of the land owners are given in **Appendix XVII.**

85. Further, land owners are not selling the land they are only leasing the property for 30years for which they are getting annual rent @ 50,000/- per acre from the date of execution of Lease Deed. The rent will paid every year in the provision of annual escalation of 5% in the annual rent at the end of each twelve (12) Month period from the commencement date. Initially, the land owners have paid Rs.110000/- as rent for period of two years, and the rent will escalate in the 3rd year. Except, Income tax on the Rent received under the lease deed shall be payable by the land owners and the rest are payable by the subproject developer. The details of the lease deed of the land are attached as **Appendix XVIII.**

86. During the site visit and subsequent to discussion with one of the land owner it was noted that, the land used for the project was classified as agriculture land but the fertility of the land had degraded over a period of time which is due to problem of saline water and scarcity of water in the area.

87. Further during the discussion with the land owner it was informed that, prior to land acquisition land was only used for agricultural activity, but the annual yield per Acre is very low as compared to the rent (Annual rent Rs. 55,000/- per Acre) they are getting out of the leased land. During the site visit, it was also observed that, except agricultural activity there were no other activities in the project area e.g. small shops, cottage industries were exist prior to the leasing of the land .

88. The Lease of land came as an opportunity to earn income from less productive land and the payment provided against the land rented has helped these farmers to find alternative land in a more fertile area or start an alternate livelihood/business.

89. During the discussion with subproject developer and land owner it was mutually agreed that the leased land has been handed to the subproject developer after harvesting of the crop by the land owners.

90. Further, the subproject developer has confirmed that there is no issue related to land leased land and compensation.

31. RESETTLEMENT IMPACT IN THE SUB-PROJECT:

91. During the site visit it was observed that, there is no a commercial / residential structure or inhabitants dwelling on the site. The project site are so identified that the project location is far from the habitation. Even it was also observed during the site visit that there were no temporary shelters/sheds at the project site. The land leased for the project doesn't result in any involuntary resettlement impacts or any compensation issues.

32. IMPACT ON TRIBAL PEOPLE:

92. As confirmed by the subproject developer that , the project construction and operation has not in any way affected the dignity, human rights, livelihood systems and culture of the residents of the villages. Moreover, the land where the Project's solar power generation facilities has been constructed, was not owned, used, occupied, or claimed as ancestral domain or asset by any tribal group.

33. LAND LEASE DEED PROCESS:

93. As documented in the Land lease Deed, the land rented for the project site was private land and was leased on a voluntary basis (willing seller willing buyer mode) from the land owners. The land was leased through land arranger under the principle willing buyer willing seller concept. The land has been rented by execution of Lease Deeds. The detail of Lease deeds are attached on **Appendix XVIII.**

94. The land for the sub-project at all three locations has been taken from locals on a lease for 30 years. The total land taken on lease for the three locations for development of 74 MW plant is approximately 422 acres. The land was earlier cultivated by locals. On interaction with the locals, whose land is taken on lease by developer, during the site visit it is inferred that the crop yield of the area was less and uncertain since the water availability was less for irrigation, therefore they have opted to give their land on lease for a steady income source. The ground water in the area is saline therefore unfit for irrigation.

34. GRIEVANCE REDRESSAL:

95. During the site visit it was informed, that Grievance Redressal Committee (GRC) was formed at the project site to ensure that the affected person's grievances, on both environmental and social concerns, are adequately addressed. The Grievance Redressal Mechanism (GRM) for the project provides an effective approach for complaints and resolution of issues raised by the affected community (if any). This mechanism was established prior to construction and will remain active throughout the life cycle of the project.

96. A Grievance Redressal Committee is already in operation at project site. The subproject developer is maintain a complain registered. The GRC comprises of Project Head and site in charge followed by site Engineer/EHS officer and Site Supervisor. For record keeping purposes, grievance redressal registers are maintained at site. The grievances if received are recorded in details mentioning the date, time, location, names of villager, details of grievance and the action taken to address the grievance.

97. As informed by the concessionaire during the site visit, the concerned local communities have already been informed about the project (via informal discussion with panchayat heads & local community representatives) and no such grievance/complain are received. There were no grievances related to leased land and compensation reported at the project site.

35. EMPLOYMENT GENERATION AND INCOME RESTORATION:

98. The concessionaire has generated employment opportunities for the local people during the construction stage of the sub-project. Employment opportunities have been provided to project affected people and local villagers during project construction stage. Most of the construction labours at site were employed on contractual basis through contractors. .

99. It has been confirmed by the concessionaire that during construction stage, local personal are regularly been engaged on need basis on contractual basis. As informed during the site visit, approximately 450 local people have been employed on site including security guards, labours, site manager and an admin-in charge.

36. COMMUNITY DEVELOPMENT ACTIVITIES:

100. During the site visit it was informed by the concessionaire that they have carried out various community development activities on public demand, which has been briefed below:

- Maintenance of village approach road at village Jhandakalan;
- The subproject developer has received one proposal from the Kheda Khurd village Panchayat for up gradation and maintenance of Kheda Khurd road;

- Organizing Awareness/knowledge sharing camp among the villagers about the solar power project;

37. SITE VISIT OBSERVATION:

101. A site visit was undertaken by the Environmental and Social Safeguard Specialists of IIFCL during 16th and 17th of March 2016 for field verification of social safeguards related aspects of the project. It was observed during the site visit that:

- The project is on construction stage;
- During the interaction with one of the representative of the land owners, it was understood that local people are shown their interest by leasing their property to the subproject. People are happy about the project.
- As informed during the visit, no grievances have been received till date from the local people.
- Local people have been employed for various construction activities.
- During the site visit it was inferred that the crop yield of the area was less and uncertain since the water availability was less for irrigation, therefore they have opted to give their land on lease for a steady income source.

38. DISCLOSURE:

102. The final ESDDR report will be accepted by the subproject developer and endorsed by IIFCL. After getting the No Objection Certificate (NOC) from the ADB, the report will be uploaded for public disclosure in IIFCL's website as well as ADB's website.

39. CONCLUSION AND RECOMMENDATION:

103. Based upon the available documents and information provided by the subproject developer, it is concluded that the concessionaire has undertaken adequate social safeguard measures during the construction stage of the project. The conclusions for the sub-project is given below:

- The sub-project have been prepared by the Government of Punjab as per the national and state government requirement and not in anticipation to ADB operation;
- The land leased for the project site is totally private land and has been rented on a voluntary basis (willing seller-willing buyer basis) from the land owners;

- Land for the sub-project at all three locations has been rented by the locals on lease basis for a period of 30 years.
- The project did not had any impact on the settlement area and no cultural and community property was affected due to the project;
- There were no grievances related to leased land and compensation reported at the project site;
- As informed by the subproject developer, during the site visit, no litigation cases are there ;
- The project do not impact any Schedule Tribe family;
- Employment opportunities have been provided to the local people for various activities;
- Concessionaire has undertaken up gradation/maintenance of village road based on the demands raised by the Sarpanch.

104. 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.
