



# Environmental and Social Impact Assessment Report

Technaf Solartech Energy Limited, Teknaf, Cox's Bazar

Prepared by



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## **LIST OF ABBREVIATIONS**

|        |   |
|--------|---|
| BBS    | – Bangladesh Bureau of Statistics                 |
| BIDA   | – Bangladesh Investment Development Authority     |
| BMD    | – Bangladesh Meteorological Department            |
| BPDB   | – Bangladesh Power Development Board              |
| BWDB   | – Bangladesh Water Development Board              |
| DoE    | – Department of Environment                       |
| DoF    | – Department of Fisheries                         |
| ECA    | – Environmental Conservation Act                  |
| ECC    | – Environmental Clearance Certificate             |
| ESIA   | – Environmental and Social Impact Assessment      |
| ESMP   | – Environmental and Social Management Plan        |
| EU     | – European Unions                                 |
| HAT    | – Highest Astronomical Tide                       |
| IEE    | – Initial Environmental Examinations              |
| IFC    | – International Finance Corporation               |
| L/C    | – Letter of credit                                |
| MEAs   | – Multilateral Environmental Agreements           |
| MoEF   | – Ministry of Environment and Forest              |
| MoPEMR | – Ministry of Power, Energy and Mineral Resources |
| MW     | – Mega Watt                                       |
| NGO    | – Nongovernmental Organization                    |
| NOC    | – No Objection Certificate                        |
| O&M    | – Operation and Maintenance                       |
| OM     | – Operations Manual                               |
| PCM    | – Public Consultation Meeting                     |
| RF     | – Resettlement Framework                          |
| SESIA  | – Summary Initial Environmental Examinations      |

|       |  |
|-------|--|
| SO    | – Safety Officer   |
| SRDI  | – Soil Resources Development Institute                     |
| TSEL  | – Technaf Solartech Energy Limited                         |
| ToR   | – Terms of Reference                                       |
| UNCED | – United Nations Conference on Environment and Development |
| UNDP  | – United Nations Development Programme                     |
| USEPA | – United States Environmental Protection Agency            |
| WB    | – World Bank   |

**Units**

|          |                       |
|----------|-----------------------|
| dB       | – Decibel             |
| PPM      | – Parts Per Million   |
| Hr       | – Hour                |
| Kg       | – Kilogram            |
| Km       | – Kilometer           |
| KW       | – Kilowatt            |
| M        | – Meter               |
| Mg       | – Milligram           |
| Ton/year | – Ton per Year        |
| MT/year  | – Metric Ton per Year |

# Volume-I

## 0. EXECUTIVE SUMMARY

### 0.1 Introduction

Power generation and supply is one of the vital issues in Bangladesh to support its ongoing development efforts. Having 149.8 million people, electricity demand is increasing day by day; and the generation of electricity has to increase to meet the demand. The industrial production which is driven by economic growth, needs more and more power. Thus, foreign and local investments are being encouraged in the power sector by GOB. The Sixth Five Year Plan contains information on demand-supply gap for electricity, source of electricity supply, use of different types of energy, electricity generation program and strategy for power generation.

The GOB's Renewable Energy Policy envisaged that 5% of total energy production by 2015 and 10% by 2020 were to be supplied from renewable sources. To achieve these targets, GOB is looking for various options for 'Renewable Energy' resources. Government has already launched the '500MW Solar Power Mission' to promote the use of Renewable Energy. Considering the immense opportunities, Technaf Solartech Energy Limited (TSEL) has established a solar photovoltaic (SPV) power plant at Alikhali, South Nhilla, Cox's Bazar with 20 MW (28 MWP) capacity, as a 20 years facility to supply power to BPDB at an agreed rate.

The TSEL project is no longer a 'Greenfield' project and it has gone into operation recently. The project received clearance from Nhilla Union Parishad on September 20, 2016 and site clearance from the DOE (Department of Environment) on September 17, 2017; allowing the construction of the project to proceed. TSEL signed the Power Purchase Agreement with BPDB (Bangladesh Power Development Board) on February 9, 2017. It also received registration from BIDA (Bangladesh Development Authority) on March 30, 2017. The environmental clearance certificate from DOE for the project was obtained on September 20, 2018. The project was financed by bridge loans from different lenders. TSEL now is applying for financing from Investment Promotion and Financing Facility (IPFF-II) of Bangladesh Bank. This ESIA has been prepared based on the ESPP (Environmental and Social Policy and Procedure) guidelines for the IPFF-II project of Bangladesh Bank.

The project is categorized as a 'Medium Risk' project as per provisions of the ESPP document for the IPFF-II project and in "Category B" according to World Bank Policy OP4.03 applicable to the IPFF-II project. This is an "Orange B" category project according to Environment Conservation Rules 1997 (i.e., amendment as per SRO No. 349-act/2017).

An Environmental and Social Audit was conducted by Bangladesh Centre for Advanced Studies (BCAS) in January 2020 covering the reporting period of September 2017 to October 2019; as part of the ESIA study. The primary objective of this audit was to assess the compliance status of the Project and its various components with respect to the agreed ESAP, Operations Phase Environmental & Social Management & Monitoring Plan (ESMMP) of the

ESIA, and applicable Performance Standards of World Bank. Out of 19 ESAP items, 7 items have been observed to be in need for further improvement to comply fully. Besides, BCAS Team has identified 19 out of 54 World Bank PS items in which TSEL should start working on improvement. Since, this was the first environmental and social audit for TSEL, attempts were made to observe as many items as possible for improvement, in an overall or gross perspective. TSEL management has agreed to address the audit observations in the shortest possible time and report in its next ES monitoring report. Detailed audit report is given in Annex 17.

## 0.2 Background of the proposed project

### 0.2.1 Project Justification and Purpose

Bangladesh's total installed electricity generation capacity (including captive power and renewable energy) was 22,562 MW as of October 2019. As of 2019, about 94% (including renewable energy) of the population had access to electricity and per capita generation has increased to 510 kWh (including captive power and renewable energy).<sup>1</sup> GOB is looking for various options for Renewable Energy resources, as under the existing generation scenario of Bangladesh, Renewable Energy has a very small share of the total generation currently; and the share does not exceed 1%. The present government has placed priority on developing Renewable Energy resources to improve energy security and to establish a sustainable energy regime alongside of conventional energy sources, as per its plan.

### 0.2.2 Project Location

The site of the project is located at South Nhilla Alikhali village of Nhilla Union, Teknaf Upazila of Cox's Bazar district. The geographical location of project site in respect of coordinates is shown below:

|           |                |               |
|-----------|----------------|---------------|
| SW Corner | 20°58'47.92"N, | 92°15'7.16"E  |
| SE Corner | 20°58'40.34"N, | 92°15'29.02"E |
| NW Corner | 20°59'12.33"N, | 92°15'16.55"E |
| NE Corner | 20°59'9.36"N,  | 92°15'25.90"E |

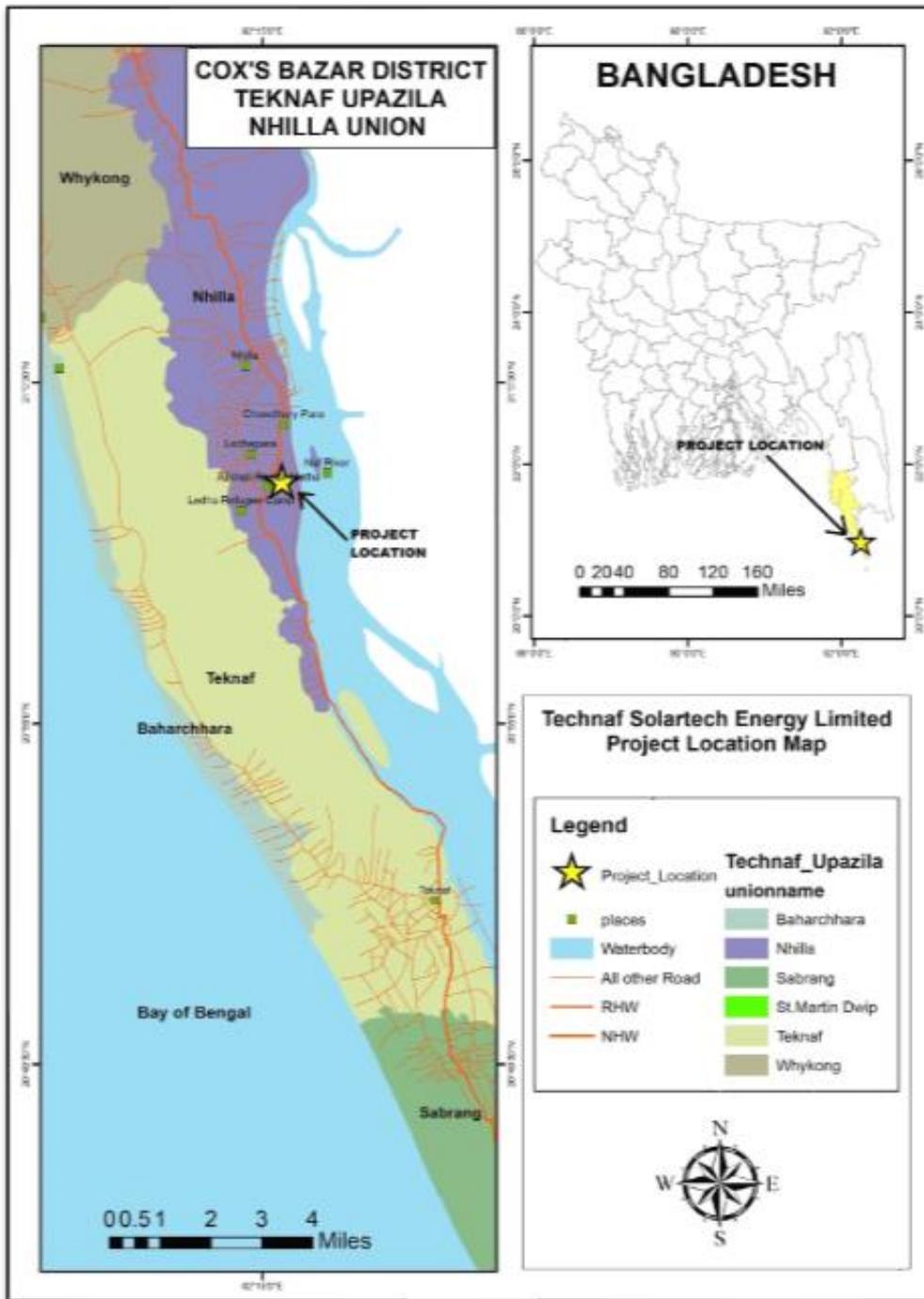
The latitudes and longitudes of the project site are given above. The boundaries of the plant location are: salt cultivation land on the north, north-west, east and south side of the project site, a few low land parcels have been found on the north-east, south-east and south-west boundaries, a salt factory and a brick field are situated to the south-west of the project site, River Naf flows along the eastern side of the project site. A bituminous carpeted road passes

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<sup>1</sup> BPDB Annual Report 2018-19

adjacent to the western boundary of the project site. The project is located on 116.87 acres of land leased from 75 landowners for a period of 24 years. The lease from willing landowners was negotiated and rate for rent was agreed in 2017 (details in [Annex-3](#)). There was no coercion either physical or mental in the process. It is further to be noted that some of the land of the project site were previously used for salt cultivation, for which the landowners dug a private canal to bring saline water inside their lands. The canal inside the project boundary is completely owned by the concerned landowners – the canal is not located on any khas (i.e., public) land. TSEL has decided to conserve the canal.

It may be noted here that ONE Bank Limited conducted environmental and social risk due diligence regarding leasing of land and ensured that no involuntary land acquisition and resettlement occurred. Landowners voluntarily leased out their lands for better income; since most of the land was barren and of no use and some land was used for salt cultivation occasionally; these activities did not provide much income.



**Map 1: Location Map of the Solar Power Plant Project**

### 0.2.3 Project Cost

The total project investment for TSEL is BDT 3,016.59 Million. Major cost elements are land and site development, factory building construction, procurement of machineries and equipment, mechanical and electrical works. Detailed breakdown of the project cost is shown in [Table 2.6 \(Vol-II\)](#).

## 0.2.4 Project Description and Associated Activities

The project sponsor took lease of the land for the purpose of installation of the plant; measuring about 117 acres at the project site. Number of workers required during the construction period peaked during the civil construction, which has now ended. The manpower requirement during the operation phase of the project is approximately 16 employees with 4 support staff and 26 Ansars as outsourced security personnel. Because of the low ES impact stipulated for the project, an impact zone of 1 km radius has been considered. Land use type within 1km radius of the project area, for environmental and socioeconomic study in compliance with the regulations, is a mix of agricultural lands, salt fields, homesteads and fallow lands. For biodiversity assessment impact zone considered is of 5km radius. Table 0.1 below depicts the key project Information:

**Table 0.1: Key Project Information**

|   |  |
|---|--|
| <b>Project Company</b>                            | Technaf Solartech Energy Limited (TSEL)  |
| <b>Type of Business</b>                           | Electricity generation and feeding to the gridline   |
| <b>Corporate Office Address</b>                   | Technaf Solartech Energy Limited, 2nd Floor, Colloid Center, 206/A, Tejgaon Industrial Area, Dhaka 1208. |
| <b>Plant Type and Capacity</b>                    | Photovoltaic solar power generation of 20 MW capacity.   |
| <b>Location</b>                                   | Village: South Nhilla Alikhali, Union: 2 No. Nhilla, Upazila: Teknaf, Zilla: Cox's Bazar                 |
| <b>Plant installation area</b>                    | 117 acres of Land  |
| <b>Electricity coverage area</b>                  | Transmission to the National Grid  |
| <b>No. of beneficiaries</b>                       | All over Bangladesh  |
| <b>Major Equipment</b>                            | Polycrystalline silicon solar modules, grid-tie string inverters.  |
| <b>Installation and Supervision</b>               | Installation by TSEL and Supervision by Sgurr Energy India Pvt. Ltd.                                     |
| <b>Operation and Maintenance</b>                  | TSEL   |
| <b>Clearance from Nhilla UP</b>                   | September 20, 2016   |
| <b>Date of power purchase agreement with BPDB</b> | February 9, 2017   |
| <b>Date of Approval by BIDA</b>                   | March 30, 2017   |
| <b>Date of Site Clearance by DOE</b>              | September 17, 2017   |
| <b>Date of commencement of construction</b>       | September 2017   |
| <b>Date of start of operation</b>                 | September 15, 2018   |
| <b>Environmental Clearance Certificate by DOE</b> | September 20, 2018   |
| <b>Issue of Factory License</b>                   | March 25, 2019   |

|  |               |
|--|---------------|
| <b>by DIFE</b>                             |               |
| <b>Issue of Trade License by Nhilla UP</b> | July 01, 2019 |
| <b>Issue of Fire License</b>               | July 01, 2019 |

### **Power Generation through Solar PV Modules**

Solar panels, also known as modules, contain photovoltaic cells made from silicon that transform incoming sunlight into electricity rather than heat (“Photovoltaic” means electricity from light — photo = light, voltaic = electricity). Solar photovoltaic cells have structure such that electrical voltage is created between the two sides of the cell surface on exposure to solar radiation. These cells are wired in series to form a solar photovoltaic array. Depending on the size of the installation, multiple strings of solar photovoltaic array cables terminate in one electrical box, called a fused array combiner. Contained within the combiner box are fuses designed to protect the individual module cables, as well as the connections that deliver power to the inverter. The electricity produced at this stage is DC (direct current) and must be converted to AC (alternating current) suitable for use. A flow diagram of power generation through solar PV is shown in Figure 1 of the main text.

The inverter is typically located in an accessible location, as close as practical to the modules. Since inverters make a slight noise, this should be taken into consideration when selecting the location. The inverter turns the DC electricity generated by the solar panels into 400-volt AC, that can be put to immediate use by connecting the inverter directly to a dedicated circuit breaker in the electrical panel. The inverter, electricity production meter, and electricity net meter are connected so that power produced by solar electric system will first be consumed by the electrical loads in the plant. The balance of power produced by solar electric system passes through electrical panel and out onto the electric grid through a transformer.

The Project Layout Plan and overall process flow diagram of TSEL are shown in [Annex 2](#).

### 0.3 Environmental Policy, Legislative and Institutional Framework

The applicable reference framework has been followed for the study is as follows:

- Bangladesh Environment Conservation Act' 1995 (Amended 2010) and the Environment Conservation Rules ' 1997 (Amended 2002).
- ESPP document for the IPFF-II project; Environmental and Social Performance Standards refer to the “World Bank Performance Standards”, which are IFC Performance Standards on Environmental and Social Sustainability adopted as the “World Bank Performance Standards” in 2013 pursuant WB Operational Policy 4.03.
- World Bank Group Environmental, Health, and Safety (EHS) Guidelines and ESRM Guidelines issued by BB in February 2017 will be applicable during IPFF II implementation.

As per Environment Conservation Rules ' 1997 (amended 2017) this type of industry has been categorized as “Orange B”. An Initial Environmental Examination (IEE) was carried out for this power plant as per regulation of Department of Environment under Ministry of Environment, Forest and Climate Change for obtaining site clearance. The Site Clearance Certificat (SCC) was issued on 17/09/2017. An Environmental Impact Assessment (EIA) is a formal requirement for the power plant according to the Bangladesh Environment Conservation Act' 1995 (Amended 2010) and the Environment Conservation Rules ' 1997 (Amended 2002, 2017).

As per ESPP document of the IPFF-II project, the following WBG PSs are triggered for TSEL sub-project.

**Table 0.2: Triggering of the WBG Performance Standards (PS)**

| Sl. | PS and Title  | Triggered | Not Triggered |
|-----|---|-----------|---------------|
| 1.  | PS1: Assessment and Management of Environmental and Social Risks and Impacts          | √         |               |
| 2.  | PS2: Labor and Working Conditions   | √         |               |
| 3.  | PS3: Resource Efficiency and Pollution Prevention                                     | √         |               |
| 4.  | PS4: Community Health, Safety, and Security   |           | √             |
| 5.  | PS5: Land Acquisition and Involuntary Resettlement                                    |           | √             |
| 6.  | PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources |           | √             |
| 7.  | PS7: Indigenous Peoples   |           | √             |
| 8.  | PS8: Cultural Heritage  |           | √             |

Detailed information on triggering of WB performance standards are shown in [Table 3.5](#).

#### **0.4 Approach and Methodology**

Based on the above Scope of Work, the study built upon the baseline survey carried out by BCAS as Environment and Social Consultant for the Environmental and Social Impact Assessment (ESIA) during March 2017 to September 2017. The initial ESIA was carried out to comply with the TOR provided by TSEL to the consultants to comply with the conditions of the DOE ECA 1995 and ECR 1997 for the Site Clearance by DoE and approval of ESIA by the DOE. DoE issued the Environmental Clearance Certificate on September 20, 2018.

This ESIA was carried out as a follow up study of IEE and is based on the primary data generated during the period from March 2017 to September 2017. Primary environmental and social data were obtained from various sources and field visits. Several field visits were undertaken to the project location; with a view to update the findings of the baseline study carried out by BCAS. During the study period the following steps were followed:

1. Baseline Survey/monitoring data acquisition of the baseline both environmental and social to carry out the ESIA;
2. Understanding the technical aspects of the power plant through primary field data, secondary literature and stakeholder consultations;
3. Identification of potential environmental impacts and evaluation of the consequences through the use of a checklist;
4. Identification of impacts was undertaken, using the Checklist Matrix and Issues forecasting tabular methods;
5. Discuss with the people living in the plant area, on the mitigation measures suggested in the ESIA; through stakeholder's consultations and general public consultation;
6. Development of an Environmental and Social Management Plan (ESMP) for possible mitigation/ enhancing measures, respectively, for negative and beneficial impacts;
7. Suggestion of mitigation measures for residual impacts;
8. Completion of a comprehensive social impact assessment through primary data collection;
9. Primary data collection from 30% of the total households within 1 km radius of the project area included in the baseline study carried out by BCAS. The criteria for choosing 30% of households within 1 km radius of the project site was judgment based on the expected picture required for the specific study. Additionally, the area is in a mixed rural cum industrial zone. A power plant and few brick fields are situated near the power plant. In choosing the households, only the nearby rural households were chosen, as they are going to be affected most during construction and operation. A number of Focus Group Discussions (FGDs) with the different categories of stakeholders were held including women;

Detailed environmental and socio-economic baseline survey was undertaken throughout the high impact zone (0.4km radius), and low impact zone (0.6km radius) of the project air-shed.

The basis was that the impact of the project was not expected to exceed the considered radius both from the environmental and socio-economic impacts due to the project. This is evident from the findings in the anticipated environmental impacts of this study which shows that they are well within the DOE standards. During the mapping exercise, in-depth consultations with local stakeholders were carried out to aid accurate identification of suitable plots. Use of maps and also utilization of the historic maps was undertaken for identifying the plots and ground level. Field verification was undertaken by the team leader, after the field data collection. Updated GIS version was applied to finalize the land use map.

List of studies and work streams required for compliance with the applicable WBG PSs are given in the table below. Larger studies are included as standalone annexes and others are integrated in the chapters.

**Table 0.3: List of studies and work streams**

| <b>Study Topics</b>  | <b>Application WBG PS, ESHG or other national/international guidelines</b>   | <b>Reference Chapter/ Annex</b>   |
|--|--|---|
| Project Justification and Purpose, Project Location, Project Description and Associated Activities | PS1: Assessment and Management of Environmental and Social Risks and Impacts   | <a href="#">Chapter 2</a><br><a href="#">Annex 1, 2, 3, 4, 5 and 6</a>                    |
| Environmental Policy, Legislative And Institutional Framework                                      | PS1: Assessment and Management of Environmental and Social Risks and Impacts   | <a href="#">Chapter 3</a><br><a href="#">Annex 7 and 8</a>                                |
| Project Categorization   | World Bank Environmental and Social Safeguard Policy; Bangladesh Bank IPFF-II ESPP Guidelines; Environment Conservation Rules 1997 | <a href="#">Chapter 3.5</a><br><a href="#">Chapter 3.6</a><br><a href="#">Chapter 3.7</a> |
| Triggering of WB Performance Standards   | PS1-8  | <a href="#">Chapter 3.8</a>   |
| Stakeholder Consultation, KII, FGD and public consultation   | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS4: Community Health, Safety, and Security        | <a href="#">Chapter 4.5</a><br><a href="#">Annex 9</a>                                    |
| Environmental And Social Baseline Study  | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS6: Biodiversity                                  | <a href="#">Chapter 5</a><br><a href="#">Annex 10, 11, 12, 13 and 15</a>                  |

| Study Topics                                       | Application WBG PS, ESHG or other national/international guidelines   | Reference Chapter/ Annex   |
|--|---|--|
|  | Conservation and Sustainable Management of Living Natural Resources   |  |
| Analysis Of Alternatives                           |   | <a href="#">Chapter 6</a>  |
| Risk Analysis and Identification                   | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 7</a>  |
| Impact Identification And Evaluation               | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 8</a>  |
| GHG Emission                                       | PS3: Resource Efficiency and Pollution Prevention   | <a href="#">Chapter 8.5.3</a><br><a href="#">Annex 14</a>                            |
| Mitigation Measures                                | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 9</a>  |
| Environmental And Social Management Program (ESMP) | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS2: Labor and Working Conditions to be done<br>PS3: Resource Efficiency and Pollution Prevention | <a href="#">Chapter 10</a>   |
| Monitoring, Evaluation And Reporting               |   | <a href="#">Chapter 11</a>   |
| Labor Assessment                                   | PS2: Labor and Working Conditions   | <a href="#">Chapter 11.6</a><br><a href="#">Annex 16</a><br><a href="#">Annex 19</a> |
| Environmental and Social Audit                     | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 11.7</a><br><a href="#">Annex 17</a>                             |
| Environmental and Social Action Plan (ESAP)        | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 11.8</a><br><a href="#">Annex 18</a>                             |

An extensive stakeholder's consultation process was undertaken through FGDs, KIIs and one large general public consultation meeting. In general, there were no negative notions about

the project in the area. However, there were certain queries about the opportunities for employment and benefits in the future from the project. The consultants and the management of TSEL, explained the mitigation measures that are being taken to mitigate the issues raised and on the benefits.

There was no resettlement issue; as the land for the project was leased from the willing owners. There was also no livelihood restoration issue, as the rental incomes are higher than the incomes from earlier land use i.e., for dry season salt making from sea water. There were no agricultural workers or sharecroppers in the land leased by TSEL.

## **0.5 Environmental and Social Baseline Study**

The ESIA primarily comprises of a detailed baseline analysis through measurements of different environmental parameters like air quality, noise level and the quality of ground and surface water in the vicinity of the project site. Based on the baseline data, the impact the project's impact has been analyzed through predictive models. Identification of the potential impacts have been made and the mitigation measures have been suggested; which if undertaken will meet the regulatory standards of the DOE as per Environmental Conservation Rules of 1997 and later amendments and ESPP document of the IPFF-II project. The anticipated impacts have been analyzed for the pre-construction phase, construction phase and operation phase.

### **0.5.1 Baseline Environmental Condition**

As the project is a Solar PV power plant, the impacts during construction were minor as expected. Particulate matter in the form of dust was the predominant pollutant, affecting the air quality during the construction phase. Dust was generated mainly during excavation, back filling and hauling operations along with transportation activities. The main source of gaseous emission during the construction phase was movement of equipment and vehicles at the site. Equipment deployed during the construction phase resulted in marginal increase in the levels of SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter (PM). The impacts have disappeared, now that the construction has been completed.

Small quantities of ground water will be used for cleaning the solar panels. So, lowering of groundwater table will not be an issue. There shall be minimal discharge of wastewater from the cleaning of Solar PV modules. Small amount of wastewater can be discharged in the canal within the project site, hardly with any impact because of tidal flow.

There was no local transportation congestion due to the construction activities of the Project. During construction activities, there was some influx of labor and a temporary labor shed was constructed with basic amenities for the laborers working on the project. At the peak of construction activities, the labor population was 250.

### **0.5.2 Baseline Socio-Economic Condition**

This study has identified social impacts of the project on the local community in the identified project impact area. Alikhali village under 7 and 8 Wards of Nhill Union have

been surveyed and the extent of impacts have been confirmed during the field assessment and stakeholder meetings; documents of relevance to this study were collected and data from the same were utilized in developing this social baseline. Bangladesh Population Census 2011 Data for Cox's Bazar District were collected and reviewed during this site assessment.

As per the survey data it can be observed that almost 28.22% of the respondents are students followed by housewife (22.28%), businessman (11.88%), farmer (8.42%), labor (7.92%), service holder (i.e., office and factory workers) (4.46%) and others (1.49%) in the study area. There is only 1% of the population who are unemployed. But almost 14.36% of the population are not fit for any occupation as they are too old or too young to work. Among the 7.92% labor, there are rickshaw-pullers, construction workers, agricultural labor, and electricians etc.

Gender analysis of this study has depicted the conventional patriarchic scenario of rural Bangladesh. Women are found lagging behind in education and job opportunities, compared to men. Majority of the women respondents were housewives or involved in household activities.

## **0.6 Analysis of Alternatives**

The three potential alternatives, namely (i) No Project; (ii) Alternative Technology and (iii) Alternative Sites, are examined here.

### **0.6.1 No project Alternative**

The "No Project" option will deprive the country of the green energy project; as Bangladesh is striving towards increasing the share of renewable energy in the electricity production, with specific long term targets.

### **0.6.2 Analysis of technology alternatives**

For a solar power plant having 20 MW capacity, the use of PV modules is more viable compared to other available technologies.

### **0.6.3 Analysis of site alternatives**

There is a general scarcity of land availability in the country, without resettlement issues and existing land use for income generation, through agriculture and other activities. Moreover, it is difficult to come to a long-term lease arrangement for projects. If the land had to be purchased, the project would not be financially viable. Additionally, the land at the project location was mainly barren, with some salt production activities during dry season, with low income generation; and thus, the landowners were willing to go into long-term lease arrangement with the project sponsors for better incomes. Considering these facts, the project site chosen was the only viable alternative.

## **0.7 Risk Analysis and Identification**

Risk analysis and identification has been carried out for the pre-construction, construction and operation phase of the project. The analysis shows that during pre-construction and

construction phases the risks are medium. For the operation phase, the risks are low. Thus, the overall project has been classified in the ‘Medium Risk’ category.

## **0.8 Impact Identification and Evaluation**

The project has overall positive impacts by providing a competitive, cost-effective, pollution free reliable mode of Solar PV power. It will help to meet the increasing demand for ‘Renewable Power’ to mitigate GHG emission.

### **0.8.1 Impacts during Construction Phase**

The environmental impact during construction phase was localized and of short-term duration. The former barren land, has settled down to a new ambient due to the project; with the area covered with the PV solar panels with a nice view. The construction related impact was primarily related to the civil works and some noise due to use of the erection of the equipment. With the completion of constructions, the impacts have disappeared.

### **0.8.2 Impact during Operation Phase**

During operation phase the impacts on environment are expected to be minimal. Importance issues in the operation phase are E-waste management, hazardous waste storage (i.e., expired Lead-acid batteries), transportation, treatment and disposal.

### **0.8.3 Mitigation Measures**

Damaged solar panels are categorized as hazardous waste. So, proper management mechanism should be adopted. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensured that panels are kept in cover, so that there is no contamination of ground and water through leaching.

VRLA batteries contain Lead which is harmful to the environment. So, expired batteries will be well stored and disposed through DOE approved battery recycling facilities.

Third party waste contractor collects waste on regular basis. Scrap wastes such as scrap metals which are sold to the scrap vendors, should be kept in a confined space to avoid any incidents or accidents and to ensure workers’ health and safety. Waste disposal register has to be maintained and regular auditing of the waste disposal has to be done. It is to be ensured that DoE approved waste contractors are utilized for handling, treating, and disposal of hazardous waste; and also agencies licensed by the other relevant regulatory authorities ; and these have to be done following good international industry practices for the wastes being handled.

## **0.9 Environmental and Social Management Program**

TSEL has implemented responsible environmental management in the construction phase; and it is committed to operating the power plant in an environmentally responsible manner and in compliance with relevant environmental laws, regulations, and guidelines in force in the country and also those prescribed by lending agencies, including the World Bank and

other financing agencies. TSEL will implement an Environmental and Social Management System (ESMS), including an environmental policy that states the principles and intentions of the enterprise in relation to its overall environmental performance. Such principles and intentions will be communicated to each employee as well as the nature of their individual environmental responsibilities. Where appropriate, staff training will be undertaken to ensure their continued good environmental performance. In addition, TSEL will aim to obtain International Organization for Standardization (ISO) 14001 accreditation for the ESMS within the first three years of operation. TSEL is also committed to the creation and implementation of programs to reduce the probability of occurrence of adverse impacts upon the environment. As required, contingency plans will be developed for mitigating potential adverse incidents. TSEL will expect the same level of environmental performance from its agents, suppliers, and contractors and will stipulate this in any legally binding agreements it enters with these parties. TSEL will also ensure that appropriate corporate resources, personnel and reporting and accountability systems, are in place for the successful implementation of the ESMP. The TSEL management will, on a continuing basis, review the objectives of the ESMP as well as the company's success in achieving these. Where objectives are not being achieved, corrective action will be taken. The ESMP objectives will also be modified over the life of the TSEL as appropriate, to reflect changing environmental laws, regulations, standards, and technologies.

### **0.10 Monitoring, Evaluation and Reporting**

For ensuring the construction and operation of the power plant according to the required compliance standards, appropriate units of the TSEL staff are assigned. The TSEL management will be fully responsible to maintain the safeguard compliance. TSEL has established an environmental/social compliance unit operating under the guidance of Head of Operation. The unit is called Environmental and Social Monitoring Unit (ESMU). The duties of the ESMU will include the following:

- Ensure environmental and social safeguard compliances;
- Coordinate environmental monitoring process;
- Act as liaison with the public, local organizations and government;
- Ensure and supervise record keeping, data storage for follow-up actions;
- Monitor hazardous materials storage and handling;
- Promote environmental awareness and safety measures; and
- Prepare environmental management and periodic monitoring reports as required by DOE.

Important training under the spectrum of ESMU will include:

- Training on firefighting;

- Training on environmental regulations and standards;
- Staff training on environmental monitoring;
- Training on environmental health and safety measure.

As a part of environmental and social compliances, ESMU of TSEL will conduct quarterly monitoring of Environment, Health, Safety & Social compliance on a regular basis. Periodic Monitoring/Auditing reports of the Project will be submitted to Bangladesh Bank and the yearly report will be shared with the WB team.

### 0.11 Public Disclosure of the ESIA document

The draft ESIA report was disclosed in the TSEL website (<https://jpl-bd.com/page/technaf-solartech-energy-limited>) for public comments on December 13, 2020. The final ESIA will be made available at accessible places (e.g. local government offices, libraries, community centers, etc.), and the executive summary translated into local language (Bengali) will be posted in the TSEL and Bangladesh Bank websites. The final ESIA document will be shared with WB for clearance and disclosure according to its procedure. As a part of the disclosure, all final versions (English and Bengali) will be available at the project office in addition to TSEL's website.

### 0.12 Discussions and Conclusion

TSEL (Technaf Solartech Energy Limited) is a 20 MW (28 MWP) SPV Power Plant. It is a non-polluting, GHG saving, economically and socially beneficial project. It saves about 25,000 tons of GHG per year compared to current grid emission of GHG in the country. The ESIA study of TSEL plant at Alikhali, South Nhillia, Cox's Bazar has shown that the all environmental, metrological, geographical, biological aspects are well suited for the project. By analyzing all documents of project such as layout, total land, proposed activities (during construction and operational stage), project cost, utilities required, transportation mode, the ESIA team has found that the possible environmental and social impacts of project can be adequately addressed. The management and monitoring plans for the purpose have been designed. The findings of the ESIA study and recommendations are briefly presented and summarily discussed here.

World Bank categorization, Bangladesh Bank IPFF-II Guidelines and DoE categorization have been followed in the analysis are presented here.:

#### **Environmental and Social Categorization of TSEL:**

The TSEL sub-project is a utility scale 20 MW (28 MWP) solar PV power plant project and the project activities have potential limited adverse environmental or social risks and/or impacts on a number of issues; which are site-specific and largely reversible. These impacts can be avoided or mitigated by adhering to applicable standards, procedures, guidelines and design criteria as described in the relevant WBG and international good

practice documents. The TSEL subproject has therefore, been classified in the Medium Risk Category as per ESPP document for the IPFF-II project (i.e., Category 'B' according to WB OP 4.03).

As per SRO No. 349- act/2017 (24 December 2017) issued by the DOE on the categorization to the Environment Conservation Rules 1997, Solar Power Plants (above 1 MW) fall under category "Orange B". The DOE approved this project under this category.

### ***Construction Related Issues:***

Mechanical erection work involved extensive use of mechanical equipment for earth moving, transportation, erection and on-site fabrication work. These activities generated some air contaminants and noise pollution. These have ceased after the construction completion.

The impact during construction of were minimal. Particulate matter in the form of dust was the predominant pollutant affecting the air quality during the construction phase. Equipment deployed during the construction phase is also likely to result in marginal increase in the levels of SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter. These impacts were marginal and temporary in nature and ceased after construction ended.

The major noise generating sources during the construction phase were vehicular traffic, construction equipment like dozer, scrapers, concrete mixers, cranes, generators, pumps, compressors, rock drills, pneumatic tools, vibrators etc.

The project site was mainly fallow land with some salt fields and there are no major habitats near the site. The impact of the construction activities was primarily confined to the project site. Since, the entire land was barren or salt field with some xerophytic plants, shrubs. Thus, the site development works did not lead to any significant loss of important species or ecosystems. The site has now been transformed into an industrial area with hardly any pollution and has settled down to a new ambient; with the area covered with the PV solar panels with a nice view.

### ***Drainage and Wastewater***

Apart from use by project operational staff, water is used for cleaning the solar panels from time to time as necessary. The wastewater produced is mostly laden with dust settled on the panels. As there are no harmful substances apart from dust in the wastewater, no treatment is required, and it is to be discharged in canal flowing through the site.

### ***Air Quality***

The ambient air quality at the found to compliant with NAAQS (National Ambient Air Quality Standards). As a SPV plant, TSEL power plant will have no air emissions. The plant will, therefore, have no adverse impact on the local air quality.

### ***Water Resources***

Groundwater extracted through two deep tubewells are to be used for domestic water supply in the site and also. As analyzed during the ESIA preparation, the water quality is compliant with drinking water standard. Extraction of a small amount of groundwater will not make noticeable impact on the water balance of the local groundwater aquifer.

### ***Solid Waste***

Impacts of excavations, land development and construction waste generated so far have been dealt with successfully; and the issues that arose, caused only usual short term problems. A storage and transfer station for solid wastes (SW) has been earmarked. Appropriate solid waste management plan has been proposed to ensure safe disposal of these wastes. TSEL has already appointed a third party for final disposal as per DOE regulations.

### ***Traffic***

Traffic congestion and obstruction to pedestrian movement due to vehicular movement and other project activities (e.g., storage of excavated soils/delivery of construction materials and equipment, etc.) was minimal even during construction stage. With the plant in operation, there is no noticable on the local traffic situation.

### ***Occupational Health and safety***

Staffs are trained on various Occupational Health and Safety related training and mock drills. Emergency response plan is in place and responsibilities have been distributed among the employees.

### ***Cumulative Impacts***

This ESIA study finds that most of the adverse impacts resulting from the project during construction phase were moderate and these have ceased at the end of construction. With the plant in operation, the pollution levels are even lower. So, there are hardly any changes in the local pollution levels, as the plant adds little additional pollutants. The cumulative impacts are, therefore, expected to be insignificant.

### ***Land Acquisition***

There was no land acquisition, as the land was leased. Landowners voluntarily leased their lands for better income; and there was no coercion either physical or mental in the leasing process. Since most of the land were barren, these provided hardy any income. Some land

was used for salt cultivation occasionally. which also provided only small income. The overall impact of leasing is increase in the income from the land for the owners.

### ***Environmental and social Management Plan***

An Environmental and Social Management Plan (EsMP), including monitoring requirements, has been developed to ensure implementation of the “mitigation and abatement measures” identified in the environmental assessment. Proper mitigation measures, as proposed in the ESMP, should be followed to reduce the environmental impacts even further; which are low.

### ***Public Participation and Community Concern***

During the operational phase, the project will bring about significant benefit for the nation. Social issues played important role during the construction and likely to do so in the operational phase. The project has generated employment opportunities for local people. Good relationship between the community and the project personnel will be assured through a participatory program.

### ***Labor Management and Occupational Safety***

With end of construction phase, temporary worker were demobilized. Nonlocal employees live in rented accommodation provided by TSEL in Teknaf and the local employees stay in their own homes nearby. TSEL management will take measures to facilitate employment of more female workers in the future. The TSEL HR comply with both OP 4.03 and GOB requirements; and also the ILO conventions to which GOB is a signatory.

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

As proposed in this document, internal and external grievance redress mechanism have been established and a register book for grievance is being maintained. There were no individual or community complaints during construction phase. The GRM mechanism will try to address any complaint amicably; and if required through formal hearings and investigations.

### ***Compliance with PSs and Management Plan***

As TSEL is in operation, an ‘Environmental Audit’ was conducted to see if there are any legacy issues from construction stage. However, no significant issues were found. The Environmental and Social Management Plan (ESMP) proposed in the ESIA document will ensure that the TSEL plant will conform to the Performance Standards set in the OP 4.03. These will be overseen, monitored, and audited by by a dedicated team in the TSEL management. Provision for indicative budget resources have been recommended for the purpose. Staffs are trained on various Occupational Health and Safety related issues and mock drills. Emergency response plan has been made and responsibilities are distributed among the employees.

***Disclosure***

The ESIA document has been disclosed on the website of the Bangladesh Bank ([https://www.bb.org.bd/aboutus/dept/ipff/ipff\\_project.php](https://www.bb.org.bd/aboutus/dept/ipff/ipff_project.php)).

*Finally, it is expected that all necessary information/ evidence contained in this ESIA document are enough to meet all requirements for the operation of the TSEL's facilities in accordance with WB OP4.03 and applicable WBG guidelines and standards.*

# Volume-II

# Main Report

## 1 INTRODUCTION

Government of Bangladesh has set up the goal of providing electricity to all by 2020 and to ensure reliable and quality supply of electricity at a reasonable and affordable price. In line with the Renewable Energy policy 2009, the government is committed to facilitate both public and private sector investment in renewable energy projects. The Renewable Energy Policy set the ambition goal of 5% of total energy production from renewable energy by 2015 and 10% by 2020; which are yet to be materialized. The Government has already launched the ‘500MW Solar Power Mission’ to promote the use of Renewable Energy to meet the increasing demand of electricity. Considering the immense opportunities, Technaf Solartech Energy Limited (TSEL) undertook this project to establish a solar based power plant at Alikhali, South Nhillia, Cox’s Bazar with 20 MW (28 MWP) capacity; as a 20 years facility on a contract with BPDB.

Bangladesh Environmental Conservation Rules (ECR, 1997) and other International Policies require that the environmental and social impacts of development projects are identified and assessed as part of the planning and design process. Based on the magnitude of potential adverse impacts, mitigation measures are to be planned before the implementation of the project. This is done through the environmental assessment process, which has become an integral part of lending operations and project development and implementation worldwide.

The area falling within 5 km distance from the site has been considered as the study area for conducting detailed studies. The ESIA study is presented in this report which is divided into 12 chapters for better understanding. The report structure is as follows:

- Chapter 1:           **Chapter 1: “Introduction”** discusses the need and objectives of the project briefly and the basic ESIA report structure
- Chapter 2:           **Chapter 2: “Background”** discusses about the information of the project, its justification and purposes, project site and area of influence and project context (geographic, ecological, social, health and temporal) as well as additional / associated project components, such as transmission lines, access roads and water supply).
- Chapter 3:           **Chapter 3: “Environmental Policy, Legislative And Institutional Framework”** describes the national policy, legal and administrative framework and also the obligations to international environmental and social treaties, agreements and conventions, the international standards applied to the project, other priorities and objectives for E&S performance identified by the buyer / project sponsor. It also explains the environmental and social requirements of the project investors.
- Chapter 4:           **Chapter 4: “Approach and Methodology”** sets out the approach and methodology used in the ESIA and how the data and information collected has been incorporated in the findings and recommendations.

- Chapter 5: **Chapter 5: “Environmental And Social Baseline Study”** defines the study area delineated for the boundaries of the baseline study. It also describes relevant physical, biological, socioeconomic, health and labor conditions, including any changes anticipated before the project start.
- Chapter 6: **Chapter 6: “Analysis of Alternatives”** identifies and provides justification for the selected design option and location.
- Chapter 7: **Chapter 7: “Risk Analysis and Identification”** identifies the associated risks in the construction and operational phase of the project.
- Chapter 8: **Chapter 8: “Impact Identification And Evaluation”** assesses the project’s likely positive and negative impacts, in quantitative terms to the extent possible.
- Chapter 9: **Chapter 9: “Mitigation/Optimization Measures And Residual Impacts”** provides the set of mitigation and management measures to be taken during implementation of the project to avoid, reduce, mitigate or remedy for adverse social and environmental impacts.
- Chapter 10: **Chapter 10: “Environmental And Social Management Program”** organizes the mitigation and optimization measures into a program of overall activities.
- Chapter 11: **Chapter 11: “Monitoring, Evaluation And Reporting”** outlines the monitoring, evaluation and reporting measures to be put in place to assess the effectiveness of the mitigation measures.
- Chapter 12: **Chapter 12: “ESIA Disclosure”** outlines the modes of public disclosure available.
- Chapter 13: **Chapter 13: “Discussion and Conclusions”** presents a clear statement of the conclusions and actions to be taken to ensure that environmental issues are adequately addressed in subsequent project preparation, implementation, monitoring and evaluation phases.
- Annexures **Annexures** contains some standalone documents as well as some related discussion on topics mentioned in the report.

## 2 BACKGROUND

### 2.1 Project Justification and Purpose

Technaf Solartech Energy Limited (TSEL) has established a grid-tied solar PV power plant at Alikhali, South Nhillia, Teknaf, Cox's Bazar beside Arakan Road, around 0.5 km from the bank of Naf River, 2 km from Teknaf PBS-2, 33/11 kV sub-station at Ledha, Teknaf. The total area of the project site is about 117 acres. TSEL has been chosen to implement and operate a 20 MW Solar Power Plant for supplying power to Bangladesh Power Development Board (BPDB) on an off-take basis; for a contracted period of 20 years. TSEL was qualified for the bid which was an unsolicited one. The required commercial operation date for the project was 12 months from date of signing of project agreements i.e., Power Purchase Agreement and Implementation Agreement. For financing TSEL was expecting to source funds from financial institutions having strong commitment on sustainable development.

Bangladesh has made remarkable progress in electricity generation over the last five years. Power Sector Master Plan 2010 (PSMP-2010) was undertaken to accommodate the government's vision 2020. According to PSMP study, the electricity demand would be 34,000MW by the year 2030. The aggregated investments for the development of the generation, transmission and related facilities are found to be at Taka 4.8 trillion (US\$ 69.5 billion). The annual average of the investment amounts to Tk. 241 billion (US\$ 3.5 billion). The government of Bangladesh had announced a renewable Energy Policy; and also a plan to increase its share in power generation from the-then level of one percent to five percent by 2015 and 10 percent in 2020. It means the country's power production from renewable energy was planned to go up to 650 MW in 2016, when the total power production was expected to be 13,000 MW. Although, the expected increase did not happen quite as planned, substantive increase in generating capacity has taken place.

Bangladesh's total installed electricity generation capacity (including captive power and renewable energy) was 22,562 MW as of October 2019. About 94% (including renewable energy) of the population had access to electricity and per capita generation has increased to 510 kWh (including captive power and renewable energy).<sup>2</sup> Under the existing generation scenario of Bangladesh, Renewable Energy has a very small share of the total generation. The share of Renewable Energy is about 1% currently. The present government is placing priority on developing Renewable Energy resources to improve energy security and to establish a sustainable renewable energy regime alongside of conventional energy sources. Government has already launched '500MW Solar Power Mission' to promote the use of Renewable Energy to meet the increasing demand of electricity. Considering the immense opportunities, Technaf Solartech Energy Limited (TSEL) has established a solar PV power plant at

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<sup>2</sup> BPDB Annual Report 2018-19

Alikhali, South Nhillia, Cox's Bazar of 20 MW (i.e., 28 MWP) capacity with a 20 years power purchase agreement with BPDB.

## 2.2 Project Location

The site of the project is located at South Nhillia Alikhali village of Nhillia Union, Teknaf Upazila of Cox's Bazar district. The geographical location of the project site in respect of GPS coordinates is shown in Table 2.1 below:

**Table 2.1: Location of Plant Site in GPS (Diagonal points)**

| Point            | Coordinate                   |
|------------------|------------------------------|
| Inside the Plant | 20°58'57.02"N, 92°15'19.79"E |
| SW Corner        | 20°58'47.92"N, 92°15'7.16"E  |
| SE Corner        | 20°58'40.34"N, 92°15'29.02"E |
| NW Corner        | 20°59'12.33"N, 92°15'16.55"E |
| NE Corner        | 20°59'9.36"N, 92°15'25.90"E  |

The latitudes and longitudes of the project's site are given above. The boundaries of the plant location are: salt cultivation land on the north, north-west, east and south side of the project site; a few low fallow land parcels are located on the north-east, south-east and south-west boundaries; a salt factory and a brick field are situated along to the south-west of the project site; the River Naf flows along the eastern side of the project site. A bituminous carpeted road passes adjacent to the western boundary of the project site. The Project Location and four side scenarios are shown in [Annex 2](#).

The Land lease activities of TSEL started from January, 2017 and about 116.87 acres of land was taken on lease for the period of 24 years at Alikhali, South Nhillia, Teknaf, Cox's Bazar. The whole land was taken on lease from 75 willing landowners at a negotiated rate. There was no coercion mental or physical in the process. The Land Details with Owners' Name, Dag and Khatian Numbers are shown in [Annex 3](#).

It is further to be noted that some of the land of this project was previously used for salt cultivation, for which the landowners dug a private canal to bring saline water inside their land. The canal inside the project boundary is completely owned by the concerned landowners – the canal is not on any khas (i.e., public) land. TSEL has decided to conserve the canal.

## 2.3 Project Description and Associated Activities

The project has been constructed on land measuring about 117 acres'. The number of workers employed during the construction period was about 250 at the peak; which gradually decreased with the winding down of the civil construction. The manpower currently involved in the plant operation is 20; including professional and technical employees and support staff. Land use type within the project impact area, for environmental and socioeconomic study, is a mix of agricultural lands, salt fields, homesteads and fallow lands. Table 2.2 below depicts the key project information:

**Table 2.2: Key Project Information**

|   |  |
|---|--|
| <b>Project Company</b>                            | Technaf Solartech Energy Limited (TSEL)  |
| <b>Type of Business</b>                           | Electricity generation and distribution through gridline   |
| <b>Corporate Office Address</b>                   | Technaf Solartech Energy Limited, 2nd Floor, Colloid Center, 206/A, Tejgaon Industrial Area, Dhaka 1208. |
| <b>Plant Type and Capacity</b>                    | Photovoltaic solar power generation of 20 MW capacity.   |
| <b>Location</b>                                   | Village: South Nhillia Alikhali, Union: No-2, Nhillia, Upazila: Teknaf, Zilla: Cox's Bazar               |
| <b>Plant installation area</b>                    | 117 acres of Land  |
| <b>Electricity coverage area</b>                  | Transmission to the National Grid  |
| <b>No. of beneficiaries</b>                       | All over Bangladesh  |
| <b>Major Equipment</b>                            | Multicrystalline silicon solar module, grid-tied string inverters.                                       |
| <b>Installation and Supervision</b>               | Installation by TSEL and Supervision by Sgurr Energy India Pvt. Ltd                                      |
| <b>Operation and Maintenance</b>                  | TSEL   |
| <b>Clearance from Nhillia UP</b>                  | September 20, 2016   |
| <b>Date of power purchase agreement with BPDB</b> | February 9, 2017   |
| <b>Date of Approval by BIDA</b>                   | March 30, 2017   |
| <b>Date of Site Clearance by DOE</b>              | September 17, 2017   |
| <b>Date of commencement of construction</b>       | September 2017   |
| <b>Date of start of operation</b>                 | September 15, 2018   |
| <b>Environmental Clearance Certificate by DOE</b> | September 20, 2018   |
| <b>Issue of Factory License by DIFE</b>           | March 25, 2019   |
| <b>Issue of Trade License by Nhillia UP</b>       | July 01, 2019  |
| <b>Issue of Fire License</b>                      | July 01, 2019  |

### 2.3.1 Major Land Use

About 1 km radius of the plant has been surveyed. Administratively, the airshed spreads over Nhilla Union (No.2) of Teknaf Upazila (shown in [Annex 2](#)).

In order to carry out the socio-economic impact, a 1 km radius area from the project location has been surveyed. This was done for the preparation of the ESIA; after the site clearance for the project from the DOE. Administratively, the socio-economic impact zone of 1 km spreads within Nhilla Union of Teknaf Upazila.

In the area, a large fraction of the land (i.e., 34.5%) are salt fields. Besides, a considerable area is covered by the Naf River. Other land use categories within 1 km radius of the project site, include residential settlements, brick kiln, educational institution (college), roads, low land and water body.

Various categories of land use within 1 km radius in the project area are presented in the following Table (Table 2.3):

**Table 2.3: Current Land Use Pattern within 1 km Radius of the Project Area**

| Land Use      | Area (sq. km) | Area (sq. m)        | Percentage     |
|---------------|---------------|---------------------|----------------|
| Agricultural  | 0.2535        | 253,454.16          | 8.07%          |
| Fisheries     | 0.3447        | 344,745.91          | 10.97%         |
| Industrial    | 0.0633        | 63,300.16           | 2.01%          |
| Institutional | 0.0057        | 5,707.37            | 0.18%          |
| Mixed         | 0.0250        | 25,049.73           | 0.80%          |
| Residential   | 0.3191        | 319,083.31          | 10.16%         |
| Road          | 0.0252        | 25,203.90           | 0.80%          |
| Salt Field    | 1.0837        | 1,083,656.08        | 34.49%         |
| Water Body    | 0.8716        | 871,594.87          | 27.74%         |
| Wetland       | 0.1498        | 149,797.63          | 4.77%          |
| <b>Total</b>  | <b>3.1416</b> | <b>3,141,593.12</b> | <b>100.00%</b> |

**Source:** Field Survey data July, 2017

Settlements in the project area includes the homesteads, vegetation with local, indigenous fruits bearing trees. Different occupation groups like farmers, sharecroppers, day laborers, businesses men, service holders (i.e., factory and office workers), rickshaw/van pullers, transport workers live in the area.

### 2.3.2 Accessibility

The site of the Solar Power Plant is situated in the South Nhilla Alikhali Village at Nhilla Union under the jurisdiction of Teknaf Upazila. The distance between Dhaka and the plant is about 445 km by road. Although River Naf is flowing to the east side of the plant, the river acts as boarder between Bangladesh and Myanmar, and hence, river communication is neither suitable, nor feasible. Cox's Bazar to Teknaf Highway passes in the North-South direction to the west of the project site. A bituminous carpeted road adjacent to the western boundary of the project site connects to the highway. Therefore, to reach the plant site, road communication is the most suitable means of access. Volumes of heavy goods can also be transported through the roadway. Means of access and road network around the project site (5 km radius) are presented in [Annex 2](#).

Details of areas surrounding the project site are as under:

The project site is situated in the South Nhilla Alikhali village of Teknaf upazila:

North side: Road, salt field, low land, institutional are (college)

South side: Salt Field, low land, settlements, canal, pisciculture, mixed land use

West side: Road, agricultural land, salt field, settlement and industry (brick field)

East side : Pisciculture, low land and river

### 2.3.3 The Airshed of the Project Area and Land Uses

The 5 kilometre airshed has been considered for assessing the impacts of air pollutants and biodiversity. The 5-kilometre radius air shed has been shown in [Annex 2](#) with the land use within 5 km radius from the project site. Table 2.4 depicts the land use categories for the 5 kilometer airshed of the project site.

**Table 2.4: Present Land Use Pattern for 5 km Impact Zone of the Project**

| Land Use      | Area (sq. km) | Percentage |
|---------------|---------------|------------|
| Agricultural  | 10.35         | 13.18%     |
| Char Land     | 1.02          | 1.30%      |
| Forest        | 0.78          | 1.00%      |
| Hill          | 19.85         | 25.27%     |
| Industrial    | 0.16          | 0.20%      |
| Institutional | 0.01          | 0.01%      |
| Mixed Use     | 0.02          | 0.03%      |
| Residential   | 6.08          | 7.75%      |
| Road          | 0.20          | 0.25%      |

|                |              |                |
|----------------|--------------|----------------|
| Salt Field     | 4.72         | 6.01%          |
| Waterbody      | 15.00        | 19.10%         |
| Wetland        | 1.27         | 1.62%          |
| <i>Myanmar</i> | <i>19.08</i> | <i>24.29%</i>  |
| <b>Total</b>   | <b>78.54</b> | <b>100.00%</b> |

### 2.3.4 Project Facilities and Design

**Environmental considerations:** All power plant design, regardless of the type of power plant, must be in accordance with the rules and regulations which have been established by the relevant national authority. TSEL is committed to comply with all applicable national and international standards. Moreover, the ambient condition of the site is suitable for the solar PV power plant project.

**Water supply:** Water supply should be adequate to meet present and future requirements for the plant. The groundwater available at the site is suited for project use. The project sponsor has constructed 5 deep tube wells for ensuring adequate water supply for cleaning of the solar panels, daily usage and for firefighting needs.

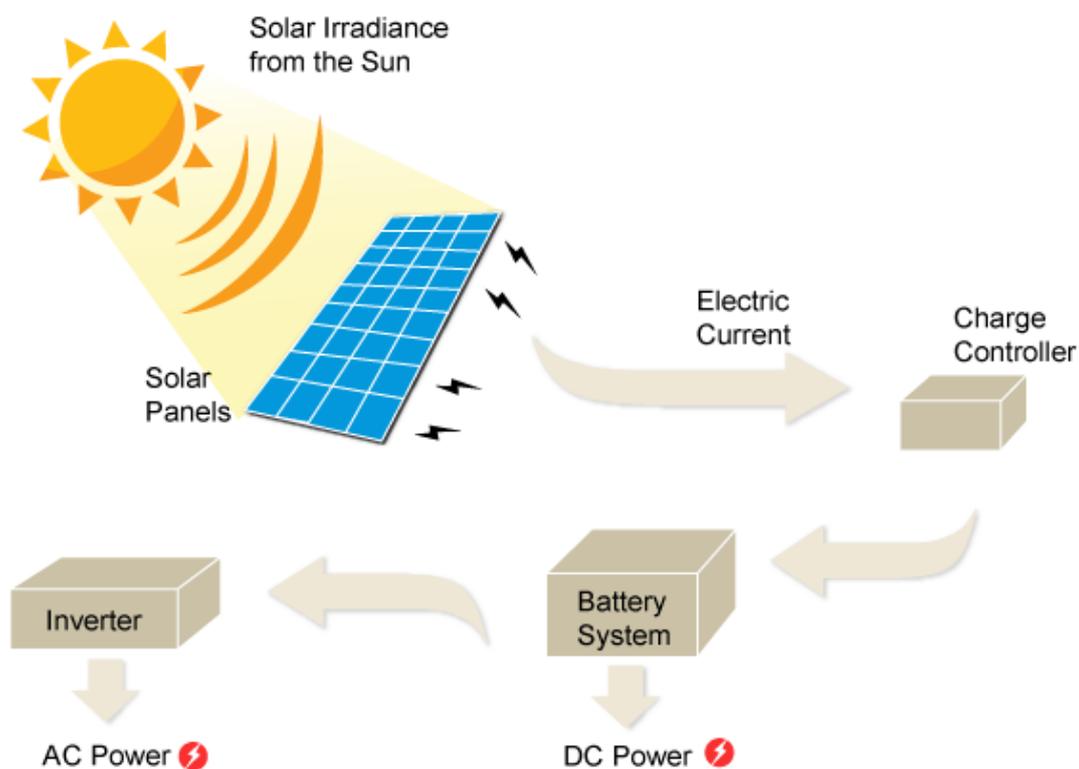
**Wastewater Disposal System:** There will be no generation of liquid effluent from the project except for sewage wastewater, which will be bled into septic tanks. There will be no battery disposal into the water bodies and hence no acid leakage from batteries can contaminate water bodies. Water will be used for cleaning the solar panels from time to time as necessary. The wastewater produced will be mostly laden with dust settled on the panels. As there are no harmful substances apart from dust in the wastewater, no treatment will be required; and the wastewater will be discharged in canal flowing through the site.

**Transmission and Interconnection:** Grid connected inverters will convert the DC output from solar panels to grid quality AC electricity. During daytime, the solar PV modules of 28 MW installed peak capacity will be connected to inverters, which will convert DC power to AC power at 400V and step up from 0.4 KV to 33 KV; which in turn will be feed to the national grid transmission line.

### 2.3.5 Power Generation through Solar Modules

Solar panels, also known as modules, contain photovoltaic cells made from silicon that transform incoming sunlight into electricity. ("Photovoltaic" means electricity from light — photo = light, voltaic = electricity.) Solar photovoltaic cells consist of poly-crystalline silicon placed under a thin slice of glass. As the photons of the sunlight beat down upon these cells, they knock the electrons off the silicon. The negatively-charged free electrons are preferentially attracted to one side of the silicon cell, which creates an electric voltage that can be collected and channeled. This current is gathered by wiring the individual solar panels together, to form a solar photovoltaic array.

Depending on the size of the installation, multiple strings of solar photovoltaic array cables terminate in one electrical box, called a fused array combiner. Contained within the combiner box are fuses designed to protect the individual module cables, as well as the connections that deliver power to the inverter. The electricity produced at this stage is DC (direct current) and must be converted to AC (alternating current) suitable for use.



**Figure 1: Flow diagram for power generation through solar modules**

The inverter is typically located in an accessible location, as close as practical to the modules. Since inverters make a slight noise, this should be taken into consideration when selecting the location. The inverter turns the DC electricity generated by the solar panels into 400-volt AC that can be put to immediate use by connecting the inverter directly to a dedicated circuit breaker in the electrical panel. The inverter, electricity production meter, and electricity net meter are connected so that power produced by solar electric system will first be consumed by the electrical loads currently in operation. The balance of power produced by solar electric system passes through electrical panel and out onto the electric grid.

### 2.3.6 Description of All Project Components per Design Provided by TSEL

The Project Layout Plan and overall process flow diagram of TSEL is shown in [Annex 2](#).

### Solar PV modules and grid connected inverters

Grid connected inverters convert the DC output from polycrystalline silicon solar panels to grid quality AC electricity. During daytime, the solar PV modules are the sources of power generation. PV modules of 28 MW installed peak capacity are connected to inverter, which will convert DC power to AC power at 400V and step up from 0.4 KV to 33 KV and feed to the grid transmission line.

### Project Equipment and Civil Works

TSEL completed the civil construction of the project in February 2018 and equipment installation in June 2018. The technical specification of the project is shown in [Annex 5](#).

#### 2.3.7 Fuel Choice

Technaf Solartech Energy Limited will generate electricity through solar panels. A small quantity of diesel is used for a standby generator, which is used in case of power outage after sunset. Final Product

Final product is electricity with a yearly estimated production of 43,794,720 KWh.

#### 2.3.8 Utility Demand

Water and electricity are necessary for this project both at construction and operational phase. These are shown in Table 2.5 below:

**Table 2.5: Utility Consumption during Construction and Operational Phases**

| Construction phase |                        | Operational Phase              |                          |                   |
|--------------------|------------------------|--------------------------------|--------------------------|-------------------|
| Utilities          | Quantity               | Utilities                      | Quantity                 | Source            |
| Water              | 10 m <sup>3</sup> /day | Water                          | 22.5 m <sup>3</sup> /day | DTW               |
| Electricity        | 85 KW                  | Electricity                    | 50 KW                    | From own source   |
|                    |                        | Diesel for Emergency Generator | 33 liter Diesel per day  | Locally purchased |

#### 2.3.9 Project Schedule

The project is concern with construction and operation phases. It had designed a 3 months construction. Operational period designed with average 5.35 hours/Day working of yearly 365 days for 20 years life-time. The maintenance will be in the night-time of any day; as the plant is operational during daytime. The project schedule is shown in [Annex 6](#).

#### 2.3.10 Project Cost

Power plant set up is a matter of cost and this total project investment associated with IPFF-II is BDT 3,016.59 Million. Major cost elements are land and site development, factory

building construction, procurement of machineries and equipment, mechanical and electrical works. The following table shows the breakdown of project cost:

**Table 2.6: Detailed Breakdown of Project Cost**

| Items   | Amount in Million BDT | Amount in Million USD |
|---|-----------------------|-----------------------|
| Land & development cost / expenses prior to COD | 128.36                | 1.52                  |
| Building & Civil Works                          | 511.79                | 6.06                  |
| Imported Machinery                              | 2,080.26              | 24.62                 |
| Import Cost (other than bank charges)           | 54.44                 | 0.64                  |
| Local Machinery & Equipment                     | 31.72                 | 0.38                  |
| Furniture, Fixtures, Office Equipment           | 15.39                 | 0.18                  |
| Bank Fee, Commission, Charges, Interest accrued | 131.34                | 1.55                  |
| Other Preliminary & Pre-operating Expenses      | 63.28                 | 0.75                  |
| <b>Total</b>                                    | <b>3,016.59</b>       | <b>35.70</b>          |

### 2.3.11 Generation of Solid, Liquid, and Gaseous Waste

Solid : Solid waste generated to be disposed through DOE approved contactors.

Liquid waste : Used water (domestic & office use, floor washing water), solar panel cleaning, and sewage.

Gaseous waste : SPM, PM<sub>2.5</sub> and PM<sub>10</sub>.

### 2.3.12 Civil Construction

Construction period activities mainly included civil, mechanical and electrical works to set up the plant. The construction activities which were done for the project are given below:

#### 2.3.12.1 Site Preparation

Site preparation comprised land filling of 2 feet and compaction of 1 acre of land. Prior to construction. A 300mm thick carpet of crushed stones was spread in the lay-down areas and on the working surface.

#### 2.3.12.2 Piling

The power plant foundation is based on piles. The piles were cast in-situ type. Design load tests was made on test piles for design purposes (design piles).

### ***2.3.12.3 Foundations***

Foundations were designed according to Bangladesh National Building Code (BNBC), 2006. The design of foundations for all structures and equipment are such that differential and total settlements or other movements would not exceed acceptable limits; and ensure safe and maintenance free operation of the plant. Detail design parameters for the civil works were provided by the relevant consultant. The nature of the filling material and the construction techniques used were such that the less heavily loaded equipment and the buildings could be founded on rafts or spread footings.

### ***2.3.12.4 Storm water drainage system***

The sewage system are designed in accordance with BS EN 752 Parts 1 to 4 "Drain and Sewer Systems Outside Buildings". Manhole and chamber covers are heavy duty throughout. For the storm water drainage, the natural canal is being used. The capacity of the surface water drainage system is sufficient to deal with a storm return period of 1 in 5 years. The surface water drainage includes all necessary gutters, down pipes, gullies, traps, catch pits, manholes etc. The quality of the discharge shall be in compliance with the required statutory limits and standards of Bangladesh.

### ***2.3.12.5 Site wall***

A security wall (barbed wire fence) has been built; which is 3m high around the permanent boundary of the site. The entrances/exits gates are securely built with steel doors.

### 3 ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

#### 3.1 Environmental Policies of Bangladesh

The GOB has developed a policy framework that requires environmental issues to be incorporated into economic development planning. The Key tenets of the various applicable policies are:

- National Environmental Policy, 1992
- National Environmental Management Action Plan, 1995
- National Conservation Strategy, 1992

Table 3.1 presents an outline of other National legal instruments that will have relevance to the Project with respect to the social and environmental considerations.

**Table 3.1: National Legal Instruments relevant to the Project**

| Act/ Rule/ Law/ Ordinance   | Enforcement Agency - Ministry/ Authority                             | Key Features   | Applicability to the Project  |
|---|--|--|---|
| The Environment Conservation Act, 1995 and subsequent amendments in 2000, 2002 and 2010 | Department of Environment<br><br>Ministry of Environment and Forests | <ul style="list-style-type: none"> <li>• Define Applicability of environmental clearance</li> <li>• Regulation of development activities from environmental perspective</li> <li>• Framing applicable limits for emissions and effluents</li> <li>• Framing of standards for air, water, and noise quality</li> <li>• Formulation of guidelines relating to control and mitigation of environmental pollution, conservation, and improvement of environment</li> <li>• Declaration of Ecologically critical areas</li> </ul> | Applicable as the project activity associated with environmental issues |
| Environmental conservation Rules, 1997 and subsequent amendments in                     | Department of Environment<br><br>Ministry of Environment             | <ul style="list-style-type: none"> <li>• Declaration of Ecologically critical areas</li> <li>• Requirement of environmental clearance certificate for various</li> </ul>   | Applicable Projects falls under Red Category and require EIA            |

| Act/ Rule/ Law/ Ordinance                                     | Enforcement Agency - Ministry/ Authority          | Key Features   | Applicability to the Project   |
|---|---|--|--|
| 2002, 2003 and 2010   | and Forests                                       | categories of projects <ul style="list-style-type: none"> <li>• Requirement of IEE/EIA as per category</li> <li>• Renewal of the environmental clearance certificate within 30 days after the expiry</li> <li>• Provides standards for quality of air, water and sound and acceptable limits for emissions/discharges from vehicles and other sources</li> </ul>   | approval prior to start construction and environmental Clearance Certificate prior to start of operation |
| Environment Court Act, 2000 and subsequent amendments in 2002 | Ministry of Environment and Forests and judiciary | <ul style="list-style-type: none"> <li>• GoB has given highest priority to environment pollution</li> <li>• Passed 'Environment Court Act, 2000 for completing environment-related legal proceedings effectively</li> <li>• Provides the Jurisdictions of environment court, the penalty for violating court's order, trial procedure in special magistrate's court, the power of entry and search, the procedure for investigation, procedure and power of environment court, the authority of environment court to inspect, appeal procedure and formation of environment appeal court.</li> </ul> | Applicable for completing environmental legal requirements effectively                                   |

### Renewable Energy Policy of Bangladesh

The renewable energy policy of Bangladesh was approved on December 18, 2008 with the target of developing renewable energy resources. This Policy laid out the target of meeting 5% of total power demand from renewable energy sources by 2015 and 10% by 2020. The policy provides an overall guidance of:

- Institutional arrangements;
- Resource, technology, and program development;
- Investment and fiscal incentives; and
- Regulatory policy.

The policy promotes the appropriate, efficient and environmentally friendly use of renewable energy. It also suggests that for large biomass electricity projects (i.e., greater than 1 MW), the project developer must demonstrate that the biomass is being sustainably harvested and that no adverse social impact will result from that development. It also restricted the larger scale production and use of biofuels which may jeopardize the existing crops.

Details are discussed in [Annex 7](#).

### **3.2 World Bank Operational Policy/Procedure (OP/BP) 4.03 – World Bank Performance Standards for Private Sector Activities**

The World Bank follows an operational policy statement (updated in February 2011), which stipulates that all operations are carried out in an environmentally responsible manner and that projects must comply with all local environment legal obligations and appropriate World Bank guidelines. World Bank Operational Policy / Procedure (OP/BP) 4.03 – World Bank Performance Standards for Private Sector Activities governs the World Bank requirements applicable to IPFF II.

The eight IFC Performance Standards have been adopted by the Bank as the World Bank Performance Standards for Projects Supported by the Private Sector (“WB Performance Standards”) for application to Bank support for projects (or components thereof) that are designed, owned, constructed and/or operated by a Private Entity, in lieu of the World Bank’s safeguard policies (“WB Safeguard Policies”). Details of all performance standards along with applicability with the project has been shown [Annex 7](#).

### **3.3 Safeguard Requirements of Equator Principle Financial Institutions**

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence and monitoring to support responsible risk decision-making. The EPs apply globally, to all industry sectors and to four financial products; 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, and 4) Bridge Loans. The relevant thresholds and criteria for application is described in detail in the Scope section of the EPs.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The ten requirements of the Equator Principle Financial Institutions (EPFIs) are discussed in [Annex 8](#).

### 3.4 Comparative Analysis of World Bank Requirements and Bangladesh Regulatory Framework

Table 3.2 lists some key comparisons between GoB and World Bank policies and guidelines in terms of processes for Environmental and Social Impact Assessment (ESIA), categorization (per Bangladesh DoE), stakeholder engagement, public consultation etc. based on the provisions of Performance Standard 1 (Assessment and Management of Environmental and Social Risks and Impacts).

**Table 3.2: Comparison between GOB and World Bank Policies and Guidelines as Applicable to IPFF II Subprojects**

| Sl. No. | Criteria  | Requirements as Per GoB Laws and Regulations  | World Bank Requirements  |
|---------|---|---|--|
| 1       | Type of environmental and social analysis   | Project specific  | Project specific, regional, sectoral, strategic including impact from associated facilities and assessment of cumulative impacts. The scope of identification of risks and impacts will be consistent with good international industry practice.   |
| 2       | Basis for categorization ( <i>note: IPFF II will follow the E&amp;S risk rating approach prescribed in the BB ESRM Guidelines</i> ) | Categorizations of industrial projects are done according to the list in Schedule-1 of the ECR, 1997. As per rule-7(2) of ECR, these categorizations are based on consideration of their sector, site and impact on the environment. Non-industrial projects are reviewed on a case by case basis by the DoE for clearance. | Categorization depends on the project/business activity being financed, magnitude of risks and impacts, context and also the type of investment, as follows: <ul style="list-style-type: none"> <li>• Significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.</li> <li>• Limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.</li> <li>• Minimal or no adverse environmental or social risks and/or impacts.</li> </ul> |
| 3       | EA /ESIA scope and outputs  | Since detailed rules and regulations for EA have not been   | Establish and maintain a process for identifying E&S risks and impacts of the project, covering the 8 thematic Performance   |

| Sl. No. | Criteria             | Requirements as Per GoB Laws and Regulations  | World Bank Requirements  |
|---------|----------------------|---|--|
|         |                      | <p>prescribed, EA outputs are not specified. However, the industrial sector guidelines, the water sector guidelines and the road sector guidelines have specific EA output requirements, such as:</p> <p>Baseline survey</p> <ul style="list-style-type: none"> <li>• IEE/EIA Report</li> <li>• Site clearance</li> <li>• Risk analysis and management</li> <li>• Analysis of alternatives</li> </ul> | <p>Standards as relevant and applicable and depending on the type, scale, and location of the project. The tools used should be commensurate with the level of potential impact and risks. ESIA process may comprise of the following:</p> <ul style="list-style-type: none"> <li>• A full-scale ESIA, a limited or focused ESIA, or straightforward application of environmental siting, pollution standards, design criteria, or construction standards.</li> <li>• Environmental and/or social audits or risk/hazard assessment when the project involves existing assets.</li> <li>• Environmental and social due diligence if assets to be developed, acquired or financed have yet to be defined.</li> <li>• Comprehensive ESIA, including an examination of alternatives for green-field developments or large expansions with specifically identified physical elements, aspects, and facilities that are likely to generate potential significant environmental or social impacts.</li> </ul> <p>E&amp;S risks and impacts shall be identified in the context of the project's area of influence.</p> |
| 4       | Mitigation hierarchy | Not comprehensively addressed   | <p>Mitigation hierarchy is one of the core underlying principles of the WB approach to identification, assessment, and management of E&amp;S risks and impacts. It is required to adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize,<sup>3</sup> and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.</p>   |

<sup>3</sup> Acceptable options to minimize will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate.

| Sl. No. | Criteria                  | Requirements as Per GoB Laws and Regulations  | World Bank Requirements  |
|---------|---------------------------|---|--|
| 5       | Public consultation       | No special mention is made for public consultation in BECA. Sectoral guidelines mentioned above have prescribed consultation. | <p>Extent and degree of engagement required by the consultation process to be commensurate with the project's risks and impacts to the affected communities. Consultation process:</p> <p>(i) to begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise; (ii) be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information in a language(s) and format understandable to Affected Communities; (iii) focus inclusive engagement on those directly affected as opposed to those not directly affected.</p> <ul style="list-style-type: none"> <li>• For projects with potentially significant adverse impacts on affected communities, it is required to conduct a process of informed consultation and participation by actively engaging with stakeholders throughout the lifecycle of the project</li> <li>• For projects with adverse impacts on Indigenous People the project sponsor is required to engage them in the ICP process and in certain circumstances required to obtain their Free, Prior, and Informed Consent (FPIC) - requirements related to Indigenous Peoples and the definition of the special circumstances requiring FPIC included in PS7.</li> </ul> |
| 6       | Disclosure of information | BECA makes no reference to disclosure. The Sectoral guidelines prescribe some provisions for disclosure                       | Affected communities to be provided with access to relevant information on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such communities and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance   |

| Sl. No. | Criteria  | Requirements as Per GoB Laws and Regulations  | World Bank Requirements   |
|---------|---|---|---|
|         |   |   | mechanism. Project to provide periodic and ongoing updates on status of implementation of the various plans developed as part of the ESA process. Disclosure of relevant information to affected communities to continue during the planning, implementation, monitoring, and evaluation of compensation payments, livelihood restoration activities and resettlement.  |
| 7       | Environmental and Social Management System (for sub-projects) | Environmental Management requirements are established by ECA 95 and ECR 97 but there are no social equivalents. | Environmental and Social Management System will be established for sub-projects and will include the following core elements: <ul style="list-style-type: none"> <li>▪ E&amp;S Policy</li> <li>▪ System for identification of risks and impacts and, in particular, conducting ESIA's</li> <li>▪ Management programs</li> </ul>   |
| 8       | Management Programs and Action Plans                          | Not addressed   | The sub-project will establish management programs that, in sum, will describe mitigation and performance improvement measures and actions that address the identified environmental and social risks and impacts of the project. The management programs will establish ESAPs which will define desired outcomes and actions to address the issues raised in the risks and impacts identification process, as measurable events to the extent possible, with elements such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods, and with estimates of the resources and responsibilities for implementation. As appropriate, the management program will recognize and incorporate the role of relevant actions and events controlled by third parties to address identified risks and impacts. |

### 3.5 World Bank Categorization of Projects

The Bank screens the Private Sector Activity in order to determine the nature and extent of the environmental and social assessment needed, based on the type, location, sensitivity, and scale of the activity, as well as the nature and magnitude of its potential impacts. This screening also identifies any additional information required to complete the Bank's environmental and social review and determine whether to support the activity. The Project Activity is categorized by the Bank under OP4.03 as Category A, B, C, depending on the nature of the activity and financing mechanism, as follows:

**Table 3.3: World Bank's Categorization for Projects**

| Category    | Justification   |
|-------------|---|
| Category A  | Projects are those whose impacts are sensitive, diverse, and unprecedented, felt beyond the immediate project environment and are potentially irreversible over the long term.  |
| Category B  | Projects involve site specific and immediate project environment interactions, do not significantly affect human populations, do not significantly alter natural systems and resources, do not consume much natural resources and have adverse impacts that are not sensitive, diverse, unprecedented and reversible. |
| Category C  | Projects are mostly benign and are likely to have minimal or no adverse environmental impacts.  |
| Category FI | A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.  |

*Source: World Bank Environmental and Social Safeguard Policy*

The TSEL sub-project is a utility scale (28 MWP) solar PV power plant project and the project activities have potential limited adverse environmental or social risks and/or impacts on a number of issues; which are site-specific and largely reversible. These impacts can be avoided or mitigated by adhering to applicable standards, procedures, guidelines and design criteria as described in the relevant WBG and international good practice documents. The TSEL subproject may therefore be classified in the Category 'B' according to WB OP4.03.

### 3.6 E&S Risks Rating as per Bangladesh Bank IPFF-II Guidelines

E&S risk rating considers multiple factors that PFIs shall take into account in their risk exposure with regard to E&S issues, including its reputational and contextual risks. The ESPP document for the IPFF II project provides guidance for sub-project risk rating; which are presented in Table 3.4 below:

**Table 3.4: E&S Ratings of Sub-projects**

| Category    | Description   |
|-------------|---|
| High risk   | Sub-projects that are likely to have significant adverse E&S impacts that are diverse, irreversible, or unprecedented.<br>Examples of significant impacts can be impacts on critical habitats, impacts on vulnerable groups or ethnic minorities, large-scale involuntary resettlement or economic displacement, or critical cultural heritage.<br>PFIs will always rate sub-projects that may involve activities on the List of E&S Sensitive Activities as High risk. It should be noted that there may be other high risk situations beyond those included in this List. Therefore, E&S risk rating will be based on a confluence of various factors in specific sub-project circumstances where sector of operation represents only one of many considerations. Both specific nature of impacts and their scale should be considered. |
| Medium risk | Sub-projects that are likely to have adverse E&S impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures and international best practice. Potential adverse environmental and/ or social impacts on communities or environmentally important areas are smaller in scale than those of High Risk transactions.   |
| Low risk    | Sub-projects that do not have the characteristics of High or Medium risk sub-projects are classified as Low risk category and typically involve business activities with minimal or no adverse E&S impacts.<br>While PFIs would have Low risk rating within their overall ESMS, IPFF II sub-projects may not be rated Low risk.   |

Source: Bangladesh Bank IPFF-II ESPP Guidelines

The ESIA prepared in line with IPFF-II guidelines indicates the risks to the local environment during pre-construction and construction phase is Medium due to generation of dust and intermittent noise due to the construction machineries used. These impacts are largely reversible and were mitigated. Therefore, TSEL is assessed to be in the medium risk category.

### 3.7 DoE Categorization

Depending upon location, size and severity of pollution loads, projects/activities have been classified in the Environmental Conservation Rules (ECRs) into four categories:

1. Green,
2. Orange A
3. Orange B
4. Red

As per SRO No. 349- act/2017 (24 December 2017) issued by the DOE on the categorization to the Environment Conservation Rules 1997, Solar Power Plants (above 1 MW) falls under category "Orange B". The DOE approved this project under this category.

### 3.8 Triggering of the WBG Performance Standards (PS) in the present project

The triggering of the WBG Performance Standards (PS) in the present project with explanations are given in the Table 3.5 below. The applicable GOB laws, Rules, Policies, and Guidelines are listed alongside the WBG PS. The International Conventions signed by Bangladesh are also included, as once signed these are equivalent to the laws.

**Table 3.5: Triggering of the WBG Performance Standards (PS)**

| Sl.   | PS and Title  | Triggered | Applicable Bangladesh Laws/Rules and conventions to which Bangladesh is a Party   |
|---|---|-----------|---|
|   |   | Yes/No    |   |
| 1   | <b>Performance Standard 1:</b><br>Assessment and Management of Environmental and Social Risks and Impacts | Yes       | <ul style="list-style-type: none"> <li>• Bangladesh Environmental Conservation Act (ECA95), 1995 and amendments;</li> <li>• Environment Conservation Rules (ECR), 1997 and amendments;</li> <li>• National Environmental Policy, 1992;</li> <li>• National Environmental Management Action Plan, 1995.</li> </ul> |
| <p><b>Explanations:</b> PS1 is an umbrella Standard as Assessment and Management of Environmental and Social Risks and Impacts are important in all projects with land-based activities (i.e. during construction, operation and decommissioning phases). PS1 is triggered in this project. The issues that may pose potential E&amp;S risks and/or impacts include air emissions and GHG benefits, electronic wastes, ecological impacts and engagement of labor etc. These issues have to be assessed to determine the extent of the risks and impacts.</p> |   |           |   |
| 2   | <b>Performance Standard 2:</b><br>Labor and Working Conditions  | Yes       | <ul style="list-style-type: none"> <li>• Bangladesh Factories Act (1965);</li> <li>• Bangladesh Labor Act, 2006;</li> <li>• Bangladesh labor Rules (2015),</li> <li>• Bangladesh Children’s Act 2013;</li> <li>• ILO Conventions 29, 87, 98, 100, 105, 111 and 182.</li> </ul>                                    |
| <p><b>Explanations:</b> PS2 is triggered in this project; as during all phases of the project, labor force will be needed and mobilized, to carry out various duties to construct and operate the project. It is therefore necessary for the Project to maintain appropriate labor and working conditions.</p>  |   |           |   |
| 3   | <b>Performance Standard 3:</b><br>Resource Efficiency and Pollution Prevention                            | Yes       | <ul style="list-style-type: none"> <li>• Bangladesh Environmental Conservation Act (ECA), 1995</li> <li>• Environment Conservation Rules (ECR), 1997 (subsequent amendments in 2002 &amp; 2003)</li> </ul>  |
| <p><b>Explanations:</b> PS3 is triggered in this project; as it will involve use of a lot of resources i.e., raw materials, semi-manufactured, manufactured components and energy. Thus, pollutants</p>   |   |           |   |

| Sl.  | PS and Title   | Triggered | Applicable Bangladesh Laws/Rules and conventions to which Bangladesh is a Party  |
|--|--|-----------|--|
|  |  | Yes/No    |  |
| <p>will be produced and these need to be minimized to comply with standards; resources and energy conservation are also prime needs.</p> <p>Construction works and operational activities are likely to generate wastes during the construction and operation phases; hence PS3 is triggered.</p>  |  |           |  |
| 4  | <b>Performance Standard 4:</b><br>Community Health, Safety, and Security   | No        | <ul style="list-style-type: none"> <li>Bangladesh Environmental Conservation Act (ECA), 1995</li> <li>Environment Conservation Rules (ECR), 1997 (subsequent amendments in 2002 &amp; 2003)</li> </ul> |
| <p><b>Explanations:</b> PS4 is not triggered in the project as there is no adverse effect in terms of water, air, noise, Community Health, Safety, and Security on the local community.</p>  |  |           |  |
| 5  | <b>Performance Standard 5:</b><br>Land Acquisition and Involuntary Resettlement                                    | No        | Acquisition and Requisition Ordinance, 1982.   |
| <p><b>Explanations:</b> PS5 will not be triggered in the project. Land has been leased from landlords on voluntarily basis and no resettlement was required. This Performance Standard does not apply to resettlement resulting from voluntary land transactions (i.e., market transactions in which the seller is not obliged to sell and the buyer cannot resort to expropriation or other compulsory procedures sanctioned by the legal system of the host country if negotiations fail).</p> <p>It is to be noted here that ONE Bank Limited conducted environmental and social risk due diligence regarding leasing land and ensured that no involuntary land acquisition and resettlement occurred. Land owners voluntarily leased their lands for better rent since most of the land was barren and of no use and some land was only used for salt cultivation occasionally; which did not bring much income. At no stage of the process any coercion physical or mental was involved. Therefore, the process of leasing land didn't trigger PS5.</p> |  |           |  |
| 6  | <b>Performance Standard 6:</b><br>Biodiversity Conservation and Sustainable Management of Living Natural Resources | No        | <ul style="list-style-type: none"> <li>Bangladesh Environmental Conservation Act (ECA), 1995</li> <li>Environment Conservation Rules (ECR), 1997 (subsequent amendments in 2002 &amp; 2003)</li> </ul> |
| <p><b>Explanations:</b> PS6 is not triggered in the project as the land was barren and previously only some salt cultivation used to take place in the project area.</p>   |  |           |  |
| 7  | <b>Performance Standard 7:</b><br>Indigenous Peoples   | No        | Chittagong Hill Tracts Regional Council Act, 1998.   |
| <p><b>Explanations:</b> PS7 is not triggered in the project. There are no indigenous people living in the impact zone of the project.</p>  |  |           |  |
| 8  | <b>Performance Standard 8:</b><br>Cultural Heritage  | No        | Antiquities Act, 1968; Convention Concerning the Protection of the World Cultural and Natural Heritage, Paris, 1972 (World Heritage Convention) (Ratified 1983).                                       |
| <p><b>Explanations:</b> PS8 is not triggered in the project. Based on current knowledge, there are no known cultural heritage installations in the project impact area. Existing communities in the</p>  |  |           |  |

| Sl.  | PS and Title | Triggered | Applicable Bangladesh Laws/Rules and conventions to which Bangladesh is a Party |
|--|--------------|-----------|---|
|  |              | Yes/No    |   |
| area do not have significant intangible heritage also. |              |           |   |

## **4 APPROACH AND METHODOLOGY**

### **4.1 General Approach**

Government of Bangladesh has set up the goal of providing electricity to all and to ensure reliable and quality supply of electricity at a reasonable and affordable price. Development of Renewable Energy is one of the important strategies adopted as part of fuel diversification program. In line with the Renewable Energy policy 2009, the government is committed to facilitate both public and private sector investment in renewable energy projects to scale up contributions of renewable energy based electricity productions. To achieve this target, GOB is looking for various options preferably Renewable Energy resources. Under the existing generation scenario of Bangladesh, Renewable Energy has a very small share to the total generation. The share of Renewable Energy is about 1% till now. The present government is placing priority on developing Renewable Energy resources to improve energy security and to establish a sustainable energy regime alongside of conventional energy sources. Government has already launched '500MW Solar Power Mission' to promote the use of Renewable Energy to meet the increasing demand of electricity. Considering the immense opportunities, Technaf Solartech Energy Limited (TSEL) has established a solar based power plant at Alikhali, South Nhill, Cox's Bazar with 20 MW capacity, under a 20 years power purchase agreement with BPDB.

As per Environment Conservation Rules '1997 (amended 2017), Solar PV plants above 1 MW is classified into Orange-B category. An Initial Environmental Examination (IEE) was carried out for this power plant as per regulation of Department of Environment under Ministry of Environment and Forest for getting site clearance. Bangladesh Centre for Advanced Studies (BCAS) was engaged by Technaf Solartech Energy Limited (TSEL) to conduct the IEE and ESIA study for this project. After submitting the IEE to DoE, TSEL has already got site clearance for the project. Bangladesh Centre for Advanced Studies (BCAS) has carried out detailed Environmental and Social Impact Assessment (ESIA) to comply with DoE Guidelines; as well as the WB Operational Policies (OP4.03) and Guidelines and JICA Safeguards Policy for the power plant.

Technaf Solartech Energy Limited (TSEL) has established the grid tied solar power plant at Alikhali, South Nhill, Teknaf, Cox's Bazar beside Arakan Road, around 0.5 km from the bank of Naf River, 2 km from Teknaf PBS-2, 33/11 kV sub-station at Ledha, Teknaf. The total area of the project site is about 117 acres; the whole parcel of land has been taken on lease from the concerned landowners for a period of 24 years. The required commercial operation date for the project was 12 months from date of signing of project agreements i.e., the Power Purchase Agreement and Implementation Agreement.

## **4.2 Methodology**

Based on the above Scope of Work, the study is built upon the baseline survey carried out by BCAS as Environment and Social Consultant for the Environmental and Social Impact Assessment (ESIA) during March 2017 to September 2017. The ESIA was carried out to comply with the TOR provided by TSEL as well as to comply with the conditions of the Site Clearance by DoE.

This ESIA have been carried out as a follow up study of IEE and is based on the primary data generated during the period from March 2017 to September 2017. Secondary data was obtained from various sources and field visits. Several field visits were undertaken to the project location with a view to update the findings of the baseline study carried out by BCAS. During the study period the following steps were followed:

1. Baseline Survey/monitoring data acquisition for both environmental and social issues to carry out the ESIA;
2. Understanding the technical aspects of the power plant through primary field data, secondary literature and stakeholder consultations;
3. Identification of the potential environmental impacts and evaluating the consequences through using a checklist based method;
4. Identification of impacts was undertaken using a Checklist Matrix and Issues forecasting tabular methods;
5. Discuss with the people living in the plant area about the mitigation measures suggested in the ESIA, through stakeholder's consultations and general public consultation;
6. Development of an Environmental and Social Management Plan (ESMP) for possible mitigation/ enhancement measures, respectively, for negative and beneficial impacts;
7. Suggestion of mitigation measures for residual impacts;
8. Completion of a comprehensive social impact assessment through primary data collection;
9. Primary data collection from 30% of the total households within 1 km radius of the project area included in the baseline study carried out by BCAS. The criteria for choosing 30% of households within 1 km radius of the project site was judgmental; based on the expected picture required for the specific study. Additionally, the area is in a mixed rural cum industrial zone. A power plant and a few brick kilns are situated in the close vicinity of the TSEL power plant. In choosing the households, only the nearby rural households were chosen; as they are likely to be affected most during construction and operation. A number of Focus Group Discussions (FGDs) with the different categories of stakeholders were held, including women;
10. Detailed environmental and socio-economic baseline survey was undertaken throughout the potential higher impact zone (0.4km radius), and low impact zone (0.6km radius) of the project airshed. The basis was that the impacts of the project were not expected to exceed the standards in the considered radius both from the environmental and social impacts due to the project. This is evident from the findings in the anticipated environmental impacts of this study, show that these are well within the DOE standards. During the mapping

exercise, in-depth consultations with local stakeholders were carried out to aid accurate identification of the plots. Use of maps and also utilization of the historic maps was undertaken for identifying the plots and ground elevation levels. Field verification was undertaken by the team leader, after the field data collection. Updated GIS version was used to finalize the land use map; and

The following primary data were obtained during the ESIA process:

- Socio-Economic survey data;
- Baseline air quality data;
- Baseline noise data (day and night times);
- Groundwater data from deep and shallow tube wells; and
- Surface Water data

This ESIA report has been prepared in compliance with the following documents:

- Bangladesh Environment Conservation Act'1995 (Amended 2010) and the Environment Conservation Rules '1997 (Amended 2002).
- World Bank Group's Performance Standards 2011.
- EHS guidelines for thermal power plants IFC.

List of studies and work streams required for compliance with the applicable laws, regulations and WBG PSs are given in the table 4.1 below. Larger studies are included as standalone annexes and others are integrated in the chapters.

**Table 4.1: List of studies and work streams**

| Study Topics   | Application WBG PS, ESHG or other national/ international guidelines   | Reference Chapter/ Annex  |
|--|--|---|
| Project Justification and Purpose, Project Location, Project Description and Associated Activities | PS1: Assessment and Management of Environmental and Social Risks and Impacts   | <a href="#">Chapter 2</a><br><a href="#">Annex 1, 2, 3, 4, 5 and 6</a>                    |
| Environmental Policy, Legislative And Institutional Framework                                      | PS1: Assessment and Management of Environmental and Social Risks and Impacts   | <a href="#">Chapter 3</a><br><a href="#">Annex 7 and 8</a>                                |
| Project Categorization   | World Bank Environmental and Social Safeguard Policy; Bangladesh Bank IPFF-II ESPP Guidelines; Environment Conservation Rules 1997 | <a href="#">Chapter 3.5</a><br><a href="#">Chapter 3.6</a><br><a href="#">Chapter 3.7</a> |
| Triggering of WB Performance Standards   | PS1-8  | <a href="#">Chapter 3.8</a>   |

| Study Topics   | Application WBG PS, ESHG or other national/ international guidelines  | Reference Chapter/ Annex   |
|--|---|--|
| Stakeholder Consultation, KII, FGD and public consultation | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS4: Community Health, Safety, and Security   | <a href="#">Chapter 4.5</a><br><a href="#">Annex 9</a>                                   |
| Environmental And Social Baseline Study                    | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources             | <a href="#">Chapter 5</a><br><a href="#">Annex 10, 11, 12, 13</a> and <a href="#">15</a> |
| Analysis Of Alternatives                                   |   | <a href="#">Chapter 6</a>  |
| Risk Analysis and Identification                           | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 7</a>  |
| Impact Identification and Evaluation                       | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 8</a>  |
| GHG Emission   | PS3: Resource Efficiency and Pollution Prevention   | <a href="#">Chapter 8.5.3</a><br><a href="#">Annex 14</a>                                |
| Mitigation Measures  | PS1: Assessment and Management of Environmental and Social Risks and Impacts  | <a href="#">Chapter 9</a>  |
| Environmental And Social Management Program (ESMP)         | PS1: Assessment and Management of Environmental and Social Risks and Impacts<br>PS2: Labor and Working Conditions to be done<br>PS3: Resource Efficiency and Pollution Prevention | <a href="#">Chapter 10</a>   |
| Monitoring, Evaluation And Reporting                       |   | <a href="#">Chapter 11</a>   |
| Labor Assessment   | PS2: Labor and Working Conditions   | <a href="#">Chapter 11.6</a><br><a href="#">Annex 16</a><br><a href="#">Annex 19</a>     |
| Environmental and Social                                   | PS1: Assessment and   | <a href="#">Chapter 11.7</a>   |

| Study Topics                                | Application WBG PS, ESHG or other national/ international guidelines         | Reference Chapter/ Annex                                 |
|---|--|--|
| Audit                                       | Management of Environmental and Social Risks and Impacts                     | <a href="#">Annex 17</a>                                 |
| Environmental and Social Action Plan (ESAP) | PS1: Assessment and Management of Environmental and Social Risks and Impacts | <a href="#">Chapter 11.8</a><br><a href="#">Annex 18</a> |

### 4.3 ESIA Team

The ESIA Team comprises of the following:

- |  |                     |
|--|---------------------|
| 1. Dr. Moinul Islam Sharif, ESIA Expert                  | Team Leader         |
| 2. Mohammad Imtiaz Sharif, Social & Environmental Expert | Project Coordinator |
| 3. Mr. Shaker Ali, Modeling Expert                       | Member              |
| 4. Mr. Ikbal Hossain, ESIA Expert                        | Member              |
| 5. Md. Saifullahil Azom, GIS and Land Use Expert         | Member              |
| 6. Mr. Sadman K. Monsur. Socio-economist                 | Member              |
| 7. Mr. Moniruzzaman, Field Surveyor                      | Member              |
| 8. Mr. ZH Khan, Field Surveyor                           | Member              |
| 9. Mr. Kawser Ahmed, Field Surveyor                      | Member              |
| 10. Mr. Imam Hossain, Field Surveyor                     | Member              |
| 11. Mr. Sohel, Data Analyst and SPSS expert              | Member              |
| 12. Ms. Dil Meher Banu, DTP Incharge                     | Member              |
| 13. Dr. Monirul Islam, Biodiversity Expert               | Member              |

### 4.4 Assumptions, uncertainties and constraints

The data collected for inclusion in the ESIA study was conducted within a limited time frame. More time was required to carry out a more detailed Social Impact Assessment (SIA) of the relevant stakeholders. However, the social unit of the Bank reviewed the lease deeds from willing landowners that were negotiated; the rate for rent was voluntarily agreed in 2017. There was no coercion either physical or mental in the process of leasing land. The ESIA has been prepared with an emphasis to cover all important environmental/social impacts and formulate pragmatic recommendations for mitigating any adverse environmental impacts.

## 4.5 Stakeholder Consultations

### 4.5.1 Stakeholder Analysis

The consultation approach was based on a combination of Formal and Informal meetings, Focus Group Discussions (FGDs), Key Informant Interview (KII) with the local elite, college teachers, women group, administration officials and Union Parishad Ward members. The formal meetings were held through prior notice, appointment and invitation including all the relevant stakeholders staying within 1 km radius from the project site, district and local administration officials and other stakeholders in the affected area. Structured questionnaire based surveys were conducted for the stakeholders. In addition, a census survey was conducted with another set of structured questionnaires for all the landowners. The findings of the structured questionnaire survey with the stakeholders have been described in Annex 9. The basis for selecting the stakeholders was based on the following criteria:

- i) Identifying the landowners;
- ii) List the number of share-croppers or impacted persons in any other way in the leased land;
- iii) Identify the government agencies connected with the project;
- iv) Identify local elites and academic persons for their view on the project;
- v) Identify the closed households or commercial institutions of the project site and make them aware about the impacts of the project and noted their concerns and reporting; and
- vi) Identify the local NGOs working in the area.

Three formal meetings specifically including all categories of stakeholders were held. One large public consultation meeting, which included all types of people affected direct and indirectly was also held; including representatives from the project areas, district and local administration, as well as other community representatives including prominent local people, lawyers, journalists, academicians and the representative from Technaf Solartech Energy Limited (TSEL). Meeting minutes of the consultations with the stakeholders are given in [Annex 9](#).

### 4.5.2 Consultation and Participation Mechanism

#### 4.5.2.1 Consultations

Public consultations were carried out during different activities in the Project cycle, using different techniques such as public meeting, small group meeting, informal meeting as per environmental social and procedures of BCAS. Meeting minutes of consultation with the stakeholders are shown in the end of this chapter. During such consultations, the participants were informed about the project in general and in particular about the following:

1. Finalization of the Project plan.

2. Design standards of the Technaf Solartech Energy Limited in relation to the applicable standards of financiers, international standards like WBG, etc.
3. Health Impacts and their mitigation as part of the Environmental and Social Management Plan (ESMP).
4. Measures taken to avoid public utilities and other social infrastructure such as school, hospital, roads etc. as well as to generate employment opportunities, and assist the development of small enterprises.
5. To ensure the pollution free environment during operation etc.
6. Social and corporate responsibility and policies to be followed.
7. Payment to the landowners in a timely manner; from whom the project lands was taken on lease.
8. Compensation for any damage associated with the project development.

#### ***4.5.2.2 Stakeholders' Participation Mechanism***

A series of public consultations/discussions were undertaken by BCAS. These programs included Key Informant Interview (KII), discussion with the various groups of stakeholders, Focus Group Discussion (FGD) and public consultation with all the stakeholders.

#### ***4.5.2.3 Public Awareness and Disclosure***

In general, community stakeholders were categorized into two broad categories: directly affected and indirectly affected. Directly affected community stakeholders include people who will have the potential to be directly impacted through loss of land, crops and other assets, environmental and social adverse impacts due to the project. Indirectly community stakeholders included those people of the project area, who have the potentiality to be affected by the project activity to a limited extent.

The methodology used for the disclosure process was as follows:

- i) During the sample-based socio-economic survey which had covered 50 households within the impact zones, dissemination of information on the project activities was also taken and information disclosure carried out;
- ii) Preliminary Informal meetings with various categories of the people; and
- iii) A public meeting which included all the stakeholder representatives from the the project impacted areas, district and local administration officials, as well as other community representatives, including prominent local people, lawyers, journalists and persons from academia.

Preliminary Informal meetings with various categories of the stakeholders were completed during survey period.

**Table 4.2: Focus Group with different groups**

| No. | Village  | No. of people attended | Date       | Occupation                      |
|-----|----------|------------------------|------------|---------------------------------|
| 1   | Alikhali | 13                     | 10.09.2017 | Salt farmers                    |
| 2   | Alikhali | 14                     | 11.09.2017 | Landowners (various occupation) |
| 3   | Alikhali | 12                     | 12.09.2017 | Farmers                         |

### 4.5.3 Consultation

Two forms of public consultation were used during preparation of the ESIA to discuss the project and involve the community in planning the mitigation measures and developing the Environmental Monitoring Plan. These are:

(i) Public meetings were held in the project area, to which representatives of the stakeholders were invited. Attendees were informed about the aim of the project and the benefits they would bring, together with their likely impacts and the ways in which they would be mitigated. Participants were invited to discuss their views and concerns, which were then incorporated into the ESIA.

(ii) Ad hoc discussions were also held on site with people and communities who could be affected by the project, so that views could be expressed in a less formal setting. These were also considered in preparing the ESIA.

Various issues discussed and evaluated on the possible impacts from the project activities on the surrounding physical, social and biological environment, were documented. Issues Discussed

The local people were interviewed three ways. In open type public meetings, some prefixed agenda related to the proposed project were discussed. The issues were raised in such way that everybody was able to express his /her opinion without hesitation. A friendly atmosphere was created prior to starting of the informal discussion.

The issues were as follows:

- An overview of the work, its background, justification of settling and future prospects etc.
- Overall impacts on surrounding physical, biological and social environment as observed or anticipated by participants due the plant's setting and future operational stage.
- Overall safety and other precautionary measures taken against any kind of accidental hazard.
- Local people's aspiration about the proposed activities of this project.

The findings of the meetings are briefly discussed in the following paragraph:

- TSEL will supply electricity to the National grid through REB, which is expected to be delivered to the people of Teknaf – local people are happy with the project.
- The solar project is good for economy and environment.
- Employment will be generated for the local peoples and also at the national level.
- Local people are interested to get employed in the plant based on their qualification. Besides, TSEL confirmed engagement of at least 100 local laborers during the construction period. Besides, indirect benefits will to the local shops and other commercial enterprises.

This project is utilizing mostly fallow lands, which brought little income. The land use change will increase rental income and result in the increase of the land value around the project area.

#### **4.5.4 Minutes of the Stakeholders' Consultation Meeting**

A stakeholder consultation meeting on Social and Environmental Impact Assessment (ESIA) of the Technaf Solartech Energy Limited was organized by BCAS at the plant premise on 3<sup>rd</sup> October, 2017. Total 24 local people from Alikhali, South Nhilla belonging to different occupational groups (e.g. businessman, service holder, labor, farmer etc.) attended the consultation meeting. Apart from BCAS personnel, officials of TSEL were present in the meeting. The consultation meeting was presided by H K Anwar and was moderated by Mr. Mahmudul Hasan, Managing Director, TSEL. On behalf of BCAS, Mr. Mohammad Imtiaz Sharif, Social & Environmental Expert, described the environmental and social impact of TSEL power plant. Mr. Imtiaz explained that the operation of the solar plant is very much environment friendly. However, during construction, noise from piling and other construction activities will be the major problem for the nearby people. It was explained that construction activities generating excessive noise are to be stopped during night-time. It was also explained that TSEL will use less noise generating equipment, and there will be different mechanisms to reduce noise within acceptable limit set by DoE. After Mr. Imtiaz's description, local participants provided their opinions regarding the power plant, which have been depicted below:

- Local people expressed their positive opinion about the TSEL solar power plant. They opined that the plant will be helpful to meet the electricity demand of the country, as well as economic prosperity of the country. The landowners stated that they leased their lands willingly to TSEL and received better than current market rate. Local people also stated that a good number of local people are already working in different construction works. Hence, employment opportunity has been improved in the area after starting of TSEL project. Local people also expressed that provision of more job opportunities will be further beneficial to them. Besides, they also opined that economic activities have also been increased at the nearby areas of the TSEL site, – as a few shops have also been established there.
- The local participants expressed that they expect TSEL to take all necessary steps to minimize the social and environmental impacts on nearby residents.

- The landowners told that TSEL is leveling all the land parcels and plot identification markings are disappearing. Hence, they are very much worried about handover of their lands on the exact locations, after the end of the project. In reply, Mr. Mahmudul Hasan, Managing Director, TSEL told that each plot corner has been marked with a permanent pillar before abolishing the boundary demarcations. Besides, TSEL is preserving digital map of the whole site with land ownership details. Hence, after completion of project tenure, TSEL will return land to the landowners on the previous locations.

Finally, the stakeholder consultation meeting was concluded with the commitment from TSEL representative that local people will always have complete access to TSEL personnel and will be welcome to share any problem arising from TSEL for the local people. TSEL has a formal grievance redress mechanism; which will take proper care of all the TSEL related problems raised by local citizens. The list of people who participated in the consultation meeting is listed in [Annex 9](#).

Some pictorial views of the consultation meeting are given below:





#### 4.5.5 Stakeholder Engagement Plan

Stakeholders are the entities those have stake or share of a project and who are affected directly or indirectly by a project. Generally individual, group, any organization or community within a particular projects influence area are considered as stakeholders of the project. The World Bank Operational Policies suggests that, the operating company should have a Stakeholder Engagement Plan (SEP) for better development practices.

Stakeholder Engagement Plan is considered to be a useful tool for maintaining communications between the project authority and its stakeholders. It will help to improve and facilitate decision making of the local community and will create an atmosphere in such a way so that the stakeholder groups are provided with sufficient opportunities to improve their livelihood. Major components of Stakeholder Engagement Process is detailed out in [Annex 9](#) for reference.

## 5 ENVIRONMENTAL AND SOCIAL BASELINE STUDY

### 5.1 Baseline Environmental Condition

#### 5.1.1 General Consideration

Base line information of existing environment is essential to take decision regarding lay out, mitigation measures and plant operation process. Information was gathered on the existing physical environment including meteorology, geology, topography, soils, hydrology and drainage, surface water quality, air quality and noise levels.

#### 5.1.2 Geographical Location of the Project Area

The site of the project is located at South Nhilla Alikhali village of Nhilla Union (2 No.), Teknaf Upazila of Cox's Bazar district. The boundaries of the plant location are: salt cultivation land on the north, north-west, east and south side of the project site, few low land parcels have been found on the north-east, south-east and south-west boundaries, a salt factory and a brick field are situated along the south-west boundary of the project site, River Naf flows along the eastern side of the project site. A bituminous carpeting road has passed through the western boundary of the project site. The Project Location is shown in Map 6 and Map 7 in [Annex 2](#).

#### 5.1.3 Physio-Chemical Environment

##### 5.1.3.1 Landscape and Topography

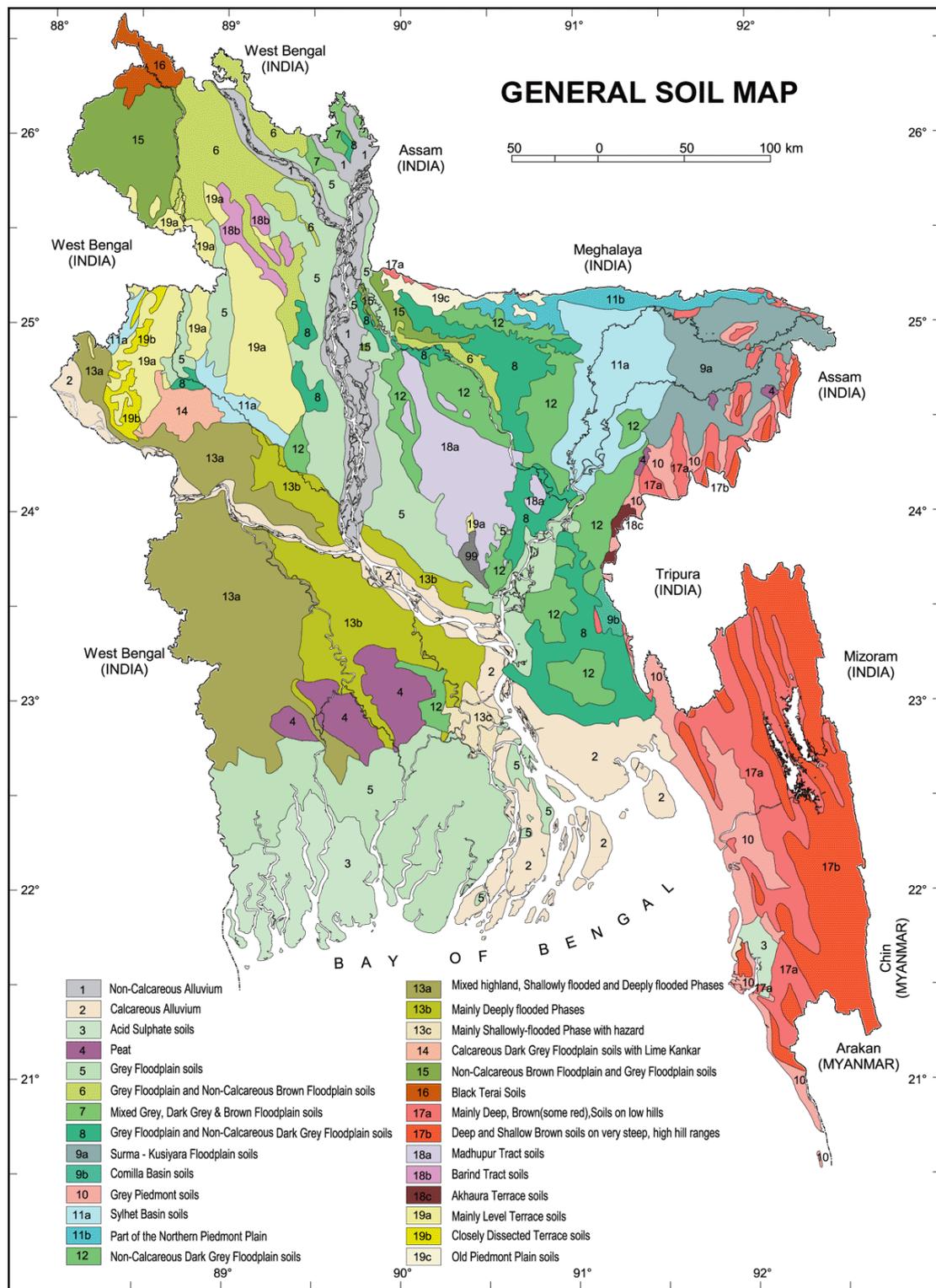
This area is occupied by permeable silt loam to silty clay loam soils on the ridges and impermeable clays in the basins which are neutral to slightly acidic in reaction. General soil types include predominantly Grey Floodplain soils. Organic matter content is low in ridges and moderate in basins. The Topographic Survey Report of the Project Site and Elevation of the Project Command Area are shown in [Annex 10](#).

##### 5.1.3.2 Land Cover

The surrounding land cover of the project area is hills, salt fields, built-up area, vegetated areas and water bodies. The land cover within 5 km radius from the project site is shown in [Annex 2](#).

##### 5.1.3.3 Geology and Soils

Most of the area of Bangladesh is a vast, low-lying alluvial plain, sloping gently to the south and southeast. According to Soil Research Development Institute's General Soil Map of Bangladesh, the project area falls in the Grey Piedmont Soil category. The following General Soil Map 2 shows the general soil type of Bangladesh.



**Map 2: General Soil Map of Bangladesh**

This area is occupied by permeable silt loam to silty clay loam soils on the ridges and impermeable clays in the basins which are neutral to slightly acidic in reaction. General soil types include predominantly Grey Piedmont Soil category. Organic matter content is low in

ridges and moderate in basins. Within this area, elevations are less than 5.8 m above sea level.

### 5.1.3.4 Agro-ecological Zones within the Project Area

A 1988 study carried out by the United Nations Development Program (UNDP) classified Bangladesh into a series of Agro-ecological Zones (AEZs) based on an assessment of commonalities in characteristics such as physiography, soil types, climate and drainage. In total, 34 regions were identified and characterized, however this information has been updated and further refined on numerous occasions since the original study was undertaken. Within this area, elevations are less than 5.8 m above sea level, which is shown in Map 3.

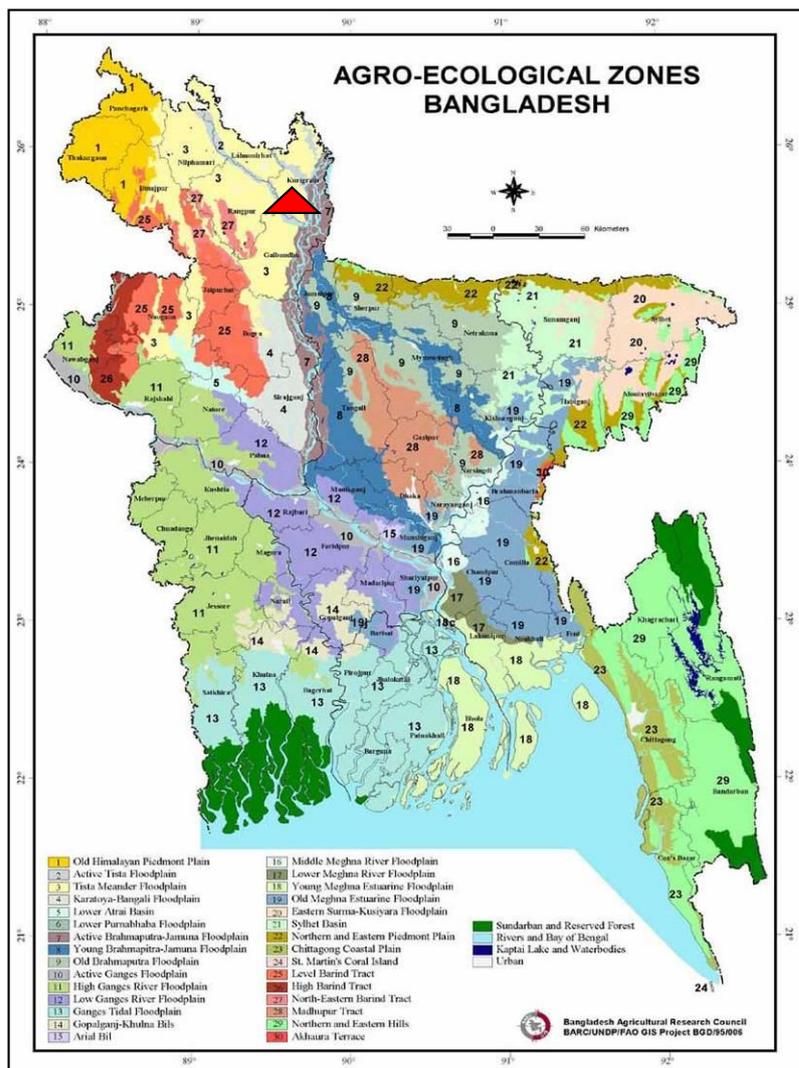
The purpose of assessing the AEZs within the project area is to establish a broad overview of expected soil conditions which can be compared against more detailed, Upazila-level data sources.

The most recent assessment was completed by the Soil Resource Development Institute (SRDI, 1998) which classified Bangladesh into 30 AEZs. The project area contains the below AEZ namely:

#### Chittagong Coastal Plain (23)

This region comprises the belt of unstable alluvial land along the Chittagong coastal areas where land is constantly being formed and eroded by the continuous tidal actions of the Bay of Bengal and its associated rivers and waterway

channels. It has an irregular relief of broad and narrow ridges and depressions. The area is occupied by sandy and silty alluvium, rich in weatherable minerals that are slightly salty in reaction. Organic matter status is low and fertility status is low to medium (Banglapedia, 2012).



Map 3: Agro-ecological zone of Bangladesh

#### 5.1.4 Biological Environment

Cox's Bazar is a growing city located at the south-east part of the country, which is also called the 'Tourism Capital' of Bangladesh. The TSEL power plant is going to be established on the bank of River Naf. Wetland around 5 km impact zone of the project includes ponds, ditches, and canals (chhara) connecting to River Naf. The impact area supports a diverse animal group and holds a balanced ecosystem.

While establishing TSEL project significant interventions are going to be carried out at the project site. These might have impact on the terrestrial and aquatic biodiversity within the impact zone of TSEL project. In view of this, this study assesses the terrestrial and aquatic flora and fauna within the impact zone of TSEL project. The section below outlines the scope of work or core components of this study.

The scope of work of this study includes:

- a) Identify the terrestrial plants within the impact zone of TSEL project.
- b) Identify the terrestrial fauna (vertebrate) within the impact zone of TSEL project.
- c) Identify the aquatic macro fauna/fish species within the impact zone of TSEL project.

The methodology used to identify the biodiversity, data were collected from the impact zone of TSEL project during September, 2016 as outlined below:

##### 5.1.4.1 Collection of Terrestrial Plants Data

Plant species were recorded surrounding 5 km of power plant area. At first, the areas were visited to monitor and plant species were recorded. Then two focus group discussions (FGDs) and two key informant interviews were carried out with the local people to prepare a checklist of the plant species available in that area. The participants were also asked to express their observations about changes of plant diversity in last one year by showing the images of plant found nearby power plant area. Sample specimens that remained unidentified from those locations were collected and later identified in the laboratory of the Department of Botany, University of Dhaka using the book Ahmed et al. (2007). The collected data result is shown in [Annex 11](#).

##### 5.1.4.2 Collection of Terrestrial Fauna Data

Four vertebrate classes (mammals, birds, reptiles and amphibians) were surveyed as this group of animals presumably important and indicator species of a balanced ecosystem. To conduct the biodiversity survey, the researcher team carried out an ecological survey in the core and surrounding areas (up to 5 km) of the power plant site. The sampling was made in a realistic manner to achieve the objectives of this study. Within the impact zone a broad range of terrestrial habitats were identified where wildlife species distributed in a dynamic way with having diversity, abundance and the status of animal species/animal groups supported by those micro and macro-habitats.

Survey of amphibians, reptiles, mammals and birds in the TSEL areas and adjacent areas carried out through conducting field survey by employing different survey methods such as

transact line sampling, point sampling, time sampling methods, opportunistic survey and zigzag survey, and two FGDs. Data were collected based on the direct observation in the field. However, where the animals were not immediately available or difficult to locate or trace, observations were made on foot print, pug marks, trailing, tracks, burrows, nests, animal holes, caves on the trees or fruits made by animal, etc. Besides, local people were discussed (during FGDs) to ascertain the existence and to assess the status/abundance of amphibians, snakes, monitor lizards, mongooses, jackals, foxes, bats, dolphins, birds etc.

In addition, other techniques e.g. Photo Flashing, Spot Lighting, Sound Tracking, call, trapping, collection of specimens etc. were used where necessary. A pair of binoculars was used to track distant animals. Standard taxonomy books, field notebooks, field manuals and taxonomic sheets used for identification of species. The species, which were not possible to identify in the field, brought to laboratory of the Department of Zoology, University of Dhaka for proper labelling for its subsequent identification. The collected data result is shown in [Annex 11](#).

#### **5.1.4.3 Collection of Fish Data**

Fish species was identified and changes in their biodiversity were investigated using key informant interviews and 2FGDs. Key informant interviews were conducted with respondents from both aquatic habitat dependent people and outside people who have good knowledge about the biodiversity in those habitats. FGDs (4-8 person in one FGD) were conducted with the habitat depended people to discuss any disputed issue that might have arisen from interviews as well as to triangulate the findings. Fish market survey was also done in one nearby fish market (*Alikhali, South Nhillia Bazar*) in order to verify the fish species identified by the FGD and key informant interview respondents. Picture was taken for each fish available in the market. The fish species were identified using the book of Rahman (2005) and the latest scientific names were updated according to ITIS (2016). The source of the fish present in the market was also asked and only the species caught from the impact zone of TSEL were taken into account. The collected data result is shown in [Annex 11](#).

### **5.1.5 Meteorological Condition**

#### **5.1.5.1 Climate**

The climate of this region is tropical, with monsoons, characterized by a change of four seasons: pre-monsoon (March to May), monsoon (June to September), post-monsoon (October to November) and dry season (December to February). Typical parameters of the weather elements, as recorded for the period of last few years of observations at Cox's Bazar Meteorological Station are presented in Table 5.7 to 5.15 below.

The importance of analyzing the historic climate conditions of the project site is important as it will influence the choice of site for the project. For example areas of high rainfall will entail that the design of the plant's drainage system, proper fortification of the site boundaries to avoid inundation and to decide the extent of land filling required to avoid impacts due to

flash floods. The relative humidity and the maximum and minimum temperatures are essential for the engine design and the cooling loads for the radiative cooling system. The wind direction and speed is important to design the stack height required to ensure dispersion to the desired levels.

#### 5.1.5.2 Rainfall

The annual rainfall is about 2000 mm and approximately 80% of it occurs during the monsoon. Average monthly rainfall during monsoon period varies between 123 mm to 409 mm. Maximum daily rainfalls during this period recorded in August 2012 is 409 mm.

The rainfall follows the general climate pattern with the highest rainfall in the summer month of June to September and minimum rainfall in the cooler and drier months of November to March. It is evident that extreme rainfall events occurred during the monsoon (June-September). Average monthly rainfall values for Cox's Bazar area since 2012 are presented in Table 5.1 below:

**Table 5.1: Monthly Average Rainfall in the project area (2012-2016)**

| Year | Rainfall in mm (Month) |      |      |      |     |      |      |      |      |      |      |      |
|------|------------------------|------|------|------|-----|------|------|------|------|------|------|------|
|      | Jan.                   | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sep. | Oct. | Nov. | Dec. |
| 2016 | 7                      | 8    | 40   | 302  | 165 | 203  | 256  | 322  | 234  | 112  | 3    | 1    |
| 2015 | 4                      | 3    | 29   | 289  | 143 | 180  | 227  | 309  | 201  | 143  | 2    | 1    |
| 2014 | 2                      | 1    | 32   | 245  | 198 | 225  | 267  | 322  | 198  | 132  | 3    | 0    |
| 2013 | 3                      | 1    | 37   | 269  | 137 | 175  | 226  | 389  | 189  | 122  | 4    | 1    |
| 2012 | 0                      | 0    | 20   | 123  | 235 | 314  | 356  | 409  | 207  | 112  | 0    | 0    |

#### 5.1.5.3 Relative Humidity

As would be expected, relative humidity during the wet season is significantly higher than those occurring at other period of the year. This is well depicted by the data as shown in the Table 5.2 for relative humidity of Cox's Bazar during the period 2012 -2016:

**Table 5.2: Average Monthly Relative Humidity of the Project Area in last 5 years**

| Humidity<br>in % | Monthly Mean Humidity |      |      |     |      |     |     |     |     |     |     |     |     |        |
|------------------|-----------------------|------|------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|--------|
|                  | Year                  | Jan. | Feb. | Mar | Apr. | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|                  | 2016                  | 72   | 64   | 60  | 68   | 74  | 79  | 81  | 85  | 72  | 70  | 69  | 72  | 69     |
|                  | 2015                  | 65   | 65   | 56  | 63   | 75  | 80  | 79  | 83  | 76  | 71  | 63  | 71  | 71     |
|                  | 2014                  | 73   | 54   | 61  | 71   | 74  | 79  | 80  | 82  | 78  | 73  | 68  | 69  | 70     |
|                  | 2013                  | 66   | 52   | 57  | 69   | 74  | 78  | 77  | 81  | 79  | 75  | 71  | 66  | 67     |
|                  | 2012                  | 69   | 54   | 57  | 64   | 76  | 80  | 79  | 82  | 77  | 73  | 67  | 73  | 70     |

#### 5.1.5.4 Temperature

The annual average temperature of this region varies from maximum 39.5°C to minimum 10.5°C

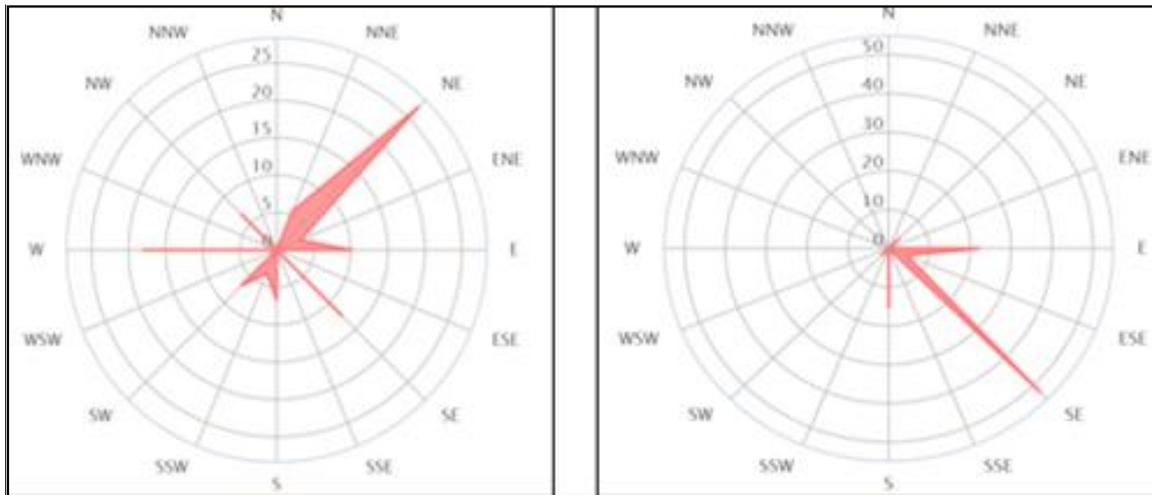
#### 5.1.5.5 Wind Speed and Direction

The maximum wind speed varies from 86 and 98 knots (Meteorological Department). The prevailing wind direction is south and south-east in most part of the year. [Annex 12](#) shows the round year wind speed and its directions for the year of 2012-2016.

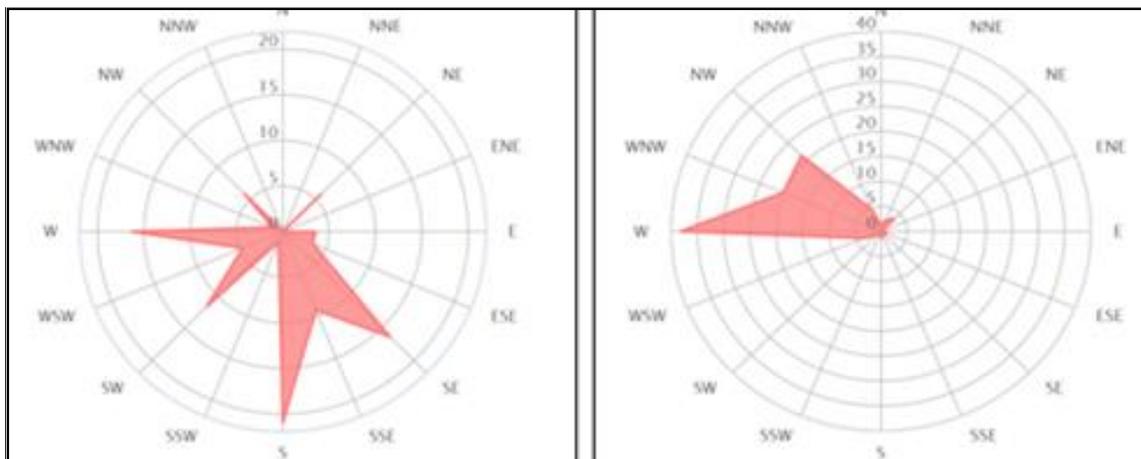
#### 5.1.5.6 Wind roses

Wind rose gives very succinct but information-laden view of how wind speed and direction are typically distributed at a particular location. Presented in a circular format, the wind rose shows the frequency of winds blowing from particular directions. The length of each "spoke" around the circle is related to the frequency of time that the wind blows from a particular direction. Each concentric circle represents a different frequency, emanating from zero at the center to increasing frequencies at the outer circles. The wind roses shown here contain additional information, in that each spoke is broken down into discrete frequency categories that show the percentage of time that winds blow from a particular direction and at certain speed ranges. All wind roses shown here use 16 cardinal directions, such as north (N), NNE, NE, etc.

The wind roses for 2016 are shown in the Figures 2&3:



**Figure 2: Wind-rose distribution in percentage (%) for January-June 2016**



**Figure 3: Wind-rose distribution in percentage (%) for June-December-2016**

The seasonal wind roses indicate shows that in Bangladesh the predominant wind direction are from North West in the winter months and from South West direction in the monsoon months. The prevalent wind directions will determine the AQM sampling locations. The wind roses indicate the prevalent wind direction in an area during the different seasons. During the preparation of the ESIA the wind roses determines the effective points where the air quality needs to be measured. This is primarily guided by the most prevalent wind direction in the project area at the time of measurements. In addition, during environmental monitoring after commissioning of the project, depending on the time of the year when monitoring is done, wind rose indicating the prevalent direction of wind at the time where the air quality will be measured as the concentrations of the pollutants will be the highest in that direction.

### 5.1.5.7 Ambient Air Temperature

In the summer (April to September) the temperature of the country varies with the amount of rainfall. During this period maximum temperature raise 39.6 degree Celsius which was observed in April 2008 where the average minimum temperature was 8.2 degree Celsius in January 2011. [Annex 13](#) shows the month-wise mean, maximum and minimum temperature for the year of 2007-2016.

The monthly average temperature variation in Cox's Bazar District has remained largely uniform over the last 10 years. There have been hotter days in some years but it had negligible effect on the average the temperature over this period. Therefore, constancy of the ambient temperature is crucial for fixing the design of the generators whose efficiency depends on ambient temperature and the design of the radiative cooling design.

### 5.1.5.8 Ambient Air Quality

Solar PV plants do not have any air emissions. However, for baseline level the ambient air quality at the plant site, some selected AQ parameters were monitored for 8 hour periods in June 2017; using [Ecotech AAS 271Mini \(India\) sampler](#). The sampler has calibration traceable to USFRM standard samplers, according to its manufacturer. The data are shown in table 5.3. Average concentration levels are found to be within NAAQS (National Ambient Air Quality Standards) and similar to levels found in rural areas of Bangladesh'

Table 5.3: The air quality data (in  $\mu\text{g}/\text{m}^3$ ) as collected from the TSELsite in June 2017

| Data Collection Period | SN      | PM <sub>10</sub> | SPM     | NO <sub>2</sub> |
|------------------------|---------|------------------|---------|-----------------|
| June 2017              | 1       | 50.5             | 155.    | 10.4            |
|                        | 2       | 48.1             | 144.    | 9.7             |
|                        | 3       | 48.9             | 201.    | 14.1            |
|                        | 4       | 46.5             | 126.    | 12.1            |
|                        | 5       | 45.7             | 136.    | 12.7            |
|                        | Average | 48±2             | 152±29  | 12 ± 2          |
| NNAQS                  |         | 150              | 200     | 100             |
| Averaging Period       |         | 24 hours         | 8 hours | Annual          |

The air sampling equipment and instruments are shown in the following photos 1 and 2:



**Photo 1: Respirable Dust Sampler for SPM, PM2.5, PM10 and SO2, NOx, CO measurement instruments (Combo Sampler Ecotech AAS 271Mini, India)**



**Photo 2: Dust Sample measurement activities**

#### 5.1.5.9 Ambient Noise Quality

The Project site is found to have ambient noise level with a range of 39.70-49.80 dBA at different time of the day. There were 12 hours noise monitoring at 5 locations in the project site for both day and night times, which have been provided in Table 5.4 and 5.5 below:

**Table 5.4: Day Time Noise Data**

| BASELINE SOUND 6:00 AM TO 6:00 PM |                                       |         |         |         |         |          |          |          |         |         |         |         |         |         |
|-----------------------------------|---------------------------------------|---------|---------|---------|---------|----------|----------|----------|---------|---------|---------|---------|---------|---------|
| Location of Measurement           | Distance from the center of the plant | 6:00 AM | 7:00 AM | 8:00 AM | 9:00 AM | 10:00 AM | 11:00 AM | 12:00 PM | 1:00 PM | 2:00 PM | 3:00 PM | 4:00 PM | 5:00 PM | 6:00 PM |
| S_Center                          | Plant Centre                          | 42.50   | 42.70   | 42.00   | 42.40   | 43.30    | 43.50    | 43.60    | 43.20   | 43.80   | 43.70   | 43.80   | 43.80   | 43.50   |
| S_1                               | To the West                           | 47.20   | 47.20   | 47.20   | 49.80   | 49.20    | 48.20    | 47.20    | 47.80   | 48.00   | 47.20   | 47.40   | 47.30   | 47.30   |
| S_2                               | To the East                           | 41.50   | 41.60   | 42.00   | 41.10   | 41.30    | 41.50    | 41.40    | 42.20   | 41.70   | 41.70   | 41.80   | 41.60   | 41.50   |
| S_3                               | To the North                          | 47.50   | 46.30   | 46.40   | 47.60   | 46.70    | 47.90    | 46.80    | 46.10   | 47.00   | 47.30   | 47.20   | 47.40   | 47.50   |
| S_4                               | To the South                          | 42.50   | 42.70   | 42.00   | 42.40   | 43.30    | 43.50    | 43.60    | 43.20   | 43.80   | 43.70   | 43.80   | 43.80   | 43.50   |

Baseline Noise Level Data at day time (12hrs.), Source: Field Survey, June, 2017; by Digital Sound Level Meter-AR814 (standard: IEC651 TYPE 2 & ANSIS1.4 TYPE 2)

**Table 5.5: Night Time Noise Data**

| BASELINE SOUND 6:00 PM TO 6:00 AM |                                       |         |         |         |         |          |          |          |         |         |         |         |         |         |
|-----------------------------------|---------------------------------------|---------|---------|---------|---------|----------|----------|----------|---------|---------|---------|---------|---------|---------|
| Location of measurement           | Distance from the center of the plant | 6:00 PM | 7:00 PM | 8:00 PM | 9:00 PM | 10:00 PM | 11:00 PM | 12:00 AM | 1:00 AM | 2:00 AM | 3:00 AM | 4:00 AM | 5:00 AM | 6:00 AM |
| S_Center                          | Plant Centre                          | 42.90   | 42.70   | 42.00   | 41.40   | 41.30    | 41.50    | 40.60    | 40.20   | 40.10   | 40.70   | 41.80   | 41.80   | 42.50   |
| S_1                               | To the West                           | 47.20   | 47.00   | 47.00   | 46.80   | 46.20    | 46.20    | 46.20    | 45.80   | 45.00   | 45.20   | 45.40   | 45.30   | 46.30   |
| S_2                               | To the East                           | 41.20   | 41.60   | 41.00   | 41.10   | 41.00    | 41.00    | 40.40    | 40.20   | 39.70   | 40.00   | 40.80   | 41.00   | 41.00   |
| S_3                               | To the North                          | 47.10   | 46.30   | 46.40   | 46.60   | 45.70    | 45.90    | 45.80    | 45.10   | 45.00   | 45.30   | 45.20   | 45.40   | 45.50   |
| S_4                               | To the South                          | 42.60   | 42.70   | 42.00   | 41.30   | 41.10    | 41.20    | 40.80    | 40.10   | 40.00   | 40.70   | 41.50   | 41.80   | 42.50   |

Baseline ambient noise level data at night time (12hrs), Source: Field Survey, June, 2017; by Digital Sound Level Meter-AR814 (standard: IEC651 TYPE 2 & ANSIS1.4 TYPE 2).

The ambient noise data seems to be moderate. It is to be noted that there is negligible difference between daytime data and nighttime data, as the power plant site is located at a very low density area, where the main source of noise is Cox's Bazar-Teknaf Highway adjoining the project boundary.

Air and Sound Monitoring Points Map of the Project Location is shown in [Annex 2](#).

### 5.1.6 Hydrology and Drainage System

The main sources of water of Teknaf upazila are rivers, khals and ponds. River Naf is the main river. The river remains navigable all through the year. A good number of khals are scattered all over the upazila connecting with the Naf River or the Bay of Bengal.

During monsoon, flash floods take place due to rain water coming down from the nearby hills. The local khals channel out the flash flood water into River Naf and the Bay of Bengal.

There are a lot of ponds in Teknaf upazila. Most of them are not usable for drinking. Ponds are found within the settlement areas. Most of the families have one or two ponds used for aquaculture and household purposes. The area of a pond varies being usually less than 1 acre in area.

### 5.1.7 Water Quality Analysis

#### 5.1.7.1 Surface Water

The Naf River water in the immediate vicinity of the project site contains minimal concentration of pollutants as the river is almost free from both from domestic and industrial contamination sources.

The Naf is the main river and its distributaries are the main sources of surface water to the

project site. The river carries run-off water from adjoining areas, which contains minimal pollutants. Water was collected from the river and analyzed in SGS Laboratory. The following Table 5.6 shows the water quality of the Naf River:

**Table 5.6: Surface Water quality (limited parameters) of the Naf River**

| Parameters   | Units  | 100 m away from the Power Plant | Bangladesh Standard |
|--------------|--------|---------------------------------|---------------------|
| pH at 24.5°C | mg/L   | 6.80                            | 6.5-8.5             |
| TDS          | ppm    | 280                             | 1000                |
| EC           | μ S/cm | 410                             | 1200                |
| Temperature  | °C     | 25.1                            | -                   |
| DO           | ppm    | 5.69                            | 4.8-8               |
| BOD5         | mg/L   | 20                              | 50                  |
| COD          | mg/L   | 48.0                            | 200                 |
| Manganese    | mg/L   | < 0.05                          | 5                   |
| Phosphate    | mg/L   | 0.42                            | -                   |
| Phosphorus   | mg/L   | 0.45                            | 1                   |

Source: SGS Laboratory (June, 2017)

The results show that all the parameters of tested surface water are within the limits of DOE.

#### 5.1.7.2 Ground Water Features in the Vicinity of the Project Site

Ground water table in the country in most areas vary from 0.5 to 3 meter in general, but at times it may be as much as 12.0 m in depth. Groundwater is recharged mainly by infiltration of rainwater and is the source of potable water in the project area. To determine quality of ground water, one sample was collected from the tube well of the project and analyzed for different parameters. The results shows that all the parameters remain within the allowable limit of drinking water value as per as Environmental Quality Standards for Bangladesh. The parameters which have been analyzed during this study are presented below in Table 5.7. The ground water zoning map is shown in Map 4.

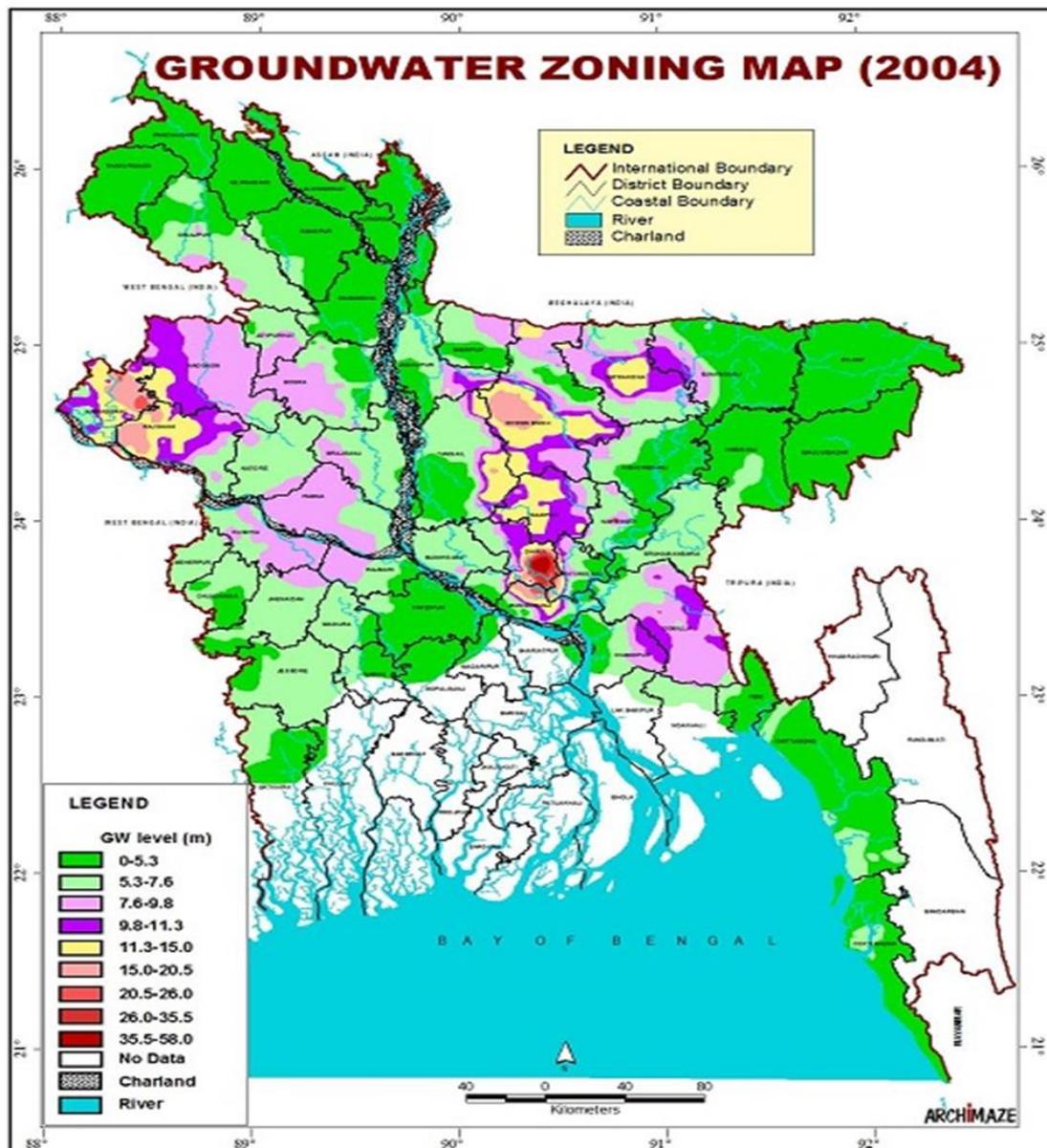
**Table 5.7: Ground water quality (limited parameters) (25-30 ft deep from ground)**

| Parameter    | Units | Value | Bangladesh Standard For Inland Ground Water |
|--------------|-------|-------|---|
| pH at 26.9°C | mg/L  | 7.1   | 6.0 - 9.0                                   |
| TDS          | ppm   | 90.0  | 1000  |
| Iron         | mg/L  | 0.8   | (0.3 – 1.0)                                 |
| Alkalinity   | mg/L  | 78.0  | -   |
| Hardness     | mg/L  | 68.0  | (200 – 500)                                 |
| Chloride     | mg/L  | 16.4  | (150 – 600)                                 |
| TSS          | mg/L  | 4.8   | 10  |

|              |                  |       |      |
|--------------|------------------|-------|------|
| COD          | mg/L             | 11.7  | NS   |
| BOD          | mg/L             | 5.5   | NS   |
| Arsenic      | mg/L             | 0.050 | 0.05 |
| Conductivity | $\mu\text{S/cm}$ | 696   | NS   |

Source: SGS Laboratory (June, 2017)

*It is to be noted that the measured BOD and COD values seem unusual; which might be caused by leaching of fertilizer or other materials from nearby lands and probably buried decaying wood.*



**Map 4: Ground Water Zoning Map of Bangladesh**

### **5.1.8 Natural Hazards Analysis**

Bangladesh can be regarded as being susceptible to natural calamities. This is due to its unique combination of physiographic, morphological and other natural features, which have led to direct loss of life and physical property on a massive scale. Plausible natural calamities include cyclones/tidal surges/tsunami, flash floods, storms & nor-westerns and earthquakes.

#### **5.1.8.1 Cyclones/Tidal Surges/Tsunami**

Bangladesh is a cyclone prone country. The country experiences, at times, catastrophic cyclones that cause loss of life and property. However, cyclones usually decay rapidly; after coming into contact with land and the losses are largely confined to coastal regions. As the project area is in the coastal belt, the likely impacts of cyclones are relatively high.

The south-eastern region (SER) of the country though is more prone to cyclonic devastations compared to the south-central (SCR) and south-western (SWR) regions; the site is vulnerable to occasional catastrophic cyclones. Ten hazardous cyclones hit the Bangladesh coast between 1960 and 2000 that caused heavy toll on human life and damage to properties. The cyclones are occasionally accompanied by tidal surge up to 10m high at the coast. The project site is relatively protected from the devastations of cyclone/tsunami induced tidal surge by a coastal embankment of BWDB along River Naf. On the other hand, the bay side is obstructed by hills, which will reduce the severity of cyclones; as evident from Cyclone Sidr and Aila in 2007 and 2009 respectively. Besides, Chittagong region was hit by a massive cyclone in 1991. Although the project site was not affected by cyclones Sidr and Aila, it was affected by the 1991 cyclone – the riverside lands of the project site were reportedly inundated by half to one meter. However, it is to be noted that no inundation level data or highest flood level data was available for the project area, as BWDB does not have any measurement station for River Naf.

Currently, the project site is expected to be protected by the BWDB embankment against any surge due to cyclone/tidal surge/tsunami. The Project will not be impacted by the floods or cyclones as the plant has been designed to withstand wind speed of 200 Km/hour (Reference: TSEL). TSEL solar panels are mounted on metallic support structures in such a way that minimum height of the panels will be over 1.8m from the present ground level, and the panels are not expected to be inundated even if surge water comes inside the project site, through any leakage or weak point of the BWDB embankment. Additionally, the control room cum administrative building is a two storied building and the inverter station is one storied, for which the plinth level has been designed to be 1m above the level of nearby Cox's Bazar Teknaf Highway.

#### **5.1.8.2 Flash Floods**

The occurrence of flash flood is rare at the project area. The last flash flood recorded was in 2009. The flood water came from nearby hills and flushed out through the canal along the

southern boundary of the project site. The impact of the flash flood was minimal on the project site, and the water quickly receded through the canal joining the River Naf. The impact of the flash flood on the project will be minimal; as the solar panels are established at a height of minimum 1.8m from the present ground level.

### 5.1.8.3 Earthquakes

Earthquake vulnerability of any place largely depends on its geology and topography, population density, building density and quality, and finally the coping strategy of its people and it shows clear spatial variations. Geographically Bangladesh is located close to the boundary of two active plates: the Indian plate in the west and the Eurasian plate in the east and north. As a result, the country is always under a potential threat of earthquake of any magnitude at any time, which might cause catastrophic devastation. Bangladesh has been divided into three seismic zones. Table 5.8 showing the earth quake zones of Bangladesh and Table 5.9 shows the major earth quake places nearest to the country. The Map 5 shows the earthquake position and its impacts.

**Table 5.8: Earthquake Zone of Bangladesh**

| Earthquake Zone | Area Name  | Seismic Factor | Seismic Coefficients | Risk        |
|-----------------|--|----------------|----------------------|-------------|
| Zone-I          | Sylhet, Moulvibazar, Sunamganj, Habiganj, Netrokona, Kishoreganj (part), Mymensingh (part), Sherpur, Kurigram, Rangpur (part), Gaibandha (part), Lalmonirhat (part)  | g/5 to g/10    | .08                  | High Risk   |
| Zone-II         | Panchagarh, Thakurgaon, Dinajpur, Nilphamari, Rangpur (part), Gaibandha (part), Lalmonirhat (part), Bogra, Naogaon, Jaipurhat, Chapai Nawabganj (part), Rajshahi (part), Natore (part), Pabna (part), Sirajgonj, Tangail, Manikganj, Dhaka, Gazipur, Narayanganj, Munshiganj, Narsingdi, Kishoreganj (part), Mymensingh (part), Comilla, Brahmanbaria (part), Chandpur (part), Feni, Noakhali (part), Chittagong, Rangamati, Khagrachhari, Bandarabn and Cox's Bazar | g/10 to g/15   | .05                  | Medium Risk |
| Zone-III        | Islands, Satkhira, Khulna, Bagerhat, Pirojpur, Barisal, Jhalokathi, Barguna, Patuakhali, Bhola, Madaripur, Gopalganj, Narail, Jessore, Chuadanga, Meherpur, Kushtia, Rajbari, Magura, Faridpur, Shariatpur, Lakhxmipur, Chandpur   | g/15 to g/20   | .04                  | Low Risk    |

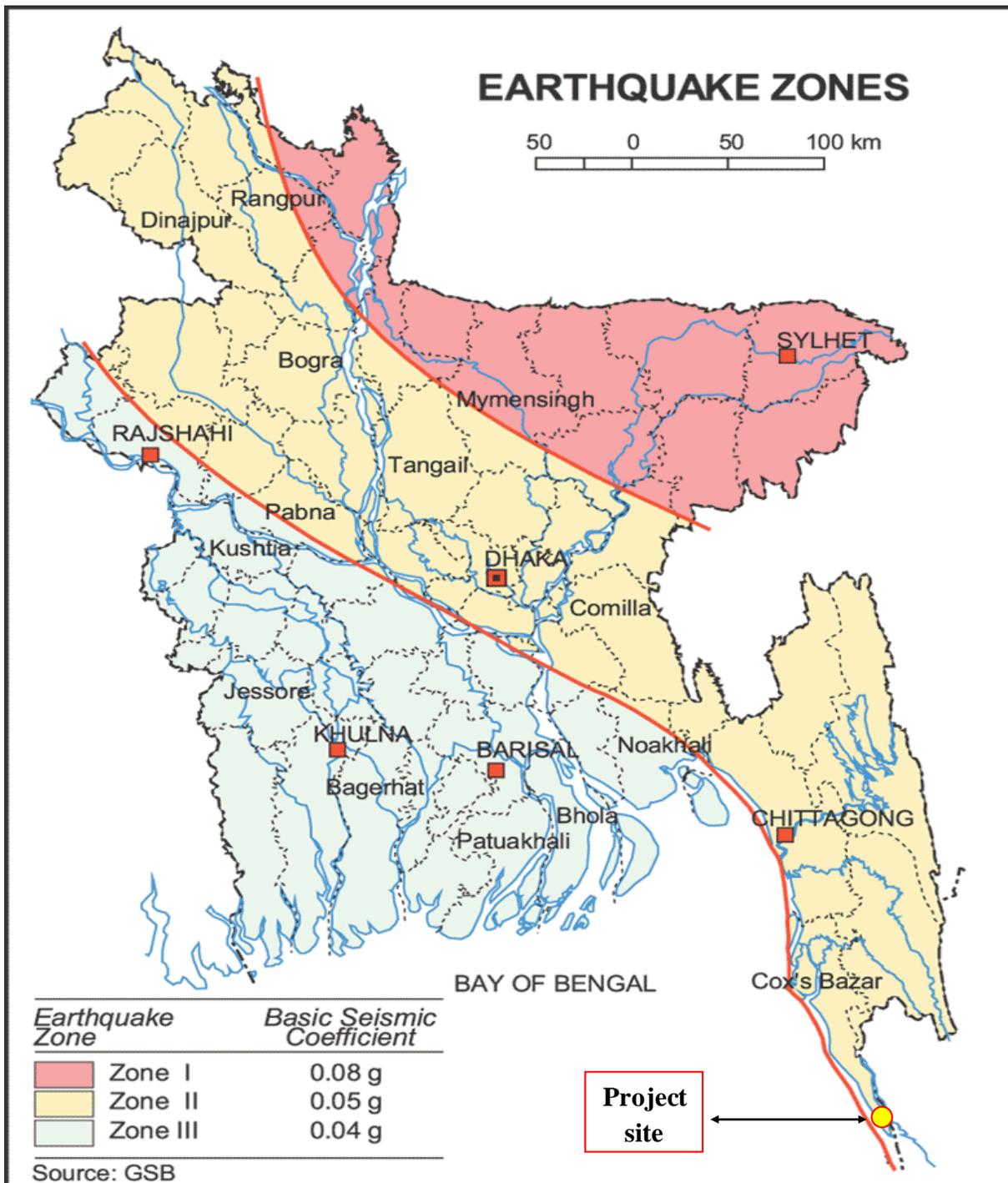
| Earthquake Zone | Area Name  | Seismic Factor | Seismic Coefficients | Risk |
|-----------------|--|----------------|----------------------|------|
|                 | (part), Noakhali (part), Chapai Nawabganj (part), Rajshahi (part), Natore (part), Pabna (part) |                |                      |      |

Source: The Journal of NOANI, Vol. 18, No. 2, dec 2001

**Table 5.9: Major Earthquakes in Bangladesh**

| Date             | Name of Earthquake      | Magnitude (Richter) |
|------------------|-------------------------|---------------------|
| 10 January, 1869 | Cachar Earthquake       | 7.5                 |
| 14 July, 1885    | Bengal Earthquake       | 7.0                 |
| 12 June, 1897    | Great Indian Earthquake | 8.7                 |
| 8 July, 1918     | Srimongal Earthquake    | 7.3                 |
| 3 July, 1930     | Dhuri Earthquake        | 7.1                 |
| 15 January, 1934 | Bihar-Nepal Earthquake  | 7.0                 |
| 15 August, 1950  | Assam Earthquake        | 8.6                 |

Cox's Bazar is situated in the Zone II and as such even though it can be considered as an earthquake vulnerable area (exceeding 7.0 on the Richter scale). The project has taken the risk the structures are designed to BNBC specifications of the civil construction to withstand earthquakes.



Map 5: Earthquake Zoning Map of Bangladesh

### **5.1.9 Traffic Movement**

The plant construction and operation will require movement of goods and people. Therefore, it is required to have information about present traffic scenario in the locality. The major machineries and materials for the project were brought by Cox's Bazar to Teknaf Highway; since, it is the main roadway for movement of people, as well as for goods transportation to and from TSEL. However, such movement had only negligible impact on this highway; and as well as for neighboring communities; because of the small incremental increase in traffic. Although, River Naf flows beside the project site, the river does not have any role in the movement of people or goods for the project, as the river flows along the boundary of Bangladesh and Myanmar.

### **5.1.10 Forests and Protected Areas**

Overall, the 'Protected Area' of Bangladesh covers an area of 243,435 hectares which accounts for 16% of the total area managed by the Forest Department and almost 2% of total area of Bangladesh. It includes 8 National Parks, 7 Wildlife Sanctuaries, 1 Game Reserve and 5 other conservation sites. These five conservation sites are National Botanical Garden, Dhaka, Baldha Garden, Dhaka, Madhabkunda Eco-Park, Moulavibazar, Sitakunda Botanical Garden and Eco-Park, Chittagong and Dulahazara Safari Parks & Cox's Bazar.

Some areas located in Teknaf Upazilla are included in the ecologically critical area (Unions/shavasPouras: Teknaf, Bahar Chara and Sabrang; Mouzas: Teknaf (excluding Bazar and Border Check post), Silkhali, Sabrang, Shah Porar Deep (excluding border check post) and Bordayle). Some part of the Upazilla also falls in the Naf River Wildlife sanctuary. However, the project site is outside all of these protected areas and site clearance by DOE confirms this.

## **5.2 Baseline Socio-Economic Condition**

### **5.2.1 Socio-Economic Condition**

The socio-economic baseline condition of the study area was assessed for evaluation of possible impacts associated with the project. The study includes an assessment of the baseline condition in consultation with the local stakeholders including the local community, governmental organizations, and community development agencies such as NGO/Self Help Groups etc. amongst other; as well as taking into account their perceptions on the impacts and benefits from the TSEL power plant.

### **5.2.2 Methodology and Approach**

The methodology and approach adopted for the socio-economic baseline assessment relied on readily available secondary information and primary information collected through consultations with a range of stakeholders for the project; as well as sample socio-economic survey of households within the impact zone of study area. The key activities that were carried out for primary and secondary data collection, are summarized as follows:

- ✓ **Desk-Based Review** of available project documentation and profile of the project site;
- ✓ **Reconnaissance Survey** to visually observe the social setting in and around 1 km of the area;
- ✓ **Secondary Information** is used from the Bureau of Statistic data for 1 km study area;
- ✓ **Consultations** with the Various Stakeholders ranging from governmental institutions, local administration (village administration), local community, landowners, project proponent etc.; and
- ✓ **Socio-Economic Survey** of the key settlements within close proximity of the existing power plant. The Socio-Economic survey was conducted for 50 households and data were collected based on a pre-developed questionnaire to assess the general socio-economic indicators of the area.

### 5.2.3 Demarcation of the Project Area for Socio-Economic Study

From practical considerations, as 1 km radius area entail quite a large primary socio-economic landscape, some typical adjacent settlement in Alikhali village under 7 and 8 Wards of Nhill Union were chosen as samples.

### 5.2.4 Reconnaissance Survey

The site visits were conducted by a team comprising of four social specialists of BCAS. The entire site visits were done in June, 2017. The socioeconomic survey, as well as the stakeholder consultations, were concluded during this period.

### 5.2.5 Consultations with Stakeholders

The team consulted with a wide range of stakeholders associated with the project. These included governmental agencies and departments, local administration, NGOs, as well as the community. Furthermore, in order to assess the community and household level impacts, a socio-economic survey for a sample of 50 household close to the power plant site was undertaken. This survey helped to establish the baseline conditions of the community living in the vicinity of the project; as well as to get their opinions, expectation and apprehensions about the TSEL power plant. The analyses of this data and the inferences drawn are provided in the following sections.

### 5.2.6 Collection and Review of Documents

During the field assessment and stakeholder meetings, documents of relevance to this study were collected and data for the same area was utilized in developing the social baseline. Bangladesh Population Census 2011 Data for Cox's Bazar District were collected and reviewed during this site assessment.

## 5.2.7 Socio-Economic Baseline Profile

### 5.2.7.1 Administrative Profile of Cox's Bazar

Cox's Bazar is a district in the south-east corner of Bangladesh and is a part of the Chittagong division. Total area of Cox's Bazar District is 2,491.85 km<sup>2</sup> of which 940.58 km<sup>2</sup> is under forest and total population is 22, 89,990 (BBS Census 2011). Population density of Cox's Bazar district is 919 per km<sup>2</sup>. Technaf Solartech Energy Limited is located at Alikhali Village of Nhilla union in Teknaf Upazila under Cox's Bazar district. The plant is by the side of Cox's Bazar-Teknaf Highway.

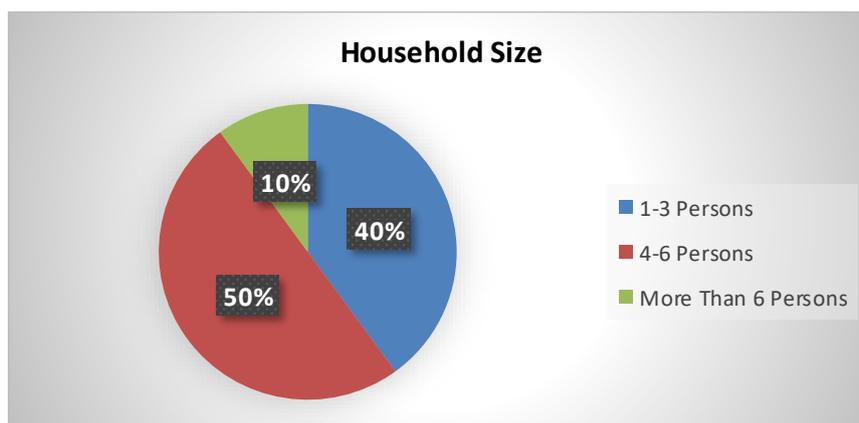
### 5.2.7.2 Findings of Socio-Economic Survey

The baseline assessment also comprised a socio-economic survey which was conducted in the closest rural settlement of the existing Technaf Solartech Energy Limited and data collected from randomly selected 50 households in order to gain first-hand information about the key household level socio-economic indicators. The following sections provide results from the analysis of the data collected.

#### 5.2.7.2.1 Demographic Trends

##### *Household Size*

According to the survey data, the majority of the households in the study area have 4-6 members. A significant percentage (50%) has 4-6 members, followed by (40%) households having 1-3 members. Only 10% of the total sample constituted of households having more than 6 members. Figure 4 shows the household size of the study area.



**Figure 4: Household Size of the Study Area**

##### *Population*

According to the BBS 2011, there are 417 households in Alikhali village. The total population is 2400 and the average household size is 5.75 persons. The field survey reveals that there are 202 people living in 50 households in the area giving an average of 4.04 persons per household. Table 5.10 below depicts the number of households by household size at the study area:

**Table 5.10: No. of Households Regarding Household Size at the Study Area**

| Household Size | Number of HHs | Percentage     |
|----------------|---------------|----------------|
| 1              | 10            | 20.00%         |
| 2              | 2             | 4.00%          |
| 3              | 8             | 16.00%         |
| 4              | 9             | 18.00%         |
| 5              | 10            | 20.00%         |
| 6              | 6             | 12.00%         |
| 7              | 2             | 4.00%          |
| 8              | 1             | 2.00%          |
| 9              | 1             | 2.00%          |
| 11             | 1             | 2.00%          |
| <b>Total</b>   | <b>50</b>     | <b>100.00%</b> |

***Population Age and Sex Distribution***

According to the BBS 2011, among 2400 people of Alikhali Village, there are 1167 male and 1233 female which expresses that the sex percentage is 48.6% and 51.4% respectively. On the other hand, according to the survey data, among 202 people male are 111 and female are 91. There are about 45% women and 55% men living in the study area. When it is time for age there are several age groups of people living in the study area. In the study it is seen that it is over half (57%) of the people who are in the 18-59 age cohort – the income earning group. The 5-9 and 10-14 years age groups have count of 8.42% and 14.85% respectively. And 15-17 years age group is only 3.47%. Further, 0-4 years (newborn) are 11.39% and 60+ years are 4.95% each. Table 5.11 below shows the population distribution of sample households by age groups:

**Table 5.11: Population Distribution of Sample Households by Age Groups**

| Age Group    | Frequency  | Percentage     |
|--------------|------------|----------------|
| 0-4          | 23         | 11.39%         |
| 5-9          | 17         | 8.42%          |
| 10-14        | 30         | 14.85%         |
| 15-17        | 7          | 3.47%          |
| 18-34        | 71         | 35.15%         |
| 35-59        | 44         | 21.78%         |
| 60+          | 10         | 4.95%          |
| <b>Total</b> | <b>202</b> | <b>100.00%</b> |

### Religious Status of the Study Area

According to the BBS 2011, among the total population of Alikhali Village, 2399 are Muslims and 1 is Hindu which indicates about 100% are Muslims. According to the sample survey, 100% of the population in the study area are Muslims by religion which is much higher than our country's religious profile.

### Marital Status

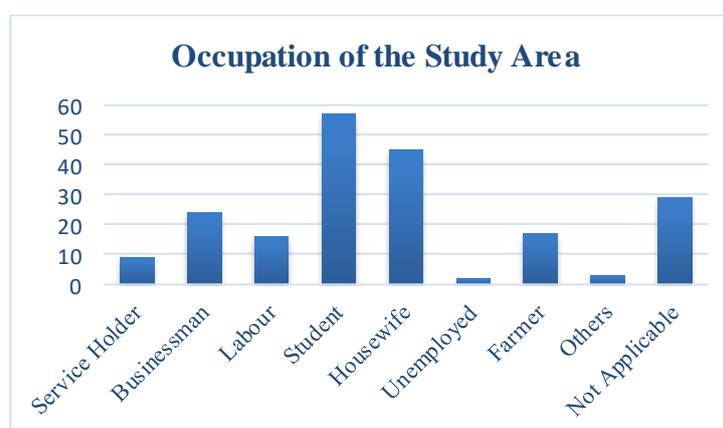
Table 5.12 presents marital status of the sample surveyed population in the study area. It is revealed from the study that, 47.52% of the population in the study area is married. The unmarried population is 15.84%. Although a huge 36.63% people of the study area who are not applicable to this status as they are below 15 years of age.

**Table 5.12: Marital Status of the Sample Surveyed Population in the Study Area**

| Marital Status | Frequency  | Percentage     |
|----------------|------------|----------------|
| Married        | 96         | 47.52%         |
| Unmarried      | 32         | 15.84%         |
| Not Applicable | 74         | 36.63%         |
| <b>Total</b>   | <b>202</b> | <b>100.00%</b> |

#### 5.2.7.2.2 Occupational Profile

As per the survey data it can be observed that almost 28.22% of the respondents are students followed by housewife (22.28%), businessman (11.88%), farmer (8.42%), labor (7.92%), service holder (4.46%) and others (1.49%) in the study area. There are only 1% who are not engaged in any works as they are unemployed. But almost 14.36% people are not applicable for any occupation as they are too old or too young to work. Among the 7.92% labor there are rickshaw-puller, construction worker, agriculturallabor, electrician etc. It can also be observed that majority of the women respondents are housewives or involved in household activities. Besides these, there are driver and village animal doctor also who are in others group. Figure 5 below shows the occupational profile of the study area:



**Figure 5: Occupational Profile of the Study Area**

### 5.2.7.2.3 Education & Literacy

According to the BBS 2011, the literacy rate for 7+ years population of Alikhali village is 16.7%. But the sample survey revealed that 80.69% of the household heads of the study area are literate. Majority of the respondents (37.13%) were found to have primary level education. High School level education is attained by 19.31% of the total sample respondent. Not a significant proportion is illiterate (7.92%). Also about 17% of the respondents complete SSC and HSC level education. A mere 7.43% people completed degree/honors level education. There are 11.39% people who are less than 5 years old and are not applicable to this status. Table 5.13 below shows the education and literacy of the HH heads of the study area:

**Table 5.13: Education Status of the HH Heads of the Study Area**

| Educational Status | Frequency  | Percentage     |
|--------------------|------------|----------------|
| Illiterate         | 16         | 7.92%          |
| Primary            | 75         | 37.13%         |
| High School        | 39         | 19.31%         |
| SSC                | 17         | 8.42%          |
| HSC                | 17         | 8.42%          |
| Degree/Honours     | 15         | 7.43%          |
| Not Applicable     | 23         | 11.39%         |
| <b>Total</b>       | <b>202</b> | <b>100.00%</b> |

### 5.2.7.2.4 Access to Utilities & Resources

#### *Property of Household*

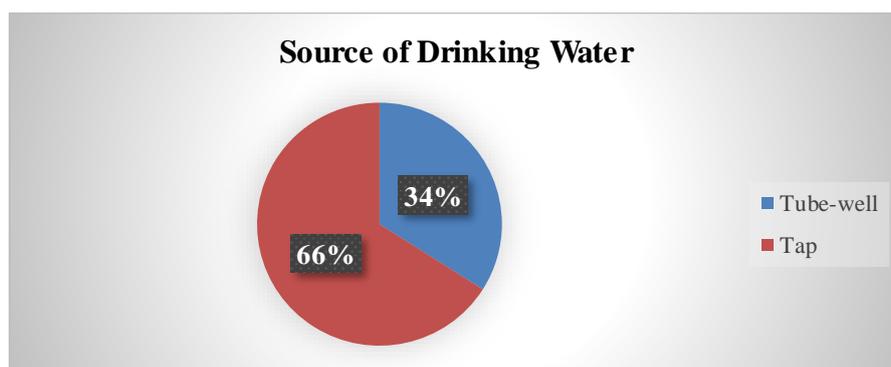
According to the BBS 2011, 98.8% people have their own house and 1.2% are rent free in the study area. In the present survey, data on household land ownership reveals that 100% of the respondents reside in their own houses.

#### *Sanitation Facilities*

According to the BBS 2011, 30.4% latrine is septic (water-sealed), 16.9% are sanitary (non-water-sealed), 51.4% are non-sanitary and 1.2% have no latrine regarding Alikhali Village. But the sample survey revealed that all of the households (100%) in the study area have septic latrines (water-sealed and non-water-sealed).

#### *Sources of Drinking Water*

According to the BBS 2011, relative larger part of the households (92.3%) use tube-wells, and 0.2% households use tap water and 7.5% household use others sources for their drinking water in the Alikhali Village. But it was observed from the sample survey that majority of the households or approximately 64% in the project study area use Tap water and 34% household use Tube-wells for drinking water. Figure 6 depicts Sources of drinking water for the sample surveyed households:



**Figure 6: Sources of Drinking Water for the Sample Surveyed Households**

### *Provision of Electricity*

According to the BBS 2011, only 15% household had the electricity in the Alikhali village. It was observed from the survey that all the households have Electricity connection.

### *Source of Fuel for Cooking*

Households in the study area use fuel for cooking purposes from mainly two different sources; firewood and LPG in cylinders. Sources of fuel for 82% household is LP gas and for 18% household it is firewood. Table 5.14 below shows the sources of fuel for the sample surveyed households:

**Table 5.14: Sources of Fuel for the Sample Surveyed Households**

| Cooking Materials | No. of HHs | Percentage     |
|-------------------|------------|----------------|
| Firewood          | 9          | 18.00%         |
| Cylinder Gas      | 41         | 82.00%         |
| <b>Total</b>      | <b>50</b>  | <b>100.00%</b> |

### *Access to Resources*

Among the surveyed household within the project study area, questions were asked on access to key resources; such as water sources, grazing land, educational facilities, hospital and markets. All surveyed households reported to have immediate access to resources way within a 1 kilometer distance as reported in the following Table 5.15:

**Table 5.15: Access to Resources**

| Access to Resources   | Less Than 1 km | 1-3 km | >3 km | Total Households |
|-----------------------|----------------|--------|-------|------------------|
| Water Source          | 50             | -      | -     | 50               |
| Hospital/Medicine     | 50             | -      | -     | 50               |
| Masjid/Temple         | 50             | -      | -     | 50               |
| Grazing Land          | 50             | -      | -     | 50               |
| Surface Water Sources | 50             | -      | -     | 50               |

### 5.2.7.2.5 Asset Ownership

#### Land Ownership

The survey has revealed that about 71% of land used by the households as cultivated land, whereas 8% of land used are homesteads and 21% of land are used in other purposes. The household have average 23.02 decimal land as their homestead and 201.8 decimal land for their cultivation. And average of 59.4 decimal land is used for other purposes. Figure 7 below depicts the use of land by the landowners:

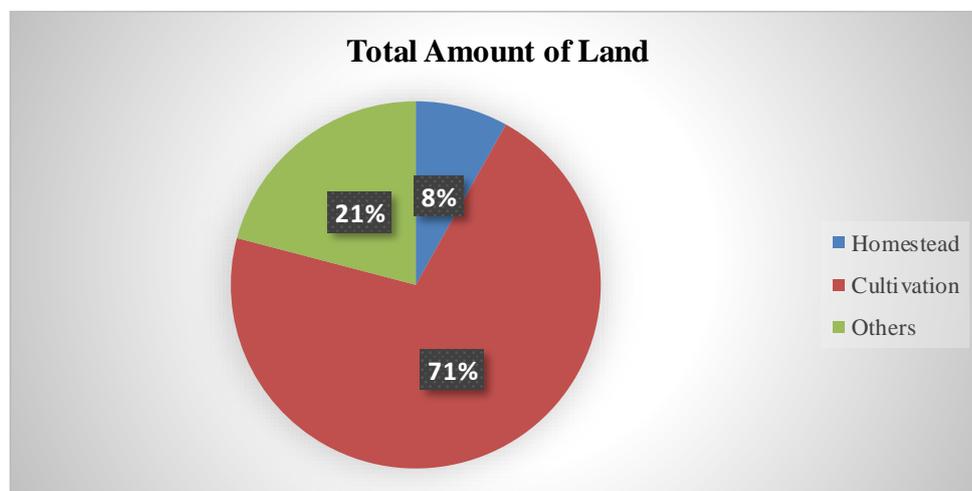


Figure 7: Use of Land by the Landowners

#### House Type

According to the BBS 2011, 1.9% houses are pucca (i.e., brick built), 7.7% houses are semi-pucca, 78.5% houses are katcha (i.e., mud) and 11.8% houses are jhupri (i.e., makeshift) at Alikhali Village. But majority of the houses in the sample surveyed area are pucca (38%) followed by semi-pucca houses (32%). And 28% houses have been observed as mud (katcha) houses whereas only 2% houses are jhupri. There are 63% pucca houses are 1 story buildings and 37% houses are 2 storied buildings. In the study area all semi-pucca houses are built with 'pucca wall, pucca floor, and tin (i.e., corrugated iron sheet) roof'. All of the mud (katcha) houses are built with 'mud wall, mud floor, and tin roof'. Table 5.16 below shows the types of houses at the study area:

Table 5.16: Types of Houses at the Study Area

| Types of House | Frequency | Percentage     |
|----------------|-----------|----------------|
| Pucca          | 19        | 38.00%         |
| Semi-Pucca     | 16        | 32.00%         |
| Kutchha        | 14        | 28.00%         |
| Jhupri         | 1         | 2.00%          |
| <b>Total</b>   | <b>50</b> | <b>100.00%</b> |

### ***Household Income***

Income sources of the household members of the study area were agriculture and livestock, agricultural work (i.e., as labor), fisheries, non-agriculture labor, industry, business, hawker, transport, construction, office work, rent, remittance, and others. Among the surveyed households, only 2% households earn less than Taka 10,000 per month – this group might be considered as poor. 44% households earn Taka 10,000-19,999 per month – this group might be considered as lower middle class. 32% households earn Taka 20,000-39,999 per month – this group might be considered as middle class. A great 18% households earn Taka 40,000 - 74,999 per month – this group falls under upper middle class category. There are 4% household that earn above Taka 75,000 per month was found in the study area, who could have been considered as rich. In general, the household head is found as the main income-earner of the family. But there are few joint families, where income-earners are more than one. Table 5.17 below shows income level of the households of the study area:

**Table 5.17: Monthly Income Level of the Households of the Study Area**

| <b>Household Income Range</b> | <b>No. of HHs</b> | <b>Percentage</b> |
|-------------------------------|-------------------|-------------------|
| <10000                        | 1                 | 2.00%             |
| 10000-19999                   | 22                | 44.00%            |
| 20000-39999                   | 16                | 32.00%            |
| 40000-74999                   | 9                 | 18.00%            |
| 75000+                        | 2                 | 4.00%             |
| <b>Total</b>                  | <b>50</b>         | <b>100.00%</b>    |

### ***Domestic Animals***

The percentage of households possessing domestic animals is observed to be moderate in the study area with only 14% not owning any form of domestic animals. However, within the remaining 86% most of the household owned or reared cows, buffaloes, goats, hens, ducks and pigeon. About 51.16% of the households the domestic animals are duck and hen, for 39.53% animals are cows, for 2.33% animals are goat and for about 6.98% animals are buffaloes and pigeons. Table 5.18 below shows the no. of households having different types of animals:

**Table 5.18: No. of Households Having Different Types of Animals**

| <b>Types of Livestock</b> | <b>Frequency</b> | <b>Percentage</b> |
|---------------------------|------------------|-------------------|
| Cow                       | 17               | 39.53%            |
| Goat                      | 1                | 2.33%             |
| Duck, Hen                 | 22               | 51.16%            |
| Others                    | 3                | 6.98%             |
| <b>Total</b>              | <b>43</b>        | <b>100.00%</b>    |

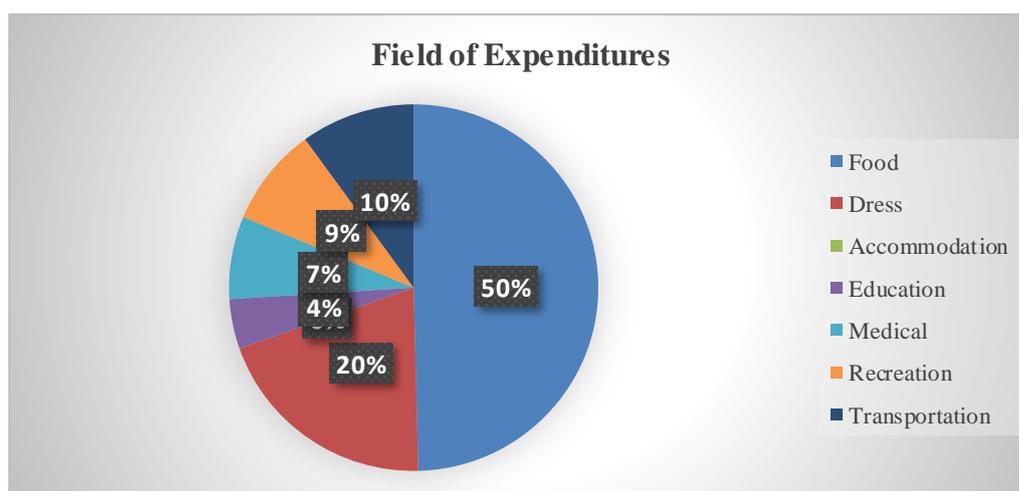
### 5.2.7.2.6 Household Expenditure

The sample survey data reveals that 2% households have average expenditure below Taka 5,000 per month, while 36% households expend Taka 5,000-9,999 per month on average, 48% households have expenditure of Taka 10,000-19,999 per month, 12% households spend Taka 20,000-39,999 per month and 2% households spend Taka 40,000-74,999 per month on an average. Table 5.19 below depicts the Expenditure Ranges of the Households of the Study Area.

**Table 5.19: Monthly Expenditure Ranges of the Households of the Study Area**

| Expenditure Range | No. of HHs | Percentage     |
|-------------------|------------|----------------|
| <5000 Taka        | 1          | 2.00%          |
| 5000-9999 Taka    | 18         | 36.00%         |
| 10000-19999 Taka  | 24         | 48.00%         |
| 20000-39999 Taka  | 6          | 12.00%         |
| 40000-74999 Taka  | 1          | 2.00%          |
| <b>Total</b>      | <b>50</b>  | <b>100.00%</b> |

It can be observed from the survey that a large fraction of the expenditure is attributed to food and consumable resources; with almost half of the monthly income being allocated for the same. Other significant expenditures include clothing, Transportation, recreation, medical and education. Figure 8 below depicts the statistics of expenditures of the households:



**Figure 8: Fields of Expenditures of the Households**

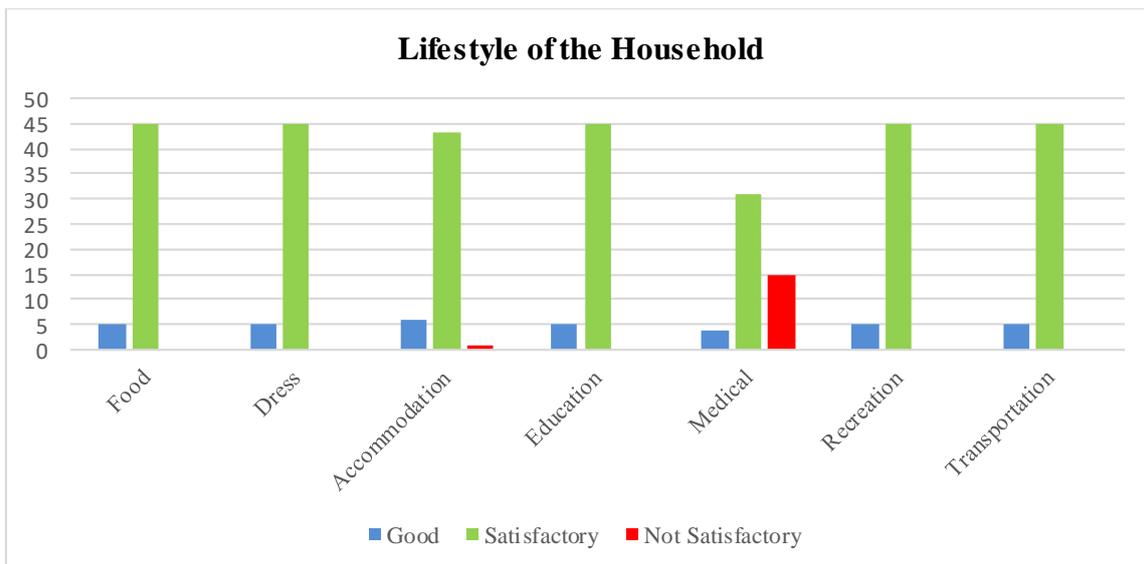
Field survey also revealed a great finding that 92% households have savings on their earnings.

**5.2.7.2.7 Involvement with NGOs/CBOs**

Sample household survey reveals that 44% households in the study area are involved with non-governmental and community-based organizations (NGOs/CBOs) and 56% family members donot have any involvement with NGOs/CBOs. BRAC and DSK work with local people for social and economic development – people have involvement with NGOs for obtaining loans and saving their money. Besides, there is a common CBO for the Muslims, which is the Masjid Committee.

**5.2.7.2.8 Satisfaction Level in Lifestyle**

The analysis of the households’ lifestyle has focused on accessibility and affordability regarding food, clothing, educational facilities, medical facilities, transport facilities, recreation etc. With respect to availability of food, clothing, education, recreation and transportation, it is considered “satisfactory” by 90% of the households under the survey. As for housing /accommodation facilities, it is found “satisfactory” by 86% of the respondents, 12.0% of the respondents found it “good” and only 2% of the respondents found it “unsatisfactory”. Medical facilities are generally considered “satisfactory” by only 28.0% of the respondents in the study area; whereas 68.0% of the respondents found them “unsatisfactory”. However, transportation facilities were scored as “satisfactory” by only 62% of the respondents, while a good 30% considered them as “unsatisfactory” and 8% considered it “poor”. So, in the case of medical services “unsatisfactory” level is far greater than other basic needs’ “unsatisfactory” level. Figure 9 below shows the satisfaction level of the household in their daily lifestyle:



**Figure 9: Satisfaction Level of the Household in their Daily Life Style**

**5.2.7.2.9 Overall Perception about the TSEL Power Plant**

All of the respondents have a positive perception about the TSEL power plant. They express the opinion that the power plant is a national asset and support to meet the electricity demand. Positive expectations of the surveyed household are primarily with respect to overall

development in the area, medical facilities, improved road facilities and employment opportunity for the local people.

## **6 ANALYSIS OF ALTERNATIVES**

### **6.1 ‘No Project’ Alternative**

From physical and environmental points of view, the ‘do-nothing’ is preferable to any project implementation, since it would avoid creation of any of the adverse impacts associated with the project. However, the ‘without project alternative’ is not acceptable; since this will reduce the potential for socio-economic development and GHG reduction goal of the country. So, it is concluded that the ‘No build’ alternative is unacceptable, and the potential socioeconomic benefits of implementation and GHG emission in the power sector outweigh the adverse impacts; all of which can be managed to be within the acceptable levels.

### **6.2 Analysis of Technology Alternatives**

GOB is looking for various options for Renewable Energy resources. Under the existing generation scenario of Bangladesh, Renewable Energy has a very small share to the total generation. The share of Renewable Energy is less than 1% currently. The present government is placing priority on developing Renewable Energy resources to improve energy security and to establish a sustainable energy regime; alongside of conventional energy sources. Government has already launched ‘500MW Solar Power Mission’ to promote the use of Renewable Energy to meet the increasing demand of electricity. Considering the scenario, solar energy generation is the most feasible technological alternative amongst renewable options; especially as wind power potential is very limited.

### **6.3 Analysis of Site Alternatives**

Bangladesh is a land scarce country, where finding suitable land of more than 100 acres of land within single boundary is very difficult. Moreover, the project land was agriculturally unproductive, where salt cultivation took place only seasonally providing meagre returns. Hence, landowners have seen the scope of larger benefit through 24 years lease to the project. Taking all these factors into consideration, the best possible site for the project is at the selected location.

## 7 RISK ANALYSIS AND IDENTIFICATION

Risk analysis and identification has been carried out on qualitative basis. Each of the impacts has been analyzed and categorization has been made based on the impacts being high, medium and low. Tables show the risk analysis of the risk analysis of the project during construction and operation phase.

**Table 7.1: Anticipated Risks on Important Environmental & Social Components during Construction Phase**

| Project Stages/<br>Source of Risks | Anticipated Risks on Important Environmental & Social Components during Construction Phase |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      |            |        |      |            | Comments |  |
|------------------------------------|--|--------|------|-----|--------|------|----------------------------|--------|------|-------|--------|------|------------|--------|------|---------------------------------|--------|------|-----------------|--------|------|------------|--------|------|------------|----------|--|
|                                    | Natural Environment  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      | Socio-economic Environment      |        |      |                 |        |      |            |        |      |            |          |  |
|                                    | Land/<br>Agriculture   |        |      | Air |        |      | Hydrology<br>&<br>Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial<br>Aquatic<br>Fauna |        |      | Human<br>Health |        |      | Homesteads |        |      | Employment |          |  |
|                                    | Low  | Medium | High | Low | Medium | High | Low                        | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                             | Medium | High | Low             | Medium | High | Low        | Medium | High | Adverse    |          | Beneficial   |
| Impacts on Aquatic Ecology         | ✓  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        | ✓    |                 |        |      |            |        |      |            |          | There will be minimal discharge during the pre-construction and construction phase of solid waste and water.<br><b>Mitigation measures:</b><br>No mitigation measure is required.  |
| Health and Safety                  |  |        |      | ✓   |        |      |                            |        |      |       |        |      |            |        |      |                                 |        | ✓    |                 |        |      |            |        |      |            |          | Particular matter (PM) generation during pre-construction and construction phases<br>Generation of noise due to piling and other construction activities and transportation of construction materials<br><b>Mitigation Measures:</b> <ul style="list-style-type: none"> <li>Regular sprinkling of water at the project site</li> </ul> |

| Project Stages/<br>Source of Risks | Anticipated Risks on Important Environmental & Social Components during Construction Phase |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      | Comments |            |        |      |            |   |
|------------------------------------|--|--------|------|-----|--------|------|----------------------------|--------|------|-------|--------|------|------------|--------|------|---------------------------------|--------|------|-----------------|--------|------|----------|------------|--------|------|------------|---|
|                                    | Natural Environment  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      | Socio-economic Environment      |        |      |                 |        |      |          |            |        |      |            |   |
|                                    | Land/<br>Agriculture   |        |      | Air |        |      | Hydrology<br>&<br>Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial<br>Aquatic<br>Fauna |        |      | Human<br>Health |        |      |          | Homesteads |        |      | Employment |   |
|                                    | Low  | Medium | High | Low | Medium | High | Low                        | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                             | Medium | High | Low             | Medium | High |          | Low        | Medium | High | Adverse    | Beneficial  |
|                                    |  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      |          |            |        |      |            | <ul style="list-style-type: none"> <li>• Use of nose mask for workers</li> <li>• Traffic management to reduce adverse effect due to noise</li> </ul>  |
| Solid Waste Management             |  | ✓      |      |     | ✓      |      |                            | ✓      |      |       |        |      |            |        |      |                                 |        |      |                 | ✓      |      |          |            |        |      |            | <p>There will be changes in the topography of the land due to excavation and leveling of land. Air quality will deteriorate during these phases on temporary basis. There may be generation of water during the piling operation.</p> <p><b>Mitigation measures:</b></p> <ul style="list-style-type: none"> <li>• The soil excavated will be used for leveling of the project site. So there is no accumulation of solid waste. No mitigation measure is required.</li> <li>• Regular sprinkling of water at the project site to reduce the dust generation</li> <li>• For incoming transportation of construction materials, it is to be ensured that the engines of the truck should be switched off to prevent emission of SO<sub>x</sub>, NO<sub>x</sub>, CO and PM. The fitness certificate of all transportation should be checked</li> </ul> |

| Project Stages/<br>Source of Risks               | Anticipated Risks on Important Environmental & Social Components during Construction Phase |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      | Comments |            |        |      |                |  |
|--|--|--------|------|-----|--------|------|----------------------------|--------|------|-------|--------|------|------------|--------|------|---------------------------------|--------|------|-----------------|--------|------|----------|------------|--------|------|----------------|--|
|  | Natural Environment  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      | Socio-economic Environment      |        |      |                 |        |      |          |            |        |      |                |  |
|  | Land/<br>Agriculture   |        |      | Air |        |      | Hydrology<br>&<br>Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial<br>Aquatic<br>Fauna |        |      | Human<br>Health |        |      |          | Homesteads |        |      | Employ<br>ment |  |
|  | Low  | Medium | High | Low | Medium | High | Low                        | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                             | Medium | High | Low             | Medium | High |          | Low        | Medium | High | Adverse        | Beneficial   |
|  |  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      |          |            |        |      |                | and recorded.<br><ul style="list-style-type: none"> <li>In case of water generation during piling, the water should be adequately disposed to ensure that the generated water does not have any impact on the surrounding environment.</li> <li>Use of PPEs to prevent inhalation of dust particles.</li> </ul>  |
| Hazardous Materials Storage                      |  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      |          |            |        |      |                | There will be no hazardous material used or stored in the project site during construction site.<br><b>Mitigation measures:</b><br>No measure is required.   |
| Transmission line, switch gears and transformers |  |        |      |     |        |      |                            |        |      |       |        |      |            |        |      |                                 |        |      |                 |        |      |          |            |        |      |                | Certain amount of electromagnetic radiation will occur near the transformer, switch gear and transmission lines.<br><b>Mitigation measures:</b> <ul style="list-style-type: none"> <li>Design of transmission line, switch gear and transformer to comply with the limits of electromagnetic interference</li> <li>The electricity transmission area should be fenced and limited access of workers are</li> </ul> |

| Project Stages/<br>Source of Risks | Anticipated Risks on Important Environmental & Social Components during Construction Phase |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      | Comments |            |        |      |            |                |
|------------------------------------|--|--------|------|-----|--------|------|----------------------|--------|------|-------|--------|------|------------|--------|------|----------------------------|--------|------|--------------|--------|------|----------|------------|--------|------|------------|----------------|
|                                    | Natural Environment  |        |      |     |        |      |                      |        |      |       |        |      |            |        |      | Socio-economic Environment |        |      |              |        |      |          |            |        |      |            |                |
|                                    | Land / Agriculture   |        |      | Air |        |      | Hydrology & Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial/Aquatic Fauna  |        |      | Human Health |        |      |          | Homesteads |        |      | Employment |                |
|                                    | Low  | Medium | High | Low | Medium | High | Low                  | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                        | Medium | High | Low          | Medium | High |          | Low        | Medium | High | Adverse    | Beneficial     |
|                                    |  |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      |          |            |        |      |            | to be ensured. |

**Table 7.2: Anticipated Risks on Important Environmental & Social Components during Operation Phase**

| Project Stages/<br>Source of Risks | Anticipated Risks on Important Environmental & Social Components during Operation Phase |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      | Comments |            |        |      |            |   |
|------------------------------------|---|--------|------|-----|--------|------|----------------------|--------|------|-------|--------|------|------------|--------|------|----------------------------|--------|------|--------------|--------|------|----------|------------|--------|------|------------|---|
|                                    | Natural Environment   |        |      |     |        |      |                      |        |      |       |        |      |            |        |      | Socio-economic Environment |        |      |              |        |      |          |            |        |      |            |   |
|                                    | Land / Agriculture  |        |      | Air |        |      | Hydrology & Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial/Aquatic Fauna  |        |      | Human Health |        |      |          | Homesteads |        |      | Employment |   |
|                                    | Low   | Medium | High | Low | Medium | High | Low                  | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                        | Medium | High | Low          | Medium | High |          | Low        | Medium | High | Adverse    | Beneficial  |
| Impacts on Aquatic Ecology         | ✓   |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            | ✓      |      |              |        |      |          |            |        |      |            | There will be minimal discharge during operation phase of solid waste and water.<br><b>Mitigation measures:</b><br>No mitigation measure is required. |

| Project Stages/Sources of Risks | Anticipated Risks on Important Environmental & Social Components during Operation Phase |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      | Comments |            |        |      |            |   |
|---------------------------------|---|--------|------|-----|--------|------|----------------------|--------|------|-------|--------|------|------------|--------|------|----------------------------|--------|------|--------------|--------|------|----------|------------|--------|------|------------|---|
|                                 | Natural Environment   |        |      |     |        |      |                      |        |      |       |        |      |            |        |      | Socio-economic Environment |        |      |              |        |      |          |            |        |      |            |   |
|                                 | Land / Agriculture  |        |      | Air |        |      | Hydrology & Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial/ Aquatic Fauna |        |      | Human Health |        |      |          | Homesteads |        |      | Employment |   |
|                                 | Low   | Medium | High | Low | Medium | High | Low                  | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                        | Medium | High | Low          | Medium | High |          | Low        | Medium | High | Adverse    | Beneficial  |
| Health and Safety               |   |        |      | ✓   |        |      |                      |        |      | ✓     |        |      |            |        |      |                            |        |      | ✓            |        |      |          |            |        |      |            | There will be no emission (Sox, NOx, CO and PM) in the operation phase. So there will be no adverse risk on workers.<br><b>Mitigation Measures:</b><br>No measure is required.  |
| Solid Waste Management          | ✓   |        |      | ✓   |        |      | ✓                    |        |      |       |        |      |            |        |      |                            |        |      | ✓            |        |      |          |            |        |      |            | Insignificant amount of solid waste will be generated from the office building and canteen.<br><b>Mitigation measures:</b><br>The waste should be collected and disposed for recycling purposes outside the project area.   |
| Hazardous Materials Storage     |   | ✓      |      |     |        |      |                      | ✓      |      |       |        |      |            |        |      |                            |        |      |              |        |      |          |            |        |      |            | Hazardous materials like transformer oils/ spent oils and solvents required for coating of PV panel fittings etc. may be stored in the plant site.<br><b>Mitigation measures:</b><br>Transformer oils/ spent oils should be stored adequately in drums with secondary containment and sealed and marked as hazardous. These should be stored in a designated area. Periodically these materials should be disposed to outside DoE approved contractors for proper disposal. |

| Project Stages/Sources of Risks                  | Anticipated Risks on Important Environmental & Social Components during Operation Phase |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      | Comments |            |        |      |            |   |
|--|---|--------|------|-----|--------|------|----------------------|--------|------|-------|--------|------|------------|--------|------|----------------------------|--------|------|--------------|--------|------|----------|------------|--------|------|------------|---|
|  | Natural Environment   |        |      |     |        |      |                      |        |      |       |        |      |            |        |      | Socio-economic Environment |        |      |              |        |      |          |            |        |      |            |   |
|  | Land / Agriculture  |        |      | Air |        |      | Hydrology & Drainage |        |      | Noise |        |      | Vegetation |        |      | Terrestrial/ Aquatic Fauna |        |      | Human Health |        |      |          | Homesteads |        |      | Employment |   |
|  | Low   | Medium | High | Low | Medium | High | Low                  | Medium | High | Low   | Medium | High | Low        | Medium | High | Low                        | Medium | High | Low          | Medium | High |          | Low        | Medium | High | Adverse    | Beneficial  |
| Transmission line, switch gears and transformers |   |        |      |     |        |      |                      |        |      |       |        |      |            |        |      |                            |        |      |              |        |      |          |            |        |      |            | Certain amount of electromagnetic radiation will occur near the transformer, switch gear and transmission lines.<br><b>Mitigation measures:</b> <ul style="list-style-type: none"> <li>• Design of transmission line, switch gear and transformer to comply with the limits of electromagnetic interference</li> <li>• The electricity transmission area should be fenced and limited accesses of workers are to be ensured.</li> </ul> |

From the above analysis it can be concluded that overall risk level for the TESL project is medium.

## 8 IMPACT IDENTIFICATION AND EVALUATION

### 8.1 General

The potential project impacts on the environment during construction & operation phases are considered and evaluated in this chapter. During the construction phase, the impacts were temporary or short-term; while long term impacts may be observed during the operation stage. Spatially the impacts have been assessed over the study area of 5 km radius of the project site.

The project has overall positive impacts by providing a competitive, cost-effective, pollution free reliable mode of Solar PV power.

### 8.2 Potential Impact Generation Activities

The construction and operation phase of the project comprises various activities each of which has an impact on environmental parameters. The impacts of the project are envisaged during the design and planning, during pre-construction phase, construction phase.

During the construction phase, the following activities had some impacts on environment:

- Site preparation
- Minor excavation and leveling
- Hauling of earth materials and wastes
- Cutting and drilling
- Erection of concrete and steel structures
- Road construction
- Painting and finishing
- Clean up operations
- Landscaping and afforestation

The activities can be divided into two categories, viz. sub-structural and super-structural work. Moreover, construction work involved cutting of trenches, excavation, concrete work etc. All these activities attribute to dust pollution. The super-structural work involved steel work, concrete work, masonry work etc. and involved operation of large construction equipment like cranes, concrete mixers, hoists, welding sets etc. These contributed to emission of dust and gases; as well as noise pollution from these activities.

Mechanical erection work involves extensive use of mechanical equipment for storage, transportation, erection and on-site fabrication work. These activities generated some air contaminants and noise pollution. The electrical activities were less polluting in general.

### 8.3 Impacts during Planning and Design Phase

The potential adverse environment impacts associated with transmission lines were avoided or minimized through careful route selection. The alignment was chosen to be away from major settlements, whenever possible, to account for future urban expansion. Forests areas and vegetation areas were avoided. Alignment in this project has avoided areas with soft soil, which pose foundation related problems. No land acquisition was required for placing transmission towers on private land, as alignment was along the ROW(right of way) of the public roads.

### 8.4 Impacts during Pre-Construction & Construction Phase

The environmental impact during construction phase was localized and of short term magnitude. However, as this project land was barren, with the change in land use the area has settled down to a nonpolluting industrial area with a nice view.

Impacts were primarily related to the civil works and some intensive impact due to erection equipment. The details of the activities and probable impact are brought out in table below. With the end of construction, these have ceased; except for the permanent change of landscape.

Table 8.1: Identification of Activities & Impacts (Pre-construction & Construction Phases: now completed)

| Construction Activities   | Environment Attribute | Impacts   |
|---|-----------------------|---|
| Land use  | Land                  | The land has settled down to a nonpolluting industrial site with a nice view.   |
|   | Socio-economics       | No Impact due to Rehabilitation & Resettlement issues were involved as fallow and barren salt fields have been used for the power plant construction. The ROW for the transmission line was sited away from major settlements and agricultural land.. |
| Site clearing and Leveling (cutting, stripping, excavation, earth movement, compaction) | Air                   | <ul style="list-style-type: none"> <li>➤ Fugitive Dust Emissions</li> <li>➤ Air Emissions from construction equipment and machinery</li> </ul> With the end of construction, these have ceased.   |
|   | Water                 | Run-off from construction area  |
|   | Land                  | Loss of topsoil was minimal as the land was mostly barren and some used for salt cultivation activities.  |
|   | Ecology               | Minimal loss of vegetation / habitat as the site was  |

| Construction Activities                                       | Environment Attribute | Impacts  |
|---|-----------------------|--|
|   |                       | a barren land with almost no vegetation.   |
| Transportation and Storage of Construction Material/Equipment | Air                   | <ul style="list-style-type: none"> <li>➤ Air Emissions from vehicles</li> <li>➤ Fugitive Dust Emissions due to traffic movement</li> </ul> With the end of construction, these have ceased.                                  |
|   | Water                 | Run-off from Storage Areas of construction Material,<br>With the end of construction, these have ceased.   |
|   | Public Utilities      | Increased flow of traffic<br>The impacts were minimal and with the end of construction, these have ceased.   |
| Civil Construction Activities                                 | Air                   | <ul style="list-style-type: none"> <li>➤ Air Emissions from construction machinery</li> <li>➤ Fugitive Dust Emissions</li> </ul> With the end of construction, these have ceased.  |
|   | Water                 | Run-off from Construction Areas<br>With the end of construction, these have ceased.  |
| Mech. and Elec. Erection Activities                           | Air                   | Air Emissions from Machines/ activities.<br>With the end of construction, these have ceased.   |
| Influx of Labor and construction of temporary houses          | Socio-economics       | <ul style="list-style-type: none"> <li>➤ Employment opportunities shall increase</li> <li>➤ Stress on infrastructure</li> </ul> With the end of construction, the construction workers are gone and labor camps were closed. |
|   | Land                  | Change in land use pattern of the area.<br>The land has settled down to a nonpolluting industrial site with a nice view. This change is permanent, but it is the intended outcome of the project.                            |
|   | Water                 | Sanitary effluents from labor colonies   |
| Transportation and Disposal of                                | Air                   | <ul style="list-style-type: none"> <li>➤ Air Emissions from Transport Vehicles</li> <li>➤ Fugitive Dust Emissions due to Movement of Traffic</li> <li>➤ Spillage and fugitive emissions of debris</li> </ul>                 |

| Construction Activities | Environment Attribute | Impacts   |
|-------------------------|-----------------------|---|
| Construction Debris     |                       | materials<br>With the end of construction, these have ceased.                   |
|                         | Water                 | Run-off from Disposal Areas<br>With the end of construction, these have ceased. |
|                         | Soil                  | No soil loss or degradation happened.   |

#### 8.4.1 Impact on Land use

The mobilization of construction equipment and construction materials required space for storage and parking of construction vehicles and equipment, construction material storage yards, disposal sites, and labor camps. To avoid environmental impact and public inconvenience, these activities were limited to the project land. These locations shall comply with the local laws and regulations and need approval from authorities to utilize these facilities (access roads, telecommunication, and pipe borne water supply).

The construction activities attracted a sizeable number of workers and some temporary worker camps were constructed on the project land to accommodate these workers. However, the impacts of the camps have now ceased, as these were closed at the end of construction. In any case the impacts were not significant due to following reasons.

- Temporary labor camps were situated on areas already acquired for the project.
- The camps were only a temporary change (restricted to construction period). After construction phase, the areas have reverted back to designed longterm use.

Further, TSEL has taken measures to improve the infrastructure of the area such as roads, schools, hospitals, etc. The project would add to the economic development of the area through allied business, which will be set-up along with the plant.

#### 8.4.2 Impact on Soil Cover

As the construction activities for the plant units of project involved filling up of fallow land and some salt fields, there were no impact on soil. The construction activities result in loss of some vegetation cover (grass and shrubs) and in the plant area. There was no adverse impact on soil in the surrounding area.

#### 8.4.3 Impact of Solid Waste

Solid waste during the construction phase consists primarily of scrapped masonry, excess concrete and cement, rejected components and materials, packing and shipping materials

(pallets, crates, Styrofoam, plastics etc.). These were disposed off in an environment friendly manner.

#### **8.4.4 Air Impact**

As the project is Solar PV Project, the impact during construction period were largely particulate matter in the form of dust affecting the air quality. Dust were generated mainly during excavation, back filling and hauling operations along with transportation activities.

The main source of gaseous emission during the construction phase were from the movement of equipment and vehicles at site. Equipment deployed during the construction phase small amount of SO<sub>2</sub>, NO<sub>x</sub>, and particulate matter. These impacts were marginal and temporary in nature and have ceased with the end of construction activities.

#### **8.4.5 Noise Impact**

The major noise generating sources during the construction phase were vehicular traffic, construction equipment like dozer, scrapers, concrete mixers, cranes, generators, pumps, compressors, rock drills, pneumatic tools, vibrators etc. The operation of these equipment will generate noise ranging between 75 – 90 dB (A). The noise generation have ceased with the end of construction activities.

#### **8.4.6 Impact on Water Environment**

The construction personnel were housed in temporary work camps. These camps discharged considerable amount of domestic wastewater. Contractors provided septic tanks and soak pit with a depth of 2 meter to dispose liquid water, so that such water did not form stagnant pools nor aggravate soil erosion. The main pollutants were organic components with the potential to cause contamination of water quality. These were taken care of by the septic tanks.

Construction processes include fabrication of concrete and related water usage. Waste water from construction activities would mostly contain suspended impurities. The wastewater was impounded before discharge, to prevent solids buildup in the existing drains. Thus, the construction site wastewater was led to a sedimentation basin, allowing a hydraulic retention time of 1 ½ to 2 hours, where excess suspended solids were settled out and relatively clear supernatant liquid was discharged to the plant drain. Generally, surface run-off water is not there in dry months during construction. However, during monsoon, surface run-off including load of suspended solids had to be dicharged into the canal flowing the the project site.

#### **8.4.7 Ecological Impact**

The project site was mainly fallow with some salt field and there are no major habitats near the site. The impact of the construction activities was primarily confined to the project site. Since, the entire land was mostly fallow, and only some xerophytic plants, shrubs grew there. Thus, the site development works would not lead to any significant loss of important species or ecosystems.

### 8.4.8 Impacts Due to Transmission Lines during Construction Phase

The project activities during construction phase did not involve any clearing of trees along the route alignment, excavation for installation of towers, erection of towers, civil works related to transmission line and line stringing as the line will connect with the existing poles of REB. During the operation phase, most of the construction phase impacts will get stabilized and the impacts will be restricted only to the operation and maintenance of the project.

The impacts of the project activities on various environmental attributes are discussed in subsequent sections.

### 8.5 Impact during Operation Phase

Various activities of operation and maintenance phase and their probable impacts on various sectors of environment are presented in table below.

**Table 8.2: Identification of Activities and Probable Impacts in Operation Phase**

| O&M Activities                           | Sector           | Probable Impacts  |
|--|------------------|---|
| Transportation                           | Air              | <ul style="list-style-type: none"> <li>➤ Air Emissions from Vehicles</li> <li>➤ Fugitive Dust Emissions due to Traffic Movement</li> </ul>  |
|  | Public Utilities | Increased flow of traffic   |
|  | Water            | No effluent generation  |
| Power Generation                         | Air              | There is no emission from solar PV Project  |
| Water Treatment for various uses         | Water            | Generation of Wastewater due to PV Cleaning Modules. The effluent is non-toxic and will be discharged in the canal within the project site.   |
| Operation of Transformers and Switchyard | Water            | There may be transformer oil spillages during maintenance.  |
| Electromagnetic Radiation                | Health & Safety  | There will be non radiative electromagnetic fields near the transformer, switchyard and the transmission lines. However, any health effect for such fields have not been confirmed.   |
| proper maintenance of PV plant           | O&M              | The O&M activities for a solar PV power plant are less demanding than those related to other forms of electricity generation. This is mainly due to the fact that there are no moving parts in TSEL SPV system (as it is a non-tracking |

| O&M Activities | Sector | Probable Impacts  |
|----------------|--------|---|
|                |        | system). However, maintenance is still an important factor in maximising both the performance and lifetime of the plant components. |

### 8.5.1 Impact on Land use

The project has been set up on fallow land and some barren salt fields. The site, after completion of its development, would consist of built up structures, landscaped to give a pleasing view. Following the construction phase, the temporarily modified land use pattern, such as construction of temporary tents to accommodate some construction personnel will be removed during the operation stage. Land released from the construction activities would be put to economic and aesthetic use to hasten recovery from adverse impacts.

### 8.5.2 Impact on Soil Cover

Most impacts of Solar PV project on soil are restricted to the construction phase, which have stabilized now with the plant in the operation phase.

During operation of a project, no appreciable adverse changes in the soils are anticipated.

### 8.5.3 Air Impact & GHG Emission

Plant operation would not significantly affect the air quality, as Solar project is green field project & there are no any gaseous emissions during operation phase from the project.

There is no net GHG emission from the project. However, GHG avoidance can be calculated from grid emission calculation.

If the yearly production of 43,794.72MWh grid is replaced with Solar PV generation, GHG emission of  $0.5635 \times 43,795 = 24,678$  tons of CO<sub>2</sub> per year can be avoided.

Here, GHG emission factor of Grid is 0.5635 ton CO<sub>2</sub>/MWh.

\* The Green House Gas (GHG) emission factor for Bangladesh has been collected from IFC's Carbon Emissions Estimation Calculator (CEET) (Details in [Annex 14](#)).

#### 8.5.3.1 Impact of Refrigerant Used in Air conditioners

In TSEL premises, total 11 ACs have been installed- seven in Control Rooms with total capacity of 18 Ton and four in First floor office with total capacity of 4 Ton. Refrigerants used in these ACs are R410A & R22. R-410A is a hydro-fluorocarbon (HFC) which is a lesser ozone depleting substance than standard FCs. However, care should be taken while choosing the right refrigerant during replacement of ACs.

### 8.5.4 Noise Impact

#### Work Zone Noise Levels

Protective gears were provided to the operators and workers working near the high noise generating machinery. As per Occupational Safety and Health Administration (OSHA) Standards, the maximum allowable noise level for the workers is 90 dB (A) for 8 hours exposure a day. The operation of SPV plant will not have impact on noise level. The project site is found to have ambient noise level with a range of 39.70-49.80 dBA at different time of the day (refer to section 5.1.5.9).

## **8.5.5 Impact on Water Environment**

### **8.5.5.1 Impact on Ground Water**

Only small amount of ground water will be drawn to clean the solar panels. So, lowering of groundwater table will not be an issue.

### **8.5.5.2 Impact on Surface Water**

There shall be minimal discharge of wastewater from cleaning of Solar PV modules. The wastewater emanating from cleaning operations will be discharged in the canal without significant impact; as the washed material will only contain soil dust settled on PV panels.

### **8.5.5.3 Terrestrial Ecology**

There is no sensitive ecological area / protected forest area such as national wildlife park, bird sanctuary near the project area or along the power line alignment. There was no significant vegetation in the project area, as the area was largely fallow with some salt production fields. Compaction of the ground surface and laying of the gravel layer on surface has lessened soil erosion from the area.

## **8.5.6 Impacts of Transmission Lines during Operation Phase**

### **8.5.6.1 Electrical Hazards**

The connection from plant substation (i.e., inverter) will be through insulated cables to standard overhead lines. Such practices are widespread in the country and considered quite safe.

## **8.5.7 Impact of Solar PV Panel**

TSEL is using polycrystalline Silicon Solar Modules for its solar plant. In order to assess the environmental impact of solar panels, it is essential to consider the Life Cycle Analysis (LCA) of solar panels.

In the manufacturing process of a solar panel, there are mining and processing of the raw materials; which are energy intensive and uses non renewable energy and therefore causing emission of GHGs.

Solar power plants once in operation have no GHG emissions or water pollution except from washing of the panels. The efficiency of solar panels have been increasing over the years; as a result it has been estimated that currently it takes between 2-3 years of operation of a solar

power plant to offset the GHG emission, caused during the manufacturing process of solar panels. Therefore, for solar power plants having a lifetime of 20 years is clearly beneficial in terms of net reduction of GHG emission over the plant life.

On completion of the lifetime of the TSEL the plant will have to be decommissioned and the panels cannot be dumped in the environment and therefore have to be disposed through recommended means. There are currently a number of DOE licensed companies for E-Waste disposal and such entities will be used for demobilised solar panels.

### **8.5.8 Impacts of O&M activities for Solar PV plant**

Compared to most other power generating technologies, PV plants have low maintenance and servicing requirements. However, proper maintenance of a PV plant is essential to optimize energy yield and maximize the life of the system.

Thorough scheduled maintenance, the requirement for unscheduled maintenance should be minimized; although, inevitably, some failures may still occur. A robust and well-planned approach to both scheduled and unscheduled maintenance is important and will be undertaken. [Annex 15](#) describes the possible O&M activities for an ideal solar PV plant.

## **8.6 Social Impacts**

### **8.6.1 Traffic Congestion**

No significant increase in the local traffic is envisaged due to the Project.

### **8.6.2 Labor Influence**

#### **8.6.2.1 Construction Phase**

During construction activities, the manpower was approximately 250. A labor camp was constructed with basic amenities for a small number of laborers staying at the site. However, this impact of the labor influx was insignificant due to the following reasons:

- Temporary labor colony was situated in the areas already acquired for the project.
- It was only a only a short term issue limited to construction period. After construction phase, the labor sheds were demolished.

TSEL has a Human Resources Policy (refer to [Annex 19](#)), which specifies the terms of employment and working conditions. These include procedures for hiring and recruiting; probation and training; performance review and promotion; insurance, salary and compensation; resignations, lay-offs and retrenchment; leave and vacation, and superannuation.; The procedures comply with the Bangladesh Labor Rules, 2015. All the employees will have access to the human resources policy and procedures. Labor inspections are done annually by the relevant government agency, which reviews wages, working hours, benefits, etc.

Most of the construction labor were employed on contractual basis. Separate labor camps were constructed within the plant premises for nonlocal labors. There were no conflict of the

nonlocal labors with locals. Regular health status monitoring of labors and its surrounding population were carried out with the mobile health care team operated by TSEL in the perproject impact area. The health issues that requires attention by TSEL are as follows:

**Table 8.3: Labor Health Management Issues and Mitigation Measures**

| <b>General Living Facilities</b>                 |  |
|--|--|
| <b>Issue</b>                                     | <b>Mitigation Measures</b>   |
| Drainage   | The labor camp/ plant site was adequately drained to avoid the accumulation of stagnant water; which may have caused proliferation of potential disease vectors such as mosquitoes, flies and others.  |
| Heating, air conditioning, ventilation and light | <ol style="list-style-type: none"> <li>1. Adequate ventilation and/or fans were to be provided in work area.</li> <li>2. Both natural and artificial lighting were provided and maintained in living facilities. Emergency lighting were also provided.</li> </ol>   |
| Water  | <ol style="list-style-type: none"> <li>1. Access to an adequate and convenient supply of free potable water were always available to workers.</li> <li>2. Drinking water supplied met national drinking water standards.</li> <li>3. All water tanks used for the storage of drinking water were cleaned and covered; to prevent water stored therein from becoming polluted or contaminated.</li> <li>4. Drinking water quality was regularly monitored.</li> </ol> |
| Wastewater and solid waste                       | <ol style="list-style-type: none"> <li>1. Wastewater, sewage, food and other solid wastes were processed according to standard practices; so that there were no significant impacts on camp residents, the biophysical environment or surrounding communities.</li> <li>2. Pest extermination, vector control and disinfection were carried out throughout the living facilities in compliance with local requirements and/or good practice.</li> </ol>              |

### **8.6.2.2 Operation Phase**

In operation phase, TSEL provides accommodation facility in Teknaf town for both permanent and contractual non-local single staffs stationed at project site. Therefore, no impact on the local life pattern is envisaged due to operational worker of the project.

First aid boxes are available at the with adequate first aide items. Contact details of the first aide providers are displayed with photographs. While checking a sample first aid box, updated list of medicines was found and the medicines inside the box were well maintained. A register logbook is also maintained.

For any injury or medical help, the patient will be sent to Upazila Health Complex. Emergency contact details of the health complex and ambulance services are detailed in the front security office of TSEL.

To ensure health & safety on project site:

1. Health and safety management plans including electrical, mechanical, and structural and food safety have been carefully designed and are to be implemented.
2. A specific fire safety plan has been prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills for employees.
3. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of

other health risk-related activities are provided to workers. It is the best practice to develop a clear policy on this issue, which is followed.

### **8.6.3 R&R Issue**

The TSEL Solar PV Plant has been set-up on largely fallow land and some barren salt fields. Therefore, there was no Resettlement & Rehabilitation (R & R) issue for the project site. Initial survey of the 2.95 km transmission line right of way (ROW) showed that it will pass through Alikhali and Leda village. The preliminary survey also showed that the transmission line and line stringing can use the existing poles of REB.

### **8.6.4 Change in Socio-economic Condition**

**Employment:** The project has generated employment opportunities for the local population. In the operation phase, out of 20 employees, four are from Teknaf. During construction period, 80% of the construction workers were locally hired. Some indirect job opportunities were created outside the project boundary. Many people found employment in service sector (providing food for the workers) and marketing of day-to-day needs viz. poultry and other agricultural products. The project has also improved the basic infrastructure such as market expansion, poultry and agricultural supply chain, etc. and the people of nearby villages can also use these amenities.

TSEL is working for the employment and skills training for the locals through following steps.

- Provision in project contracts to provide priority in employment
- On the Job Training for skills upgradation on mechanical and electrical issues, OHS related issues, etc.

Overall, there are some positive impacts on the socio-economic condition of the locality.

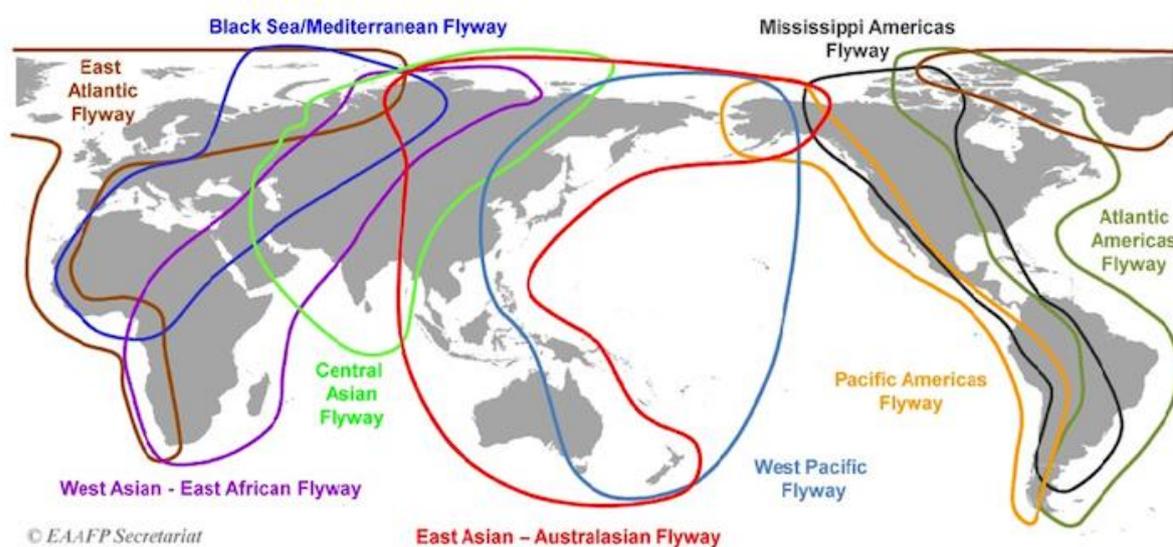
During recent outbreak of COVID-19 pandemic, TSEL constructed a hand-washing station in front of the main gate. Safety instructions are displayed to increase awareness on benefits of wearing masks and social distancing. Safety instruction posters, face masks and hand sanitizers are being distributed among the relevant stakeholders of neighboring communities.

**Development of Infrastructure:** The job opportunities in non-agricultural sector are likely to increase. The installation of the power plant is expected to further increase the prospects by bringing in direct and indirect employment opportunities.

As the project and consequent activities are expected to generate additional employment and income opportunities for the local population, market expansion supported by infrastructural development will foster economic growth in the area. Flow of reliable and adequate power from the plant will not only enhance growth in the region, but will also bring about a change in energy consumption pattern by switching over from other sources of energy. This will ease off burden on the existing biomass sources.

## 8.7 Impact on Migratory Birds

Migration studies of birds in Bangladesh are rare, however in recent years a small numbers of water-birds using Bangladesh have been fitted with satellite transmitters. Evidences so far indicate local movements within Bangladesh between wetlands; and some longer range movements from the north-east to the lower Meghna and coast. In addition, waterfowl wintering in Orissa (India) pass through north-western Bangladesh, ducks wintering in Hakaluki Haor, migrate through Assam and on to breeding grounds spread from the Tibetan plateau and western China, to western Mongolia, and even in one case a route through Manchuria to far eastern Siberia.



**Figure 10: Nine Major Migratory Flyways**

Flyways for migratory birds, wetlands like haor and breeding grounds of migratory birds do not fall under project area of investigation (AoI). The project area is not located on the migration route or near to sanctuary for migratory birds. Thus, the project activities, structures or transmission lines do not have any impact on the migratory birds in any way.

## 8.8 Hazardous and E-Waste generation

Various electrical equipment such as solar PV panels, inverter, rectifiers, batteries and electrical cords are used in the power plant. A small quantity, apx 20 KVA battery bank is used for internal control & protection relay power supply system. Usual lifetime of such Lead-acid (VRLA) batteries is 2 years. After lifetime expiry, these are required to be disposed through DOE authorized battery recycling companies for reprocessing. TSEL will follow this practice. Quantity of such VRLA (Valve Regulated Lead Acid) batteries in TSEL premises is 146 (150 AH – 42 Nos, 120 AH – 80 Nos, 50 AH, 2V – 24 Nos).

Some of these electrical equipment may get damaged or broken during operation phase. Over the time, the amount may accumulate to a significant quantity. These E-waste can be

categorized as hazardous waste. There are now several E-waste disposal companies authorized by DOE; any disposal will be done through these companies.

## 9 MITIGATION/ OPTIMIZATION MEASURES AND RESIDUAL IMPACTS

### 9.1 Mitigation measures taken during Construction phase

Mitigation measures for the anticipated impacts occurring in the construction phase are described below:

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Land Use   |
| <b>Mitigation Measure</b> | <p>The selected project site was barren salt field and away from highly populated areas, agricultural lands, important ecological habitats and residential areas. The removal of trees and green cover vegetation was minimized during the site development and other facilities.</p> <p>Each corner of each plot was physically marked with marking pillars and digital map/ plant layout was prepared showing exact land plots for each land owners.</p> |

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Soil Cover   |
| <b>Mitigation Measure</b> | <p>Appropriate soil erosion control measures such as plantation activities would be undertaken by TSEL to appease the chances of soil erosion. Completion of excavation and foundation work in limited time schedule was ensured to reduce / minimize the chances of soil erosion.</p> |

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Solid Waste  |
| <b>Mitigation Measure</b> | <p>During the construction there was generation of garbage, for which designated practices of solid waste disposal was followed. Solid waste disposal was done as follows:</p> <ul style="list-style-type: none"> <li>• The excavated material generated was reused for site filling and leveling operation to the maximum extent possible.</li> <li>• The scrap metal waste generated from erection of structures and related construction activities was collected and stored separately in a stack yard and sold to local recyclers.</li> <li>• Food waste and recyclables viz. paper, plastic, glass etc was properly segregated and stored in designated waste bins/containers. The recyclables were periodically sold to local recyclers while food waste was disposed through waste handling agency.</li> <li>• Hazardous waste viz. waste oil etc was collected and stored in paved and bunded area and subsequently sold to authorized</li> </ul> |

recyclers.

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Noise   |
| <b>Mitigation Measure</b> | To minimize the noise impact on nearby communities, construction schedules had been optimized and vehicular traffic was routed away from the nearest settlement, Alikhali village, which is approximately 1 km from the power plant site. Also the noise level was substantially lower near the plant boundary due to attenuation caused over the distance. Overall, the impact of generated noise on the environment during construction period was insignificant, reversible and localized in nature. |

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Water   |
| <b>Mitigation Measure</b> | To address potential impacts on water quality, disinfected latrines (e.g., through regular liming) was used as main component of the sanitation system. |

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Ecology  |
| <b>Mitigation Measure</b> | <ul style="list-style-type: none"> <li>• Construction workers were prohibited from harvesting wood in the project area during their employment.</li> <li>• Work force were prevented from disturbing the flora, fauna including hunting of animal</li> <li>• Greenery development to be ensured over 33% area of the project site with plantation of fruit and other trees. This shall be done after completion of major construction works, preferably before starting the operation phase</li> <li>• Marking of trees removed prior to clearance, and replantation of trees was ensured within the project area where feasible.</li> </ul> |

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Construction equipment and schedule   |
| <b>Mitigation Measure</b> | <ul style="list-style-type: none"> <li>• Construction techniques and machinery were selected to minimize ground disturbance</li> <li>• Construction activities were undertaken during the night and local communities were informed of the construction schedule.</li> <li>• Construction equipment was well maintained.</li> <li>• Storage of construction materials was avoided beside the road, around water bodies, residential or public sensitive locations<br/>Construction materials was stored in covered areas to ensure protection from dust and emissions.</li> </ul> |

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Transportation   |
| <b>Mitigation Measure</b> | <ul style="list-style-type: none"> <li>Existing roads and tracks were used for construction and maintenance access to the site.</li> <li>Transport loading and unloading of construction materials did not cause nuisance to the people by way of noise, vibration and dust</li> </ul> |

## 9.2 Mitigation measures taken during Operation Phase

Mitigation measures for the anticipated impacts occurring in the operation phase are described below:

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Soil Cover  |
| <b>Mitigation Measure</b> | The soil conditions of the project site would be allowed to stabilize during this period after the impacts of the construction phase. 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. The species shall be suitable for local climate and available. |

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Water   |
| <b>Mitigation Measure</b> | The wastewater emanating from cleaning PV Panel operations are discharged through the natural canal. The wastewater will not hamper the quality of surface water. |

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Ecology  |
| <b>Mitigation Measure</b> | Soil erosion due to removal of herbaceous vegetation will be minimized through adoption of mitigation measures like paving and surface treatment and water sprinkling. |

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Use of refrigerants   |
| <b>Mitigation Measure</b> | <ul style="list-style-type: none"> <li>For air-conditioning, HCFC refrigerants such as R-22 will not be used as they have ozone depleting potential as well as global warming potential.</li> <li>Regular inspection and maintenance of air-conditioning and refrigeration appliances will be conducted to prevent and minimize refrigerant leakage.</li> <li>Re-filling records will be kept and maintained.</li> <li>For existing air-conditioning and refrigeration appliances that</li> </ul> |

|  |  |
|--|--|
|  | <p>operate on HCFCs, the refrigerant will be recovered or recycled whenever an overhaul of equipment is to be carried out. Replacing or retrofitting such equipment to operate on non-HCFCs refrigerant will also be considered.</p> <ul style="list-style-type: none"> <li>• Alternative refrigerants will be looked for future replacement or purchase.</li> </ul> |
|--|--|

|                           |  |
|---------------------------|--|
| <b>Impact Indicator</b>   | Electric Shock   |
| <b>Mitigation Measure</b> | <p>Injury due to electric shock will be minimized or avoided by:</p> <ul style="list-style-type: none"> <li>• Security fences around substation</li> <li>• Establishment of warning signs</li> <li>• Careful design using appropriate technologies to minimize hazards.</li> </ul> |

|                           |   |
|---------------------------|---|
| <b>Impact Indicator</b>   | Hazardous Waste Storage   |
| <b>Mitigation Measure</b> | <ul style="list-style-type: none"> <li>• Waste will be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills.</li> <li>• Hazardous waste will be stored in closed containers away from direct sunlight, wind and rain.</li> <li>• Secondary containment systems will be constructed with materials appropriate for the wastes being contained and adequate to prevent loss to the environment</li> <li>• Secondary containment will be included wherever liquid wastes are stored in volumes greater than 220 liters. The available volume of secondary containment should be at least 10 percent of the largest storage container, or 25 percent of the total storage capacity (whichever is greater) in that specific location</li> <li>• Information on chemical compatibility will be readily available to employees, including labeling each container to identify its contents</li> <li>• Access to hazardous waste storage areas will be limited to employees who have received proper training</li> <li>• Clearly identifying (label) and demarcating the area, including documentation of its location on a facility map or site plan</li> <li>• Periodic inspections of waste storage areas will be conducted and the findings will be documented</li> <li>• Spill response and emergency plans will be prepared and implemented to address their accidental release.</li> </ul> |

| Impact Indicator                 | Hazardous Waste Transportation  |
|----------------------------------|---|
| <p><b>Mitigation Measure</b></p> | <ul style="list-style-type: none"> <li>• On-site and Off-site transportation of waste will be conducted so as to prevent or minimize spills, releases, and exposures to employees and the public.</li> <li>• All waste containers designated for off-site shipment will be secured and labeled with the contents and associated hazards, be properly loaded on the transport vehicles before leaving the site, and be accompanied by a shipping paper (i.e., manifest) that describes the load and its associated hazards.</li> </ul> |

| Impact Indicator                 | Hazardous Waste Treatment and Disposal   |
|----------------------------------|--|
| <p><b>Mitigation Measure</b></p> | <ul style="list-style-type: none"> <li>• The technical capability will be developed to manage the waste in a manner that reduces immediate and future impact to the environment</li> <li>• All required permits, certifications, and approvals will be acquired from applicable government authorities</li> <li>• It will be ensured that commercial or government waste contractors handling, treating, and disposing of hazardous waste are reputable and legitimate enterprises, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled.</li> <li>• Compliance with applicable local and international regulations will be ensured.</li> </ul> |

## 10 ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAM

### 10.1 General

This chapter deals at length with the measures that TSEL has taken or will take in response to the need for sound environmental management throughout the various phases of the project. The chapter also outlines measures that will be taken in relation to the management of social impacts and the need to address grievances that the various project stakeholders might have, in respect of various stages of project implementation, throughout the life of the project.

The mitigation measures proposed in another chapter of this ESIA Report, which are designed to avoid or minimize impacts during construction, operational and decommissioning phases of the project form the basis of this Chapter. This Chapter presents the specific plan for implementing the mitigation and addressing community grievances within the framework of an Environmental and Social Management Program (ESMP). The following principles were used to guide the preparation of the ESMP:

- Focus on occupational health, safety, and environment risk prevention;
- Affordable, safe technologies are used wherever failure of equipment would have a significant effect on safety, health, or the environment;
- Conformance with relevant standards, codes, and practices will be considered in the application of the safe technologies;
- All activities will be performed in a safe and effective manner and all equipment will be maintained in good operating conditions for the protection of health and safety of all persons and the conservation of the environment and property;
- All necessary precautions are carried out to control, remove, or otherwise correct any hazardous materials leaks and/or spills, or other health and safety hazards;
- All activities and components related to construction of the power station will meet relevant international standards which ensure sufficient technical levels of safety; and
- Necessary measures will be ensured to redress grievances that the communities within and in the proximity of the Project Site might experience.

This Chapter describes the ESMP of the TSEL Power Plant project and addresses the following key components:

- Management activities and systems;
- Plans, procedures, and programs;
- Implementation schedule; and
- Plans for integrating the ESMP within the overall development plan for TSEL.

## 10.2 Environmental and Social Management

TSEL is committed to constructing and operating the power plant in an environmentally responsible manner and in compliance with relevant environmental laws, regulations, and guidelines in force in the country and also those prescribed by lending agencies, including the World Bank and other financing agencies. TSEL will implement an Environmental and Social Management System (ESMS), including an environmental policy that states the principles and intentions of the enterprise in relation to its overall environmental performance. Such principles and intentions will be communicated to each employee as well as the nature of their individual environmental responsibilities. Where appropriate, staff training will be undertaken to ensure their continued environmental performance. In addition, TSEL will aim to obtain International Organization for Standardization (ISO) 14001 accreditation for the ESMS within the first three years of operation.

TSEL is also committed to the creation and implementation of programs to reduce the probability of occurrence of adverse impacts upon the environment. As required, contingency plans will be developed for mitigating potential adverse incidents. TSEL will expect the same level of environmental performance from its agents, suppliers, and contractors and will stipulate this in any legally binding agreements it enters with these parties.

TSEL will also ensure that appropriate corporate resources, personnel and reporting and accountability systems, are in place for the successful implementation of the ESMP. They will, on a continuing basis, review the objectives of the ESMP as well as the company's success in achieving them.

Where objectives are not being achieved, corrective action will be taken. The ESMP objectives will also be modified over the life of the TSEL Power Plant, as appropriate, to reflect changing environmental laws, regulations, standards, and technologies.

## 10.3 Plans, Procedures and Programs

As part of the ESMP objectives, several plans, procedures, and programs have been developed to guide every stage of project construction, operation, and decommissioning so that the environmental performance of the power plant is optimized. While formulating a detailed ESMP for the TSEL Power Plant project, the pertinent impacts during the three phases, (i.e. construction, operation and decommissioning) have been taken into consideration. The pertinent impact aspects during the three project stages, as applicable, have been as under the following major headings:

1. Air Quality (dust and other particulate matter generation);
2. Hydrology and Surface Water Quality;
3. Drainage and Flood Control;
4. Terrestrial Ecology;
5. Aquatic Ecology;
6. Land Use;
7. Water Use;
8. Traffic and Transportation;

9. Solid Wastes;
10. Occupational Health and Safety;
11. Emergency Response;
12. Socio-Economics; and
13. Public Relations.

The following sections present an overview of the plans, procedures, and programs that will be developed for the TSEL.

#### **10.4 Environmental and Social Management Program (ESMP)**

The ESMP is sub-divided into the following phases of development:

- Construction Phase; and
- Operational Phase;

It is to be noted that for this project the mitigation measures are minimal and the activity wise cost are not kept in record.

Table 10.1: ESMP Activities in Construction and Operation Phases

| Issues/ Aspects                                     | Location                      | Mitigation Measures   | Key Verifiable Indicator   | Responsibility | Remarks  | Cost (USD)   |
|---|-------------------------------|---|--|----------------|--|--------------|
| <b>Construction Phase</b>                           |                               |   |  |                |  |              |
| 1. Removal or disturbance to other public utilities | Project site and nearby areas | <ul style="list-style-type: none"> <li>• Advance notice was given to the public about the time and the duration of the utility disruption</li> <li>• Use of well trained and experienced machinery operators was ensured to reduce accidental damage to the public utilities</li> </ul>               | <ul style="list-style-type: none"> <li>▪ Public inconvenience</li> <li>▪ Disruption to other commercial and public activities / Public complaints</li> </ul> | TSEL           | Implemented throughout the construction period | Not Recorded |
| 2. Equipment layout and installation                | Project Site                  | <ul style="list-style-type: none"> <li>• Construction techniques and machinery were selected in such a way to minimize ground disturbance</li> <li>• No major topographical and land contour changes occurred in the vicinity of the project site.</li> <li>• Proper internal drainage was</li> </ul> | <ul style="list-style-type: none"> <li>▪ Noise and vibrations</li> <li>▪ Minimal ground disturbance</li> </ul>   | TSEL           | Implemented in Construction period             | Not Recorded |

| Issues/ Aspects                                     | Location     | Mitigation Measures  | Key Verifiable Indicator  | Responsibility                               | Remarks                            | Cost (USD)   |
|---|--------------|--|---|--|------------------------------------|--------------|
|   |              | in place to ensure that no water logging happens in and around the project site.   |   |  |                                    |              |
| 3. Construction schedules                           | Project Site | <ul style="list-style-type: none"> <li>Construction activities were minimized during the night and local communities were informed of the construction schedule.</li> </ul>  | <ul style="list-style-type: none"> <li>Noise nuisance to neighbouring properties</li> <li>Construction as per Scheduled timings only</li> </ul>                   | TSEL, Contractor through contract provisions | Implemented in Construction period | Not Recorded |
| 4. Provision of facilities for Construction workers | Project Site | <ul style="list-style-type: none"> <li>Facilities for construction workforce included labor camp, proper sanitation, drinkable water supply, kitchen, and entertainments such as football, board games, TV, radio, etc.</li> </ul>             | <ul style="list-style-type: none"> <li>Amenities for Workforce Facilities</li> <li>Presence of proper sanitation, water supply and waste</li> </ul>               | TSEL, Contractor Through contract            | Implemented in Construction period | Not Recorded |
| 5. Wood/ vegetation loss, harm to animals           | Project Site | <ul style="list-style-type: none"> <li>Construction workers were prohibited from harvesting wood in the project area during their employment.</li> <li>Workers were prevented from disturbing the flora, fauna including hunting of</li> </ul> | <ul style="list-style-type: none"> <li>Insignificant loss of vegetation as the of land was basically salt field</li> <li>No complaints by local people</li> </ul> | TSEL, Contractor through contract provisions | Implemented in Construction period | Not Recorded |

| Issues/ Aspects                     | Location     | Mitigation Measures   | Key Verifiable Indicator   | Responsibility                               | Remarks                                     | Cost (USD)   |
|-------------------------------------|--------------|---|--|--|---|--------------|
|                                     |              | animal<br>• Greenery development to be ensured over 33% area of the project site with plantation of fruit and other trees. This will be done after completion of major construction works, preferably before starting the operation phase | or other evidence of illegal harvesting<br>▪ Tree plantation around the plant boundary |  |   |              |
| 6.Site clearance                    | Project Site | • There were no valuable trees on the site and some scrub weeds were removed. Empty spaces will be with trees as feasible.  | ▪ Vegetation plantation  | TSEL, Contractor through contract provisions | To be implemented after Construction period | Not Recorded |
| 7.Removal of Plot Boundary markings | Project Site | • Each corner of each plot were physically marked with marking pillars and digital map was prepared showing exact land plots for each land owners.<br>• Adequate arrangements have been made for proper                                   | ▪ Proper land parcel marking<br>▪ Digital mapping of plots                             | TSEL, Contractor through contract provisions | Implemented in Construction period          | Not Recorded |

| Issues/ Aspects                                     | Location     | Mitigation Measures  | Key Verifiable Indicator  | Responsibility                               | Remarks                            | Cost (USD)   |
|---|--------------|--|---|--|------------------------------------|--------------|
|   |              | handing over of the leased lands on the same location to the landowners after the end of the project   |   |  |                                    |              |
| 8.Mechanized construction                           | Project Site | <ul style="list-style-type: none"> <li>• Construction equipment was well maintained.</li> <li>• Proper maintenance was ensured and machines were turned off when not in use.</li> </ul>                                      | <ul style="list-style-type: none"> <li>▪ Noise, vibration</li> <li>▪ operator safety,</li> <li>▪ efficient operation</li> <li>▪ equipment wear and tear</li> </ul>              | TSEL, Contractor through contract provisions | Implemented in Construction period | Not Recorded |
| 9. Construction of internal roads for accessibility | Project Site | <ul style="list-style-type: none"> <li>• Existing roads and tracks was used for construction and maintenance access to the site</li> <li>• Internal HBB road was constructed.</li> </ul>                                     | <ul style="list-style-type: none"> <li>• Access roads, routes</li> </ul>  | TSEL, Contractor through contract provisions | Implemented in Construction period | Not Recorded |
| 10. Transportation and storage of materials         | Project Site | <ul style="list-style-type: none"> <li>• Transport loading and unloading of construction materials did not to cause nuisance to the people by way of noise, vibration and dust</li> <li>• Storage of construction</li> </ul> | <ul style="list-style-type: none"> <li>▪ Water, AirQuality and Noise levelsresults</li> <li>▪ Nuisance to the general public</li> <li>▪ Records of Grievance redress</li> </ul> | TSEL   | Implemented in Construction period | Not Recorded |

| Issues/ Aspects                   | Location     | Mitigation Measures   | Key Verifiable Indicator   | Responsibility                                | Remarks                            | Cost (USD)   |
|-----------------------------------|--------------|---|--|---|------------------------------------|--------------|
|                                   |              | <p>materials was avoided beside the road, around water bodies, residential or public sensitive locations</p> <ul style="list-style-type: none"> <li>• Construction materials was stored in covered areas to ensure protection from dust, emissions</li> </ul> | mechanism  |   |                                    |              |
| 11. Health and safety             | Project Site | <ul style="list-style-type: none"> <li>• Contract provisions specified the minimum requirements for construction camps</li> <li>• Contractor provided workers with required PPE.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Injury and sickness of workers and members of the public</li> </ul> | TSEL (Contractor through contract provisions) | Implemented in Construction period | Not Recorded |
| 12. Nuisance to nearby properties | Project Site | <ul style="list-style-type: none"> <li>• Contract clauses specified about careful construction practices.</li> <li>• Existing access ways was used.</li> </ul>  | <ul style="list-style-type: none"> <li>• Reinstatement of land status</li> </ul>                             | TSEL (Contractor through contract provisions) | Implemented in Construction period | Not Recorded |
| <b>Operational Phase</b>          |              |   |  |   |                                    |              |

| Issues/ Aspects                                     | Location     | Mitigation Measures  | Key Verifiable Indicator   | Responsibility | Remarks                                   | Cost (USD)                                      |
|---|--------------|--|--|----------------|---|---|
| 1. Electric Hazard                                  | Project Site | <ul style="list-style-type: none"> <li>• Security fences around substation</li> <li>• Establishment of warning signs</li> <li>• Careful design using appropriate technologies to minimize hazards</li> </ul> | <ul style="list-style-type: none"> <li>• Proper maintenance of fences and sign boards</li> <li>• Usage of appropriate technologies (lost work days due to illness and injuries)</li> </ul> | TSEL           | Implementation throughout the operation   | To be funded from budget provision (Table 11.3) |
| 2. Transmission line, switch gears and transformers | Project Site | <ul style="list-style-type: none"> <li>• Design of transmission line, switch gear and transformer to comply with standards and safety requirements.</li> </ul>   | <ul style="list-style-type: none"> <li>• Required ground clearance (metres)</li> <li>• Report on safety and implementation of signs.</li> </ul>  | TSEL           | Implementation throughout the operation   | „   |
| 3. Health and safety                                | Project Site | <ul style="list-style-type: none"> <li>• Safety signs and physical barriers.</li> <li>• Training on occupational health and safety for all employees</li> </ul>  | <ul style="list-style-type: none"> <li>• Injury and sickness records</li> <li>• Records of training events</li> </ul>  | TSEL           | To be Implemented during operation period | „   |
| 4. Air, water and                                   | Project site | <ul style="list-style-type: none"> <li>• As per standard and schedule</li> </ul>   | <ul style="list-style-type: none"> <li>• Values of</li> </ul>  | TSEL           | To be                                     | „   |

| Issues/ Aspects   | Location | Mitigation Measures  | Key Verifiable Indicator   | Responsibility | Remarks                                   | Cost (USD) |
|-------------------|----------|--|--|----------------|---|------------|
| noise analysis    |          |  | Parameters   |                | Implemented during operation period       |            |
| 5. Waste disposal |          | <ul style="list-style-type: none"> <li>Solid and hazardous wastes to disposed through authorized Agencies</li> </ul> | <ul style="list-style-type: none"> <li>Record of waste inventory and disposal</li> </ul> | TSEL           | To be Implemented during operation period | „          |

## 11 MONITORING, EVALUATION AND REPORTING

### 11.1 Institutional Requirements

For ensuring the construction and operation of the power plant according to the required compliance, there should be designated entity/institution or unit. The institution will be fully responsible to maintain the safeguard compliances. TSEL has realized the importance of establishing a separate entity for environmental monitoring and management. So, to maintain the environmental and social compliances, TSEL has established a dedicated compliance unit operating under the guidance of Head of Operation which will act as Environmental and Social Monitoring Unit (ESMU). The detail of the ESMU has been discussed in the following sections.

#### 11.1.1 Environmental and Social Monitoring Unit

TSEL is in principal obligated to relevant national and international environmental and social compliances and standards. It has informed that it will try to maintain all relevant compliances during construction and operational phases. In doing so, it has planned to form ESMU as is mentioned in the earlier section. The duties of the ESMU will include to:

- ✦ Ensure environmental and social safeguard compliances;
- ✦ Coordinate environmental monitoring process;
- ✦ Act as liaison with the public, local organizations and government;
- ✦ Ensure and supervise record keeping, data storage for follow-up actions;
- ✦ Monitor hazardous materials storage and handling;
- ✦ Promote environmental awareness and safety measures; and
- ✦ Prepare environmental management and periodic monitoring reports as required by DOE.

#### 11.1.2 Composition of Environmental and Social Monitoring Unit

The ESMU will be based on three tiers operational mechanism. It will be led by Head of Operation of the power plant. Head of Operation will serve as General Manager (Planning, Administration and Safeguard Compliance). Under his guidance there will be one Compliance Manager, who will be supported by two Compliance Officers. One Compliance Officer will be responsible for all sorts of environmental aspects and standards and another one will be assigned to maintain social and occupational health and safety aspects and standards.

Consulting services will be mobilized as necessary to assist in initial operations, to ensure that the ESMU will be self-sufficient for ESMP implementation, submission of progress reports, and preparation of environmental assessment for subsequent construction works.

Additional third-party services may be employed by the TSEL as necessary. Qualified and experienced construction contractor will be responsible for implementation of mitigation measures during the construction phase.

To look after the EHS aspects, TSEL should deploy an EHS Officer/Compliance Officer having sound qualification and experience. Based on the performance, he will be extended for the Operation Phase or a new EHS officer will be recruited. The major responsibilities of the EHS Officer/Compliance Officer are as follows:

- Monitor the environmental, health, safety, fire protection and emergency response matters;
- Ensure the compliance of the Department of Environment;
- Ensure the compliance of other external stakeholders;
- Monitor the implementation of the ESMP;
- Develop standard operational procedure (SOP) for EHS aspects;
- Conduct safety inspections; provide safety training to promote a safe working environment for the employees.

### 11.1.3 Environmental Training

Training is an integral part of a preventive strategy. Environmental and disaster management training will be required to ensure proper implementation of effective environmental management and monitoring plan; and disaster management plan. However, training could be organized by ESMU involving relevant staff. As a trainer, competent Consultant can be outsourced. Important training under the spectrum of ESMU includes:

- Training on firefighting;
- Training on environmental regulations and standards;
- Staff training on environmental monitoring;
- Training on environmental health and safety measure.

The following are the trainings and mock drills implemented by TSEL:

| <b>EHS Mock Drill</b>   | <b>EHS Trainings</b>  |
|---|---|
| <ul style="list-style-type: none"> <li>• Fire / explosion at office, guest house and canteen</li> <li>• Fire Prevention &amp; use of Fire Extinguishers</li> <li>• Emergency at height &amp; Fall Protection</li> <li>• Snake Bite</li> <li>• Slips &amp; Falls, Ladder Safety, Material Handling &amp; Lifting of materials</li> </ul> | <ul style="list-style-type: none"> <li>• Motivational Training</li> <li>• PPE, &amp; Emergency Response and Preparation</li> <li>• Work Place Safety &amp; Behavioral Safety</li> <li>• Calamities</li> <li>• Food poisoning</li> <li>• Traffic Management, Security Training &amp; Sign Signals &amp; Barricade</li> </ul> |

| EHS Mock Drill  | EHS Trainings   |
|---|---|
| <ul style="list-style-type: none"> <li>• Road Accident</li> <li>• Electrical short circuit at panel / HT Yard</li> <li>• Oil Spillage</li> <li>• Grass Fire</li> <li>• Fuel Fire</li> <li>• Electric shock</li> <li>• Chocking in throat</li> </ul> | <ul style="list-style-type: none"> <li>• General House Keeping</li> <li>• Hazardous Materials Handling</li> <li>• Wind Storm</li> <li>• Flood &amp; Water Damage Prevention</li> <li>• Power Tool Safety</li> <li>• Confined Space &amp; Hot Work</li> <li>• Abnormal Sound in PVSP</li> <li>• Disciplinary Policy</li> </ul> |

## 11.2 Environmental and Hazardous Waste Monitoring

Environmental monitoring is an essential component of environmental management plan, as it provides the basic scenario of the impact of the project on baseline condition. The prime objectives of environmental monitoring are:

- Assess the effectiveness of proposed mitigation measures by comparing monitoring result with baseline data/environmental standards;
- Identify the extent of environmental impact;
- Determine project compliance with regulatory requirements;
- Adopt remedial action and further mitigation measures if found to be necessary.

During the Construction Phase, the construction contractor ensured that activities like land leveling, clearing work, access road construction, putting proper traffic signals etc. had been accomplished properly to minimize the level of impact. This in turn has to be monitored by the Compliance Officer of ESMU of the power plant, in operation phase. Preventive maintenance has to be carried out to identify and resolve problems. Other environmental good practices include maintaining hygienic conditions, maintenance of fire and safety equipment etc. and clearing of grass will be done periodically.

The monitoring program will be in compliance with national environmental standards. The importance of this monitoring program is also for ensuring that the plant does not create adverse environmental changes in the area and provide a database of operations and maintenance, which can be utilized if unwarranted complaints are made.

Damaged solar panels are categorized as hazardous wastage. So proper management mechanism has been adopted. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensured that panels should be kept in cover so that there is no contamination in ground and water through leaching.

Waste should be stored in a manner that prevents the commingling or contact between incompatible wastes, and allows for inspection between containers to monitor leaks or spills. Examples include sufficient space between incompatibles or physical separation such as

walls or containment curbs. Access to hazardous waste storage areas should be limited to employees who have received proper training. Periodic inspections of waste storage areas should be conducted and the findings are to be documented.

Third party waste contractor collects waste on regular basis. Scrap wastes such as scrap metals which are sold to the scrap vendors should be kept in a confined space avoid any incidents or accidents and to ensure workers' health and safety. Waste disposal register has to be maintained regularly and auditing of the waste contractor shall have to be done accordingly. It is to be ensured that DoE approved waste contractors handling, treating, and disposing of hazardous waste, licensed by the relevant regulatory agencies and following good international industry practice for the waste being handled.

### 11.2.1 Environmental Monitoring Parameters

Environmental monitoring requires set of parameters that could be conveniently measured, assessed and evaluated periodically to observe the trends of change in base line environmental quality. The lists of possible parameters to be tested, sample number and sampling frequency are given in Table 11.1 and Table 11.2 for the construction and operation phases respectively.

**Table 11.1: Monitoring parameters and frequency of monitoring during construction**

| <b>Key parameters to be monitored: (1) Ambient Air Quality</b>  |   |   |   |
|---|---|---|---|
| <b>location</b>   | <b>frequency</b>  | <b>parameter</b>  | <b>submission</b>   |
| At Project site, residential /institutional /commercial areas within 500m outside from plant boundary | Quarterly (routine) analysis                                | SPM, PM <sub>10</sub> , PM <sub>2.5</sub>               | Quarterly submission to Cox's Bazar District Office of DOE. |
| <b>Key parameters to be monitored: (2a) Surface Water</b>   |   |   |   |
| <b>location</b>   | <b>frequency</b>  | <b>parameter</b>  | <b>submission</b>   |
| Project site at Cox's Bazar   | Bi-annual basis in each year (pre-monsoon and post-monsoon) | pH, Temperature, DO, BOD, COD, TDS, TSS, Oil and grease | Bi-annual submission to Cox's Bazar District Office of DOE. |
| <b>Key parameters to be monitored: (2b) Ground Water</b>  |   |   |   |
| <b>location</b>   | <b>frequency</b>  | <b>parameter</b>  | <b>submission</b>   |
| Project site at Cox's Bazar   | Bi-annual basis in every year                               | pH, Temperature,  | Bi-annual submission to                                     |

|   | (pre-monsoon and post-monsoon)                                   | DO, BOD, COD, TDS, Oil and grease | Cox's Bazar District Office of DOE.                         |
|---|--|-----------------------------------|---|
| Key parameters to be monitored: (3) Noise   |  |                                   |   |
| location  | frequency  | parameter                         | submission  |
| At four corners of Project boundary, residential/institutional /commercial areas within 100m and 300m outside from plant boundary | Quarterly (routine) analysis<br>Hourly basis for 24 hours during | Limits in dBA                     | Quarterly submission to Cox's Bazar District Office of DOE. |

**Table 11.2: Monitoring parameters and frequency of monitoring during operation phase**

| Key parameters to be monitored: (1) Ambient Air Quality  |  |   |   |
|--|--|---|---|
| location   | frequency  | parameter   | submission  |
| At Project site, residential /institutional/commercial areas within 500m outside from plant boundary                     | Quarterly (routine) analysis                                 | SPM, PM <sub>10</sub> , PM <sub>2.5</sub>               | Quarterly submission to Cox's Bazar District Office of DOE. |
| Key parameters to be monitored: (2a) Surface Water   |  |   |   |
| location   | frequency  | parameter   | submission  |
| Project site at Cox's Bazar  | Bi-annual basis in each year (pre-monsoon and post-monsoon)  | pH, Temperature, DO, BOD, COD, TDS, TSS, Oil and grease | Bi-annual submission to Cox's Bazar District Office of DOE. |
| Key parameters to be monitored: (2b) Ground Water  |  |   |   |
| location   | frequency  | parameter   | submission  |
| Project site at Cox's Bazar  | Bi-annual basis in every year (pre-monsoon and post-monsoon) | pH, Temperature, DO, BOD, COD, TDS, Oil and grease      | Bi-annual submission to Cox's Bazar District Office of DOE. |
| Key parameters to be monitored: (3) Noise  |  |   |   |
| location   | frequency  | parameter   | submission  |
| At four corners of Project boundary, residential/institutional /commercial areas within 100m and 300m outside from plant | Quarterly (routine) analysis<br>Hourly basis for             | Limits in dBA   | Quarterly submission to Cox's Bazar District Office of      |

| boundary  | 24 hours during |                       | DOE.             |
|---|-----------------|-----------------------|------------------|
| Key parameters to be monitored: (4) Electromagnetic Force   |                 |                       |                  |
| location  | frequency       | parameter             | submission       |
| Measurement of electromagnetic force by a certified agency for Transmission line, switch gears and transformers | Annual          | electromagnetic force | Lender/Financier |

TSEL had not conducted any monitoring for the key parameters. But it is to be noted that TSEL has committed to do the key parameter monitoring for their half yearly E&S audit.

### 11.2.2 Hazardous Waste Monitoring

The management of hazardous and non-hazardous waste should include the following monitoring activities:

- Regular visual inspection of all waste storage collection and storage areas has to be done for evidence of accidental releases and to verify that wastes are properly labeled and stored.
- Regular audits of waste segregation and collection practices has to be conducted.
- Tracking of waste generation records by proper documentation
- Characterizing waste for proper management, especially for hazardous wastes
- Keeping manifests or other records that document the amount of waste generated and its destination
- Hazardous wastes are to be disposed off through DOE approved certified vendors

### 11.3 Environmental Monitoring and Management Budget

Environmental monitoring is conducted to compare the change between baseline condition and after project scenario, by testing some environmental parameters of air, water and noise and in case of necessity soil is tested. ESMU is fully responsible for environmental monitoring as well as implementation of environmental management plan. As testing environmental parameters required sophisticated instruments, it is suggested that ESMU should outsource consulting firm for testing and analyzing environmental parameters. But it will have to be equipped with required instruments gradually by purchasing required instruments. However, a tentative environmental monitoring budget has been proposed in Table 11.3. Laboratory analysis fees considered as per monitoring fees format of DOE/private laboratories.

**Table 11.3: An Annual Tentative Budget for Environmental Monitoring**

| Activity   | Units    | Annual Total      |
|--|----------|-------------------|
| Firefighting and suppression equipment, training and annual fire safety drill  | lump sum | 150,000           |
| Cost of occupational health and safety   | lump sum | 300,000           |
| Quarterly test of ambient air quality (SPM, PM <sub>10</sub> , PM <sub>2.5</sub> )                                       | 4        | 100,000           |
| Half yearly test of surface water (pH, Temperature, DO, BOD, COD, TDS, Oil and   | 2        | 75,000            |
| Half yearly test of ground water (pH, Temperature, DO, BOD, COD, TDS, Oil and  | 2        | 75,000            |
| Quarterly noise monitoring   | 4        | 100,000           |
| Measurement of electromagnetic force by a certified agency for Transmission line, switch gears and transformers (annual) | 1        | 300,000           |
| Environmental Training   | lump sum | 125,000           |
| Quarterly Environmental & Social Audit by Third Party  | 4        | 2,800,000         |
| <b>Sub Total in Tk.</b>  |          | 4,025,000         |
| <b>Contingency (10 %)</b>  |          | 402,500           |
| <b>Total in BDT</b>  |          | <b>4,427,500</b>  |
| <b>Note: (Considering USD 1 = Tk. 82.0)</b>  |          | <b>USD 53,994</b> |

### 11.4 Financial Arrangement for Environmental Monitoring and Management

TSEL will provide the full financial support to Environmental and Social Monitoring Units (ESMU). For ensuring smooth and uninterrupted functioning of ESMU, it is suggested that TSEL will allocate the required fund based on analysis of estimated budget proposed by ESMU early in the every financial year. So, ESMU can run its operation to ensure environmental monitoring as well as implementation of proposed environmental management plan as may cause due to the unavailability of fund.

### 11.5 Environmental & Social Monitoring and Management Reporting

As a part of environmental and social compliances, TSEL will engage third party consultant for conducting quarterly Environment, Health, Safety & Social Compliance Monitoring/Auditing and the monitoring/audit report of the Project should be submitted to the financier/lender. It will describe in detail about the status of implementation of Environmental and Social Management and Monitoring Plan (ESMMP) as described in Section 10.4 of this report. This will also take into account compliance with national and

lender required/international legal requirements in line with Environment, Health, Safety & Social Compliances. FINANCIER/LENDER will monitor the EHS compliance as and when required. The schedule of reporting the monitoring arrangement has been presented in the following Table 11.4.

**Table 11.4: Reporting schedule**

| Reporting entity       | Frequency of Report  | Entity to whom the report will be submitted |
|------------------------|--|---|
| ESMU team of TSEL      | Quarterly EHS & Social Compliance Report during construction phase                                 | To the Financier/ Lender through TSEL       |
| Third Party Consultant | Quarterly EHS & Social Compliance Report during for the 1 <sup>st</sup> 2 years of operation phase | To the Financier/ Lender through TSEL       |

## 11.6 Labor Assessment

The Environmental and Social Action Plan (ESAP) for TSEL identified the necessity for undertaking labor audit covering own and subcontractor workers of TSEL to assess compliance with the national laws and World Bank PS2 requirements. In this regard, TSEL hired Bangladesh Centre for Advanced Studies for carrying out the labor audit.

The prime objective of the labor audit was to undertake labor audit covering own and subcontractor workers of the plant to assess compliance with the national laws and WB PS2 requirements, and then suggest corrective action plans for ensuring improved labor conditions at the plant.

Operation of a solar power plant is not that much labor intensive. At TSEL, about 12 employees work at a times. TSEL ensures that Bangladesh Labor law is strictly followed. TSEL provides various compensation & benefits to their permanent and contractual employees. Internal grievance mechanism is in place for the TSEL staff. No child labor is accepted or encouraged in TSEL. TSEL focuses on their worker's health and safety. Adequate training on various safety related issues, use of PPEs, emergency preparedness and job hazards are arranged frequently.

Given the nature of the project, the BCAS Team recommends that labor audit should be carried out half yearly monitoring for at least two consecutive years of operation.

Detailed assessment/ audit report is in [Annex 16](#) and the HR policy of TSEL is shown in [Annex 19](#).

### **11.7 Environmental and Social (E&S) Audit**

An Environmental and Social Audit was conducted by ESIA Consultant- Bangladesh Centre for Advanced Studies (BCAS) on January 2020 covering the reporting period of May 2019 to October 2019. The primary objective of this audit was to assess the compliance status of the Project and its various components with respect to the agreed ESAP, Operations Phase Environmental & Social Management & Monitoring Plan (ESMMP) of the ESIA, and applicable Performance Standards of World Bank.

Out of 19 ESAP items, 7 items have been observed that need further improvement to comply efficiently. Besides, BCAS Team has identified 19 out of 54 World Bank PS items in which TSEL should start working on improvement. Since, this was the first environmental and social audit for TSEL, attempts were made to observe as many items as possible in an overall or gross perspective. BCAS Audit Team will endeavor to observe various environmental, social, health and safety issues in further detail during the future audits.

Detailed audit report is in [Annex 17](#).

### **11.8 Environmental and Social Action Plan (ESAP)**

After the E&S Audit conducted by Bangladesh Centre for Advanced Studies on January 2020, TSEL was given a set of recommendation for the improvement of environmental and social aspects by on World Bank Performance Standards (WB PSs). TSEL has already implemented/ complied few of them. TSEL management is committed to implement the remaining recommendations as well. The targeted timeline is set for May-June 2020 within this time TSEL will try to implement and improve the remaining corrective actions.

The detailed action plan including the recommendations, observation, responsible person and expected timeline is listed in [Annex 18](#).

## **12 PUBLIC DISCLOSURE OF THE ESIA DOCUMENT**

The draft ESIA report was disclosed in the TSEL website (<https://jpl-bd.com/page/technaf-solartech-energy-limited>) for public comments on December 13, 2020. The final ESIA will be made available at accessible places (e.g. local government offices, libraries, community centers, etc.), and the executive summary translated into local language (Bengali) will be posted in the TSEL and Bangladesh Bank websites. The final ESIA document will be shared with WB for clearance and disclosure according to its procedure. As a part of the disclosure, all final versions (English and Bengali) will be available at the project office in addition to TSEL's website.

## 13 DISCUSSION AND CONCLUSION

TSEL (Technaf Solartech Energy Limited) is a utility scale 20 MW (28 MWP) SPV Power Plant. It is a non-polluting, GHG saving, economically and socially beneficial project. It saves about 25,000 tons of GHG per year compared to current GHG emission. The ESIA study of TSEL plant at Alikhali, South Nhillia, Cox's Bazar has shown that all environmental, meteorological, geographical, biological aspects are well suited for the project. By analyzing all documents of project such as layout, total land, proposed activities (during construction and operational stage), project cost, utilities requirement, transportation mode, the ESIA team found that the possible environmental and social impacts of project can be adequately addressed. The management and monitoring plans for the purpose have been designed. The findings of the ESIA study and recommendations are briefly discussed here.

The site has now been transformed into an industrial area with hardly any pollution and has settled down to a new ambient; with the area covered with the PV solar panels with a nice view.

World Bank categorization, Bangladesh Bank IPFF-II Guidelines and DoE categorization have been followed in the analysis is given here:

- World Bank Policy on Environmental and Social Categorization:  
The TSEL sub-project activities have potential limited adverse environmental or social risks and/or impacts on a number of issues; which are site-specific and largely reversible. These impacts can be avoided or mitigated by adhering to applicable standards, procedures, guidelines and design criteria as described in the relevant WBG and international good practice documents. The TSEL subproject may therefore be classified in the Category 'B' according to WB OP 4.03.
- E&S Risks Rating as per Bangladesh Bank IPFF-II Guidelines:  
During the operation phase the risks falls under "Medium Risk" since the project activities will have minimal environment and social impacts.
- DoE Categorization:  
As per SRO No. 349- act/2017 (24 December 2017) issued by the DOE on the categorization to the Environment Conservation Rules 1997, Solar Power Plants (above 1 MW) falls under category "Orange B". The DOE approved this project under this category.

### *Drainage and Wastewater*

Apart from use by project operational staff, water is used for cleaning the solar panels from time to time as necessary. The wastewater produced is mostly laden with dust settled on the

panels. As there are no harmful substances apart from dust in the wastewater, no treatment is required, and it is to be discharged in canal flowing through the site.

### ***Air Quality***

The ambient air quality at the found to compliant with NAAQS (National Ambient Air Quality Standards). As a SPV plant, TSEL power plant will have no air emissions. The plant will, therefore, have no adverse impact on the local air quality.

### ***Water Resources***

Groundwater extracted through two deep tubewells are to be used for domestic water supply in the site and also. As analyzed during the ESIA preparation, the water quality is compliant with drinking water standard. Extraction of a small amount of groundwater will not make noticeable impact on the water balance of the local groundwater aquifer.

### ***Solid Waste***

Impacts of excavations, land development and construction waste generated so far have been dealt with successfully; and the issues that arose, caused only usual short term problems. A storage and transfer station for solid wastes (SW) has been earmarked. Appropriate solid waste management plan has been proposed to ensure safe disposal of these wastes. TSEL has already appointed a third party for final disposal as per DOE regulations.

### ***Traffic***

Traffic congestion and obstruction to pedestrian movement due to vehicular movement and other project activities (e.g., storage of excavated soils/delivery of construction materials and equipment, etc.) was minimal even during construction stage. With the plant in operation, there is no noticable on the local traffic situation.

### ***Occupational Health and safety***

Staffs are trained on various Occupational Health and Safety related training and mock drills. Emergency response plan is in place and responsibilities have been distributed among the employees.

### ***Cumulative Impacts***

This ESIA study finds that most of the adverse impacts resulting from the project during construction phase were moderate and these have ceased at the end of construction. With the plant in operation, the pollution levels are even lower. So, there are hardly any changes in the local pollution levels, as the plant adds little additional pollutants. The cumulative impacts are, therefore, expected to be insignificant.

### ***Land Acquisition***

There was no land acquisition, as the land was leased. Landowners voluntarily leased their lands for better income; and there was no coercion either physical or mental in the leasing process. Since most of the land were barren, these provided hardly any income. Some land was used for salt cultivation occasionally, which also provided only small income. The overall impact of leasing is increase in the income from the land for the owners.

### ***Environmental and social Management Plan***

An Environmental and Social Management Plan (EsMP), including monitoring requirements, has been developed to ensure implementation of the “mitigation and abatement measures” identified in the environmental assessment. Proper mitigation measures, as proposed in the ESMP, should be followed to reduce the environmental impacts even further; which are low.

### ***Public Participation and Community Concern***

During the operational phase, the project will bring about significant benefit for the nation. Social issues played important role during the construction and likely to do so in the operational phase. The project has generated employment opportunities for local people. Good relationship between the community and the project personnel will be assured through a participatory program.

### ***Labor Management and Occupational Safety***

With end of construction phase, temporary worker were demobilized. Nonlocal employees live in rented accommodation provided by TSEL in Teknaf and the local employees stay in their own homes nearby. TSEL management will take measures to facilitate employment of more female workers in the future. The TSEL HR comply with both OP 4.03 and GOB requirements; and also the ILO conventions to which GOB is a signatory.

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

As proposed in this document, internal and external grievance redress mechanism have been established and a register book for grievance is being maintained. There were no individual or community complaints during construction phase. The GRM mechanism will try to address any complaint amicably; and if required through formal hearings and investigations.

### ***Compliance with PSs and Management Plan***

As TSEL is in operation, an ‘Environmental Audit’ was conducted to see if there are any legacy issues from construction stage. However, no significant issues were found. The Environmental and Social Management Plan (ESMP) proposed in the ESIA document will ensure that the TSEL plant will conform to the Performance Standards set in the OP 4.03. These will be overseen, monitored, and audited by a dedicated team in the TSEL management. Provision for indicative budget resources have been recommended for the

purpose. Staffs are trained on various Occupational Health and Safety related issues and mock drills. Emergency response plan has been made and responsibilities are distributed among the employees.

***Disclosure***

The ESIA document has been disclosed on the website of the Bangladesh Bank ([https://www.bb.org.bd/aboutus/dept/ipff/ipff\\_project.php](https://www.bb.org.bd/aboutus/dept/ipff/ipff_project.php)).

*Finally, it is expected that all necessary information/ evidence contained in this ESIA document are enough to meet all requirements for the operation of the TSEL's facilities in accordance with WB OP4.03 and applicable WBG guidelines and standards.*

# **Volume-III**

## **Annexes**



## Registration from Bangladesh Investment Development Institute

3002017

[ BIDA : Online Registration System - English Version ]



### Bangladesh Investment Development Authority (BIDA) Prime Minister's Office

Ref No. **03.231.161.00.00.1529.2017, 39**

Date: 2017-03-30

Sub: Registration of proposed industrial project under the title: **Technaf Solartech Energy Limited**

Dear Sir,

With reference to your application received on 2017-03-29 concerning the above subject, I am pleased to confirm that your proposed industrial project has been duly registered with the Bangladesh Investment Development Authority. The Registration number for this project is **J-401017036753-H** and the particulars of the terms and conditions of which are appended.

If we could be of any further assistance to you, please do not hesitate to call our Service Center representative who could be reached at telephone # 9561416, 9577271-2, 9587352-3.

In the meantime, we would like to take this opportunity to extend our best wishes to you in your future endeavours.

Thanking You,

✓ MANAGING DIRECTOR

Technaf Solartech Energy Limited  
House/Plot/Holding Number: ABC HOUSE, Flat/Apartment/Floor Number:  
8TH FLOOR,  
Road Name/Road Number: 08 KEMAL ATATURK AVENUE, Post Office:  
BANANI,  
Thana/Upazilla: BANANI, District: Dhaka, - 1213.

Sincerely yours,

(Sabina Yeasmin)  
Director (R&I-Foreign Industry),  
Bangladesh Investment Development  
Authority

Ref No. 03.231.161.00.00.1529.2017

Date: 2017-03-30

Copy for kind information and necessary action:

1. Director General, Department of Environment, Poribesh Bhaban, Plot No. 16 Agargaon, Sher-e-Bangla Nagar, Dhaka.
2. Registrar, Joint Stock Companies & Firms, TCB Bhaban, 1 Karwan Bazar, Dhaka.
3. General Manager, Statistics Department Bangladesh Bank, 29 th Storied Building, Motijheel C/A, Dhaka.
4. Deputy Commissioner, COX'S BAZAR.
5. Director (Policy Advocacy), Bangladesh Investment Development Authority, Jibon Bima Tower, 10 Dilkusha C/A, Dhaka.
6. Director (IM&C), Bangladesh Investment Development Authority, Jibon Bima Tower, 10 Dilkusha C/A, Dhaka.
7. P.S. to Executive Chairman, Bangladesh Investment Development Authority, Dhaka.
8. Master file.

Sincerely yours,

(Abu Mohammad Nurul Hayat Tetul)  
Assistant Director (R&I-Foreign

Bangladesh Investment Development Authority, Prime Minister's Office, Jibon Bima Tower, 10 Dilkusha C/A, Dhaka-1000  
Phone : PABX 88-02-9561416, 9577271-2, Fax : 88-02-9562312, E-mail : service@bida.gov.bd, Web : www.bida.gov.bd  
Bangladesh Investment Development  
Authority

Site Clearance from DOE

(Note: As per SRO No. 349-act/2017(24 December 2017) issued by the DOE on the categorization to the Environment Conservation Rules 1997, Solar Power Plants (above 1 MW) falls under category "Orange B". The site clearance was approved on 17 September 2017. So the project was then categorized as "Red".)



**গণপ্রজাতন্ত্রী বাংলাদেশ সরকার**  
 পরিবেশ অধিদপ্তর, কক্সবাজার জেলা কার্যালয়  
 সায়মন রোড, ঝাউতলা, কক্সবাজার সদর, কক্সবাজার।  
 E-mail: coxsbazar@doe.gov.bd www.doe.gov.bd  
 ফোন ৪ ০৩৪১-৬২২৩২।

নম্বর- ০২৪

[পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭-এর বিধি ৭ ও ৮ অনুসারে অবস্থানগত ছাড়পত্র]

স্মারক নম্বরঃ ২২.০২.২২০০.২১৩.৭২.১৯৪.১৭. ০৫৮

তারিখঃ ০১/০৯/১৪২৪ বঙ্গাব্দ  
১৭/০৯/২০১৭ খ্রিস্টাব্দ

**বিষয়ঃ টেকনাফ সোলারটেক এনার্জি লিমিটেড নামক সৌর বিদ্যুৎ উৎপাদন কেন্দ্র এর অবস্থানগত ছাড়পত্র (শ্রেণীঃ লাল)।**

তারি ১০/০৪/২০১৭ তারিখের কক্সবাজার জেলা কার্যালয়ে অবস্থানগত ছাড়পত্র আবেদনের প্রেক্ষিতে গত ২১/০৮/২০১৭ ও ২২/০৮/২০১৭ তারিখে পরিবেশ অধিদপ্তর, সদর দপ্তর পরিবেশগত ছাড়পত্র বিষয়ক কমিটির ৪১২ তম সভার প্রতিক নং ৫ (৬) এ বর্ণিত শর্তাবলীর আলোকে পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ অনুযায়ী লাল শ্রেণীভুক্ত বিবেচনায় সাহ- অসীমাবাদী, দক্ষিণ জীলা, উপজেলাঃ টেকনাফ, জেলাঃ কক্সবাজার এ অবস্থিত টেকনাফ সোলারটেক এনার্জি লিমিটেড নামক সৌর বিদ্যুৎ উৎপাদন কেন্দ্র এর অবস্থানগত ছাড়পত্র পরিবেশ অধিদপ্তর অধিদপ্তর চট্টগ্রাম অঞ্চল কার্যালয়ের অনুমোদনক্রমে শিল্পবর্ধিত শর্তসাপেক্ষে প্রদান করা হলো। উপরে আবেদিত যে কোন শর্ত ভঙ্গের কারণে জারীকৃত ছাড়পত্র বাতিল বলে গণ্য হবে।

**শর্তাবলীঃ**

১. অবকাঠামোগত উন্নয়নের আওতার অন্যান্য বিধির মধ্যে আইইএ প্রতিবেদনে বর্ণিত সকল নির্দেশন মেজার্স যথাযথভাবে বাস্তবায়ন করতে হবে।
২. সৌর বিদ্যুৎ উৎপাদন কেন্দ্র স্থাপন কর্মকান্ড ও পরিচালনা দ্বারা কোনভাবে পরিবেশ (মাটি, পানি, বায়ু ও শব্দ) দূষণ করা যাবে না।
৩. পরিবেশ অধিদপ্তর কর্তৃক আইইএ প্রতিবেদনে কার্যপরিধি (TOR) অনুমোদন করিয়ে নিতে হবে। অনুমোদিত TOR-এর ভিত্তিতে আইইএ প্রতিবেদন প্রণয়ন করতে হবে এবং উক্ত আইইএ প্রতিবেদন পরিবেশ অধিদপ্তরের অনুমোদনের নিমিত্তে পেশ করতে হবে।
৪. আইইএ প্রতিবেদনে এ প্রকল্প সূচী পানীয় পদার্থের নিঃসরণ এবং বহু কণা (Particulate Matters) নির্গমন পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭-এ উল্লিখিত মানসম্মত যথাঃ বাষ্প, কুণ্ডিত গ্যাসের পুনঃব্যবহারের ব্যবস্থা, বর্জ্য ব্যবস্থাপনার ক্ষেত্রে প্রতিটি রিডাকশন স্টেজের বিস্তারিত ও বাস্তবসম্মত বর্ণনা এবং ১০০% ওয়াটার রিশাইফিং- এর বিধি অর্ন্তভুক্ত করতে হবে।
৫. আইইএ প্রতিবেদনে নিজস্ব সোলার ও ইকুইপমেন্ট-এর সমন্বয়ে ইনহাউজ এনভায়রনমেন্টাল মনিটরিং সিস্টেম গড়ে তোলার বিষয়ে প্রয়োজনীয় কার্যপত্রী ও আর্থিক প্রস্তাবনা অন্তর্ভুক্ত করতে হবে।
৬. আইইএ অনুমোদিত না হলে আমদানিকৃত যন্ত্রপাতির অনুমুদ্রে L/C খোলা যাবে না।
৭. প্রকল্প চাওয়ার মূল্যতম ৩৩% কারণ উপযুক্ত প্রক্রিতির ফলস্র ও বনজ পাহা লাগিয়ে সনুসঙ্গত করতে হবে।
৮. প্রকল্প নির্মাণকালে সূচী স্থানা/ভাট্ট নিয়ন্ত্রণের জন্য সময়ে সময়ে পর্যায় পানি ছিটানোর ব্যবস্থা গ্রহণ করতে হবে।
৯. শ্রমিকদের পেশাগত পাহা কর্মচারে সকল ব্যবস্থা যেমনঃ হার্ট হেলমেট, নোজ মাস্ক, বুট, চশমা ইত্যাদির ব্যবস্থা রাখতে হবে।
১০. এই ছাড়পত্র স্থানের মালিকানা স্বত্ব নির্ধারণ করে না।
১১. IEE প্রতিবেদনে বর্ণিত সকল Mitigation Measures বাস্তবায়ন করতে হবে।
১২. সৌর বিদ্যুৎ উৎপাদন কেন্দ্র স্থাপনের বিস্তারিত পরিবেশ মূল্যায়ন কেন্দ্র অধিবেশন উত্থাপিত ও অত্র দপ্তর কর্তৃক তা প্রমাণিত হলে অত্র দপ্তরের নির্দেশিত নিয়ন্ত্রণ/সংশোধনমূলক ব্যবস্থাসি (স্থানান্তর/কার্যক্রম বদলসহ) গ্রহণে প্রতিটিমটি বাধ্য থাকবে।
১৩. প্রতিষ্ঠান নির্মাণ কার্যক্রম দ্বারা আশেপাশের জমি, জমির ফসল, বনজ ও ফলজ বৃক্ষের ক্ষতিসাধন কার যাবে না।
১৪. প্রতিষ্ঠানের ডিমেন্টিক কাজে সূচী তরল বর্জ্য যথাযথমূলক স্টোরেজ ট্যাংকে রেখে নির্গমন করার ব্যবস্থা রাখতে হবে।
১৫. উর্ধ্ব কুঁড়ি, পাহাড় কিংবা টিলা কেটে সৌর বিদ্যুৎ উৎপাদন কেন্দ্র মাটি ভরাট কাজে ব্যবহার করা যাবে না। অপরিসরতে সরকারী বিধি অনুসারে যথাযথ কর্তৃপক্ষের অনুমোদন সাপেক্ষে মজা পুকুর/খাল/বাড়ী/দিঘী/নদ-নদী/হাওর/চর/খাল বা তৎসমতুল্য জায়গা হতে মাটি সরগ্রহের ব্যবস্থা করতে হবে।
১৬. সৌর বিদ্যুৎ উৎপাদন কেন্দ্র স্থাপনে কর্মরত শ্রমিক কর্মচারীদের স্বাস্থ্যসংক্রান্ত পরিবেশ এবং নিরাপত্তামূলক ব্যবস্থা নিশ্চিত করতে হবে।
১৭. এই ছাড়পত্র কোনভাবেই সৌর বিদ্যুৎ উৎপাদন কেন্দ্রে ব্যবহৃত জমির মালিকানার শর্ত পূরণ করে না। এ সংক্রান্ত কোন প্রকল্প জটিলতা সৃষ্টি হলে এ ছাড়পত্র বাতিল বলে গণ্য হবে।
১৮. সৌর বিদ্যুৎ উৎপাদন কেন্দ্র নির্মাণ কর্মকান্ডে কর্মরত শ্রমিকদের সুপেয় পানির ব্যবস্থা রাখতে হবে।
১৯. অত্রি মূল্যায়ন নিয়ন্ত্রণকল্পে ভাট্টার যথাযথমূলক অত্রি নির্বাপক ব্যবস্থা গড়ে তুলতে হবে।

২০. বিদ্যুৎ উৎপাদন কেন্দ্রের নির্মাণ কার্যক্রমে উৎপন্ন শব্দ এবং কঠিন/তরল/বাষ্পীয় বর্জ্যের নিয়ন্ত্রণ/নির্গমন মাত্রা যথাক্রমে শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা, ২০০৬ এবং পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭-এ বর্ণিত মানমাত্রার মধ্যে হতে হবে।
২১. ১-২০ নং পর্যন্ত শর্তাবলী পূরণ সাপেক্ষে এবং সৌর বিদ্যুৎ উৎপাদন কেন্দ্র নির্মাণ কাজ সম্পন্ন করে পরিবেশগত ছাড়পত্রের জন্য আবেদন করতে হবে। পরিবেশগত ছাড়পত্র গ্রহণ ব্যতীত কোন অবস্থায় সৌর বিদ্যুৎ উৎপাদন কার্যক্রম চালু করা যাবে না।
২২. প্রতিষ্ঠান নির্মাণ কার্যক্রম দ্বারা জনস্বার্থের ক্ষতি হলে তৎক্ষণাত্ত ক্ষতিপূরণ দিতে হবে। দূষণ নিয়ন্ত্রণ ব্যবস্থা কার্যকর না থাকলে এবং এর ফলে পরিবেশ ও প্রতিবেশের ক্ষতি হলে Polluters Pay Principle অনুসারে ক্ষতিপূরণ ধার্য করা হবে এবং নির্ধারিত সময়ের মধ্যে ক্ষতিপূরণ দিতে হবে।
২৩. এই ছাড়পত্র জারীর তারিখ হতে পরবর্তী ০১ (এক) বৎসরের জন্য বহাল থাকবে এবং মেয়াদ শেষ হবার অন্ততঃ ৩০ (মিশ) দিন পূর্বে নবায়নের জন্য আবেদন করতে হবে।
২৪. অবস্থানগত ছাড়পত্রের মূলকপি প্রতিষ্ঠানে সংরক্ষণ করতে হবে। পরিবেশ অধিদপ্তরের এনফোর্সমেন্ট টিম, পরিদর্শক ও পরিদর্শনের ক্ষমতাস্বত্ব অন্যান্য কর্মকর্তাদের প্রতিষ্ঠান পরিদর্শনকালে ছাড়পত্র/নবায়নপত্র প্রদর্শন এবং সৌর বিদ্যুৎ উৎপাদন কার্যক্রম পরিদর্শনে সহযোগিতা করতে হবে।
২৫. উপর্যুক্ত ১-২৫ অনুচ্ছেদে বর্ণিত যে কোন শর্ত ভঙ্গ করলে এ ছাড়পত্র বাতিল বলে গণ্য হবে এবং তাঁর/তার প্রতিষ্ঠানের বিরুদ্ধে বাংলাদেশ পরিবেশ সংরক্ষণ আইন, ১৯৯৫ (সংশোধিত-২০১০); পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭; শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা, ২০০৬ অনুসারে আইনগত ব্যবস্থা গ্রহণ করা হবে।



(সরদার শরীফুল ইসলাম)  
সহকারী পরিচালক

ফোনঃ ০৩৪১-৬২২৩২

✓ জনাব মাহমুদুল হাসান  
ব্যবস্থাপনা পরিচালক  
টেকনাক সোলারটেক এনার্জি লিমিটেড  
সং-অরুণাখালী, দক্ষিণ হীলা,  
উপজেলাঃ টেকনাক, জেলাঃ কক্সবাজার।

\*স্মারক নম্বরঃ ২২.০২.২২০০.২১৩.৭২.১৯৪.১৭.

অনুলিপিঃ সমস্ত অবগতির জন্য-

- ১। পরিচালক, পরিবেশ অধিদপ্তর, ৪টিয়ার অফিস কার্যালয়, ঢাকা।
- ২। জেলা প্রশাসক, কক্সবাজার।
- ৩। অফিস কপি।

/০৫/১৪২৪ বঙ্গাব্দ

তারিখঃ-----

/০৯/২০১৭ খ্রিস্টাব্দ

(সরদার শরীফুল ইসলাম)

সহকারী পরিচালক

ফোনঃ ০৩৪১-৬২২৩২

## DOE Environmental Clearance Certificate



গণপ্রজাতন্ত্রী বাংলাদেশ সরকার  
পরিবেশ অধিদপ্তর  
কক্সবাজার জেলা কার্যালয়  
নিউ সার্কিট হাউস রোড, বাহার ছরা,  
কক্সবাজার, কক্সবাজার-৪৭০০।  
www.doe.gov.bd

### পরিবেশগত ছাড়পত্র

ছাড়পত্র নং: ১৮-০৮২১৫

পরিবেশগত ব্যবস্থাপনা নিশ্চিতকরণ সাপেক্ষে সংযুক্ত শর্তে নিম্নবর্ণিত প্রতিষ্ঠান/প্রকল্পের অনুকূলে পরিবেশগত ছাড়পত্র প্রদান করা হলো :

|                                |  |
|--------------------------------|--|
| প্রতিষ্ঠান/প্রকল্পের নাম       | : Technaf Solar Tech Energy Ltd  |
| উদ্যোক্তার নাম                 | : Mr. Nuher Latif Khan   |
| সনাক্তকরণ নং                   | : ৬০০০৬  |
| প্রতিষ্ঠান/প্রকল্পের কার্যক্রম | : Power plant  |
| প্রতিষ্ঠান/প্রকল্পের শ্রেণী    | : Orange-B   |
| প্রতিষ্ঠান/প্রকল্পের ঠিকানা    | : Alikhali, South Nila, Rongikhali, Teknaf, coxsbazar, Teknaf, Cox's Bazar |
| প্রদানের তারিখ                 | : 20.09.2018   |
| মেয়াদ উত্তীর্ণের তারিখ        | : 27.06.2019   |



এ ছাড়পত্র সনদের সাথে পৃথকভাবে সংযুক্ত প্রদত্ত শর্তাবলী যথাযথভাবে প্রতিপালন করতে হবে, অন্যথায় ছাড়পত্র বাতিল/কর্তিপূরণ আদায়সহ যে কোন আইনানুগ ব্যবস্থা গ্রহণ করা হবে।

বিঃদ্রঃ এটি একটি সিস্টেম জেনারেটেড ছাড়পত্র এবং এতে কোনোরূপ স্বাক্ষরের প্রয়োজন নেই।

ছাড়পত্রটি যাচাই করতে ভিজিট করুন: [http://ecc.doe.gov.bd/certificate\\_verification](http://ecc.doe.gov.bd/certificate_verification)

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সনাক্তকরণ নং: ৬০০০৬ Technaf Solar Tech Energy Ltd ছাড়পত্র নং: ১৮-০৮২১৫

পরিবেশগত ছাড়পত্র জন্য প্রয়োজ্য শর্তাবলী:

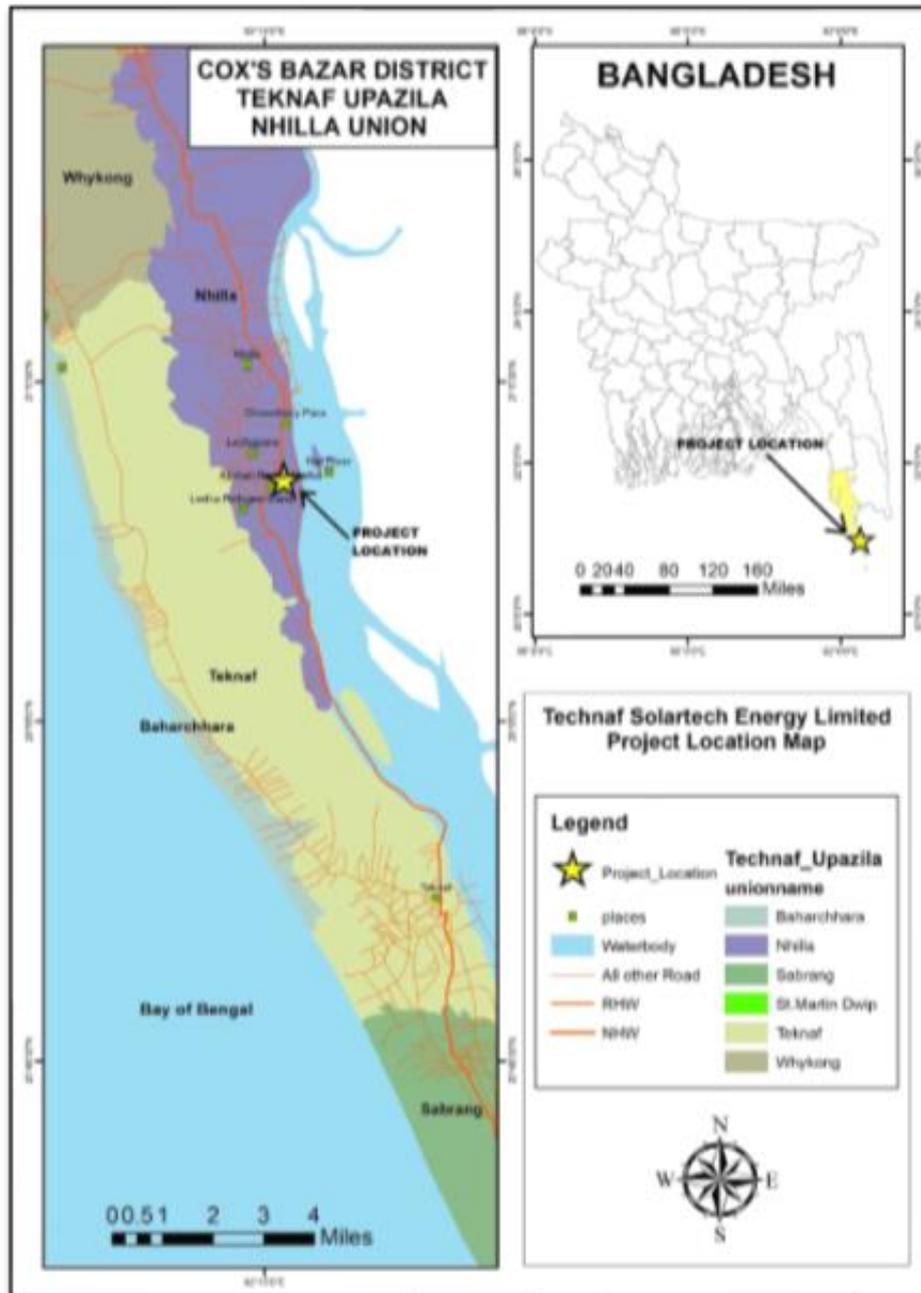
১. বাংলাদেশ পরিবেশ সংরক্ষণ আইন ১৯৯৫ (সংশোধিত ২০১০) এবং পরিবেশ সংরক্ষণ বিধিমালা ১৯৯৭ (সংশোধিত ২০০২) এর সকল বিধি-বিধান প্রতিপালন করতে হবে।
২. এ ছাড়পত্র সৌর বিদ্যুৎ উৎপাদন কার্যক্রম পরিচালনার জন্য প্রয়োজ্য হবে।
৩. ইএমপি প্রতিবেদনে উল্লেখিত মিটিগেশন মেজার্স যথাযথভাবে বাস্তবায়ন করতে হবে।
৪. প্রকল্পের উৎপাদন কার্যক্রম পরিচালনার সময় উর্বর কৃষিজমি, পাহাড় বা টিলা কর্তন বা খাল ভরাট করা যাবে না।
৫. স্থানীয় শবন চাষীদের শবন চাষ কার্যক্রম কোনভাবে বিঘ্নিত করা যাবে না।
৬. প্রকল্পের উৎপাদন, জায়গা সম্প্রসারণ কিংবা তৎসংশি—→→ কোন প্রকার পরিবর্তনের জন্য পরিবেশ অধিদপ্তরের পূর্বানুমতি/ছাড়পত্র প্রয়োজন হবে।
৭. প্রকল্পের উন্নয়ন কার্যক্রম পরিচালনার সময় সৃষ্ট শব্দ এবং বায়বীয় বর্জ্যের নিঃসরণ/নির্গমন মাত্রা যথাক্রমে শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা-২০০৬ এবং পরিবেশ সংরক্ষণ বিধিমালা ১৯৯৭-এ বর্ণিত মানমাত্রার মধ্যে হতে হবে।
৮. প্রকল্পের উন্নয়ন কার্যক্রম পরিচালনার সময় সৃষ্ট বর্জ্য Environmentally Sound Disposal এর ব্যবস্থা করতে হবে, ডমেস্টিক কাজে সৃষ্ট তরল বর্জ্য যথোপযুক্ত সেটলিং ট্যাংক ও সোক পিটের মাধ্যমে নির্গমন করতে হবে।
৯. প্রকল্পের উন্নয়ন কার্যক্রম দ্বারা জনস্বার্থের ক্ষতি হলে তৎজন্য ক্ষতিপূরণ দিতে হবে। দূষণ নিয়ন্ত্রণ ব্যবস্থা কার্যকর না থাকলে এবং এর ফলে পরিবেশ ও প্রতিবেশের ক্ষতি হলে **Polluters Pay Principle** অনুসারে ক্ষতিপূরণ ধার্য করা হবে এবং নির্ধারিত সময়ের মধ্যে ক্ষতিপূরণ দিতে হবে। দূষণ নিয়ন্ত্রণের স্বার্থে প্রয়োজ্য অন্য কোন শর্ত প্রতিপালনে কর্তৃপক্ষ বাধ্য থাকবে।
১০. বাংলাদেশ পরিবেশ সংরক্ষণ আইন, ১৯৯৫ এবং পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭ এ প্রদত্ত ক্ষমতাবলে উপরোল্লিখিত শর্তসমূহ উহতভূৎপ করা হবে।
১১. প্রকল্পের বিরুদ্ধে যেকোন পর্যায়ে পরিবেশ দূষণসহ অন্য যে কোন অভিযোগ উত্থাপিত হলে ও অত্র দপ্তর কর্তৃক তা প্রমাণিত হলে অত্র দপ্তরের নির্দেশিত নিয়ন্ত্রণ/সংশোধনমূলক ব্যবস্থা (স্থানান্তর/কার্যক্রম বন্ধসহ) গ্রহণ করতে আপনার প্রতিষ্ঠান বাধ্য থাকবে।
১২. অবস্থানগত ছাড়পত্রের মূলকপি প্রতিষ্ঠানে সংরক্ষণ করতে হবে। পরিবেশ অধিদপ্তরের এনফোর্সমেন্ট টিম, পরিদর্শক, পরিদর্শনের ক্ষমতাপ্রাপ্ত কর্মকর্তাগণ কারখানা পরিদর্শনকালে ছাড়পত্র/নবায়ন পত্র প্রদর্শন এবং প্রতিষ্ঠানের কার্যক্রম পরিদর্শনে সহযোগিতা করতে হবে।
১৩. এ ছাড়পত্র প্রতিষ্ঠান ও জমির মালিকানা সংক্রান্ত কোন প্রকার মালিকানা স্বত্ত্বপ্রদান করেনা। এ বিষয়ে কোন জটিলতা সৃষ্টি হলে ছাড়পত্র বাতিল বলে গণ্য হবে।
১৪. মেয়াদ শেষ হওয়ার অন্ততঃ ৩০(ত্রিশ) দিন পূর্বে ছাড়পত্র নবায়নের জন্য অত্র দপ্তরে আবেদন করতে হবে।
১৫. উপরোক্ত ১-১৫ অনুচ্ছেদে বর্ণিত শর্তাবলী যথাযথভাবে প্রতিপালনের ক্ষেত্রে সংশ্লিষ্ট কর্তৃপক্ষের কোনরূপ উদাসীনতা, শিথিলতা বা যেকোন শর্তের লংঘন পরিবেশ দূষণ সংশ্লিষ্টতায় জনস্বাস্থ্যের প্রতি হুমকি বিবেচনায় প্রদত্ত ছাড়পত্র বাতিলসহ তাঁর/তাঁর প্রতিষ্ঠানের বিরুদ্ধে বাংলাদেশ পরিবেশ সংরক্ষণ আইন, ১৯৯৫ (সংশোধিত ২০১০), পরিবেশ সংরক্ষণ বিধিমালা, ১৯৯৭, এবং শব্দ দূষণ (নিয়ন্ত্রণ) বিধিমালা, ২০০৬ অনুসারে আইনগত ব্যবস্থা গ্রহণ করা হবে।

ছাড়পত্রটি যাচাই করতে ভিজিট করুন: [http://ecc.doe.gov.bd/certificate\\_verification](http://ecc.doe.gov.bd/certificate_verification)

## Annex 2: Project Detailed Drawing

### Project Location of TSEL

The site of the project is located at South Nhilla Alikhali village of 2 no. Nhilla Union, Teknaf Upazila of Cox's Bazar district (shown in Map 7).



Map 6: Location Map of the Solar Power Plant Project



**Map 7: Location of the Project on Google Map**



**Photo 3: The Site of the Plant before Construction**



**Photo 4: South Side of the Project Area**



**Photo 5: East Side of the Project Area**



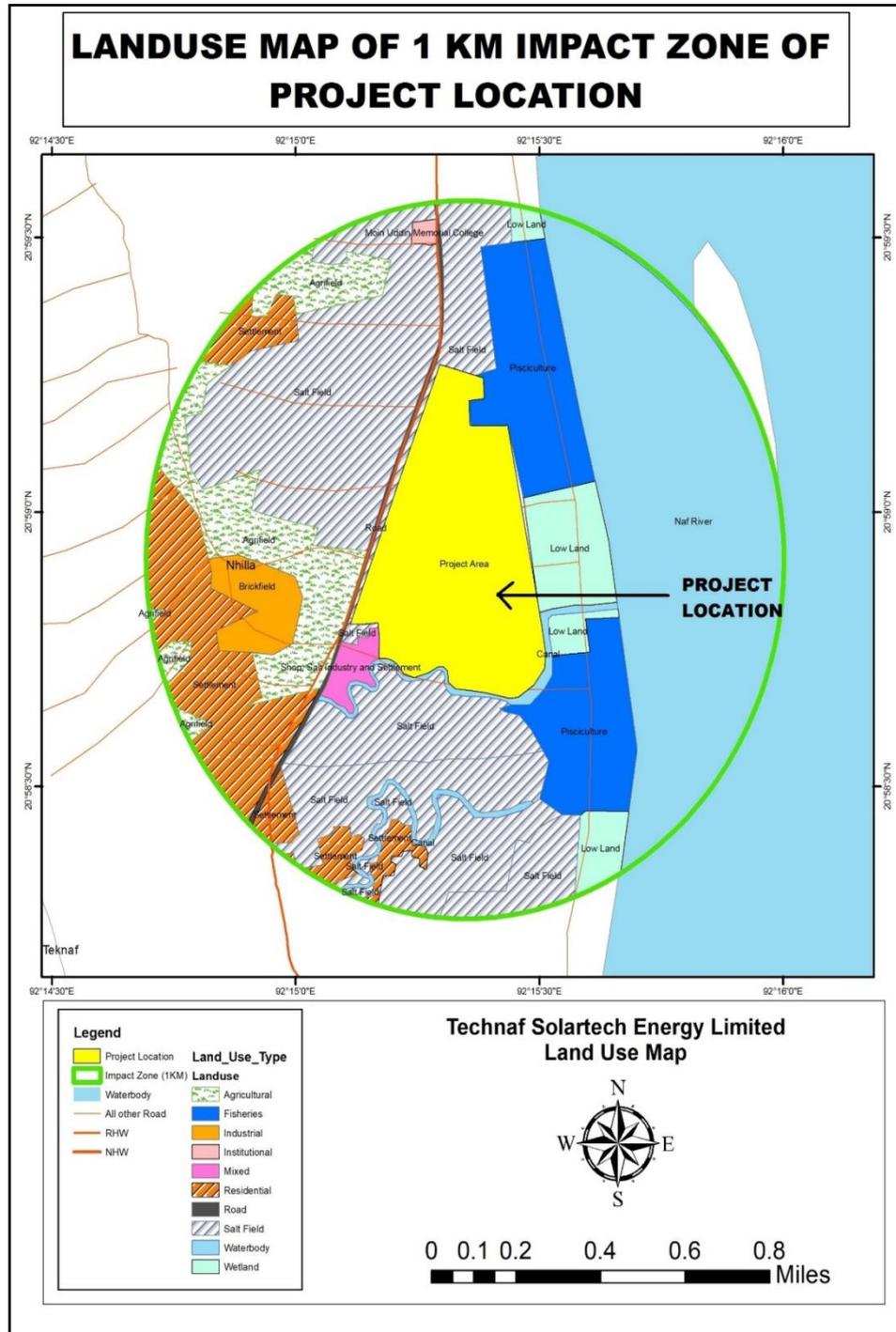
**Photo 6: North Side of the Project Area**



**Photo 7: West Side of the Project Area**

### Major Land Use

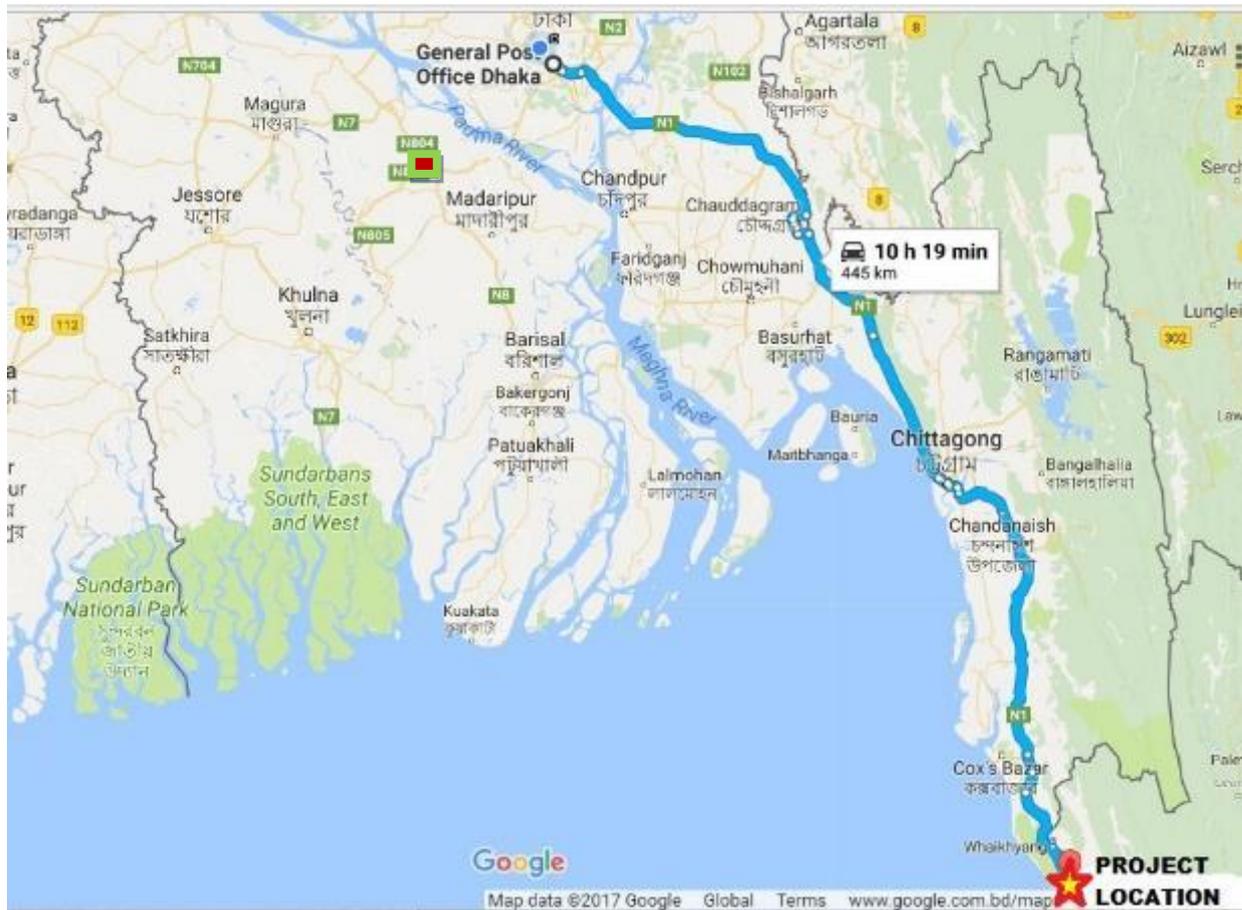
About 1 km radius of the plant has been surveyed. Administratively, the air shed spreads over 2 No. Nhilla Union of Teknaf Upazila (shown in Map 9).



Map 8 : Current land use pattern of the power plant area

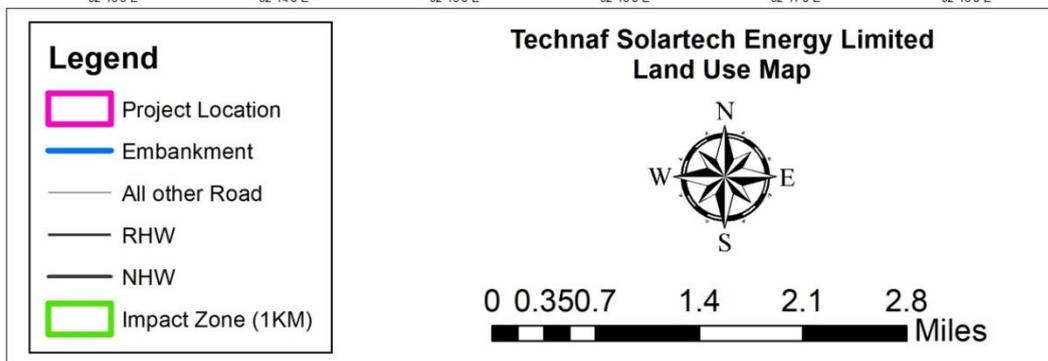
### Means of Roadway Access and Road Network around the Project Site

Means of access and road network around the project site (5 km radius) are presented in Map 10 & 11.



Map 9: Means of Roadway Access to the Project Site

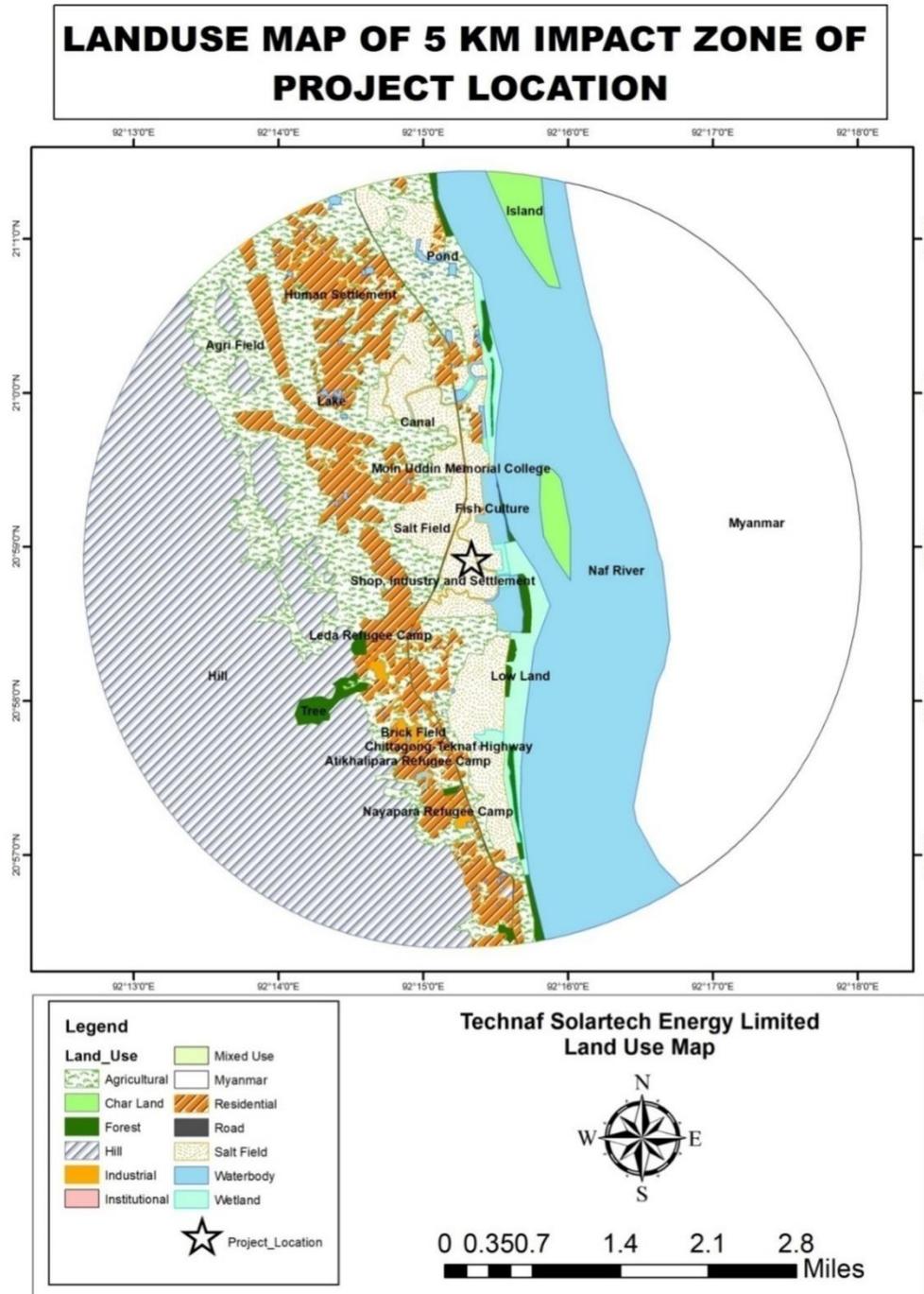
## ROADS AND RIVER MAP OF 5 KM IMPACT ZONE OF PROJECT LOCATION



**Map 10: Road Network around the Project Site (5 km Radius)**

### Air Shed of Project Area

The 5 kilometre air shed has been considered to assess the impacts of air pollutants and biodiversity. The 5-kilometre radius air shed has been shown in Map 12.



Map 11: Project Air Shed showing Land Use for 5 km Radius of the Project Site

### Project Layout Plan and overall process flow diagram

Figure 11 shows the layout plan including the positions of solar modules, inverter locations and road connections and figure 12& 13 shows the process flow digram of electricity generation from the plant.

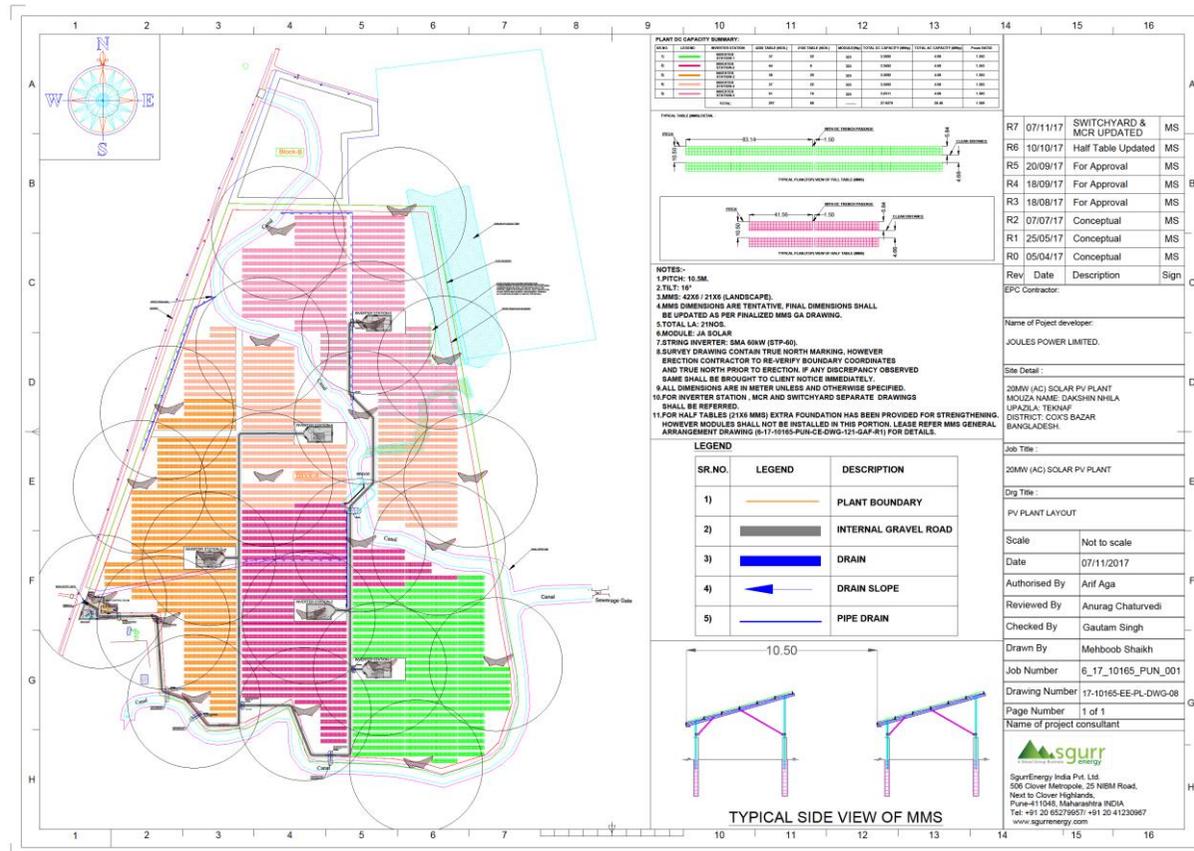


Figure 11: Project Layout Plan

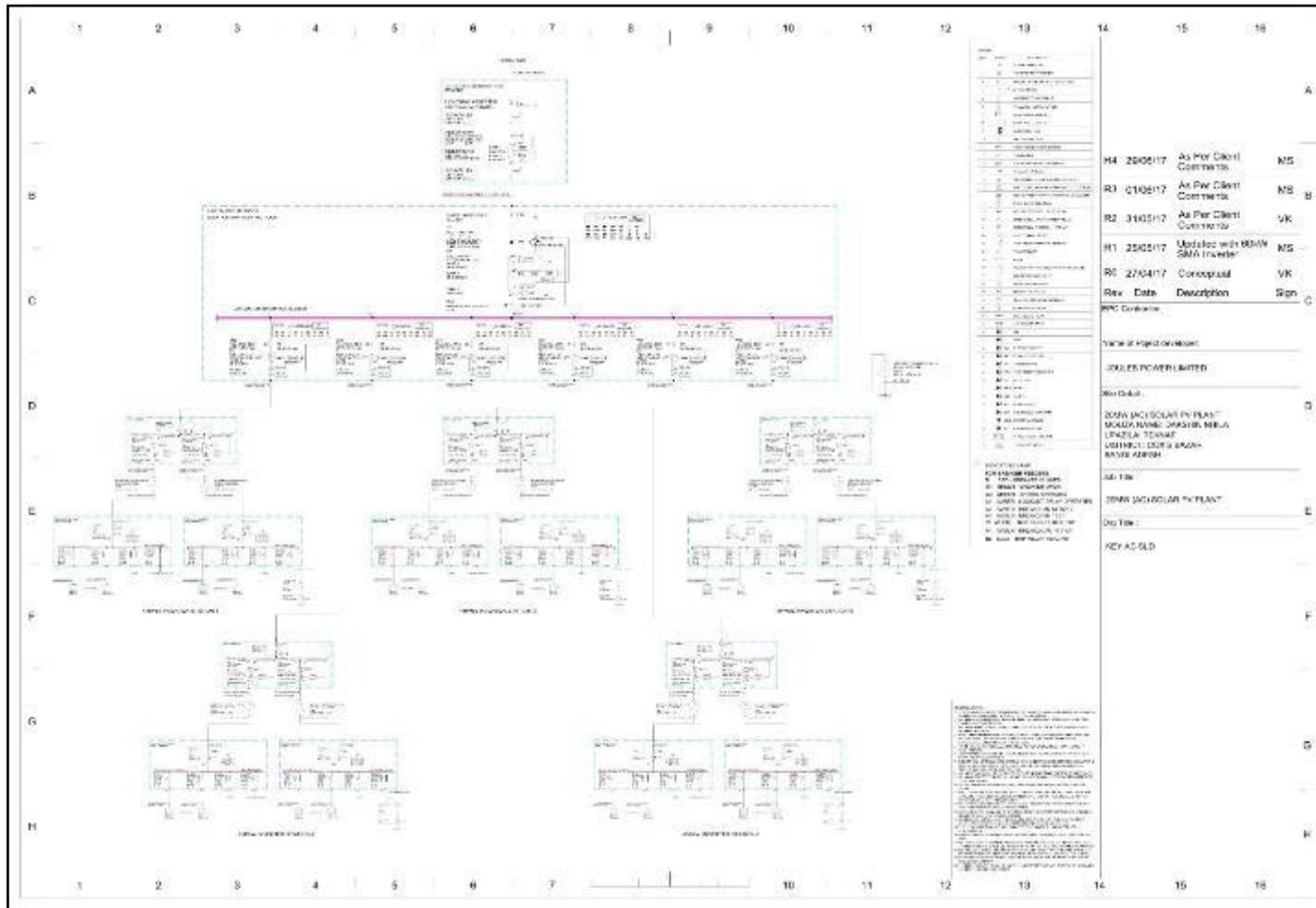


Figure 12: Process flow diagram

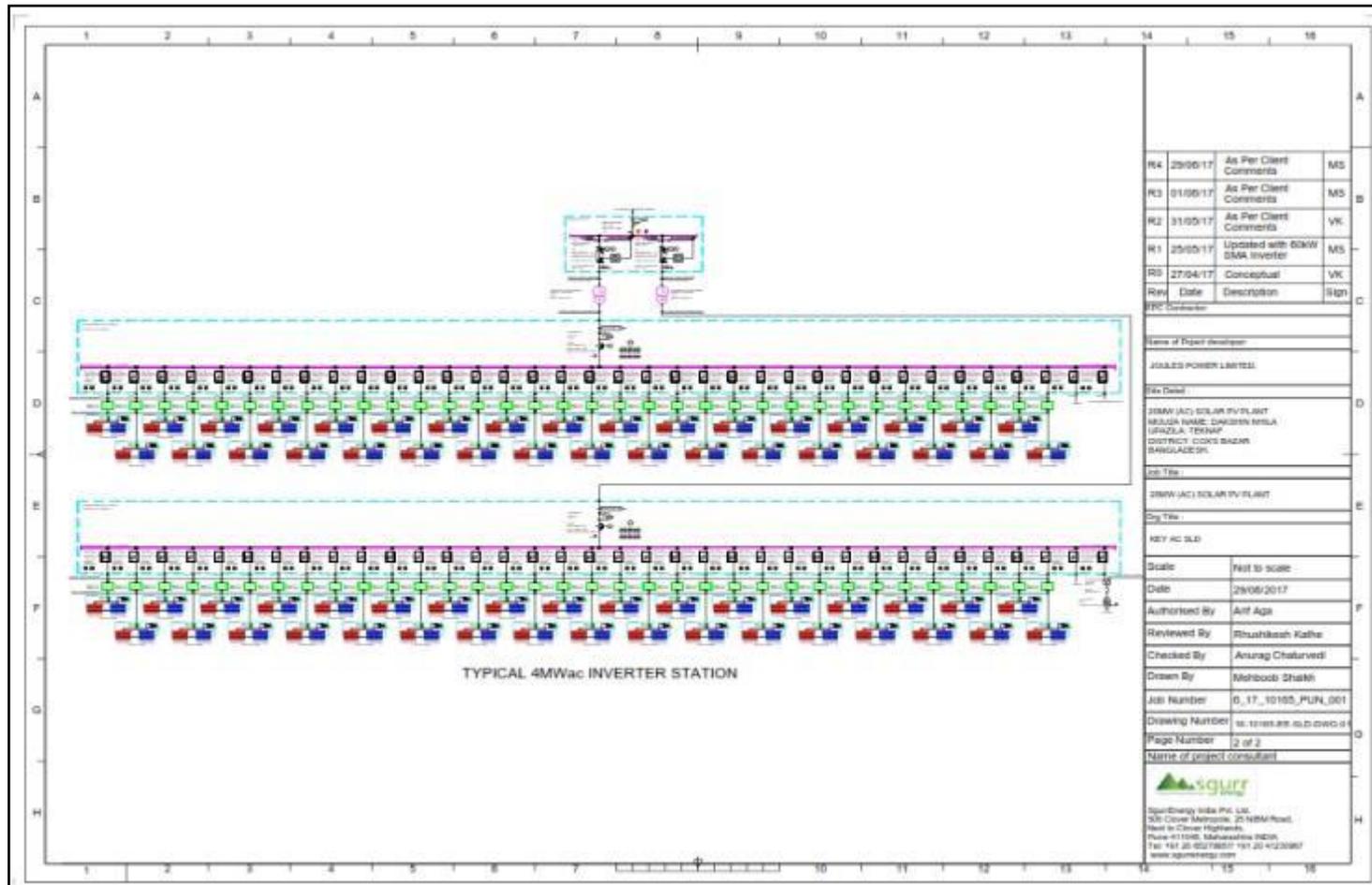


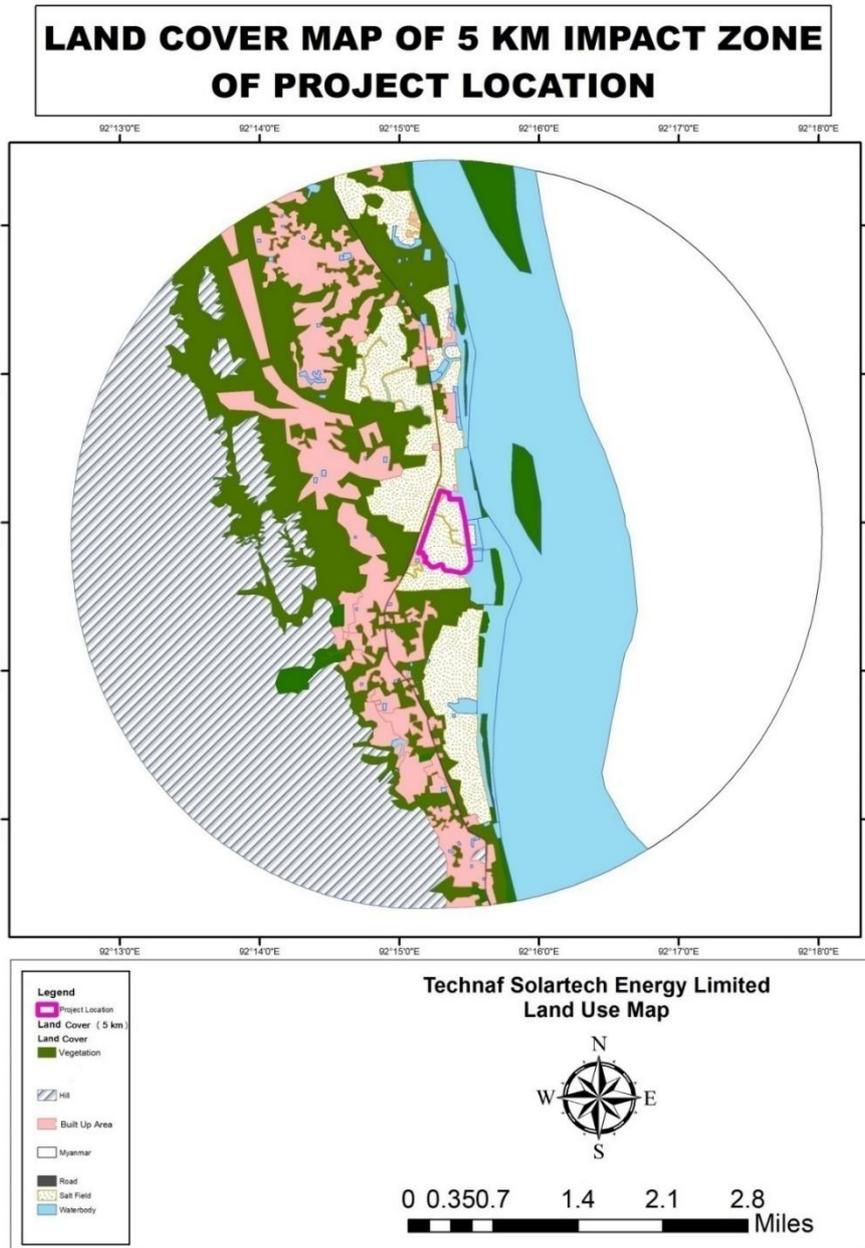
Figure 13: Process flow diagram (2)



**Photo 8: Aerial view of constructed TSEL**

### Land Coverage of the Project Site

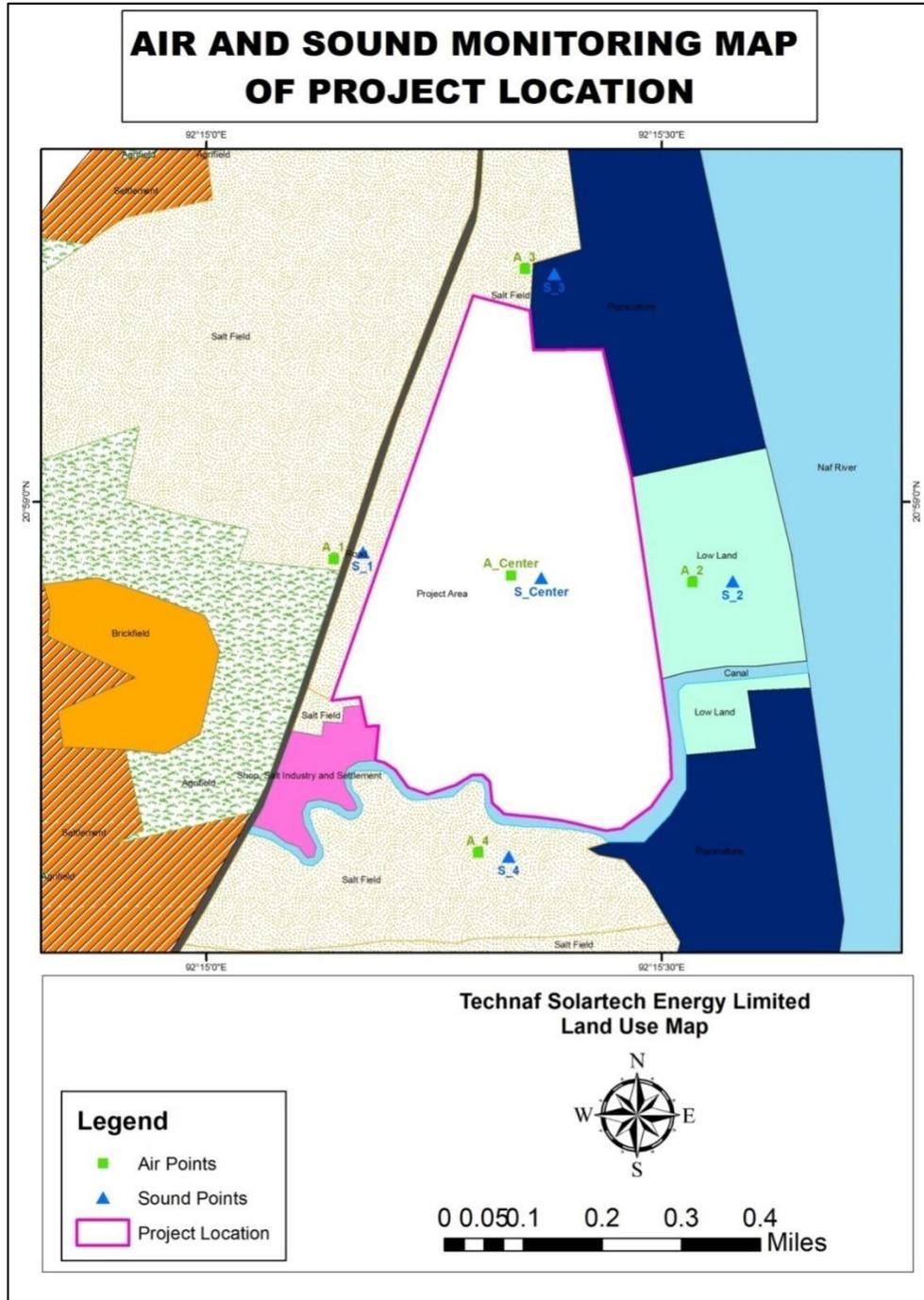
The surrounding land cover of the project area is hills, salt fields, built-up area, vegetated areas and water bodies. The land cover within 5 km radius from the project site is shown in Map 13.



**Map 12: Land-Cover Map of the Project Area**

### Air and Noise Monitoring Points

Air and noise monitoring data was collected from 5 locations to set the baseline data. The locations are shown in Map 14.



Map 13: Air and Sound Monitoring Points Map of the Project Location

### Annex 3: Land Details with Owners' Name, Dag and Khatian Numbers

#### Details of land Use for Project

The Land lease activities of TSEL were started from January, 2017 and about 116.87 acres of land was taken lease for the period of 24 years at Alikhali, South Nhilla, Teknaf, Cox's Bazar. The whole land was taken as lease from willing land owners at a negotiated rate. The Land Details with Owners' Name, Dag and Khatian Numbers are shown in the following table:

**Table 14.1: Details of the Land Leased from TSEL**

| SL. No. | Land Owner Name                             | BS Dag No.  | Total Land (Decimals) |
|---------|---|-------------|-----------------------|
| 01      | Shafiqul Islam Chowdhury                    | 10661       | 20.00                 |
|         |   | 10673       | 14.00                 |
|         |   | 10674       | 25.00                 |
|         |   | 10715       | 120.00                |
| 02      | Hazi Jamal Hochon                           | 10686       | 57.00                 |
| 03      | Ali Hossain                                 | 10723       | 67.33                 |
|         |   | 10715/10751 | 80.00                 |
| 04      | Saira Khatun, Asma Begum, Abdur Rahman Bodi | 10723       | 14.00                 |
|         |   | 10715       | 160.00                |
| 05      | Syful Karim, Md. Dolilur Rahman             | 10654       | 63.00                 |
|         |   | 10655       | 4.25                  |
|         |   | 10657       | 14.00                 |
|         |   | 10658       | 20.00                 |
| 06      | Abdul Gafur, Amir Hochon                    | 10724       | 43.00                 |
|         |   | 10686       | 45.00                 |
|         |   | 10676       | 40.00                 |
| 07      | Delower                                     | 10735       | 66.66                 |
| 08      | Shamsun Nahar                               | 10674       | 40.00                 |
|         |   | 10671       | 25.00                 |
| 09      | Mr. Jamal Hochon                            | 10661       | 147.23                |
|         |   | 10674       |                       |

| SL. No. | Land Owner Name   | BS Dag No.  | Total Land (Decimals) |
|---------|---|-------------|-----------------------|
|         |   | 10688       |                       |
|         |   | 10669       |                       |
|         |   | 10676       |                       |
|         |   | 10684       |                       |
|         |   | 10689       |                       |
|         |   | 10668       |                       |
|         |   | 10670       |                       |
|         |   | 10653/10754 |                       |
|         |   | 10661       | 50.00                 |
|         |   | 10675       | 10.00                 |
|         |   | 10741       | 30.00                 |
|         |   | 10726       | 22.17                 |
|         |   | 10729/10749 | 4.50                  |
|         |   | 10737       | 40.00                 |
| 10      | Monju Ara Begum   | 10671       | 25.00                 |
| 11      | Romija Khatun, Kader Hossain, Ashraf Hossain, Farid Alom, Jafar Alam, Rashid Ahmed, Badsha Miah, Golam Azom, Md. Hochon, Jaheda Khatun, Noor Jahan, Noor Nahar. | 10684       | 45.00                 |
|         |   | 10673       | 65.00                 |
|         |   | 10672       | 80.00                 |
|         |   | 10661       | 43.50                 |
|         |   | 10674       | 108.50                |
|         |   | 10667/10747 | 70.00                 |
| 12      | Dil Mohammad & 5 Brothers   | 10659       | 57.00                 |
|         |   | 10660       |                       |
| 13      | Mohammad Osman  | 10715       | 80.00                 |
| 14      | Mohammad Hochon   | 10675       | 107.00                |
|         |   | 10689       | 5.00                  |
|         |   | 10727       | 40.00                 |
|         |   | 10671       | 7.67                  |
| 15      | Jamal Hochon Gong   | 10661       | 100.00                |
|         |   | 10665       | 30.00                 |
|         |   | 10672       | 18.00                 |

| SL. No. | Land Owner Name  | BS Dag No. | Total Land (Decimals) |
|---------|--|------------|-----------------------|
|         |  | 10674      | 207.00                |
|         |  | 10681      | 7.00                  |
|         |  | 10694      | 5.50                  |
|         |  | 10695      | 5.50                  |
|         |  | 10692      | 40.00                 |
|         |  | 10723      | 6.00                  |
| 16      | Ezahar Mia   | 10688      | 33.33                 |
| 17      | Jamal Hosson & Jokir Ahmed                             | 10661      | 40.00                 |
| 18      | Chayad Alam  | 10623      | 40.00                 |
| 19      | Gulam Azam & Mohammad Hosson                           | 10674      | 80.00                 |
| 20      | Farid Alam & 5 Brothers                                | 10661      | 40.00                 |
| 21      | Farid Alam   | 10674      | 100.00                |
|         |  | 10661      |                       |
| 22      | Riduan Bhuiyan & 3 Brothers                            | 10675      | 113.00                |
|         |  | 10671      | 12.00                 |
|         |  | 10666      | 33.33                 |
| 23      | Abdur Rakim or Rahim                                   | 10661      | 40.00                 |
| 24      | Ayesha Begum represented by Soltan Ahmad               | 10741      | 35.00                 |
|         |  | 10675      | 25.00                 |
|         |  | 10674      |                       |
|         |  | 10742      |                       |
|         |  | 10738      |                       |
| 25      | 'Hazi Saleh Ahamed                                     | 10737      | 240.00                |
| 26      | Successor of Gura Mia 'Ayesha Begum & 7 son 2 daughter | 10737      | 180.00                |
| 27      | Senuara Begum  | 10674      | 60.00                 |
| 28      | Halema Khatun  | 10674      | 20.00                 |
|         |  | 10661      | 15.00                 |
|         |  | 10684      | 5.00                  |
|         |  | 10694      |                       |
| 29      | Monju Ara  | 10672      | 20.00                 |

| SL. No. | Land Owner Name  | BS Dag No.                                      | Total Land (Decimals) |
|---------|--|---|-----------------------|
| 30      | Khursheda Begum  | 10672   | 20.00                 |
| 31      | Saleha Begum   | 10675   | 70.00                 |
| 32      | Shah Azam  | 10684   | 52.00                 |
|         |  | 10688   | 8.00                  |
|         |  | 10669   | 5.00                  |
|         |  | 10660   | 54.34                 |
|         |  | 10742   | 40.00                 |
|         |  | 10741   | 40.00                 |
|         |  | 10724, 10691, 10694, 10723, 10674, 10685, 10686 | 186.00                |
| 33      | Dr. Md. Nurul Absar Hkan, Dr. Md. Monjur Hosain, Dr. Jinnatun Nesa                                       | 10661   | 60.00                 |
| 34      | Ahmed Hochon, Jafar Alam, Ummat Ali, Aiysha Begum, Gulfaraj Begum  | 10741   | 40.00                 |
|         |  | 10674   | 113.33                |
| 35      | Simanta Aqua Culture Limited   | 10674,10672, 10673,                             | 235.87                |
|         |  | 10673,10672                                     | 80.67                 |
|         |  | 10673,10672                                     | 34.50                 |
|         |  | 10743   | 80.00                 |
|         |  | 10673,10674, 10672                              | 76.33                 |
|         |  | 10674   | 20.00                 |
| 36      | Mojaher Miah, Azaher Miah, Dolil Ahammad, Shamsul Alam, Ubaidul Hazur, Nurul Haque, Dudu Miah, Lala Bibi | 10774   | 136.66                |
|         |  | 10688   | 73.00                 |
| 37      | Johur Alam   | 10673   | 200.00                |
| 38      | 'Hazi Mokbul Ahmed   | 10741   | 40.00                 |
| 39      | Md Rafique son of Rashid Ahmed   | 10741   | 80.00                 |
| 40      | Md Yousuf Son of Dildar Ahmed  | 10741   | 25.00                 |
|         |  | 10737   | 15.00                 |
| 41      | Md. Dildar Ahmed ( Hazi Farid Ahamed)  | 10741   | 40.00                 |
| 42      | Nurul Huda   | 10661   | 11.00                 |

| SL. No. | Land Owner Name               | BS Dag No.  | Total Land (Decimals) |
|---------|-------------------------------|-------------|-----------------------|
|         |                               | 10692       | 8.67                  |
|         |                               | 10674       | 9.33                  |
|         |                               | 10663       | 27.00                 |
|         |                               | 10735/10774 | 21.67                 |
|         |                               | 10724       | 5.00                  |
|         |                               | 10729       | 11.33                 |
| 43      | Nurul Huda                    | 10671       | 0.33                  |
|         |                               | 10672       | 20.00                 |
|         |                               | 10674       | 0.67                  |
|         |                               | 10734       | 30.00                 |
| 44      | Gura Bibi, Shukot Ali         | 10674       | 14.67                 |
|         |                               | 10661       | 44.00                 |
| 45      | Alikhali Mosque               | 10672       | 152.00                |
|         |                               | 10674       | 40.00                 |
| 46      | Jafor Alam, Jamal Hochon      | 10672       | 60.00                 |
| 47      | Rongikhali Darul Ulum Madrasa | 10679       | 60.00                 |
|         |                               | 10665       | 20.00                 |
|         |                               | 10666       | 20.00                 |
| 48      | Dil Mohammad(Dost Mohammad)   | 10689       | 3.33                  |
|         |                               | 10690       | 10.00                 |
|         |                               | 10665       | 6.00                  |
|         |                               | 10666       | 7.00                  |
|         |                               | 10668       | 10.00                 |
|         |                               | 10669       | 4.00                  |
|         |                               | 10692       | 3.00                  |
|         |                               | 10693       | 2.00                  |
|         |                               | 10699       | 6.00                  |
|         |                               | 10680       | 35.00                 |
|         |                               | 10682       | 53.33                 |
|         | 10679                         | 62.50       |                       |
|         | 10735                         | 80.00       |                       |

| SL. No. | Land Owner Name  | BS Dag No.  | Total Land (Decimals) |
|---------|--|-------------|-----------------------|
|         |  | 10729       | 4.00                  |
| 49      | Mst. Nabin Sona, Yeasmin Ara, Anju Ara, Forija Begum, Nurul Amin, Nurul Aziz, Abul Hasnat, Nurul Hasnat, Ummay Shely, Jasmin Sultana | 10674       | 50.00                 |
|         |  | 10684       | 58.00                 |
|         |  | 10732       | 15.50                 |
|         |  | 10750       | 15.00                 |
|         |  | 10734       | 6.50                  |
|         |  | 10729       | 4.00                  |
|         |  | 10715       | 400.00                |
| 50      | Shahid Sarwar  | 10662       | 107.00                |
|         |  | 10653/10754 | 51.00                 |
|         |  | 10661       | 105.33                |
|         |  | 10742       | 98.72                 |
| 51      | Sirajul Monowar  | 10675       | 120.00                |
|         |  | 10672       | 97.23                 |
| 52      | Hazi Saleh Ahamed , Mostak Ahamed  | 10725       | 80.00                 |
| 53      | Inheritance of Moulavi Soyed   | 10742       | 97.00                 |
| 54      | Md Aman Ullah  | 10693       | 40.00                 |
| 55      | Rashida  | 10674       | 30.00                 |
|         | Liakat Ali   | 10674       | 30.00                 |
| 56      | Mohammad Kamal Uddin   | 10668       | 127.33                |
| 57      | Mojaher Miah, Azaher Miah, Dolil Ahammad, Shamsul Alam, Ubaidul Hazur, Nurul Haque, Dudu Miah, Lala Bibi                             | 10669       | 458.18                |
| 58      | Akimunnesa , Sikder Ali, Siddique Ahammad, Lala Bibi, Patla Bibi   | 10692       | 291.33                |
| 59      | Foyej Ahammad  | 10693       | 68.27                 |
| 60      | Mr. Afsar Kamal  | 10674       | 50.00                 |
| 61      | Nurul Kabir  | 10665       | 100.00                |
| 63      | Dil Mohammad   | 10674       | 187.00                |
| 62      | Harun KSA  | 10684       | 350.00                |
| 63      | Jamal Member & Brothers (Inherritance)   | 10673       | 250.00                |

| SL. No.              | Land Owner Name       | BS Dag No. | Total Land (Decimals) |
|----------------------|-----------------------|------------|-----------------------|
| 64                   | Gojaiya               | 10672      | 400.00                |
| 65                   | Moulavi Shaker & Gong | 10661      | 400.00                |
| 66                   | Gura Mia (Farid)      | 10688      | 300.00                |
| 67                   | Ashu (Molavi Rafique) | 10669      | 150.00                |
| 68                   | Bodu Company          | 10676      | 80.00                 |
| 69                   | Amanullah             | 10684      | 40.00                 |
| 70                   | Shah Majidia Madrasha | 10699      | 40.00                 |
| 71                   | Moulavi Kabir         | 10680      | 80.00                 |
| 72                   | Omar Ali              | 10682      | 160.00                |
| 73                   | Kamal Hossain         | 10679      | 200.00                |
| 74                   | Borhan                | 10774      | 120.00                |
| 75                   | Momtaj Hossain        | 10658-60   | 255.16                |
| <b>Total Decimal</b> |                       |            | <b>11,686.55</b>      |

## Annex 4: Terms of Reference (ToR)

### **Environmental and Social Impact Assessment (ESIA) of a Grid-tied Solar Plant Project by Teknaf Solartech Energy Limited (TSEL)**

*(Note: This TOR was provided by DOE in its site clearance. Although, it does not fully conform to WB OP4.03, formal revision of the TOR was not done. The ESIA team focused on upgrading the EIA document cleared by DOE to a WBOP4.03 compatible ESIA document.)*

#### **INTRODUCTION**

Teknaf Solartech Energy Limited (TSEL) is in the process to establish and operate a grid-tied solar power plant at Teknaf, Cox's Bazar spreading over about 117 acres of land. Because TSEL has been approved to implement and operate a 20 MW Solar Power Plant for supplying power to Bangladesh Power Development Board (BPDB) on an off-take basis for a contracted period of 20 years. TSEL has qualified for the bid on an unsolicited basis. The required commercial operation date for the project is 12 months from date of signing of project agreements i.e., Power Purchase Agreement and Implementation Agreement. For financing TSEL is expected to source fund from financial institutions having strong commitment on sustainable development. So, TSEL has decided to engage a qualified professional/firm to conduct a detail environmental and social impact assessment.

#### **LEGISLATIVE REQUIREMENTS**

The ESIA must include the legislative requirement of the Department of Environment (DoE), World Bank OPs (especially OP 4.03) incorporating Performance Standards (1-8), IFC EHS General Guidelines 2008 and relevant international conventions.

#### **OBJECTIVES OF THE ESIA**

The primary objectives of the ESIA are to:

- Assess the baseline environmental and social conditions in the project area (an airshed of 5 km radius);
- Identify the potential environmental, social and occupational impacts due to the project in terms of construction, operation and de-commissioning phases;
- Propose appropriate mitigation measures and monitoring plan to minimize adverse environmental, occupational and social impacts as per the DOE, WB OP 4.03, IFC EHS guidelines and relevant best practices.

#### **SCOPE OF WORK**

- The ESIA will cover the environmental, occupational and social impacts due to establishing and operating a grid-tied solar plant with capacity of 20 MW;

- Ensure that the ESIA has covered the requirement of the DOE, WB OP 4.03, IFC EHS Guidelines on General Health Safety, and relevant best practices (as applicable);

#### **STANDARD AND GUIDANCE**

- The ESIA will comply with the **Environment Conservation Rules (ECR)**, 1997 and other relevant rules and regulations of Bangladesh government;
- World Bank Group's Performance Standards (PS 1-8); under WB OP4.03 applicable to IPFF-II project
- It will comply with the major requirements **IFC EHS General Guidelines**

#### **APPROACH AND METHODOLOGY**

The guiding approach of the ESIA will be based on following five principles:

- Completeness: The consultant will provide all facts and figure in a complete manner;
- Consistency: All facts and figures will be presented in a consistent manner;
- Relevancy: There will be no irrelevant discussion or illustration in the ESIA;
- Accuracy: All information and description should be accurate and they are supported with the source of reference (as is possible);
- Transparency: The consultant will prepare the ESIA from a neutral and ethical position, which means that all the issues will be depicted in a transparent manner with due importance and honest judgment.

#### **CONTENT**

The ESIA report shall contain but not limited to the following contents:

##### **i. Cover page**

Including logo, project title, name of developer, name of consultant, date of original and date of revised versions

##### **ii. Table of Contents**

#### **1. NON-TECHNICAL SUMMARY**

Should concisely discuss significant findings and recommended actions in appropriate and understandable lay language

#### **2. BACKGROUND**

2.1 Project justification and purpose

2.2 Project location should include maps showing project site and area of influence

2.3 Project description and associated activities, detailing the operation modes

Describing the project context (geographic, ecological, social, health and temporal) as well as additional / associated project components, such as transmission lines,

access roads and water supply). Should also describe facilities and activities by third parties that are essential for successful operation of the project.

### 3. ENVIRONMENTAL POLICY, LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

Presents the national policy, legal and administrative framework. Also presents obligations to international environmental and social treaties, agreements and conventions, the international standards applied to the project, other priorities and objectives for E&S performance identified by the buyer / project sponsor. Explains environmental and social requirements of the project investors.

### 4. APPROACH AND METHODOLOGY

This Chapter sets out the approach and methodology used in the ESIA and how the data and information collected has been incorporated in the findings and recommendations.

#### 4.1 General Approach

For example including flow charts depicting how the ESIA has been developed

#### 4.2 Methodology

Describe the methodology used for data gathering, including the scientific approach for the baseline studies, for example sampling methods, instrumentation etc. Describe the methodology used to categorize the significance of the environmental and social impacts identified (e.g. into high, medium and low risks).

#### 4.3 ESIA Team

Briefly outline how the ESIA work was organised, the names of the team members, their roles and their qualifications.

#### 4.4 Assumptions, uncertainties and constraints

Identify any information gaps and/or limitations to the available data.

#### 4.5 Stakeholder consultation

Describe the stakeholder consultation process and the results. This may be presented as follows (extract from the ERA template for a Stakeholder Engagement Plan):

**Table 14.2: Teplate for Stakeholder Engagement Plan**

| Stakeholder Groups                            | Key Stakeholders | Summary of Specific Interest |
|---|------------------|------------------------------|
| International                                 |                  |                              |
| Governmental                                  |                  |                              |
| Non-government organizations                  |                  |                              |
| Operational suppliers, clients and client rep |                  |                              |
| Institutions (iniversities, think tanks)      |                  |                              |
| Internal stakeholders                         |                  |                              |

|                                   |  |  |
|-----------------------------------|--|--|
| <b>Public group</b>               |  |  |
| <b>General communities</b>        |  |  |
| <b>Other key affected parties</b> |  |  |

## **5. ENVIRONMENTAL AND SOCIAL BASELINE STUDY**

Defines the study area delineated for the boundaries of the baseline study. Describes relevant physical, biological, socioeconomic, health and labour conditions, including any changes anticipated before the project start. Considers current and planned development activities within the project area but not directly connected to the project. Indicates accuracy, reliability and sources of the data used.

## **6. ANALYSIS OF ALTERNATIVES**

Analysis of alternatives: comparing reasonable alternatives to the proposed project technology, design, and operation in terms of their potential E&S impacts, the feasibility of mitigating these impacts, etc. The alternatives should match the alternative designs presented in the Feasibility Study. Include technical drawings, maps etc. of alternative designs. Provide the criteria for the assessment and identification of the best design option available. Identify and provide justification for the best design option.

## **7. IMPACT IDENTIFICATION AND EVALUATION**

Predicts and assesses the project's likely positive and negative impacts, in quantitative terms to the extent possible. Identifies mitigation measures for the negative impacts, and any residual negative impacts that cannot be mitigated. Identifies and estimates the extent and quality of the available data, key data gaps, and uncertainties associated with predictions, and specified topics that do not require further attention. Evaluates impacts and risks from associated facilities and third party activities. Examines global, trans-boundary, and cumulative effects as appropriate.

## **8. MITIGATION/OPTIMISATION MEASURES AND RESIDUAL IMPACTS**

Consists of the set of mitigation and management measures to be taken during implementation of the project to avoid, reduce, mitigate or remedy for adverse social and environmental impacts. These should be prioritised on the basis of an assessment of their significance.

## **9. ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMME**

Organises the mitigation and optimization measures identified in chapter 8 into a programme of overall activities. This may be made more operational through the development of specific action plans. The ESMP may be a multiple of other plans, for example Stakeholder Engagement Plan, Resettlement Action Plan etc. The ESMP may be structured as follows:

**Table 14.3: Sample Template for ESMP**

| Issues/<br>Aspects | Location | Mitigation<br>measures | Key verifiable<br>indicators | Person<br>responsible | Remarks | Cost<br>(US) |
|--------------------|----------|------------------------|------------------------------|-----------------------|---------|--------------|
|                    |          |                        |                              |                       |         |              |
|                    |          |                        |                              |                       |         |              |
|                    |          |                        |                              |                       |         |              |

## 10. MONITORING, EVALUATION AND REPORTING

Outline the monitoring, evaluation and reporting measures to be put in place to assess the effectiveness of the mitigation measures. Describe who will be responsible for their implementation, and whether a management system will be put in place.

## 11. CONCLUSION AND RECOMMENDATIONS

This section should present a clear statement of the conclusions and recommendations on actions to be taken to ensure that environmental issues are adequately addressed in subsequent project preparation, implementation, monitoring and evaluation phases.

## 12. APPENDICES

### 12.1 References Used

### 12.2 Technical Appendices

- Records of stakeholder engagement.
- List of stakeholders consulted or engaged. (Record of interagency and consultation meetings. Records of any other means of obtain the views of affected groups, such as surveys.)
- Terms of Reference.
- Other technical information and data, as required.
- List of ESIA report preparers – individuals and organizations
- References – written materials used in the study preparation – to be listed as follows: Author, (year), reference title, journal or publisher, page number
- Associated reports, audits and plans (e.g. resettlement action plan or indigenous peoples/natural resource dependent community plan, community health plan).
- Action plan describing actions necessary to implement the various sets of mitigation measures, prioritise these actions, timeline for implementation, and schedule for communicating with the affected communities.

## Annex 5: Technical specification of the project

### Technical specification of Electricity Generation System Components

TSEL is producing electricity from solar modules via photovoltaic cells and converting the generated DC current to AC current through inverters. All the detailed specification is listed below:

**Table 14.4: Detailed Specification of equipments used in TSEL**

| Sr. No.  | Item Description  | Unit Of Material | Quantity |
|----------|---|------------------|----------|
| <b>A</b> | <b>PV Modules capacity</b>  |                  |          |
|          | <b>PV Modules of capacity 325Wp</b>   | Nos              | 94809    |
|          | <b>RFID Tags for modules</b>  | Nos              | 94809    |
| <b>B</b> | <b>Module Mounting Structure (MMS)</b>  |                  |          |
|          | <b>42X6MMS Structure along with fasteners and allied</b>  | Sets             | 350      |
|          | <b>Inverter Structure along with fasteners and allied</b>   | Sets             | 350      |
| <b>C</b> | <b>DC System</b>  |                  |          |
|          | <b>Connectors (MC4 Connectors)</b>  |                  |          |
|          | Male Connector  | Nos.             | 20000    |
|          | Female Connector  | Nos.             | 20000    |
|          | <b>String Combiner Boxes (SCB)</b>  |                  |          |
|          | String Combiner boxes (SCB) for string configuration having DC input 12 nos. & DC output – 1 no., with fuse protection.       | Nos.             | 400      |
|          | <b>DC Cables</b>  |                  |          |
|          | Single core 4sq.mm 1.8kV DC, XLPO, Al/Copper cable, EN 50618 and TUV  | m                | 150000   |
|          | Single core 95sq.mm, 1.5kV DC, XLPE, Ar, Al/Copper cable  | m                | 150000   |
| <b>D</b> | <b>String Inverters make SMA 60KW, 400V with connected accessories and peripherals and all necessary tools &amp; tackles.</b> | Nos.             | 400      |

| Sr. No.  | Item Description  | Unit Of Material | Quantity |
|----------|---|------------------|----------|
| <b>E</b> | <b>Inverter Transformer</b>   |                  |          |
|          | <b>33/0.4, 2MVA , ONAN Transformer with off circuit tap changer.</b>  | No.              | 12       |
| <b>F</b> | <b>AC System</b>  |                  |          |
|          | <b>19/33KV(E) HT POWER CABLE</b>  |                  |          |
|          | 3Cx185 sq.mm HT Cable (19/33kV(E), Al/Copper conductor, XLPE insulated, extruded PVC compound type ST-2 inner sheathed)                       | m                | 8000     |
|          | 3Cx240 sq.mm HT Cable (19/33kV(E), Al/Copper conductor, XLPE insulated, extruded PVC compound type ST-2 inner sheathed)                       |                  | 4000     |
|          | 3Cx300 sq.mm HT Cable (19/33kV(E),Al/Copper conductor, XLPE insulated, extruded PVC compound type ST-2 inner sheathed)                        |                  | 4000     |
|          | <b>1.1KV LT POWER CABLE</b>   |                  |          |
|          | 1100V (E),Al/Copper conductor, XLPE insulated, Al armoured, overall PVC outer sheathed, generally conforming to IEC 60502 of following sizes. |                  |          |
|          | 3Cx35 sq.mm LT Cable  | m                | 10000    |
|          | 1C x 300 sq.mm LT Cable   | m                | 10000    |
|          | 1C x 500 sq.mm LT Cable   | m                | 10000    |
|          | <b>1.1KV LT POWER CABLES</b>  |                  |          |
|          | 4C x 10 sq.mm Al/Cu cable   | m                | 7000     |
|          | 2C x 2.5 sq.mm Al/Cu cable  | m                | 2000     |
|          | 4C x 4 sq.mm Al/Cu cable  | m                | 1000     |
|          | 3C x 2.5 sq.mm Al/Cu cable  | m                | 1000     |
|          | 1C x 2.5 sq.mm Al/Cu cable  | m                | 1000     |
|          | 4C x 25 sq.mm Al/Cu cable   | m                | 1000     |
|          | <b>415V AC Distribution Board (415V ACDB) at MCR</b>  |                  |          |

| Sr. No.  | Item Description   | Unit Of Material | Quantity |
|----------|--|------------------|----------|
|          | 33kV/415V,3ph,4 wire ACDB consisting of incomers for 50kVA Transformer bus couplers and TPN feeders with all control, protection, indication, other accessories & fittings as per specification and single line diagram. | Nos.             | 5        |
|          | <b>400V Indoor Main LT Panel as per key AC SLD (16-10165-EE-SLD-DWG-01)</b>  | Nos.             | 12       |
|          | <b>415V AC Distribution Board (415V ACDB) at Inverter Station</b>  |                  |          |
|          | 415V, 3ph, 4 wire UPS DB consisting of DP feeders as per single line diagram attached complete with all control, protection, indication, other accessories & fittings as per specification. (For inverter rooms)         | Nos.             | 6        |
|          | 415V, 3ph, 4 wire UPS DB consisting of DP feeders as per single line diagram attached complete with all control, protection, indication, other accessories & fittings as per specification. (For MCR)                    | Nos.             | 2        |
|          | <b>DP/4P Structure</b>   |                  |          |
|          | Double Pole Structure consisting of ISMC Channels and all required accessories   | Set              | 2        |
|          | 33kV Metering CT as per SLD  | Nos.             | 4        |
|          | 33kV Metering PT as per SLD  | Nos.             | 4        |
|          | Energy meter   | No.              | 2        |
|          | 33kV, 10kA Lightning Arrestor  | Nos.             | 4        |
|          | 33kV Motorized Isolator with Earth Switch as per SLD   | Set              | 4        |
| <b>G</b> | <b>Allied System</b>   |                  |          |
|          | <b>Cable Termination</b>   |                  |          |
|          | Termination of following sizes of cables at equipment end including supply of required double compression cable glands, bimetallic lugs, ferrules, tag no. plates etc. for following cables                              |                  |          |
|          | 1C x 4 sq.mm cable/ <i>Pin type termination</i>  | Lots             | 1        |
|          | 1C x 95sq.mm cable / <i>Bimetallic Lugs</i>  | Lots             | 1        |

| Sr. No. | Item Description  | Unit Of Material | Quantity |
|---------|---|------------------|----------|
|         | 3C x 35sq.mm cable/ <i>Lugs</i>   | Lots             | 1        |
|         | 3C x 240sq.mm cable/ <i>Lugs</i>  | Lots             | 1        |
|         | 1C x 300 sq.mm LT Cable/ <i>Bimetallic Lugs</i>   | Lots             | 1        |
|         | 1C x 70 sq.mm cable/ <i>Double Compression Gland</i>  | Lots             | 1        |
|         | 3C x 35sq.mm cable/ <i>Double Compression Gland</i>   | Lots             | 1        |
|         | 3C x 240sq.mm cable/ <i>Double Compression Gland</i>  | Lots             | 1        |
|         | 1C x 300 sq.mm LT Cable/ <i>Double Compression Gland</i>  | Lots             | 1        |
|         | <b>HT Cable End Termination &amp; Straight Through Joints</b>   |                  |          |
|         | End Terminations for 33 kV earthed grade HT Cables (XLPE) for following sizes including necessary clamps / gland, lugs etc. |                  |          |
|         | 3Cx185 SQ.MM HT Cable termination kit   | Nos.             | 50       |
|         | 3Cx185 SQ.MM HT Cable termination kit for RMU   | Nos.             | 50       |
|         | 3Cx185 SQ.MM HT Cable straight through joints required  | Nos.             | 50       |
|         | 3Cx240 SQ.MM HT Cable termination kit   | Nos.             | 50       |
|         | 3Cx240 SQ.MM HT Cable termination kit for RMU   | Nos.             | 50       |
|         | 3Cx240 SQ.MM HT Cable straight through joints required  | Nos.             | 50       |
|         | 3Cx300 SQ.MM HT Cable termination kit   | Nos.             | 50       |
|         | 3Cx300 SQ.MM HT Cable termination kit for RMU   | Nos.             | 50       |
|         | 3Cx300 SQ.MM HT Cable straight through joints required  | Nos.             | 50       |
|         | <b>1.1KV LT Cables</b>  |                  |          |
|         | 2C x 4 sq.mm Al/Cu cable  | Lots             | 1        |
|         | 4C x 10 sq.mm Al/Cu cable   | Lots             | 1        |
|         | 2C x 2.5 sq.mm Al/Cu cable  | Lots             | 1        |
|         | 4C x 4 sq.mm Al/Cu cable  | Lots             | 1        |

| Sr. No. | Item Description  | Unit Of Material | Quantity |
|---------|---|------------------|----------|
|         | 3C x 2.5 sq.mm Al/Cu cable  | Lots             | 1        |
|         | 1C x 2.5 sq.mm Al/Cu cable  | Lots             | 1        |
|         | 4C x 50 sq.mm Al/Cu cable   | Lots             | 1        |
|         | <b>Cable Markers/Clamps for 33kV buried cable</b>   |                  |          |
|         | Cable markers for underground cable runs of LT Cables and 33kV inclusive of providing and fixing supports on 18 SWG enameled steel plate engraved   | Nos.             | 200      |
|         | <b>Cable Warning tape for DC &amp; 33kV cables</b>  |                  |          |
|         | Cable warning tape for underground cable runs with letters "BURIED ELECTRIC CABLES BELOW" marked on yellow background, including necessary Civil material   | m                | 4000     |
|         | DC trench   | m                |          |
|         | MV AC trench  | m                | 4000     |
|         | <b>Cable Trays</b>  |                  |          |
|         | a) 900 x 2 x 100 mm (W x T x H) Ladder Type   | m                | 100000   |
|         | b) 200 x 2 x 50 mm (W x T x H) Perforated Type  | m                | 100000   |
|         | c) 100 x 2 x 50 mm (W x T x H) Perforated Type with Cover   | m                | 100000   |
|         | d) 600 x 2 x 100 mm (W x T x H) Ladder Type   | m                | 100000   |
|         | e) 450 x 2 x 100 mm (W x T x H) Ladder Type   | m                | 100000   |
|         | ISMC channels, support metallic anchor fasteners for supporting cable tray supports / equipment erection .This shall also include hardware such as nut/bolts/ washers required to do mounting structure and other equipment earthing as required. | Lots             | 1        |
|         | <b>Safety Equipment</b>   |                  |          |
|         | Following equipment including necessary hard wares;   |                  |          |
|         | a. Shock hazard charts complete with frame and glass  | Nos.             | 50       |
|         | b. First aid boxes  | Nos.             | 50       |

| Sr. No. | Item Description  | Unit Of Material | Quantity |
|---------|---|------------------|----------|
|         | c. Caution boards as per IEC  | Nos.             | 50       |
|         | d. Sand bucket with stand (Each set with 5 buckets)   | Nos.             | 50       |
|         | e. SLD with frame and glass   | Nos.             | 50       |
|         | f. Fire extinguisher  |                  | 50       |
|         | i. 10kG Co2 type  | Nos.             | 50       |
|         | ii. Foam 45 ltr capacity  | Nos.             | 50       |
|         | iii. 10kG DCP type  | Nos.             | 50       |
|         | g. Insulated floor Mats Manufactured from highly electric resistant elastomer, conforming to IEC, upper surface is having small aberration (Anti-Skid) marks to avoid slippery effects & lower surface is plain, according to its class, 1m wide. |                  |          |
|         | a) Type – ‘A’ for working voltage upto 3.3 KV, Thick: 2mm   | m                | 500      |
|         | b) Type – ‘C’ for working voltage upto 33KV, Thick: 3mm   | m                | 100      |
|         | <b>Heavy Duty HDPE pipes</b>  |                  |          |
|         | 200mm diameter pipe   | m                | 500      |
|         | <b>HDPE Conduit pipe and coupler</b>  |                  |          |
|         | Conduit pipe, 50mm ID   | m                | 100000   |
|         | <b>Illumination System</b>  |                  |          |
|         | <b>Lighting Fixtures</b>  |                  |          |
|         | Following lighting fixtures complete with lamps and necessary control gear including supply of all connected materials like flexible conduit, clamps, supports, chains, anchor fastners, bolts, nuts and washers                                  |                  |          |
|         | 40W Capsule LED fixture, surface / pendent mounting with all necessary accessories like suspension pipes, cover plates etc and suitable for 240V AC. Bajaj type – BICDP 40W LED / Philips / equivalent.   | Nos.             | 500      |
|         | 60W LED fixture, Outdoor type wall / structure  | Nos.             | 500      |

| Sr. No. | Item Description   | Unit Of Material | Quantity |
|---------|--|------------------|----------|
|         | mounting suitable for 240V AC. Bajaj / Philips / Wipro equivalent.   |                  |          |
|         | 70W MH fixture, Outdoor type wall / structure mounting suitable for 240V AC.                                       | Nos.             | 100      |
|         | <b>Internal wiring</b>   |                  |          |
|         | 25 mm dia PVC Pipe   | m                | 1000     |
|         | 32A Welding Socket   | Nos.             | 50       |
|         | 2.5 sqmm Al/Cu wire  | m                | 50000    |
|         | 4 sqmm Al/Cu wire  | m                | 20000    |
|         | 6 sqmm Al/Cu wire  | m                | 500      |
|         | 230V 6A SP switch  | Nos.             | 500      |
|         | 6A Power Socket  | Nos.             | 500      |
|         | 16A Switch   | Nos.             | 500      |
|         | 16A Power Socket   | Nos.             | 500      |
|         | 16 module switchboard with 11nos 5A plate type switches with 2Nos of 5A, 3 pin 240V receptacle with safety shutter | Nos.             | 500      |
|         | 6 module Switchboard with 1nos 16A plate type switches with 2Nos of 16A, 3 pin 240V receptacle with safety shutter | Nos.             | 500      |
|         | 3way Junction Box  | Nos.             | 500      |
|         | Clamps for conduits - 25 mm dia  | Nos.             | 500      |
|         | Bends  | Nos.             | 500      |
|         | Circular boxes/pull out boxes  | Nos.             | 500      |
|         | Couplers   | Nos.             | 500      |
|         | <b>Lighting Panels/ Power panels</b>   |                  |          |
|         | 20kVA UPS with 4hr power backup with required battery bank   | Nos.             | 4        |
|         | 3kVA UPS with 2hr power backup with required battery bank  | Nos.             | 10       |

| Sr. No.  | Item Description  | Unit Of Material | Quantity |
|----------|---|------------------|----------|
|          | <b>Street Lighting Poles</b>  |                  |          |
|          | 15 Watt LED   | Nos.             | 500      |
|          | Swaged tubular steel poles complete with base plate alongwith supply of luminaries supporting bracket and earthing materials. 3.5m high lighting pole with Supply Junction box with HRC fuse, neutral link, terminal block and 02 nos. M8 earthing stud for single arm steel pole along with mounting bracket suitable for steel pole mounting. | Nos.             | 500      |
|          | Following Feeder Pillar Box/Street LP with dusk to dawn controller and timer FPB with outgoing feeders for outdoor lighting. Incomer : 50A TPN ELCB, Outgoing : 3 nos 16A SPN MCB   | Nos.             | 10       |
|          | <b>Street Lighting cables</b>   |                  |          |
|          | 1.1kV grade, XLPE insulated armored Aluminum cable of size 4Cx10 sq. mm. for street light poles   | m                | 2000     |
|          | <b>Cable band, cable ties</b>   |                  |          |
|          | 100 mm aluminum tag   | Lots             | 1        |
|          | PVC cable tie for clamping of loose solar cables with solar panel frames, Panel structure etc. The PVC cable tie shall be UV resistance.  | Lots             | 1        |
|          | Cable Tie 300 mm UV protected black   | Lots             | 1        |
|          | Cable Tie 100 mm UV protected black   | Lots             | 1        |
|          | Cable Sleeve 8 mm Red   | Lots             | 1        |
|          | Cable Sleeve 8 mm Black   | Lots             | 1        |
|          | Ferrule 0-9 (10mm)  | Lots             | 1        |
|          | ferrule,P,N (10mm)  | Lots             | 1        |
| <b>H</b> | ferrule,R, Y, B (10mm)  | Lots             | 1        |
|          | <b>Water Pumps and other Systems</b>  |                  |          |
|          | Sump pump set 1.5HP, 3 phase, 415 volts, 50 Hz  | Nos.             | 5        |
|          | Portable water pump set 1.5HP, 3 phase, 415 volts, 50   | Nos.             | 5        |

| Sr. No.  | Item Description   | Unit Of Material | Quantity |
|----------|--|------------------|----------|
|          | Hz   |                  |          |
| <b>I</b> | Control panel consisting of DOL starter, MCB etc   | Nos.             | 5        |
|          | 4C, 4sq. Mm, 1100V AC grade PVC insulated steel wire/ tape armored copper conductor cables as required for installation of above pump. | m                | 500      |
|          | <b>HT Switchgear and Battery Charger System</b>  |                  |          |
|          | Control Room 33kV, 630A VCB(7Nos.), 25kA for 3 sec, Indoor type switchgear Panel at control room, Line PT- 1 No.                       | No.              | 10       |
|          | Inverter Room 33kV, 630A VCB, 25kA for 3 sec, Indoor RMU Panel at inverter room with 2 Breaker + 1LBS (Type- CVV)                      | Nos.             | 10       |
|          | 48V dual FCBC battery chrger with suitable AH capacity and DCDB.   | Nos.             | 4        |
|          | <b>Solar Field Earthing</b>  |                  |          |
|          | Following GI earthing strip / GI Wire  |                  |          |
|          | 50x10mm GI flat  | m                | 2000     |
|          | 25x6mm GI Flat   | m                | 25000    |
|          | 32x6mm Cu flat   | m                | 500      |
|          | 16sq.mm Insulated Al/Cu cable ( Yellow-green for SCB grounding)  | m                | 1500     |
| <b>J</b> | 16sq.mm Insulated Al/Cu cable Bimetallic lug for terminating with earth strip  | Nos.             | 500      |
|          | 16sq.mm Insulated Al/Cu cable ( Yellow-green for Inverter grounding)   | m                | 2000     |
|          | 16sq.mm Insulated Bimetallic Lug   | Nos.             | 500      |
|          | 60MM DIA. 3000MM LONG GI pipe electrode with salt, charcoal etc (treated pits)   | Nos.             | 200      |
|          | ESE type lightning arrester (107 ms radial range)  | Nos.             | 24       |
|          | 18MM DIA. 3000MM LONG Cu bonded electrode with chemical powder   | Nos.             | 100      |

| Sr. No. | Item Description   | Unit Of Material | Quantity |
|---------|--|------------------|----------|
|         | <b>Weather Station and Control &amp; Monitoring</b>  |                  |          |
|         | <b>Control &amp; Monitoring Cables for PV Plant</b>  |                  |          |
|         | 4x2x0.5 Sq. mm Twisted pair shielded Cable ( Type Li-2YCYv or equivalent)  | km               | 10       |
|         | 4 pair Category 6e cable consisting of 24 AWG solid copper conductors The cable shall have flexible jacket and ripcord for easy stripability | m                | 6000     |
|         | 06F armored unitube single sheath, multimode type Fiber optics Cable with required terminations.   | m                | 10000    |
|         | <b>LT Control Cables (1.1 kV grade, PVC insulated, armoured FRLS PVC sheathed copper conductor cables)</b>                                   |                  |          |
|         | 4Cx2.5 Sq. mm Multistrand Al/Cu Cable  | m                | 1000     |
|         | 8Cx2.5sq. mm Multistrand Al/Cu Cable   | m                | 1000     |
|         | 12Cx2.5sq. mm Multistrand Al/Cu Cable  | m                | 1500     |
|         | <b>SCADA Hardware/Software</b>   |                  |          |
|         | RTU Panel with I/O cards, ethernet/modbus/gateway units, FO convertors, ethernet switches.   | Nos.             | 10       |
|         | Workstation 22"  | Nos.             | 15       |
|         | Server with required accessories and storage   | Nos.             | 15       |
|         | Historian server workstation with required accessories and storage   | No.              | 10       |
|         | SLDC Communication gateway/RTU   | No.              | 10       |
|         | GPS Clock  | No.              | 10       |
|         | Remote monitoring license  | Nos.             | 10       |
|         | Software License with for unlimited I/O tags   | No.              | 10       |
|         | Others as required to commission the SCADA   | Lot              | 10       |
|         | <b>Instruments for meteorological measurements</b>   |                  |          |
|         | Pyranometer  | Nos.             | 10       |
|         | Ambient Temperature cum humidity measuring   | No.              | 10       |

| Sr. No. | Item Description   | Unit Of Material | Quantity |
|---------|--|------------------|----------|
|         | instrument   |                  |          |
|         | Anemometer   | No.              | 10       |
|         | Module temperature sensor  | Nos.             | 10       |
|         | Data logger  | No.              | 20       |
|         | Barometer  | No.              | 10       |
|         | Rain Gauge   | No.              | 10       |
|         | <b>Misc Others</b>   |                  |          |
|         | Multi Sensors  | Nos.             | 350      |
|         | Heat Detector  | Nos.             | 350      |
|         | Fire Alarm Panel   | Nos.             | 50       |
|         | CCTV cameras   | Nos.             | 50       |
|         | 1.5 ton Split AC   | Nos.             | 10       |
|         | Electrical, Electronics and Mechanical Tools   | Sets             | 50       |
|         | Installation of galvanized Factory Fabricated sheet metal ducting generally as specified and completely factory fabricated with:<br>a) with angle 40x40x5mm flange & Stiffener Diagonal angle of 25x25x3mm all four side<br>b) Galvanized companion flanges & girth angles.<br>c) Turning vanes- 2 nos/inverter<br>d) Galvanized structural support systems for hanging of duct<br>e) Single louvered Exhaust air grilles with bird mesh in aluminum construction duly Powder coated and to be fitted with Exhaust Air Ducting of each Inverter Unit.<br>f) 2mm Galvanized Sheet Steel - 10 sq.mtr /per inverter | Nos.             | 50       |
|         | Exhaust fans in Inverter rooms   | Nos.             | 30       |

### Annex 6: Project Schedule

#### Project Schedule of TSEL

The project is concern with construction and operation phases. It had designed a 6 months construction. Operational period designed with average 5.35 hours/Dayworking of yearly 365 days for 20 years lifetime. The maintenance will be in the night-time of any day as it will run in the day time. The project schedule is shown below:

**Table 14.5: Project Schedule of TSEL**

| Technaf Solartech Energy Limited Project Planner |                                    |          |         |          |          |            |               |             |              |              |             |              |           |           |         |          |          |            |               |
|--|------------------------------------|----------|---------|----------|----------|------------|---------------|-------------|--------------|--------------|-------------|--------------|-----------|-----------|---------|----------|----------|------------|---------------|
| S/L  | ACTIVITY                           | DURATION | May, 17 | June, 17 | July, 17 | August, 17 | September, 17 | October, 17 | November, 17 | December, 17 | January, 18 | February, 18 | March, 18 | April, 18 | May, 18 | June, 18 | July, 18 | August, 18 | September, 18 |
| 1  | Preliminary Design                 | 90       | █       | █        | █        | █          | █             | █           | █            | █            | █           | █            | █         | █         | █       | █        | █        | █          | █             |
| 2  | Preliminary Design Approval        | 10       |         |          |          | █          |               |             |              |              |             |              |           |           |         |          |          |            |               |
| 3  | Boundary Fencing Work              | 115      |         |          |          | █          | █             | █           | █            | █            | █           | █            | █         | █         | █       | █        | █        | █          | █             |
|  | Civil Construction                 | 180      |         |          |          |            | █             | █           | █            | █            | █           | █            | █         | █         | █       | █        | █        | █          | █             |
| 4  | Installation                       | 280      |         |          |          |            |               | █           | █            | █            | █           | █            | █         | █         | █       | █        | █        | █          | █             |
| 5  | Off Grid Commissioning and Testing | 60       |         |          |          |            |               |             |              |              |             |              |           |           |         | █        | █        | █          | █             |
| 6  | Grid Connection and Start up       | 30       |         |          |          |            |               |             |              |              |             |              |           |           |         |          | █        | █          | █             |
| 7  | On Grid Commissioning              | 15       |         |          |          |            |               |             |              |              |             |              |           |           |         |          |          | █          | █             |
| 8  | Performance Test                   | 10       |         |          |          |            |               |             |              |              |             |              |           |           |         |          |          | █          | █             |
| 9  | COD                                | 7        |         |          |          |            |               |             |              |              |             |              |           |           |         |          |          |            | █             |

## Annex 7: Environmental Policy, Legislative and Institutional Framework

### General

The following is the review of the relevant national legislation, regulatory and policy instrument and some international ones. The proponent of the project will conduct its infrastructural and operational activities in compliance with applicable Bangladeshi and international legislation and agreements. A comprehensive review of the legal and institutional framework within which the environmental and social assessment is to be carried out.

### Environment Conservation Rules, 1997 (subsequent amendments in 2002 and 2003)

The Environment Conservation Rules, 1997 are the first set of rules promulgated under the Environment Conservation Act, 1995. These Rules provide for, *inter alia*, the following:

- The national Environmental Quality Standards (EQS) for ambient air, surface water, groundwater, drinking water, industrial effluents, emissions, noise and vehicular exhaust;
- Categorization of industries, development projects and other activities on the basis of actual (for existing industries/development projects/activities) and anticipated (for proposed industries/development projects/activities) pollution load;
- Procedure for obtaining environmental clearance;
- Requirement for undertaking IEE and ESIA as well as formulating ESMP according to categories of industries/development projects/activities; and
- Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life.

Depending upon location, size and severity of pollution loads, projects/activities have been classified in the Environmental Conservation Rules (ECRs) into four categories:

1. Green,
2. Orange A
3. Orange B
4. Red

The corresponding category related to power plants is included under:

*Schedule-1, Red Category:*

- Item 6: power plants; and

The Rules also incorporate “inclusion lists” of projects requiring varying degrees of environmental investigation e.g. all new projects under the ‘red’ category generally will require a two-step assessment procedure. Firstly, an Initial Environmental Examination (IEE) will be required for site clearance, and secondly, if warranted, a full Environmental Impact Assessment

(ESIA) for technical clearance. This ESIA has been carried out following the IEE of the project and also on the basis of the Terms of Reference (ToR) for the ESIA, which were approved by DoE, in accordance with the requirements of the ECRs, toward obtaining an 'Environmental Clearance Certificate' for the proposed project.

### **The ESIA Guidelines for Industry, 1997**

The ESIA Guidelines is a handbook comprising procedures for preparing an ESIA and for reviewing an ESIA for the benefit of the development partners, ESIA Consultants, reviewers, and academics. While preparing these guidelines, the present environmental status as well as the need for rapid economic development of Bangladesh has been considered. These considerations have essentially resulted in simpler procedures to be followed for preparing and/or reviewing an ESIA.

Application for Environmental Clearance at A requires 60 working days to reach A1 with Site Clearance. Submission at B of ESIA as per ToR approved at AI needs another 90 working days to reach B1 with ESIA approval and Environmental Clearance Certificate (*60 working days for ESIA approval and 30 working days for ECC after the applicant/project sponsor completes the formalities as specified in the ESIA approval letter and reports to DoE*). ECC issued through such a process remains valid for 1 (one) year, after which renewal is necessary. *During stages between A and A1 and between B and B1, observations are made and the applicant may be asked for modification of his/her information/data/reports submitted to DoE for necessary clearance.*

### **Environmental Court Act, 2010**

By the Act, government can establish one or more environment court in each district. Each court will be constituted with one judge and in consultation with Supreme Court. The Govt. shall appoint an officer of judicial service of the rank of joint district judge. Each environment court will be established at district sadar. But government can relocate the locations of judiciary activities of this court at any location through issuance of general or special order in government gadget. If more than one environment court is established in one district, government will delineate jurisdiction of each court by gadget notification.

- ✚ To fulfill the purposed of this act, government can inaugurate one or more special magistrate court at each district through gadget notification. Government, in consultation with Supreme Court, will appoint a metropolitan magistrate or a first class judicial magistrate solely or as special magistrate in addition to his/her general duty for any jurisdiction.
- ✚ Whatever remains any other law, Director General or any person empowered by him will be able to file a case at special magistrate court. The special magistrate court will be competent to impose penalty for offences described in this Act including section 9, to confiscate an equipment or part, a transport used in the commission of such offence or

article or other thing involved with the offence and to pass order or decree for compensation in appropriate cases.

- ✚ Whatever remains any other law, all the cases received from the special magistrate will be judged and resolved at the environment court. The environment court will be competent to impose penalty for offences described in this Act including section 8(2), to confiscate an equipment or part, a transport used in the commission of such offence or article or other thing involved with the offence and to pass order or decree for compensation in appropriate cases.
- ✚ The Act has defined timeline for resolving any case under both special magistrate court and environment court.
- ✚ Aggrieved People may appear to Environment Appeal Court (established under Section 20 of this Act) for justice directly within 30 days of resolution of any case.

## Relevant International Treaties and Conventions

Bangladesh is party to a number of international environmental conventions, treaties, and agreements. The international treaties and conventions relevant to the Project and their status are detailed in the following table.

**Table 14.6: The International Treaties and Conventions Relevant To the Project**

| Environment-related International convention and Treaties  | Status  | Applicability to Project |
|--|---|--------------------------|
| Vienna Convention for the Protection of the Ozone Layer (Vienna, 1985)   | 02.08.90 (accessed)<br>(entry into force)             | Applicable               |
| Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal 1987)                                     | 02.08.90(accessed)<br>31.10.90 (entry into force)     | Applicable               |
| London Amendment to the Montreal Protocol on substances that Deplete the Ozone Layer (London, 1990)              | 18.03.94 (accessed)<br>16.06.94 (entry into force)    | Applicable               |
| Copenhagen Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Copenhagen, 1992       | 27.11.2000 (accepted)<br>26.2.2001 (entry into force) | Applicable               |
| Montreal Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1997           | 27.7.2001 (Accepted)<br>26.10.2001 (Entry into force) | Applicable               |
| Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and Their Disposal (Basel, 1989) | 01.04.93 (accessed)                                   | Applicable               |
| United Nations Framework Convention  | 09.06.92 (signed)                                     | Applicable               |

| Environment-related International convention and Treaties                   | Status                                      | Applicability to Project   |
|---|---|--|
| on Climate Change, (New York, 1992)   | 15.04.94 (ratified)                         |  |
| Convention on Biological Diversity, (Rio De Janeiro, 1992)                  | 05.06.92 (signed)<br>03.05.94 (ratified)    | Applicable   |
| Convention on Persistent Organic Pollutants, Stockholm                      | 23.5.2001 (signed)<br>12.03.2007 (ratified) | Applicable and use of any persistent pollutants to be prohibited |
| Kyoto protocol to the United Nations Framework Convention on Climate Change | 21.8.2001 (accessed)                        | Applicable   |

Source: DoE, Bangladesh

### Renewable Energy Policy of Bangladesh

The renewable energy policy of Bangladesh has been approved on December 18, 2008 with the target of developing renewable energy resources. This Policy laid out the target of meeting 5% of total power demand from renewable energy sources by 2015 and 10% by 2020. The policy provides an overall guidance of

- Institutional arrangements
- Resource, technology, and program development
- Investment and fiscal incentives
- Regulatory policy

The policy promotes the appropriate, efficient and environmentally friendly use of renewable energy. It also suggests that for large biomass electricity projects (i.e., greater than 1 MW) the project developer must demonstrate that the biomass is being sustainably harvested and that no adverse social impact will result from that development. It also restricted the larger scale production and use of biofuels which may jeopardize the existing crops.

### World Bank Operational Policy/Procedure (OP/BP) 4.03 – World Bank Performance Standards for Private Sector Activities

World Bank Operational Policy / Procedure (OP/BP) 4.03 – World Bank Performance Standards for Private Sector Activities governs the World Bank requirements applicable to IPFF II. The aim of this policy is to facilitate Bank financing for private sector led economic development projects by applying environmental and social standards that are better suited to the private sector, while enhancing greater policy coherence across the World Bank Group. OP/BP 4.03, among its other provisions, stipulates the requirements for Bank-supported

projects involving Financial Intermediaries (FIs), as follows: If the Private Sector Activity involves a FI, the FI is required to:

- (a) Develop and operate an Environmental and Social Management System (ESMS) that is commensurate with the level of social and environmental risks in its portfolio, and prospective business activities;
- (b) Ensure that all subprojects supported by the Bank comply with applicable national and local laws and regulations, and, in case of higher risk subprojects involved, with the requirements of the World Bank Performance<sup>4</sup> Standards 1-8.
- (c) Apply relevant aspects of WB Performance Standard 2 to its employees.<sup>4</sup>

### **World Bank Performance Standards and Environmental, Health and Safety Guidelines**

The World Bank has set out eight Performance Standards, as listed below, in respect of various parameters pertaining to a proposed project.

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;

Performance Standard 2: Labor and Working Conditions;

Performance Standard 3: Resource Efficiency and Pollution Prevention;

Performance Standard 4: Community Health, Safety, and Security;

Performance Standard 5: Land Acquisition and Involuntary resettlement;

Performance Standard 6: Biodiversity Conservation and Sustainable Management of living Natural Resources;

Performance Standard 7: Indigenous Peoples; and

Performance Standard 8: Cultural Heritage.

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<sup>4</sup>In case of IPFF II, this requirement will be applicable to the PFIs, but not BB.

A summary of the Performance Standards objectives is presented in Table 14.7.

**Table 14.7: Details of World Bank Performance Standards**

| PS | Title  | Objectives   |
|----|--|--|
| 1  | PS1: Assessment and Management of Environmental and Social Risks and Impacts | <ul style="list-style-type: none"> <li>• To identify and evaluate environmental and social risks and impacts of the project.</li> <li>• To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize,<sup>5</sup> and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.</li> <li>• To promote improved environmental and social performance of project sponsors through the effective use of management systems.</li> <li>• To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.</li> <li>• To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.</li> </ul> |
| 2  | PS2: Labor and Working Conditions  | <ul style="list-style-type: none"> <li>• To promote the fair treatment, nondiscrimination, and equal opportunity of workers.</li> <li>• To establish, maintain, and improve the worker-management relationship.</li> <li>• To promote compliance with national employment and labor laws.</li> <li>• To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the project sponsor's supply chain.</li> <li>• To promote safe and healthy working conditions, and the health of workers.</li> <li>• To avoid the use of forced labor.</li> </ul>  |
| 3  | PS3: Resource Efficiency and Pollution                                       | <ul style="list-style-type: none"> <li>• To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.</li> </ul>  |

<sup>5</sup>Acceptable options to minimize will vary and include: abate, rectify, repair, and/or restore impacts, as appropriate. The risk and impact mitigation hierarchy is further discussed and specified in the context of Performance Standards 2 through 8, where relevant.

| PS | Title   | Objectives   |
|----|---|--|
|    | Prevention  | <ul style="list-style-type: none"> <li>To promote more sustainable use of resources, including energy and water.</li> <li>To reduce project-related GHG emissions.</li> </ul>  |
| 4  | PS4: Community Health, Safety, and Security   | <ul style="list-style-type: none"> <li>To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.</li> <li>To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.</li> </ul>  |
| 5  | PS5: Land Acquisition and Involuntary Resettlement                                    | <ul style="list-style-type: none"> <li>To avoid, and when avoidance is not possible, minimize displacement by exploring alternative project designs.</li> <li>To avoid forced eviction.</li> <li>To anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.</li> <li>To improve, or restore, the livelihoods and standards of living of displaced persons.</li> <li>To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.</li> </ul> |
| 6  | PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources | <ul style="list-style-type: none"> <li>To protect and conserve biodiversity.</li> <li>To maintain the benefits from ecosystem services.</li> <li>To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.</li> </ul>  |
| 7  | PS7: Indigenous Peoples <sup>6</sup>  | <ul style="list-style-type: none"> <li>To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.</li> <li>To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when</li> </ul>  |

<sup>6</sup>In Bangladesh, the accepted terminology for such communities is “Tribal peoples and/ or small ethnic communities”

| PS | Title                  | Objectives   |
|----|------------------------|--|
|    |                        | <p>avoidance is not possible, to minimize and/or compensate for such impacts.</p> <ul style="list-style-type: none"> <li>• To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.</li> <li>• To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.</li> <li>• To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.</li> <li>• To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.</li> </ul> |
| 8  | PS8: Cultural Heritage | <ul style="list-style-type: none"> <li>• To protect cultural heritage from the adverse impacts of project activities and support its preservation.</li> <li>• To promote the equitable sharing of benefits from the use of cultural heritage.</li> </ul>   |

Of the above eight Performance Standards, Performance Standard 1 establishes the importance of:

- (i) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects;
- (ii) effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
- (iii) The project sponsor's management of environmental and social performance throughout the life of the project.

Performance Standards 2 through 8 establish objectives and requirements to avoid, minimize, and where residual impacts remain, to compensate/offset for risks and impacts to workers, Affected Communities, and the environment.

The applicability of Performance Standard 1-8 is established during the environmental and social risks and impacts identification process described in Performance Standard 1. While all relevant environmental and social risks and potential impacts should be considered as part of the assessment, Performance Standards 2 through 8 describe potential environmental and social risks and impacts that require particular attention. Where environmental or social risks and impacts are identified, the project sponsor is required to manage them through its Environmental and Social Management System (ESMS) consistent with Performance Standard 1.

In addition to the eight Performance Standards, the IFC General Environmental, Health and Safety (EHS) Guidelines are considered pertinent to the Project. The EHS Guidelines comprise technical reference documents with general industry-specific examples of Good International Industry Practice. The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues in specific industry sectors. During preparation of this ESIA for the TSEL Power Plant project, the General EHS Guidelines were applied and relevant guidance in the Industry Sector Guidelines for Thermal Power Plants (dated December 19, 2008) was followed (where applicable).

The IFC *Policy on Disclosure of Information*, The Access to Information Policy is effective as of January, 2012 supersedes the IFC Disclosure of Information Policy of April 2006. The policy seeks to provide accurate and timely information regarding its activities to clients, partners and stakeholders including the Affected Communities and other interested parties.

For each proposed Category A and B project, IFC disclose as summary of its review findings and recommendations, the Environmental and Social Review Summary (ESRS). The ESRS includes:

- i) Reference to the Performance Standards and any applicable grievance mechanisms, including the CAO;
- ii) The rationale for IFC's categorization of a project;
- iii) A description of the main environmental and social risks and impacts of the project;
- iv) Key measures identified to mitigate those risks and impacts, specifying any supplemental actions that will need to be implemented to undertake the project in a manner consistent with the Performance Standards, or where required by IFC, the Environmental and Social Action Plan (ESAP);
- v) Where greater than 25,000 MT CO<sub>2</sub> equivalent, the expected GHG emissions of the project;
- vi) Electronic copies or web links, where available, to any relevant ESIA documents prepared by or on behalf of the client; and
- vii) For those projects where the verification of the Free, Prior, and Informed Consent (FPIC) of indigenous peoples is required, a description of the status of that consent process;

## Annex 8: Safeguard Requirements of Equator Principle Financial Institutions

The ten requirements of the Equator Principle Financial Institutions (EPFIs) correspond to the following parameters:

- *Principle 1 (Review and Categorization)*: When a project is proposed for financing, the EPFI will, as part of its internal environmental and social review and due diligence, categorize it based on the magnitude of its potential environmental and social risks and impacts. Such screening is based on the environmental and social categorization process of the IFC. Projects are classified, relating to social or environmental impacts, in Category A (significant impacts), Category B (limited impacts) and Category C (minimal or no impacts).
- *Principle 2 (Environmental and Social Assessment)*: For all Category A and Category B Projects, the EPFI will require the client to conduct an assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and impacts of the proposed project (which may include the illustrative list of issues found in Exhibit II to the EPs). The Assessment Documentation should propose measures to minimize, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project.
- *Principle 3 (Applicable Environmental and Social Standards)*: The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI will require that the assessment process evaluates compliance with the applicable standards as follows:

For projects located in Non-Designated Countries, the assessment process evaluates compliance with the then applicable WB Performance Standards and the World Bank Group EHS Guidelines; and
- *Principle 4 (Environmental and Social Management System and Equator Principles Action Plan)*: For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree an Equator Principles Action Plan (AP). The Equator Principles AP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards;
- *Principle 5 (Stakeholder Engagement)*: For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities and, where relevant, Other Stakeholders. For projects with potentially

significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. The client will tailor its consultation process to the risks and impacts of the project, the project's phase of development; the language preferences of the Affected Communities, their decision-making processes and the needs of disadvantaged and vulnerable groups. This process should be free from external manipulation, interference, coercion and intimidation.

To facilitate Stakeholder engagement, the client will, commensurate to the project's risks and impacts, make the appropriate Assessment Documentation readily available to the Affected Communities, and where relevant Other Stakeholders, in the local language and in a culturally appropriate manner.

The client will take account of and document, the results of the Stakeholder Engagement process, including any actions agreed resulting from such process. For Projects with environmental or social risks and adverse impacts, disclosure should occur early in the assessment process, in any event before the project construction commences, and on an ongoing basis.

EPFIs recognize that indigenous peoples may represent vulnerable segments of project affected communities. Projects affecting indigenous peoples will be subject to a process of informed Consultation and Participation, and will need to comply with the rights and protections for indigenous peoples contained in relevant national law, including those laws implementing host country obligations under international law. Consistent with the special circumstances described in WB Performance Standard 7 (when relevant as defined in Principle 3), projects with adverse impacts on indigenous people will require their Free, Prior and informed Consent (FPIC) 3.

- *Principle6 (Grievance Mechanism):* For all Category A and, as appropriate, Category B projects, the EPFI will require the client, as part of the ESMS, to establish a grievance mechanism designed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance.

The grievance mechanism is required to be scaled to the risks and impacts of the project and have Affected Communities as its primary user. It will seek to resolve concerns promptly, using an understandable and transparent consultative process that is culturally appropriate, readily accessible, at no cost, and without retribution to the party that originated the issue or concern. The mechanism should not impede access to judicial or administrative remedies. The client will inform the Affected Communities about the mechanism in the course of the Stakeholder Engagement process.

- *Principle7(Independent Review):* For all Category A and, as appropriate, Category B projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles

compliance. The Independent Environmental and Social Consultant will also propose or opine on a suitable Equator Principles AP capable of bringing the Project into compliance with the Equator Principles, or indicate when compliance is not possible.

- *Principle 8 (Covenants)*: For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects. Furthermore, for all Category A and Category B Projects, the client will covenant the financial documentation:
  - To comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects; and
  - To provide periodic reports in a format agreed with the EPFI (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third-party experts, that i) document compliance with the ESMPs and Equator Principles AP (where applicable), and ii) provide representation of compliance with relevant local, state and host country environmental and social laws, regulations and permits; and
  - To decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan

Where a client is not in compliance with its environmental and social covenants, the EPFI will work with the client on remedial actions to bring the project back into compliance to the extent feasible. If the client fails to re-establish compliance within an agreed grace period, the EPFI reserves the right to exercise remedies, as considered appropriate.

- *Principle 9 (Independent Monitoring and Reporting)*: To assess project compliance with the Equator Principles and ensure ongoing monitoring and reporting after Financial Close and over the life of the loan, the EPFI will, for all Category A and, as appropriate, Category B Projects, require the appointment of an Independent Environmental and Social Consultant, or require that the client retain qualified and experienced external experts to verify its monitoring information which would be shared with the EPFI.
- *Principle 10 (Reporting and Transparency)*: For all Category A and, as appropriate, Category B Projects:
  - The client will ensure that, at a minimum, a summary of the ESIA is accessible and available online; and
  - The client will publicly report GHG emission levels (combined Scope 1 and Scope 2 Emissions) during the operational phase for Projects emitting over 100,000 tons of CO<sub>2</sub> equivalent annually.

## Annex 9: Stakeholder Engagement Plan

### Stakeholder consultation and Participation

Three formal meetings specifically including all categories of stakeholders were held. One large public consultation meeting which included all types of people affected direct and indirectly. Representatives from the project areas, district and local administration, as well as other community representatives including prominent local people, lawyers, journalists, academicians and the representative from Technaf Solartech Energy Limited (TSEL).

The following table shows the type of stakeholders consulted during the study period.

**Table 14.8: List of Stakeholders for information dissemination and disclosure**

| SN. | Stakeholder | Issues and concerns discussed   |
|-----|-------------|---|
| 1   | Ward Member | <p>Nurul Huda<br/>Member<br/>8 no. Ward, Nhilla<br/>Union Parishad<br/>Teknaf, Cox's Bazar</p>  <ul style="list-style-type: none"> <li>✚ As a Member I request you to help the affected people by giving jobs in the power plant. We expect disturb free environment which will be appreciable from us.</li> <li>✚ To provide continuous help to the Mosque, Madrasha and other social institutions</li> <li>✚ To provide first aid and employ a doctor for treatment the affected people</li> <li>✚ To provide clothes to the vulnerable people during winter season</li> <li>✚ To create tree plantation to check the heat</li> <li>✚ Public nuisance should reduce as much as possible</li> <li>✚ To pay the Land lease to the actual land owner</li> <li>✚ Be careful when the heavy vehicle move in the road so that the road structure may not damage</li> </ul> |

|    |                             |   |
|----|-----------------------------|---|
|    |                             | <ul style="list-style-type: none"> <li>✚ The land owner who have lost their total land please provide them by giving a job based on their skill or provide them some fund or training on small enterprise and fund</li> <li>✚ In a nutshell, my request is the company should keep the social environment for living friendly</li> </ul>  |
| 2. | Moin Uddin Memorial College | <p>A N M Touhidul Mashek<br/>Acting Principal<br/>Moin Uddin Memorial College<br/>Alikhali, Teknaf<br/>Mobile: 01816-910883</p>  <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>✚ As the Principal of the Moin Uddin Memorial College which is not very far from it, I request you to keep the heat in limit. We expect disturb free environment which will be appreciable from us.</li> <li>✚ It will be nice place to live in the future and will be a good place to work as there will be many educated person in the project.</li> <li>✚ If possible please take our boys in the work as much as possible</li> <li>✚ We can help you finding the best person as we know the educated ones</li> <li>✚ To create tree plantation to check the heat</li> <li>✚ Public nuisance should reduce as much as possible</li> <li>✚ Be careful when the heavy vehicle move in the road so that the road structure may not damage and if possible please develop the approach road.</li> </ul> <p>In a nutshell, my request is the company should keep the environment for living friendly</p> |

|   |                            |  |  |
|---|----------------------------|--|--|
| 3 | (Community Leader)         | <p>Nurul Huda<br/>President<br/>Leda Camp Bazar Committee, Leda<br/>Teknaf, Cox's Bazar</p> <ul style="list-style-type: none"> <li>✚ As a guardian I request you to help the affected people by giving jobs in the power plant. We expect disturb free environment which will be appreciable from us.</li> <li>✚ To provide continuous help to the Mosque, Madrasha and other social institutions</li> <li>✚ If there's any help then it would be equal for the two ward's population.</li> <li>✚ To provide first aid and employ a doctor for treatment the affected people</li> <li>✚ To provide clothes to the vulnerable people during winter season</li> <li>✚ To create tree plantation to check the heat</li> <li>✚ Public nuisance should reduce as much as possible</li> <li>✚ To pay the Land lease to the actual land owners</li> <li>✚ Be careful when the heavy vehicle move in the road so that the road structure may not damage</li> <li>✚ The land owner who have lost their total land please provide them by giving a job based on their skill or provide them some fund or training on small enterprise and fund</li> </ul> <p>In a nutshell, my request is the company should keep the social environment for living friendly</p> |   |
| 4 | FGD with Salt Farmer Group | <p>Zafor Alom,<br/>Alikhali<br/>Md. Ashraf Ali,<br/>Alikhali<br/>Kader Hoshen,<br/>Alikhali<br/>Golam Azam,<br/>Alikhali<br/>Mohammad<br/>Hossain, Alikhali</p>  |  |

|   |                           |  |
|---|---------------------------|--|
|   |                           | <p>Rashid Ahmed, Alikhali<br/>         Farid Alam, Alikhali<br/>         Badsha Mia, Alikhali<br/>         Foyez Ahmed, Alikhali<br/>         Helal Uddin, Alikhali<br/>         Jamal Ahmed, Alikhali<br/>         Jakir Ahmod, Alikhali<br/>         Hafez Ahmod, Alikhali</p> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>✚ They were very much concern about how they can live in their father resident where they have been living from generation to generation and now it is going to turn into an industrial zone.</li> <li>✚ They make concern about heat which can damage their serene life.</li> <li>✚ Their main concern was that many person become unemployed as they worked in salt field, so if there's any opportunity please take them in your daily works.</li> <li>✚ They want work opportunity in the plant site as the land is getting lower day by day and the amount of production of the land.</li> <li>✚ Meaningful community development in the affected areas was demanded.</li> </ul> |
| 5 | FGD with Landowners Group | <p>Shahjahan, Alikhali<br/>         Nurul Haq, Alikhali<br/>         Ejhar Mia, Alikhali<br/>         Md. Yousuf, Alikhali<br/>         Monsur Rahman, Alikhali<br/>         Liakat Ali, Alikhali<br/>         Showkat Ali, Alikhali<br/>         Mohammad Ali, Alikhali<br/>         Abdur Rahim Shikder, Alikhali<br/>         Jolal Ahmod, Alikhali<br/>         Sorowar Kamal Shikder, Alikhali<br/>         Jashim Uddin, Alikhali<br/>         Sorowar Kamal Shikder, Alikhali</p>   |

|   |                       |  |
|---|-----------------------|--|
|   |                       | <p>Abul Monzur Shikder , Alikhali</p> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>✚ They were very much concern about how they can live in their father resident where they have been living from generation to generation and now it is going to turn into an industrial zone.</li> <li>✚ They asked the authority to keep their land same as before at the end of the contract period.</li> <li>✚ They make concern about heat which can damage their serene life.</li> <li>✚ Their main concern was that many person become unemployed as they worked in salt field, so if there's any opportunity please take them in your daily works.</li> <li>✚ They want work opportunity in the plant site as the land is getting lower day by day and the amount of production of the land.</li> <li>✚ They also urges for the development of a hospital as the plant authority told about that.</li> <li>✚ They also told about the future development of the area which can be circulated as commercial zone.</li> <li>✚ Meaningful community development in the affected areas was demanded.</li> </ul> |
| 6 | FGD with Farmer Group | <p>Md. Ashraf Ali, Alikhali<br/>         Kader Hoshen, Alikhali<br/>         Badsha Mia, Alikhali<br/>         Jakir Ahmod, Alikhali<br/>         Nurul Hakim, Alikhali<br/>         Shahjahan, Alikhali<br/>         Ejhar Mia, Alikhali<br/>         Jashim Uddin, Alikhali<br/>         Ramiz Ahmed, Alikhali<br/>         Md. Rasel, Alikhali<br/>         Farid Alam, Alikhali<br/>         Meher Ali, Alikhali</p>   |

|   |  |   |
|---|--|---|
|   |  | <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>✚ They were very much concern about how they can live in their father resident where they have been living from generation to generation and now it is going to turn into an industrial zone.</li> <li>✚ They make concern about heat which can damage their serene life.</li> <li>✚ They told that it is a good news for them that there's a power plant and it is solar technology.</li> <li>✚ They are also happy as there would a place for community gatherings and a bazar can be formed beside it.</li> <li>✚ Their main concern was that many person become unemployed as they worked in salt field, so if there's any opportunity please take them in your daily works.</li> <li>✚ They want work opportunity in the plant site as the land is getting lower day by day and the amount of production of the land.</li> <li>✚ Meaningful community development in the affected areas was demanded.</li> </ul> |
| 7 | Fire Service and Civil Defense, Cox's Bazar. | <p>Mr. Kiriti Barua<br/>Station Officer (SO)<br/>Fire Service and Civil Defense,<br/>Teknaf, Cox's Bazar<br/>Mobile: 01813-963241</p> <ul style="list-style-type: none"> <li>✚ Hidden point must be installed</li> <li>✚ Water reservation is necessary</li> <li>✚ Hose drill must be installed</li> <li>✚ Extinguisher at around 500m2</li> <li>✚ must be placed with CO, heat detector and other accessories</li> <li>✚ First aid, fix alarm system, PA system, Springer system is needed</li> <li>✚ Every 6 month interval a training to the staff on fire equipment is needed</li> </ul>  |

|  |  |   |  |
|--|--|---|--|
|  |  | <ul style="list-style-type: none"> <li>✚ Self-arrangement of all equipment is the best arrangement</li> <li>✚ Heat detector is needed</li> <li>✚ Panel board system should be installed properly and which will be operational during fire disaster</li> <li>✚ The door should be in two hour protected type</li> <li>✚ Foam tender transit will be needed for the emergency period especially for the power cutting off.</li> <li>✚ A staff training on six moth basis by the fire station is needed.</li> </ul> |  |
|--|--|---|--|

A stakeholder consultation meeting on Social and Environmental Impact Assessment (ESIA) of the Technaf Solartech Energy Limited was organized by BCAS at the plant premise on 3rd October, 2017. Total 24 local people from Alikhali, South Nhilla belonging to different occupational groups (e.g. businessman, service holder, labor, farmer etc.) attended the consultation meeting. The participation list is presented in the following table.

**Table 14.9: List of People who participated in the Consultation Meeting**

| S.N. | Name of the Participant | Area     | Mobile Number | Occupation     |
|------|-------------------------|----------|---------------|----------------|
| 1    | H K Anwar               | Alikhali | 01746458844   | Chairman       |
| 2    | Jamal Hossain           | Alikhali | 01819994172   | Farmer         |
| 3    | Zafor Alam              | Alikhali | 01814480551   | Service Holder |
| 4    | Zakir Ahmed             | Alikhali | 01811821350   | Farmer         |
| 5    | Zafor Alam              | Alikhali | 01829258376   | Farmer         |
| 6    | Rashid Ahmed            | Alikhali | No            | Labour         |
| 7    | Momtaz Hossain          | Alikhali | 01854005702   | Business       |
| 8    | Ejhar Mia               | Alikhali | None          | Farmer         |
| 9    | Kadir Hossain           | Alikhali | None          | Farmer         |
| 10   | Shafiqul Islam Chy.     | Alikhali | 01819519472   | Business       |
| 11   | Ahmad Hossain           | Alikhali | 01876221328   | Business       |
| 12   | Helal Uddin             | Alikhali | 01720298421   | Business       |
| 13   | Ali Hossain             | Alikhali | 01877550891   | Business       |

| <b>S.N.</b> | <b>Name of the Participant</b> | <b>Area</b> | <b>Mobile Number</b> | <b>Occupation</b> |
|-------------|--------------------------------|-------------|----------------------|-------------------|
| 14          | Liakot Ali                     | Alikhali    | 01854425548          | Business          |
| 15          | Ummat Ali                      | Alikhali    | 01748213400          | Farmer            |
| 16          | Nurul Huda                     | Alikhali    | 01883014267          | Farmer            |
| 17          | Dalilur Rahman                 | Alikhali    | 01826577180          | Farmer            |
| 18          | Selim Ullah                    | Alikhali    | 01818416453          | Farmer            |
| 19          | Osman                          | Alikhali    | 01854423300          | Labour            |
| 20          | Rashed                         | Alikhali    | 01715611836          | Farmer            |
| 21          | Md. Rafique                    | Alikhali    | 01715694548          | Farmer            |
| 22          | Dildar Ahmad                   | Alikhali    | 01710807730          | Farmer            |
| 23          | Kamal Uddin                    | Alikhali    | 01820536528          | Business          |
| 24          | Mr. Rafique                    | Alikhali    | 01517385166          | Farmer            |
| 25          | Md. Imtiaz Sharif              | BCAS        | 01716640994          | Service Holder    |
| 26          | Azmari Akhter                  | BCAS        | 01716640994          | Service Holder    |
| 27          | Md. Saifullahil-Azom           | BCAS        | 01717004105          | Service Holder    |
| 28          | Mahmudul Hasan                 | TSEL        | 01618555801          | Service Holder    |
| 29          | Mainul Haque                   | TSEL        | 01684854035          | Service Holder    |
| 30          | Abdullah Al Aziz               | TSEL        | 01812342070          | Service Holder    |

## Stakeholder Engagement Plan

### Introduction

Stakeholders are the entities those have stake or share of a project and who are affected directly or indirectly by a project. Generally individual, group, any organization or community within a particular projects influence area are considered as stakeholders of the project. The World Bank Operational Policies suggests that, the operating company should have a Stakeholder Engagement Plan (SEP) for better development practices.

According to IFC Stakeholder Engagement Practice Book, a good Stakeholder Plan should be:

- ✓ Well targeted towards its stakeholders
- ✓ Should properly inform about the actions and key concerns
- ✓ Gender inclusive that ensures proper participation of women representatives
- ✓ Free from biasness
- ✓ Meaningful to its objectives and strategies
- ✓ Properly documented
- ✓ Continuous

### The Project

Technaf Solartech Energy Limited (TSEL) is developing a 20 MW Solar based plant at Alikhali, South Nhillia, Teknaf, Cox's Bazar. Since the required land for the project was bought from the willing sellers, and the economic use of the land parcels use not that effective, no negative impact has been observed from the view point of the former land owners – rather the landowners have been found be doing better with the money received through selling the lands to TSEL. Since, the land parcels were not productive, there was neither any sharecropper nor any agricultural laborer working in those land parcels. However, the neighboring residents of the plant are going to be affected both during the construction phase due to noise, dust etc. and during operation phase due to noise and emissions. Hence, Good Industrial Practice (GIP) refers that a stakeholder engagement plan is required to minimize or mitigate the adverse impacts of the project stakeholders and the neighboring community.

### Objectives of Stakeholder Engagement Plan

Stakeholder Engagement Plan is considered to be a useful tool for maintaining communications between the project authority and its stakeholders. It will help to improve and facilitate decision making of the local community and will create an atmosphere in such a way so that the stakeholder groups are provided with sufficient opportunities to improve their livelihood.

The objectives for the Stakeholder Engagement Plan should be:

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- ✓ To disseminate the SEP to the community and the stakeholders.
- ✓ To provide a proper guidance for stakeholder engagement in such a way so that it meets the international standards
- ✓ To identify and monitor the project stakeholders through the SEP
- ✓ To identify and resolve the grievances in an efficient way
- ✓ To engage with the stakeholders on community development activities to be executed by TSEL and also on environmental and social issues
- ✓ To establish a respectful and long lasting relationship with the community and stakeholders

### Stakeholder Engagement Process

The following flowchart represents the major components of Stakeholder Engagement Process:



**Figure 14: Flowchart of the major components of Stakeholder Engagement Process**

## **Identification of Stakeholders**

Identification of different level of stakeholders is the primary requirement for the engagement plan. For a large scale project like TSEL there can be different level of stakeholders. From the analysis of project planning, the stakeholders can be classified into the four following categories:

### **Landowners**

As mentioned earlier, the required land for the project was taken as lease from the willing land owners, and the economic use of the land parcels use not that effective, no negative impact has been observed from the view point of the land owners – rather the landowners have been found be doing better with the money received through leasing the lands to TSEL. The land parcels were basically salt fields, in which local day laborers used to work for only three months in a year. About 100 day laborers were employed at the project site formerly. TSEL confirmed engagement of at least 100 local laborers during the whole project tenure

It is to be noted that very few neighboring residents of the plant area are going to be affected during the construction phase due to noise, dust, outsider labor involvement etc. So along with vulnerable households, the neighboring community will also be considered as important stakeholder groups and the early engagement strategy should be applied for them.

### **Interested Group**

Generally, community people including local elites, politicians, civil society, businessmen, sub-contractors or general community representatives will be considered as the interested group of stakeholders.

### **Strategic Partners**

Since the very inception to smooth operational level, this project will engage several types of entities who will work as strategic partners for the project. The major strategic partners for TSEL are:

- ✓ The Engineering, Procurement and Construction (EPC) Contractor (if engaged)
- ✓ Design, Supervision and Monitoring Consultants (if engaged)
- ✓ Social & Environmental Consultants
- ✓ Social & Environmental Monitoring/Auditing Consultants
- ✓ NGOs: Social service delivery (if required)

### **Government Entities**

Government entities include National and Local Government Officials including Teknaf Upazila Parishad, 2 No. (South) Nhilla Union Parishad, Department of Environment, BPDB, REB, Fire Service, Police Stations etc. and different license authorities.

### Stakeholder Profiling

An effective stakeholder engagement plan can be attained when it is properly documented and is aware about each and every individual stakeholder. To do so, profiling of stakeholders can be the key to better SEP. The following template can be used for future level stakeholder profiling.

**Table 14.10: Template of future level stakeholder profiling**

| Type of Stakeholders   | Influence and Risk Level       | Key Information   |            |                  |                   |                     |
|------------------------|--------------------------------|---|------------|------------------|-------------------|---------------------|
| Neighboring Households | <b><i>Influence Level:</i></b> | <b>Name of Household Head:</b>                          |            |                  |                   |                     |
|                        | High                           | Address:  |            |                  |                   |                     |
|                        | Medium                         | Occupation:   |            |                  |                   |                     |
|                        | Low                            | Contact:  |            |                  |                   |                     |
|                        |                                | Engagement Method:<br><i>Socio-Economic Information</i> |            |                  |                   |                     |
|                        | <b><i>Risk Level:</i></b>      | <b>Name of Family Member</b>                            | <b>Age</b> | <b>Education</b> | <b>Occupation</b> | <b>Key Concerns</b> |
|                        | 1   2   3   4   5              |   |            |                  |                   |                     |
| Interested Group       | <b><i>Influence Level:</i></b> | <b>Type of Group:</b>                                   |            |                  |                   |                     |
|                        | High                           | Address:  |            |                  |                   |                     |
|                        | Medium                         | Key Concerns:   |            |                  |                   |                     |
|                        | Low                            | Engagement Method:                                      |            |                  |                   |                     |
|                        |                                |   |            |                  |                   |                     |
| Strategic Partners     | <b><i>Influence Level:</i></b> | <b>Type of Partners:</b>                                |            |                  |                   |                     |
|                        | High                           | Address:  |            |                  |                   |                     |
|                        | Medium                         | Key Concerns:   |            |                  |                   |                     |
|                        | Low                            | Engagement Method:                                      |            |                  |                   |                     |
|                        |                                |   |            |                  |                   |                     |
| Government Entities    | <b><i>Influence Level:</i></b> | <b>Type of Entity:</b>                                  |            |                  |                   |                     |
|                        | High                           | Address:  |            |                  |                   |                     |
|                        | Medium                         | Key Concerns:   |            |                  |                   |                     |
|                        | Low                            | Engagement Method:                                      |            |                  |                   |                     |
|                        |                                |   |            |                  |                   |                     |
|                        | 1   2   3   4   5              |   |            |                  |                   |                     |

### **Disclosure of Project Information**

The main aim of the stakeholder engagement is to disclose project information as clearly as possible. The technical issues should be communicated in a manner that is comprehensible to the stakeholders and should reflect transparency accountability.

### **Consultation and Participation**

World Bank Operational Policy (OP) 4.12 states that, affected persons should be meaningfully consulted and should have opportunities to participate in planning and implementing development programs. So to ensure meaningful consultation, the project will initiate some consultation strategies which may include Focus Group Discussion (FGD), structured and semi structured questionnaire, meeting, Participatory Rural Appraisal (PRA), Rapid Rural Appraisal (RRA), visit, Key Informant Interview (KII), Community Mapping, assessment which will be determined based on the requirements of the Project. Most importantly, proper documentation of the consultation events should be regularly maintained and updated.

### **Negotiation and Partnership**

Good Industrial Practice suggests that, project within a community should be people intensive. Stakeholder's involvement within project by creating opportunities of partnership is required to be considered with great importance. Community Engagement strategies such as engagement of community people as representatives in committees, involvement within various events led by project will enhance peoples right in the decision making process.

### **Grievance Redress Management**

Grievance Redress management is an important task for the implementation of Stakeholder Engagement. From the land lease process, and then construction to operation, various grievances can be raised from the community, particularly for environmental and social aspects. So, to address and resolve grievances properly, the Company should have a Grievance Redress Plan or Mechanism. The plan will describe grievance address procedure, channel of communication, responsible authority to resolve and timeframe for mitigation any grievances which will be raised by the community, will be referred either to Joint Committee for Community Relations (JCCR) or to GRC-Plant based on the type of the grievances. If the GRC-Plant fails to resolve the grievance within one month or deems to transfer, it will be transferred to GRC-Corporate for better outcomes.

### **Preparation and Implementation of Corrective Action Plans**

Corrective Action Plans are the initiatives that take place as an outcome of the consultations and engagement. For TSEL, GRM, Environmental and Social Impact Assessment and Legal Register will be used as guiding documents for making the corrective action plan.

## Monitoring and Reporting

The SEP of TSEL should have provisions of monitoring and reporting of stakeholder engagement activities. The engagement strategies, timeline, stakeholder categories, newly engaged stakeholders, public consultations, and grievance status, major concerns should be properly addressed and outcomes should be documented. In addition to the activities, One Yearly Monitoring Report should be prepared and submitted to the lender/financier mentioning the status and updates of Stakeholder Engagement.

## Responsible Departments/Personnel

Following departments or personnel should be responsible for the implementation of Stakeholder Engagement Plan for TSEL.

TSEL Site Office for Site level assistance or TSEL Corporate Office for corporate level assistance

- ✓ Designated personnel for site level assistance during construction
- ✓ TSEL EHS Personnel for direct engagement
- ✓ Local NGO (if engaged) assigned by TSEL for social service delivery
- ✓ Any other parties assigned by TSEL

The following template will be used for Stakeholder Engagement and will be updated regularly.

**Table 14.11: Stakeholder Engagement Process for Project Affected Household/Groups**

| Stakeholder Type      | Engagement Process/Strategy | Discussed/ Raised Issues | Issues referred to the GRC or JCCR | Action Taken | Timeline |
|-----------------------|-----------------------------|--------------------------|------------------------------------|--------------|----------|
| Landowners            | Meeting                     |                          |                                    |              |          |
|                       | FGD                         |                          |                                    |              |          |
|                       | Personal Interview          |                          |                                    |              |          |
|                       | KII                         |                          |                                    |              |          |
| Neighboring Community | Meeting                     |                          |                                    |              |          |
|                       | FGD                         |                          |                                    |              |          |
|                       | Personal Interview          |                          |                                    |              |          |
|                       | KII                         |                          |                                    |              |          |
| School Authority      | Meeting                     |                          |                                    |              |          |
|                       | FGD                         |                          |                                    |              |          |
|                       | Personal Interview          |                          |                                    |              |          |
|                       | Visit                       |                          |                                    |              |          |

**Table 14.12: Stakeholder Engagement Process for Others**

| Stakeholder Type                  | Engagement Process                   | Discussed/Raised Issues | Action Taken | Timeline |
|-----------------------------------|--------------------------------------|-------------------------|--------------|----------|
| NGO (if engaged)                  | Service Delivery to community people |                         |              |          |
|                                   | Visit to NGO office                  |                         |              |          |
|                                   | Meeting                              |                         |              |          |
| JCCR                              | Meeting                              |                         |              |          |
|                                   | Visit                                |                         |              |          |
| Local Subcontractors (if engaged) | Meeting                              |                         |              |          |
| Local elites /politicians         | FGD                                  |                         |              |          |
|                                   | Meeting                              |                         |              |          |
| Plant staff and workers           | Grievance lodged                     |                         |              |          |
|                                   | Meeting                              |                         |              |          |
|                                   | Plant visit                          |                         |              |          |

### Plan for Further Consultation and Community Participation during Project Implementation

The proposed plan for future public consultations is as follows:

**Table 14.13: The proposed plan for future public consultations**

| Sl No | Phase                 | Issues   | Timeline                             |
|-------|-----------------------|--|--------------------------------------|
| 1     | Detailed/Check survey | Public Meeting and individual affected household survey will be carried out as per the monitoring programs.                                      | In every six month                   |
| 2     | Construction Phase    | Localized group meetings, Distribution of information leaflets and brochures, Public display   | Throughout construction period       |
| 3     | Operation Phase       | Information brochures, Operation field offices in the affected localities, Monitoring and providing response to public enquiries, Press releases | Continuous during Project operations |

## Annex 10: The Topographic Survey Report of the Project Site and Elevation of the Project Command Area

### Landscape and Topography of the Project Site

This area is occupied by permeable silt loam to silty clay loam soils on the ridges and impermeable clays in the basins which are neutral to slightly acidic in reaction. General soil types include predominantly Grey Floodplain soils. Organic matter content is low in ridges and moderate in basins. The Topographic Survey Report of the Project Site and Elevation of the Project Command Area are shown in Figure 15 & Map 14 respectively.

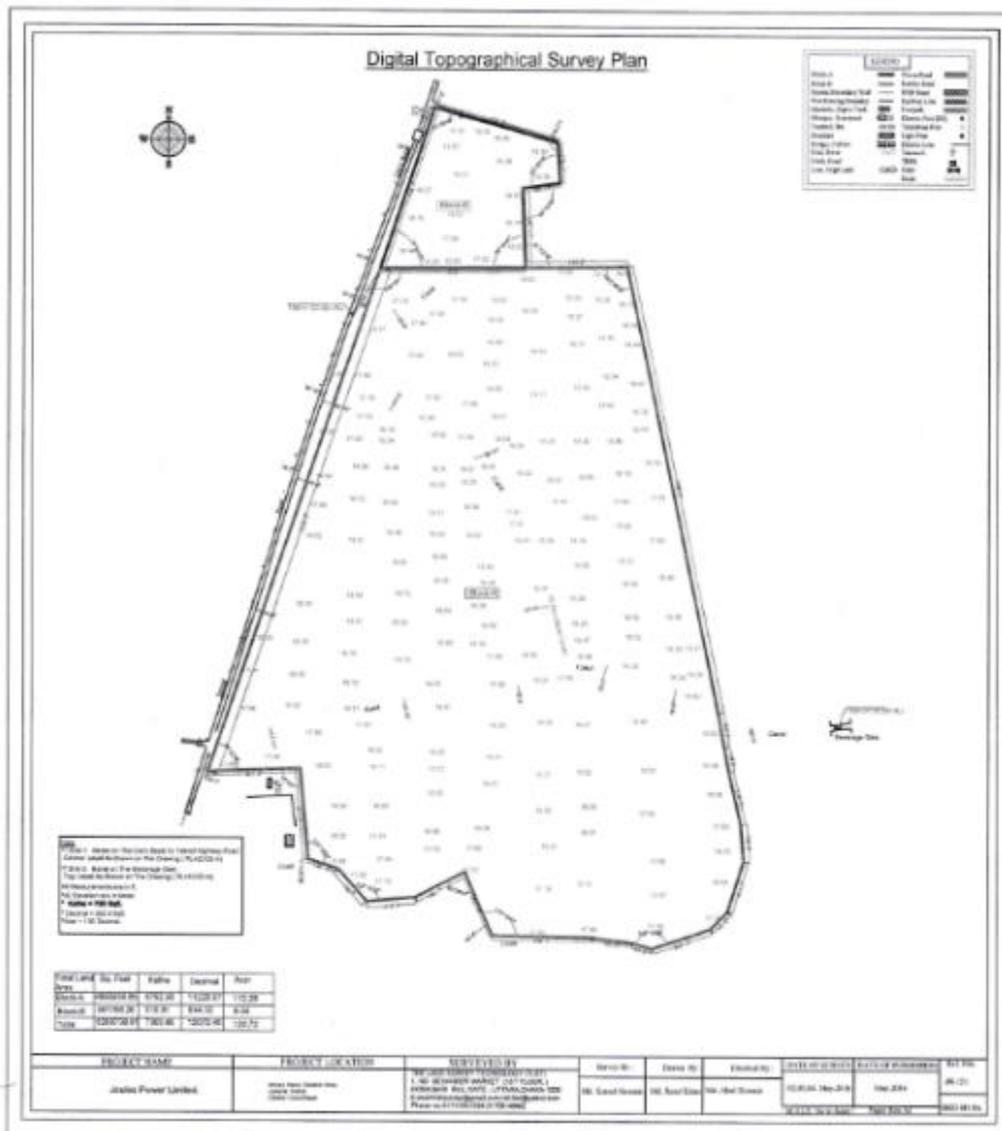
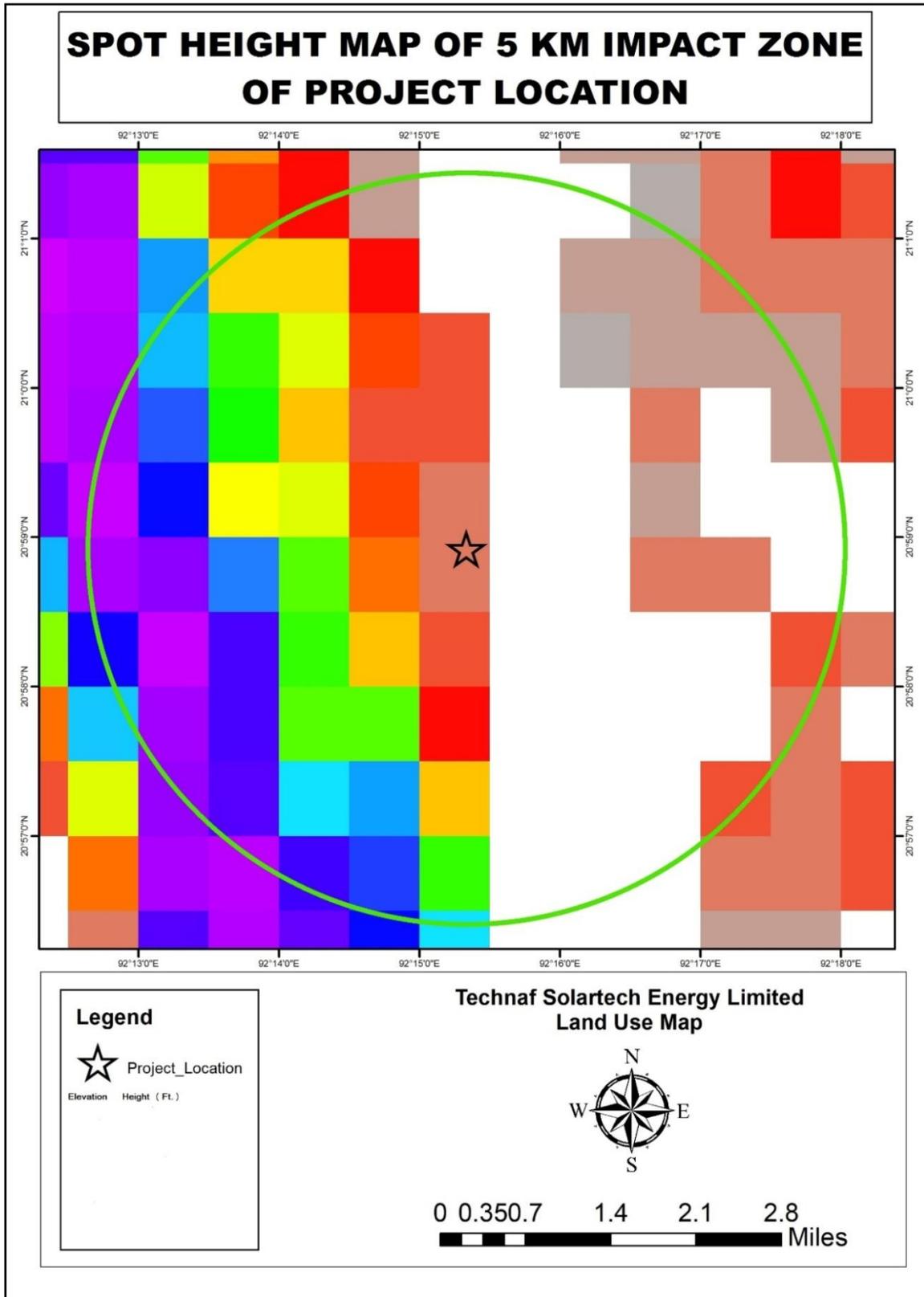


Figure 15: Topographic Survey Report of the Project Site



Map 14: Elevation of the Project Command Area

## Annex 11: Data Collection on Biodiversity within the impact zone of TSEL project

### Terrestrial Flora

The plant species recorded from the impact zone (5 km radius) of the TSEL along with their IUCN status are given in Table 14.14 below:

**Table 14.14: List of Plant Species Recorded from the Impact Zone of the TSEL, Alikhali, South Nhill, Teknaf, Cox's Bazar.**

| No. | Common Name        | Bangla Name    | Scientific Name                 | Type  | IUCN Status* |
|-----|--------------------|----------------|---------------------------------|-------|--------------|
| 1   | Jack Fruit         | Katal          | <i>Artocarpus heterophyllus</i> | Tree  | LC           |
| 2   | Ladies Finger/Okra | Verendi/dheros | <i>Abelmoschus esculentus</i>   | Shrub | LC           |
| 3   | Giant Bulrush      | Kasuru         | <i>Actinoscirpus grossus</i>    | Herb  | LC           |
| 4   | Gum Arabic Tree    | Babla          | <i>Acacia nilotica</i>          | Tree  | LC           |
| 5   | Silk Trees         | Koroi          | <i>Albizia richardiana</i>      | Tree  | LC           |
| 6   | Wood Apple         | Bhel           | <i>Aegle marmelos</i>           | Tree  | LC           |
| 7   | Bombay Hemp        | Agacha         | <i>Agave cantula</i>            | Herb  | LC           |
| 8   | Bailly Great Weed  | Ochunti        | <i>Ageratum conyzoides</i>      | Herb  | LC           |
| 9   | Chinese Evergreens | Pata Bahar     | <i>Aglaonema marantifolium</i>  | Herb  | LC           |
| 10  | Garlic             | Peaj           | <i>Allium sativum</i>           | Herb  | LC           |
| 11  | Giant Taro         | Mankachu       | <i>Alocasia macrorrhizos</i>    | Herb  | LC           |
| 12  | Red Amaranth       | Lal Shak       | <i>Amaranthus gengeticus</i>    | Herb  | LC           |
| 13  | Green Amaranth     | Data Shak      | <i>Amaranthus viridis</i>       | Herb  | LC           |
| 14  | Walking Fern       | Dhekia Shak    | <i>Ampelopteris prolifera</i>   | Herb  | LC           |
| 15  | Pea Nt             | Badam          | <i>Arachis hypogaea</i>         | Herb  | LC           |
| 16  | Betel Palm         | Supari         | <i>Areca catechu</i>            | Tree  | LC           |
| 17  | Monkey Fruit       | Deaua          | <i>Artocarpus lacucha</i>       | Tree  | LC           |
| 18  | Star fruit         | Kamranga       | <i>Averrhoa</i>                 | Tree  | LC           |

| No. | Common Name                        | Bangla Name | Scientific Name                | Type  | IUCN Status* |
|-----|------------------------------------|-------------|--------------------------------|-------|--------------|
|     |                                    |             | <i>carambola</i>               |       |              |
| 19  | Margosa/Neem Tree                  | Neem Tree   | <i>Azadirachta indica</i>      | Tree  | LC           |
| 20  | Burmese Grape                      | Lot-Kon     | <i>Baccaurea ramiflora</i>     | Tree  | LC           |
| 21  | Dwarf Bacoba                       | Brammi      | <i>Bacopa monieri</i>          | Herb  | LC           |
| 22  | Indian Timber Bamboo               | Bash        | <i>Bambusa tulda</i>           | Shrub | LC           |
| 23  | Spinach                            | Pui Shak    | <i>Basella alba</i>            | Herb  | LC           |
| 24  | Ash Gourd/White Gourd/Winter Gourd | Chal Kumra  | <i>Benincasa hispida</i>       | Herb  | LC           |
| 25  | Sugar Palm                         | Tal         | <i>Borassus flabellifer</i>    | Tree  | LC           |
| 26  | Paper Flower                       | Kagoj Phool | <i>Bougainvillea peruviana</i> | Shrub | LC           |
| 27  | Rape                               | Sarisha     | <i>Brassica napus</i>          | Herb  | LC           |
| 28  | Water grass                        | Ghash       | <i>Bulbosatylis barbata</i>    | Herb  | LC           |
| 29  | Cane                               | Beta        | <i>Calamus rotang</i>          | Shrub | LC           |
| 30  | Soap Bush                          | Ghash       | <i>Calibanus hookeri</i>       | Herb  | LC           |
| 31  | Crown Flower                       | Akondo      | <i>Calotropis gigantea</i>     | Shrub | LC           |
| 32  | Chili Peppers                      | Morich      | <i>Capsicum annum</i>          | Shrub | LC           |
| 33  | Pepper                             | Morich      | <i>Capsicum frutescens</i>     | Shrub | LC           |
| 34  | Papaya                             | Pepe        | <i>Carica papaya</i>           | Tree  | LC           |
| 35  | Cassia Tree                        | Minjiri     | <i>Cassia siamea</i>           | Tree  | LC           |
| 36  | Indian Pennywort                   | Thankuni    | <i>Centella asiatica</i>       | Herb  | LC           |
| 37  | Lemon                              | Lebu        | <i>Citrus aurantifolia</i>     | Shrub | LC           |
| 38  | Pomelo                             | Jambura     | <i>Citrus grandis</i>          | Tree  | LC           |
| 39  | Ivy Gourd                          | Telakucha   | <i>Coccinia cordifolia</i>     | Herb  | LC           |
| 40  | Coconut Tree                       | Narikel     | <i>Cocos nucifera</i>          | Tree  | LC           |
| 41  | Garden Croton                      | Pata Bahar  | <i>Codiaeum variegatum</i>     | Shrub | LC           |

| No. | Common Name                   | Bangla Name  | Scientific Name                  | Type  | IUCN Status* |
|-----|-------------------------------|--------------|----------------------------------|-------|--------------|
| 42  | Common Coleus                 | Pata Bahar   | <i>Coleus Scutellarioides</i>    | Herb  | LC           |
| 43  | Taro                          | Kochu        | <i>Colocasia esculenta</i> Black | Herb  | LC           |
| 44  | Taro                          | Kochu        | <i>Colocasia esculenta</i> White | Herb  | LC           |
| 45  | Jute                          | Deshi Pat    | <i>Corchorus capsularis</i>      | Shrub | LC           |
| 46  | Coriander                     | Dhonia       | <i>Coriandrum sativum</i>        | Herb  | LC           |
| 47  | Pumpkin                       | Misti Kumra  | <i>Cucurbita maxima</i>          | Herb  | LC           |
| 48  | Indian Bread Root             | Lata Kosturi | <i>Cullen corylifolium</i>       | Herb  | EN           |
| 49  | Turmeric                      | Holud        | <i>Curcuma longa</i>             | Herb  | LC           |
| 50  | Nabhali                       | Ghash        | <i>Cyanotis cristata</i>         | Herb  | LC           |
| 51  | Bermuda Grass                 | Dūrvā Grass  | <i>Cynodon dactylon</i>          | Herb  | LC           |
| 52  | Flat-Sedge                    | Chanch       | <i>Cyperus compressus</i>        | Herb  | LC           |
| 53  | Thorn Apple                   | Dhutura      | <i>Datura metel</i>              | Shrub | LC           |
| 54  | Elephant Apple                | Chalta       | <i>Dellenia indica</i>           | Tree  | LC           |
| 55  | Royal Poinciana/Flamboyant    | Krisnochura  | <i>Delonix regia</i>             | Tree  | LC           |
| 56  | Malabar Ebony/Pale Moon Ebony | Gaub         | <i>Diospyros perigrina</i>       | Tree  | LC           |
| 57  | Edible Fern                   | Dhekia Shak  | <i>Diplazium esculentum</i>      | Herb  | LC           |
| 58  | Water Hyacinth                | Kochuripana  | <i>Eichhornia crassipes</i>      | Herb  | LC           |
| 59  | Ladyfinger Cactus             | Cactus       | <i>Echinocereus pentalophus</i>  | Herb  | LC           |
| 60  | Cylon Olive/Indian Olive      | Jalpai       | <i>Elaeocarpus robustus</i>      | Tree  | LC           |
| 61  | Chinease Water Chestnut       | Pānaphala    | <i>Eleocharis dulcis</i>         | Herb  | LC           |
| 62  | Long Coriander                | Bon Dhonia   | <i>Eryngium foetidum</i>         | Herb  | NE           |

| No. | Common Name               | Bangla Name     | Scientific Name                 | Type  | IUCN Status* |
|-----|---------------------------|-----------------|---------------------------------|-------|--------------|
| 63  | Gum Trees                 | Eucalyptus      | <i>Eucalyptus camaldulensis</i> | Tree  | NE           |
| 64  | Bean                      | Sheem           | <i>Lablab purpureus</i>         | Herb  | LC           |
| 65  | Bottle Gurd               | Lau             | <i>Lagenaria siceraria</i>      | Herb  | LC           |
| 66  | Wood Apple/Elephant Apple | Bael            | <i>Limonia acidissima</i>       | Tree  | LC           |
| 67  | Tomato                    | Tomato          | <i>Lycopersicon esculentum</i>  | Herb  | LC           |
| 68  | Indian Banyan             | Baut            | <i>Ficus bengalensis</i>        | Tree  | LC           |
| 69  | Hairy Fig/Devil Fig       | Kakdumur/Dumurr | <i>Ficus hispida</i>            | Tree  | LC           |
| 70  | Pipal/Bo-Tree/Peepul Tree | Ashwath/Pipul   | <i>Ficus religiosa</i>          | Tree  | LC           |
| 71  | Jasmine                   | Gandharaj       | <i>Gardenia jasminoides,</i>    | Tree  | LC           |
| 72  | Sunflower                 | Surjamukhi      | <i>Helianthus annuus</i>        | Herb  | LC           |
| 73  | Indian Heliotrope         | Hatisur         | <i>Heliotropium indicum</i>     | Herb  | LC           |
| 74  | China Rose                | Joba            | <i>Hibiscus rissinensis</i>     | Shrub | LC           |
| 75  | False Rubber Tree         | Kurchi          | <i>Holarrhena floribunda</i>    | Tree  | LC           |
| 76  | Water Spinach             | Kolmishak       | <i>Ipomoea aquatica</i>         | Herb  | LC           |
| 77  | Sweet Potato              | Misti Alu       | <i>Ipomoea batatas</i>          | Herb  | LC           |
| 78  | Pink Morning Glory        | Dhol Kolmi      | <i>Ipomoea fistulosa</i>        | Herb  | LC           |
| 79  | West Indian Jasmine       | Rangan          | <i>Ixora chinensis</i>          | Shrub | CD           |
| 80  | Arabian Jasmine           | Beli            | <i>Jasminum duplex</i>          | Shrub | LC           |
| 81  | Gendarussa                | Jagatmadan      | <i>Justicia gendarussa</i>      | Shrub | LC           |
| 82  | Green Kayllinga           | Ghash           | <i>Kayllinga brevifolia</i>     | Herb  | LC           |
| 83  | Henna Tree                | Mehedi          | <i>Lawsonia</i>                 | Shrub | LC           |

| No. | Common Name                             | Bangla Name         | Scientific Name                | Type  | IUCN Status* |
|-----|---|---------------------|--------------------------------|-------|--------------|
|     |   |                     | <i>inermis</i>                 |       |              |
| 84  | Honey weed/Siberian Motherwort          | Roktodron           | <i>Leonurus sibiricus</i>      | Herb  | LC           |
| 85  | Common Leucas                           | Shetodron           | <i>Leucas ciliata</i>          | Herb  | LC           |
| 86  | Litchi/Liechee                          | Litchu              | <i>Litchi chinensis</i>        | Tree  | LC           |
| 87  | Kamala Tree                             | Soto Bura           | <i>Mallotus roxburghianus</i>  | Tree  | LC           |
| 88  | Nodding Malvaviscus                     | Soto Joba           | <i>Malvaviscus arboreus</i>    | Shrub | LC           |
| 89  | Mango Tree                              | Aam                 | <i>Mangifera indica</i>        | Tree  | LC           |
| 90  | Sapodilla/Chiku                         | Sofeda              | <i>Manilkara achras</i>        | Tree  | LC           |
| 91  | Malabar Melastome                       | Bon Tejpata         | <i>Melastoma malabathricum</i> | Herb  | LC           |
| 92  | Lacy Fern                               | Fita Dhekia         | <i>Microlepia speluncea</i>    | Herb  | LC           |
| 93  | Sleepy Plant/Dormilones/Shy Plant       | Lajjabati           | <i>Mimosa Pudica</i>           | Herb  | LC           |
| 94  | Spanish Cherry/ Medlar/Bullet Wood      | Bokul               | <i>Mimusops elengi</i>         | Tree  | LC           |
| 95  | Bitter Melon/Bitter Gourd/Bitter Squash | Karolla/Uchhe/Us ta | <i>Momordica charantia,</i>    | Herb  | LC           |
| 96  | Flowering Banana/Ornamental Banana      | Kala                | <i>Musa ornata</i>             | Tree  | LC           |
| 97  | Banana Plan                             | Kancha Kala         | <i>Musa paradisiaca</i>        | Tree  | LC           |
| 98  | Banana Plant                            | Kala                | <i>Musa sepientum</i>          | Tree  | LC           |
| 99  | Holy Basil                              | Tulshi              | <i>Ocimum sanctum</i>          | Shrub | LC           |
| 100 | Paddy                                   | Dhan                | <i>Oryza sativa</i>            | Herb  | LC           |
| 101 | Creeping Woodsorrel/Sleeping Beauty     | Amrul               | <i>Oxalis corniculata</i>      | Herb  | LC           |
| 102 | Skunkvine/Chinese Fever Vine            | Gandhabhaduli       | <i>Paederia foetida</i>        | Herb  | LC           |

| No. | Common Name                              | Bangla Name             | Scientific Name                | Type  | IUCN Status* |
|-----|--|-------------------------|--------------------------------|-------|--------------|
| 103 | Pepperwort                               | Panimarich              | <i>Persicaria hydropiper</i>   | Herb  | LC           |
| 104 | Chir Pine                                | Pine                    | <i>Pinus longifolia</i>        | Tree  | LC           |
| 105 | Silver Date Palm/Sugar Date Palm         | Khajur/Khejur           | <i>Phoenix sylvestris</i>      | Tree  | LC           |
| 106 | Betel                                    | Pan                     | <i>Piper betle</i>             | Herb  | LC           |
| 106 | Indian Long Pepper                       | Pipul/Pipla             | <i>Piper longam</i>            | Herb  | LC           |
| 108 | Wild Betel                               | Bon Pan                 | <i>Piper sylvaticum</i>        | Herb  | LC           |
| 109 | Knotweed/Knotgrass/Bistort/Tear thumb    | Biskatali/Panimarich    | <i>Polygonum tomentosum</i>    | Herb  | LC           |
| 110 | Frangipani/Red-Jasmine/Temple Tree       | Gorur Champa/Dalan Phul | <i>Plumeria acuminata</i>      | Tree  | LC           |
| 111 | Guava/Lemon Guava                        | Payra                   | <i>Psidium guajava</i>         | Tree  | LC           |
| 112 | Chinese Brake/Chinese Ladder Brake       | Dhekia Shak             | <i>Pteris vittata</i>          | Herb  | LC           |
| 113 | Low Flat-Sedge                           | Ghash                   | <i>Pycnus pumilus</i>          | Herb  | LC           |
| 114 | Cursed Buttercup/Celery-Leaved Buttercup | Palik/Podika/Kan dir    | <i>Ranunculus scleratus</i>    | Herb  | LC           |
| 115 | Rose                                     | Golap                   | <i>Rosa centrifolia</i>        | Shrub | LC           |
| 116 | Rain Tree                                | Rain Tree               | <i>Samanea saman</i>           | Tree  | LC           |
| 117 | Viper's Bowstring Hemp/Snake Plant       | Pata Bahar              | <i>Sansevieria trifasciata</i> | Herb  | NE           |
| 118 | Sugarcane                                | Aakh                    | <i>Saccharum officinarum</i>   | Herb  | CD           |
| 119 | Bur Tree/Canary Wood/Yellow Cheesewood   | Kodom                   | <i>Sarcocephalus cordatus</i>  | Tree  | LC           |
| 120 | Eggplant                                 | Begun                   | <i>Solanum menlongena</i>      | Shrub | LC           |
| 121 | Garden Huckleberry                       | Tit Begun               | <i>Solanum nigrum</i>          | Shrub | LC           |
| 122 | Potato                                   | Alu                     | <i>Solanum tuberosum</i>       | Herb  | LC           |
| 123 | Phakphet                                 | Marhatitiga             | <i>Spilanthes paniculata</i>   | Herb  | LC           |
| 124 | Spinach                                  | Palong Shak             | <i>Spinacia</i>                | Herb  | LC           |

| No. | Common Name                               | Bangla Name             | Scientific Name              | Type  | IUCN Status* |
|-----|---|-------------------------|------------------------------|-------|--------------|
|     |   |                         | <i>oleracea</i>              |       |              |
| 125 | Golden Apples                             | Amra                    | <i>Spondias pinnata</i>      | Tree  | LC           |
| 126 | West Indian Mahogany                      | Mahogany                | <i>Swietenia mahagoni</i>    | Tree  | LC           |
| 127 | Chivit/Civit                              | Civit                   | <i>Swintonia floribunda</i>  | Tree  | LC           |
| 128 | Black Plum                                | Jam                     | <i>Syzygium cumini</i>       | Tree  | LC           |
| 129 | Java Apple/Wax Jambu                      | Jamrul                  | <i>Syzygium samarangense</i> | Tree  | NE           |
| 130 | French Marigold                           | Gada                    | <i>Tagetes patula</i>        | Herb  | LC           |
| 131 | Tamarind                                  | Tetul                   | <i>Tamarindia indica</i>     | Tree  | LC           |
| 132 | Peacock Feathers                          | Thuja                   | <i>Thuja orientalis</i>      | Shrub | LC           |
| 133 | Yellow Or Chebulic Myrobalan              | Horitoki                | <i>Terminalia chebula</i>    | Tree  | LC           |
| 134 | Bengal Arum                               | Ghet Kachu              | <i>Typhonium trilobatum</i>  | Herb  | LC           |
| 135 | Madagascar Periwinkle/Rosy Periwinkle     | Noyon Tara              | <i>Vinca rosea</i>           | Shrub | LC           |
| 136 | Rough Cocklebur/Common Cocklebur          | Ghagra/Lehra/Bic haphal | <i>Xanthium indicum</i>      | Shrub | LC           |
| 138 | Corn                                      | Bhutta                  | <i>Zea mays</i>              | Herb  | CD           |
| 139 | Chinese Date/Chinese Apple/ Indian Jujube | Boroi/Kul               | <i>Zizyphus mauritiana</i>   | Tree  | LC           |

\*LC = Least Concern, NE= Not Evaluated, CD= Conservation Dependent according to IUCN Bangladesh (2000).

### Terrestrial Fauna

There are 42 species of amphibian species, 157 reptilian species, 124 species of mammals and 718 bird species reported from Bangladesh (Khan 2010, Sarker and Sarker 1988). However, in the current study, a total of 9 amphibians, 17 reptiles, 10 mammals and 43 birds were identified in the impact zone of the project.

A total of 9 amphibian species were identified in the present project area (Table 4.3). On the basis of frequency of occurrence or relative abundance, Common Toad, Skipper Frog, Indian Bull Frog and Cricket Frog were commonly (55.55%) found and less common (33.33%)

species were Pierries Cricket Frog, Nepal Cricket Frog etc. Furthermore, Ornate Narrow-mouthed Frog was rare. Species found on the impact areas were Least Concern (LC) on the basis of IUCN-Bangladesh (2000) threatened category. Although Cricket Frogs have not been evaluated by IUCN Bangladesh yet but the species of cricket frog found in the impact areas were not subject to any threats. Table 14.15 depicts the List of Amphibian species identified in the impact zone of the TSEL, Alikhali, South Nhilla, Teknaf, Cox’s Bazar.

**Table 14.15: List of Amphibian species identified in the impact zone of the TSEL, Alikhali, South Nhilla, Teknaf, Cox’s Bazar.**

| No | Order | Family         | Species                           | English Name               | Local Name            | IUCNStatus* |
|----|-------|----------------|-----------------------------------|----------------------------|-----------------------|-------------|
| 1  | Anura | Bufonidae      | <i>Duttaphrynus melanostictus</i> | CommonToad                 | Kuno Bang             | LC          |
| 2  |       | Dicroglossidae | <i>Euphlyctis cyanophylctis</i>   | Skipper Frog               | Kotkoti Bang          | LC          |
| 3  |       |                | <i>Euphlyctis hexadactylus</i>    | Green Frog                 | Sabuj Bang            | EN          |
| 4  |       |                | <i>Fejervarya syhadrensis</i>     | Syhadris Cricket Frog      | Syhadrir Jhijhi Bang  | LC          |
| 5  |       |                | <i>Fejervarya teraiensis</i>      | Terrei Cricket Frog        | Terrei Jhijhi Bang    | NE          |
| 6  |       |                | <i>Fejervarya pierrei</i>         | Pierries Cricket Frog      | Pierrei’s Jhijhi Bang | NE          |
| 7  |       |                | <i>Fejervarya nepalensis</i>      | Nepal cricket frog         | Choto Jhijhi Bang     | NE          |
| 8  |       |                | <i>Hoplobatrachus tigerinus</i>   | Indian BullFrog            | Sona Bang             | NE          |
| 9  |       | Microhylidae   | <i>Microhyla ornata</i>           | Ornate Narrow-mouthed Frog | China Bang            | LC          |

\*VU = Vulnerable; EN = Endangered; CR = Critically Endangered, DD=Data Deficient, NE=Not Evaluated, according to IUCN Bangladesh, 2000.

A total of 17 reptiles species were identified in the present study area (Table 14.16). On the basis of frequency of occurrence or relative abundance Common Garden Lizard, Common skink, Yellow-bellied House Gecko, Bengal Monitor, Common Smooth Water Snake, Checkered Keelback Water Snake, Common Smooth Water Snake and Spectacled Cobra were found as common (41.18%). Among them Tokay Gecko, Oriental Leaf- Toed Gecko,

Common Wolf Snake and Indian Rat Snake/Western Rat Snake were less common species (23.53%). Indian Roofed Turtle, Vine Snake, Striped Keelback, Monocellate Cobra and Common Indian Krait were found as rare species (35.29%). On the other hand, according to IUCN-Bangladesh (2000) Red list Threatened category Monocellate Cobra, Common Indian Krait species were Vulnerable and Common Smooth Water Snake was endangered.

**Table 14.16: List of Reptilian species identified in the impact zone of the TSEL, Alikhali, South Nhill, Teknaf, Cox’s Bazar.**

| No | Order                 | Family                   | Species                   | English Name                     | Local Name                         | IUCN Status*             |    |
|----|-----------------------|--------------------------|---------------------------|----------------------------------|------------------------------------|--------------------------|----|
| 1  | Testudines (Chelonia) | Bataguridae/ Geoemydidae | <i>Pangshura tecta</i>    | Indian Roofed Turtle             | Kori Kaitta                        | LC                       |    |
| 2  | Squamata              | Agamidae                 | <i>Calotes versicolor</i> | Common Garden Lizard             | Roktochusha                        | LC                       |    |
| 3  |                       | Scincidae                | <i>Mabuya carinata</i>    | Common skink                     | Anjon/Anchil                       | LC                       |    |
| 4  |                       | Gekkonidae               |                           | <i>Gekko gekko</i>               | Tokay Gecko                        | Takkok                   | VU |
| 5  |                       |                          |                           | <i>Hemidactylus brookii</i>      | Oriental Leaf-Toed Gecko           | Choto Tiktiki            | LC |
| 6  |                       |                          |                           | <i>Hemidactylus flaviviridis</i> | Yellow-bellied House Gecko         | Goda Tiktiki             | LC |
| 7  |                       |                          |                           | <i>Hemidactylus frenatus</i>     | Common House Lizard                | Dakchara Tiktiki         | LC |
| 8  |                       | Varanidae                |                           | <i>Varanus bengalensis</i>       | Bengal Monitor                     | Painna Shap              | LC |
| 9  |                       | Colubridae               |                           | <i>Ahaetulla nasuta</i>          | Vine Snake                         | Sutanoli Shap            | LC |
| 10 |                       |                          |                           | <i>Amphiesma stolatum</i>        | Striped Keelback                   | Dora-shap                | LC |
| 11 |                       |                          |                           | <i>Enhydryis enhydryis</i>       | Common Smooth Water Snake          | Paina-shap               | EN |
| 12 |                       |                          |                           | <i>Lycodon aulicus</i>           | Common Wolf Snake                  | Shadaraon Gharginni Shap | VU |
| 13 |                       |                          |                           | <i>Xenocrohis piscator</i>       | Checked Keelback Water Snake       | Dhora Shap               | LC |
| 14 |                       |                          |                           | <i>Ptyas mucosus</i>             | Indian Rat Snake/Western Rat Snake | Daraj Shap               | VU |

| No | Order | Family   | Species                   | English Name        | Local Name        | IUCN Status* |
|----|-------|----------|---------------------------|---------------------|-------------------|--------------|
| 15 |       | Elapidae | <i>Naja kaouthia</i>      | Monocellate Cobra   | Gokhra Shap       | VU           |
| 16 |       |          | <i>Naja naja</i>          | Spectacled Cobra    | Khoia Gokhra Shap | VU           |
| 17 |       |          | <i>Bungarus caeruleus</i> | Common Indian Krait | Kalkeotey         | VU           |

\*VU = Vulnerable; EN = Endangered; CR = Critically Endangered, DD=Data Deficient, NE=Not Evaluated, according to IUCN Bangladesh, 2000.

A total of 10 mammalian species were identified in the impact area (Table 14.17). On the basis of frequency of occurrence or relative abundance Bengal Fox, Indian Grey Mongoose and House Rat were commonly (30%) found in the study area. Golden Jackal, Mole Rat, Greater Bandicoot Rat, Indian Flying Fox and Asian House Shrew were not common or less common (50%) in the study area. Rare (20%) species found in this area were Jungle cat and Five-Stripped Palm Squirrel. On the other hand according to IUCN-Bangladesh (2000) Red list Threatened category Jungle Cat categorized as endangered.

**Table 14.17: List of Mammals identified in the impact zone of the TSEL, Alikhali, South Nhilla, Cox's Bazar.**

| No | Order        | Family       | Species                      | English Name                | Local Name           | IUCN Status* |
|----|--------------|--------------|------------------------------|-----------------------------|----------------------|--------------|
| 1  | Carnivora    | Canidae      | <i>Canis aureus</i>          | Golden Jackal               | Pati Shial/<br>Shial | VU           |
| 2  |              |              | <i>Vulpes bengalensis</i>    | Bengal Fox                  | Khek Shial           | VU           |
| 3  |              | Felidae      | <i>Felis chaus</i>           | Jungle cat                  | Ban Biral            | EN           |
| 4  |              | Herpestidae  | <i>Herpestes edwardsi</i>    | Indian Grey Mongoose        | Beji                 | VU           |
| 5  | Rodentia     | Muridae      | <i>Bendicota bengalensis</i> | Mole Rat                    | Indur                | LC           |
| 6  |              |              | <i>Bendicota indica</i>      | Greater Bandicoot Rat       | Dhari indur          | LC           |
| 7  |              |              | <i>Rattus rattus</i>         | House Rat                   | Indur                | LC           |
| 8  |              | Sciuridae    | <i>Funambulus pennanti</i>   | Five-Stripped Palm Squirrel | Katbirali            | LC           |
| 9  | Chiroptera   | Pteropodidae | <i>Pteropus giganteus</i>    | Indian Flying Fox           | Bara badur           | LC           |
| 10 | Soricomorpha | Soricidae    | <i>Suncus murinus</i>        | Asian House Shrew           | Chika                | LC           |

\*VU = Vulnerable; EN = Endangered; CR = Critically Endangered, DD=Data Deficient, NE=Not Evaluated, according to IUCN Bangladesh, 2000.

A total of 39 birds species were found in the project area (Table 14.18). On the basis of frequency of occurrence or relative abundance commonly (66.67%) found species were Red Jungle fowl, Burmes Hoopoe, Common Kingfisher, Pied Kingfisher, Asian Cuckoo, House swift, Rock Pigion, Spotted Dove, Little Cormorant, Great Cormorant, Indian Pond Heron, House Crow, Grey Drongo, White-rumped Shama, Jungle Myna, Common Myna, House sparrow etc. Bar-headed Duck, Red headed Bay Woodpecker, Black-rumped Flameback, Barn Owl, Brahminy Kite, Little erget, Hill Myna and Forest wagtail were not so common or less common (20.51%). Greylag Goose, Black-hooded Orile, Rose-ringed Parakeet, Crested Goshawk and Blue-throated Barbet were found as rare species (12.82%). On the other hand according to IUCN-Bangladesh (2000) Red list Threatened category most of the species found in the impact area were categorized as Least Concern.

**Table 14.18: List of Birds identified in the impact zone of the TSEL, Alikhali, South Nhilla, Cox's Bazar.**

| No | Order         | Family       | Species                              | English Name              | Local Name         | IUCN Status* |
|----|---------------|--------------|--------------------------------------|---------------------------|--------------------|--------------|
| 1  | Galliformes   | Phasianidae  | <i>Gallus gallus</i>                 | Red Junglefowl            | Bon Morog/Murgi    | LC           |
| 2  | Anseriformes  | Anatidae     | <i>Anas poecilorhyncha</i>           | Spotbill Duck             | Pati hans          | LC           |
| 3  |               |              | <i>Anaser indicus</i>                | Bar-headed Duck           | Raj hans           | NE           |
| 4  |               |              | <i>Anaser anser</i>                  | Greylag Goose             | Raj hans           | NE           |
| 5  | Piciformes    | Picidae      | <i>Blythipicus pyrrhotis</i>         | Red headed Bay Woodpecker | Lalmatha kathtokra | LC           |
| 6  |               |              | <i>Chrysocolaptes guttacristatus</i> | Greater Lamback           | Baro-kathtokra     | LC           |
| 7  |               |              | <i>Dinopium bengalensis</i>          | Black-rumped Flameback    | Kathtokra          | NE           |
| 8  |               | Megalaimidae | <i>Megalaima asiatica</i>            | Blue-throated Barbet      | Basanta Bauri      | NE           |
| 9  | Upupiformes   | Upupidae     | <i>Upupa epops</i>                   | Burmes Hoopoe             | Hudhud Pakhi       | LC           |
| 10 | Coraciiformes | Alcedinidae  | <i>Alcedo atthis</i>                 | Common Kingfisher         | Sotto Machhranga   | LC           |
| 11 |               |              | <i>Ceryle rudis</i>                  | Pied                      | Pakra-             | LC           |

| No | Order                    | Family            | Species                        | English Name             | Local Name       | IUCN Status* |
|----|--------------------------|-------------------|--------------------------------|--------------------------|------------------|--------------|
|    |                          |                   |                                | Kingfisher               | Machhrnga        |              |
| 12 | Cuculiformes             | Cuculidae         | <i>Eudynamys scolopaceus</i>   | Asian Cuckoo/Koel        | Kokil            | LC           |
| 13 | Psittaciformes           | Psittacidae       | <i>Psittacula krameri</i>      | Rose-ringed Parakeet     | Tia              | LC           |
| 14 | Apodiformes              | Apodidae          | <i>Apus nipalensis</i>         | House swift              | Ababil           | LC           |
| 15 | Strigiformes             | Tytonidae         | <i>Tyoto alba</i>              | Barn Owl                 | Laxmi Pencha     | NE           |
| 16 | Columbiformes            | Columbidae        | <i>Columba livia</i>           | Rock Pigeon              | Jalali Kobutor   | LC           |
| 17 |                          |                   | <i>Stigmatopelia chinensis</i> | Spotted Dove             | Tila Ghughu      | LC           |
| 18 | Falconiformes            | Accipitridae      | <i>Accipiter trivigathus</i>   | Crested Goshawk          | Baj              | NE           |
| 19 |                          |                   | <i>Haliastur indus</i>         | Brahminy Kite            | Shankho Cheel    | NE           |
| 20 | Podicipediformes         | Phalacrocoracidae | <i>Microcarbo niger</i>        | Little Cormorant         | Paan-Kowri       | LC           |
| 21 |                          |                   | <i>Phalacrocorax carbo</i>     | Great Cormorant          | Brihat Paankowri | LC           |
| 22 |                          | Ardeidae          | <i>Ardeola grayii</i>          | Indian Pond Heron        | Kani Bok         | LC           |
| 23 |                          |                   | <i>Egretta intermedia</i>      | Little egret             | Chhoto Bok       | NE           |
| 24 | Passeriformes            | Corvidae          | <i>Corvus levaillantii</i>     | Jungle Crow              | Daar Kak         | LC           |
| 25 |                          |                   | <i>Corvus splendens</i>        | House Crow               | Pati Kak         | LC           |
| 26 |                          |                   | <i>Oriolus xanthornus</i>      | Black-hooded Oriole      | Holdey Pakhi     | LC           |
| 27 |                          |                   | <i>Dicrurus macrocercus</i>    | Grey Drongo              | Fingey           | LC           |
| 28 |                          | Muscicapidae      | <i>Copsychus malabaricus</i>   | White-rumped Shama       | Shama            | LC           |
| 29 |                          |                   | <i>Copsychus saularis</i>      | Oriental Magpie          | Doel             | LC           |
| 30 |                          | Sturnidae         | <i>Sturnus contra</i>          | Asian Pied Starling/Myna | Go Shalik        | LC           |
| 31 | <i>Sturna malabarica</i> |                   | Chestnut-tailed Starling       | Kath Shalik              | LC               |              |

| No | Order | Family       | Species                      | English Name      | Local Name     | IUCN Status* |
|----|-------|--------------|------------------------------|-------------------|----------------|--------------|
| 32 |       |              | <i>Acridotheres fuscus</i>   | Jungle Myna       | Jhuti Shalik   | LC           |
| 33 |       |              | <i>Acridotheres grandis</i>  | Bank Myna         | Gang Shalik    | LC           |
| 34 |       |              | <i>Acridotheres tristis</i>  | Common Myna       | Bhat Shalik    | LC           |
| 35 |       |              | <i>Gracula religiosa</i>     | Hill Myna         | Moyna          | LC           |
| 36 |       | Pycnonotidae | <i>Pycnonotus cafer</i>      | Red-vented Bulbul | Bangla Bulbuli | LC           |
| 37 |       | Passeridae   | <i>Passer domesticus</i>     | House sparrow     | Chorai         | LC           |
| 38 |       | Ploceidae    | <i>Ploceus philippinus</i>   | Baya Weaver       | Babui          | LC           |
| 39 |       | Motacillidae | <i>Dendronanthus indicus</i> | Forest wagtail    | Bon-Kanjon     | LC           |

\*VU = Vulnerable; EN = Endangered; CR = Critically Endangered, DD=Data Deficient, NE=Not Evaluated, according to IUCN Bangladesh, 2000.

### Aquatic Fauna/Fish

The fish species recorded from the impact zone (5 km radius) of the TSEL along with their IUCN status are given in Table 14.19 below:

**Table 14.19: Fish species identified in the impact zone of the TSEL, Alikhali, South Nhilla, Teknaf, Cox's Bazar.**

|    | Scientific Name  | English/Common Name | Local/Bangla Name | IUCN status* |
|----|--|---------------------|-------------------|--------------|
| 1. | <i>Hypophthalmichthys molitrix</i> (Valenciennes in Cuvier and Valenciennes, 1844) | Silver carp         | Silver carp       | -            |
| 2. | <a href="#"><i>Hypophthalmichthys nobilis</i></a> (Richardson, 1845)               | Bighead carp        | Bighead carp      | -            |
| 3. | <i>Ctenopharyngodon idella</i> (Valenciennes in Cuvier and Valenciennes, 1844)     | Grass carp          | Grass carp        | -            |
| 4. | <i>carpio</i> (Linnaeus, 1758)   | Common carp         | Common carp       | -            |
| 5. | <i>Cyprinus carpio var specularis</i> (Lacepède, 1803)                             | Mirror carp         | Mirror carp       | -            |

|     | Scientific Name   | English/Common Name                          | Local/Bangla Name               | IUCN status * |
|-----|---|--|---------------------------------|---------------|
| 6.  | <i>Oreochromis mossambicus</i> (Peters, 1852)   | Mozambique mouth-breeder                     | Tilapia                         | -             |
| 7.  | <i>Pangasius hypophthalmus</i> (Sauvage, 1878)  |  | Thai pangas                     | -             |
| 8.  | <i>Clarias gariepinus</i> (Burchell, 1822)  |  | African magur                   | -             |
| 9.  | <i>Barbonymus gonionotus</i> (Bleeker, 1850)  |  | Thai sarputi                    | -             |
| 10. | <i>Pisodonophis boro</i> (Hamilton, 1822)   | Rice paddy eel                               | Kharu, Hijra                    | NO            |
| 11. | <i>Congresox telabonoides</i> (Bleeker, 1852)   | Indian pike conger                           | Kamila                          | NO            |
| 12. | <i>Monopterusuchia</i> (Hamilton, 1822)   | Cuchia, Rice eel                             | Kuchia, Kuicha, Kunche          | VU            |
| 13. | <i>Tetraodon cutcutia</i> (Hamilton, 1822)  | Ocellated puffer fish                        | Tepa, potka                     | NO            |
| 14. | <i>Chelanodon patoca</i> (Hamilton, 1822)   | Milk spotted puffer                          | Potka, Fotka                    | NO            |
| 15. | <i>Xenentodon cancila</i> (Hamilton, 1822)  | Freshwater garfish, Silver nneedlefish       | Kakila, Kaikka                  | NO            |
| 16. | <a href="#"><u><i>Hyporhamphus limbatus</i></u></a> (Valenciennes in Cuvier and Valenciennes, 1847) | Congaturi halfbeak                           | Ek Thuita, Ek Thota             | -             |
| 17. | <i>Aplocheilus panchax</i> (Hamilton, 1822)   | Blue Panchax                                 | Techoukka, Kanpona              | NO            |
| 18. | <i>Aplocheilus panchax</i> (Hamilton, 1822)   |  | Bechi, Kanpona                  | DD            |
| 19. | <i>Channa striata</i> (Bloch, 1793)   | Stripped snakehead                           | Shol                            | NO            |
| 20. | <i>Channa marulius</i> (Hamilton, 1822)   | Great snakehead                              | Gajar                           | EN            |
| 21. | <i>Channa punctata</i> (Bloch, 1793)  | Green snakehead                              | Taki, Lata, Lati, Okol, Chaitan | NO            |
| 22. | <i>Channa orientalis</i> (Bloch and Schneider, 1801)  | smooth-breasted snakefish, Walking snakehead | Gachua, Raga, Cheng             | VU            |
| 23. | <i>Securicula gora</i> (Hamilton, 1822)   |  | Ghora chela                     | NO            |
| 24. | <i>Salmostoma phulo</i> (Hamilton, 1822)  | Finescale razorbelly monnow                  | Fulchela                        | NO            |

|     | Scientific Name   | English/Common Name     | Local/Bangla Name                   | IUCN status * |
|-----|---|-------------------------|-------------------------------------|---------------|
| 25. | <i>Salmostoma bacaila</i> (Hamilton, 1822)                | Large razorbelly monnow | Katari, Narkalichela                | NO            |
| 26. | <i>Esomus danricus</i> (Hamilton, 1822)                   | Flying barb             | Dankina, Danrika, Darka, Dadhika    | DD            |
| 27. | <i>Chela cachius</i> (Hamilton, 1822)                     |                         | Chep Chela                          | DD            |
| 28. | <i>Aspidoparia morar</i> (Hamilton, 1822)                 |                         | Morari, Morar                       | DD            |
| 29. | <i>Bengala elanga</i> (Hamilton, 1822)                    | Engala barb             | Along, Sephatia                     | EN            |
| 30. | <i>Rasbora rasbora</i> (Hamilton, 1822)                   | Darkina                 | Gangetic scissortail rasbora        | EN            |
| 31. | <i>Rasbora daniconius</i> (Hamilton, 1822)                | Slender rasbora         | Darkina                             | -             |
| 32. | <i>Barilius barna</i> (Hamilton, 1822)                    |                         | Koksa, Bani koksa                   | DD            |
| 33. | <i>Barilius bendelisis variety cosca</i> (Hamilton, 1822) |                         |                                     | EN            |
| 34. | <i>Danio rerio</i> (Hamilton, 1822)                       |                         | Anju                                | -             |
| 35. | <i>Amblypharyngodon mola</i> (Hamilton, 1822)             | Mola carplet            | Mola, Molongi, Moya                 | NO            |
| 36. | <i>Chagunius chagunio</i> (Hamilton, 1822)                | Chaguni                 | Jarua, Utti                         | DD            |
| 37. | <i>Osteochilus hasseltii</i> (Valenciennes, 1842)         |                         |                                     | -             |
| 38. | <i>Labeo gonius</i> (Hamilton, 1822)                      | Karia labeo             | Ghainna, Goni, Kurchi               | EN            |
| 39. | <i>Labeo calbasu</i> (Hamilton, 1822)                     | Orange fin labeo        | Kalibaus, Baus, Kalia               | EN            |
| 40. | <i>Labeo rohita</i> (Hamilton, 1822)                      |                         | Rui, Rou                            | NO            |
| 41. | <i>Labeo bata</i> (Hamilton, 1822)                        |                         | Bara                                | EN            |
| 42. | <i>Cirrhinus cirrhosus</i> (Bloch, 1795)                  | Mrigal                  | Mrigal, Mirka                       | NO            |
| 43. | <i>Cirrhinus reba</i> (Hamilton, 1822)                    |                         | Bhagna, Raik, Tatkini, Bata, Laacho | VU            |
| 44. | <i>Puntiussarana</i> (Hamilton, 1822)                     | Olive barb              | Sarpunti, Sarnaputi, Saralpunti     | CR            |

|     | Scientific Name                                  | English/Common Name    | Local/Bangla Name                     | IUCN status * |
|-----|--|------------------------|---------------------------------------|---------------|
| 45. | <i>Puntius chola</i> (Hamilton, 1822)            | Swamp barb             | Chala punti                           | NO            |
| 46. | <i>Puntius guganio</i> (Hamilton, 1822)          | Glass barb             | Mola punti                            | NO            |
| 47. | <i>Puntius phutunio</i> (Hamilton, 1822)         | Spotted barb           | Phutani punti                         | NO            |
| 48. | <i>Puntius conchoni</i> (Hamilton, 1822)         | Rosy barb              | Kanchan punti, Taka punti             | NO            |
| 49. | <i>Puntius ticto</i> (Hamilton, 1822)            | Two-spot barb          | Tit punti                             | VU            |
| 50. | <i>Puntius gelius</i> (Hamilton, 1822)           | Golden barb            | Gilipunti                             | DD            |
| 51. | <i>Puntius sophore</i> (Hamilton, 1822)          | Pool barb              | Punti, Jat punti, Vasipunti           | NO            |
| 52. | <i>Puntius terio</i> (Hamilton, 1822)            | Onespot barb           | Teri punti                            | NO            |
| 53. | <i>Gibelion catla</i> (Hamilton, 1822)           | Catla                  | Catla, Katal                          | NO            |
| 54. | <i>Acanthocobitis botia</i> (Hamilton, 1822)     | Mottled loach          | Bilturi, Natwa, Balichata             | -             |
| 55. | <i>Pangio pangia</i> (Hamilton, 1822)            |                        | Panga                                 | NO            |
| 56. | <i>Lepidocephalus guntea</i> (Hamilton, 1822)    | Guntea loach           | Gutum                                 | NO            |
| 57. | <i>Clarias batrachus</i> (Linnaeus, 1758)        | Walking catfish        | Magur                                 | NO            |
| 58. | <i>Wallago attu</i> (Bloch and Schneider, 1801)  | Freshwater shark       | Boal                                  | NO            |
| 59. | <i>Ompok bimaculatus</i> (Bloch, 1794)           | Butter catfish         | Kani pabda, Boali pabda, Pupta, Pafta | EN            |
| 60. | <i>Heteropneustes fossilis</i> (Bloch, 1794)     | Stinging catfish       | Shingi, Shing                         | NO            |
| 61. | <i>Plotosus canius</i> (Hamilton, 1822)          | Grey eel-catfish       | Gang magur                            | VU            |
| 62. | <i>Silonia silonia</i> (Hamilton, 1822)          | Silond catfish         | Shillong                              | EN            |
| 63. | <i>Ailia coila</i> (Hamilton, 1822)              | Gangetic ailia         | Kajuli, Baspata                       | NO            |
| 64. | <i>Pseudeutropius atherinoides</i> (Bloch, 1794) | Indian potasi          | Batasi                                | NO            |
| 65. | <i>Sperata aor</i> (Hamilton, 1822)              | Long whiskered catfish | Ayre                                  | VU            |
| 66. | <i>Sperata seenghala</i> (Sykes, 1839)           | Giant river catfish    | Guizza, Guizza air                    | EN            |
| 67. | <i>Mystus cavasius</i> (Hamilton, 1822)          | Gangetic mystus        | Kabashi-tengra, Golsha-tengra, golsha | VU            |
| 68. | <i>Mystus bleekeri</i> (Day, 1877)               | Day's mystus           | Tengra, Golsha-                       | NO            |

|     | Scientific Name                                | English/Common Name                          | Local/Bangla Name                       | IUCN status * |
|-----|--|--|---|---------------|
|     |  |  | tengra                                  |               |
| 69. | <i>Mystus tengara</i> (Hamilton, 1822)         |  | Bajari-tengra,<br>Ghuitta-tengra        | NO            |
| 70. | <i>Mystus gulio</i> (Hamilton, 1822)           | Long whiskers<br>catfish                     | Nuna-tengra                             | DD            |
| 71. | <i>Gangra viridescens</i> (Hamilton, 1822)     |  | Gang tengra                             | -             |
| 72. | <i>Megalops cyprinoides</i> (Broussonet, 1782) | Indo-pacific tarpon                          |   | DD            |
| 73. | <i>Chitala chitala</i> (Hamilton, 1822)        | Featherback,<br>Clown knife fish             | Chital                                  | EN            |
| 74. | <i>Notopterus notopterus</i> (Pallas, 1769)    | Asiatic knifefish,<br>Bronze feather<br>back | Foli                                    | VU            |
| 75. | <i>Colia dussumieri</i> (Valenciennes, 1848)   | Gold spotted<br>grenadier anchovy            | Olua                                    | -             |
| 76. | <i>Setipinna phasa</i> (Hamilton, 1822)        | Gangetic hairfin<br>anchovy                  | Phasa                                   | NO            |
| 77. | <i>Setipinna taty</i> (Valenciennes, 1848)     | Scaly hairfin<br>anchovy                     | Teli phasa                              | NO            |
| 78. | <i>Gudusia chapra</i> (Hamilton, 1822)         | India river shad                             | Chapila                                 | NO            |
| 79. | <i>Tenualosa ilisha</i> (Hamilton, 1822)       | Hilsa shad                                   | Ilish                                   | NO            |
| 80. | <i>Tenualosa toil</i> (Valenciennes, 1848)     | Toil shad                                    | Chandana                                | NO            |
| 81. | <i>Corica soborna</i> (Hamilton, 1822)         | Ganges river sprat                           | Kachki                                  | NO            |
| 82. | <i>Pellona ditchela</i> (Valenciennes, 1848)   | Indian pellona                               | Choukka                                 | NO            |
| 83. | <i>Nematalosa nasus</i> (Bloch, 1795)          | Bloch's gizzard<br>shad                      | Barang                                  | NO            |
| 84. | <i>Macrognathus aculeatus</i> (Bloch, 1786)    | Elephant trunk<br>fish. Lesser spiny<br>eel  | Tara baim                               | VU            |
| 85. | <i>Mastacembelus armatus</i> (Lacepède, 1800)  | Zig-zag eel, Spiny<br>eel                    | Baim, Bam, Sal<br>baim                  | EN            |
| 86. | <i>Macrognathus pancalus</i> (Hamilton, 1822)  | Indian<br>mastacembelid eel                  | Guchi, Baim,<br>Pankal, turi,<br>Chirka | NO            |
| 87. | <i>Polynemus paradiseus</i> (Linnaeus, 1758)   | Paradise threadfin                           | Tapasi                                  | NO            |

|      | Scientific Name   | English/Common Name         | Local/Bangla Name                                       | IUCN status * |
|------|---|-----------------------------|---|---------------|
| 88.  | <i>Rhinomugil corsula</i> (Hamilton, 1822)                                | Corsula                     | Khorsula, Bata, Khalla, Arwari, Halla, Hira, Khor, Urul | NO            |
| 89.  | <i>Sicamugil cascasia</i> (Hamilton, 1822)                                | Yellow tail mullet          | Kachki  | NO            |
| 90.  | <i>Trichogaster chuna</i> (Hamilton, 1822)                                | Dwarf gourami               | Chuna khailsha  | -             |
| 91.  | <a href="#"><u><i>Colisa fasciata</i></u></a> (Bloch and Schneider, 1801) | Banded gourami              | Khailsha, Khaila, Cheli, Chopra, Khoksa                 | NO            |
| 92.  | <i>Colisa lalia</i> (Hamilton, 1822)                                      | Doarf gourami               | Lal Khailsha, Boicha, Ranga Khailsha                    | NO            |
| 93.  | <i>Ctenops nobilis</i> (McClelland, 1844)                                 | Frail gourami               | Neftani   | EN            |
| 94.  | <i>Pseudosphromenus cupanus</i> (Cuvier and Valenciennes, 1831)           | Spike tail paradise fish    | Koi bandi   | -             |
| 95.  | <i>Anabas testudineus</i> (Bloch, 1792)                                   | Climbing perch              | Koi   | NO            |
| 96.  | <i>Eleotris lutea</i> (Day, 1878)   | Lutea sleeper               | Kuli  | NO            |
| 97.  | <i>Eleotris fusca</i> (Bloch and Schneider, 1801)                         | Dusky sleeper               | Kuli, Budh Bailla                                       | NO            |
| 98.  | <i>Pseudapocryptes elongates</i> (Cuvier, 1816)                           |                             | Chewa, Chiring  | -             |
| 99.  | <i>Apocryptes bato</i> (Hamilton, 1822)                                   |                             | Chiring   | NO            |
| 100. | <i>Parapocryptes batoides</i> (Day, 1878)                                 |                             | Dali chewa  | NO            |
| 101. | <i>Boleophthalmus boddari</i> (Pallas 1770)                               | Bodddart's goggle-eyed goby | Dahuk   | NO            |
| 102. | <i>Periophthalmus koelreuteri</i> (Pallas, 1770)                          |                             | Dahuk   | NO            |
| 103. | <i>Periophthalmodon schlosseri</i> (Pallas, 1770)                         |                             | Dahuk   | NO            |
| 104. | <i>Glossogobius giuris</i> (Hamilton, 1822)                               | Tank goby                   | Bele, Bailla  | NO            |
| 105. | <i>Odontamblyopus rubicundus</i> (Hamilton, 1822)                         |                             | Lal chewa   | NO            |
| 106. | <i>Platycephalus indicus</i> (Linnaeus, 1758)                             |                             | Mur bailla  | DD            |
| 107. | <a href="#"><u><i>Sillaginopsis panijus</i></u></a> (Hamilton,            | Flathead sillago            | Tular dandi   | NO            |

|      | Scientific Name                               | English/Common Name | Local/Bangla Name                | IUCN status * |
|------|---|---------------------|----------------------------------|---------------|
|      | 1822)   |                     |                                  |               |
| 108. | <i>Nandus nandus</i> (Hamilton, 1822)         |                     | Meni, Bheda                      | VU            |
| 109. | <i>Badis badis</i> (Hamilton, 1822)           |                     | Koi Bandi                        | EN            |
| 110. | <i>Otolithoides pama</i> (Hamilton, 1822)     |                     | Poa                              | -             |
| 111. | <i>Johnius coitor</i> (Hamilton, 1822)        |                     | Koitor                           | NO            |
| 112. | <i>Panna microdon</i> (Bleeker, 1849)         | Panna croaker       |                                  | -             |
| 113. | <i>Pseudambassis ranga</i> (Hamilton, 1822)   | Indian glass fish   | Chanda, Ranga-chanda, Lal chanda | VU            |
| 114. | <i>Pseudambassis baculis</i> (Hamilton, 1822) |                     | Chanda                           | DD            |

\*Status DD=data deficient, CR=critically endangered, EN= endangered, VU= vulnerable and NO=not threatened are based on IUCN Bangladesh, 2000.

## Annex 12: Wind Speed and Directions

The maximum wind speed varies from 86 and 98 knots (Meteorological Department). The prevailing wind direction is south and south-east in most part of the year. The following table shows the round year wind speed and its directions for the year of 2012-2016:

**Table 14.20: Wind Speed And Its Directions For The Year Of 2015-2019**

| Months     | 2016               |                | 2015               |                | 2014               |                | 2013               |                | 2012               |                |
|------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|--------------------|----------------|
|            | wind Speed (Knots) | Wind Direction |
| <b>Jan</b> | 2.2                | West           | 2.3                | West           | 2.8                | North - West   | 3.3                | North          | 3.2                | North          |
| <b>Feb</b> | 3.1                | West           | 3.2                | West           | 3.2                | West           | 3.4                | North          | 3.3                | North          |
| <b>Mar</b> | 2.2                | South          | 2.3                | South          | 3.7                | South          | 3.5                | South          | 3.6                | South          |
| <b>Apr</b> | 2.5                | South          | 2.4                | South          | 4.4                | South          | 3.6                | South          | 3.4                | South          |
| <b>May</b> | 2.4                | South          | 2.5                | South          | 3.2                | South          | 3.5                | South          | 3.6                | South          |
| <b>Jun</b> | 3.1                | South          | 3.2                | South          | 3.1                | South          | 3.3                | South          | 3.4                | South          |
| <b>Jul</b> | 2.2                | South-East     | 2.3                | South-East     | 2.3                | South          | 3.4                | South          | 3.3                | South          |
| <b>Aug</b> | 2.4                | South-East     | 2.2                | South-East     | 2.1                | South          | 2.6                | South          | 2.6                | South          |
| <b>Sep</b> | 2.2                | South-East     | 2.5                | South-East     | 2.5                | South-East     | 2.7                | South          | 2.5                | South          |
| <b>Oct</b> | 2.0                | North- West    | 2.6                | North- West    | 2.0                | North-East     | 2.6                | North-East     | 2.6                | North-East     |
| <b>Nov</b> | 2.3                | West           | 2.4                | West           | 2.8                | North          | 2.5                | North-East     | 2.7                | North-East     |
| <b>Dec</b> | 2.2                | South-East     | 2.5                | South-East     | 2.2                | North          | 3.6                | West           | 3.3                | West           |

## Annex 13: Ambient Air Temperature

In the summer (April to September) the temperature of the country varies with the amount of rainfall. During this period maximum temperature raise 39.6 degree Celsius which was observed in April 2009 where the average minimum temperature was 8.2 degree Celsius in January 2012. The following table shows the month-wise mean, maximum and minimum temperature for the year of 2007-2016.

Table 14.21: The Month-Wise Mean, Maximum And Minimum Temperature For The Year Of 2007-2016

| Year | Parameters     | Months     |       |       |       |       |       |       |       |       |       |       |       |
|------|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|      |                | Jan        | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   |
| 2016 | Mean temp (°C) | 12.4       | 18.4  | 20.9  | 24.8  | 25.9  | 23.1  | 26.6  | 25.5  | 26.8  | 25.6  | 18.9  | 17.8  |
|      | Max temp (°C)  | 25.3       | 31.2  | 33.2  | 33.7  | 33.7  | 32.3  | 32.3  | 32.5  | 31.9  | 32.2  | 29.6  | 26.8  |
|      | Min temp (°C)  | 15.32      | 23.4  | 23.23 | 19.32 | 26.34 | 26.43 | 23.33 | 32.43 | 26.43 | 24.3  | 23.44 | 23.44 |
| 2015 | Mean temp (°C) | 25.3       | 23.4  | 23.23 | 19.32 | 26.34 | 26.43 | 23.33 | 32.43 | 26.43 | 24.3  | 23.44 | 23.44 |
|      | Max temp (°C)  | 32.1       | 31.2  | 33.2  | 33.7  | 33.7  | 32.3  | 32.3  | 32.5  | 31.9  | 32.2  | 29.6  | 26.8  |
|      | Min temp (°C)  | 15.32      | 19.4  | 21.9  | 23.8  | 24.9  | 26.1  | 26.6  | 26.5  | 25.8  | 24.6  | 19.9  | 15.8  |
| 2014 | Mean temp (°C) | 22.4       | 24.45 | 24.55 | 26.43 | 24.44 | 25.43 | 23.45 | 24.33 | 25.4  | 23.45 | 18.12 | 19.55 |
|      | Max temp (°C)  | 24.5       | 29.1  | 32.2  | 34.4  | 33.2  | 33.4  | 31.4  | 32    | 32.7  | 30.5  | 29    | 27    |
|      | Min temp (°C)  | 14.1       | 18.3  | 22.4  | 24.1  | 24.2  | 26.8  | 25.8  | 26.6  | 26    | 24.3  | 19.8  | 15.6  |
| 2013 | Mean temp (°C) | 14.5       | 19.8  | 25.6  | 28.3  | 28.8  | 28.8  | 29.6  | 29.5  | 28.8  | 26.9  | 23.1  | 17.8  |
|      | Max temp (°C)  | 29         | 34.2  | 37.3  | 37.9  | 36.9  | 35.8  | 35.1  | 35.1  | 34    | 35.7  | 33.2  | 29.7  |
|      | Min temp (°C)  | 9.6        | 12    | 18.4  | 20.8  | 21.3  | 23.2  | 25.3  | 25    | 24.8  | 21.5  | 16.6  | 11    |
| 2012 | Mean temp (°C) | 14.2       | 19.8  | 24    | 26.4  | 27.6  | 29.1  | 29.2  | 29    | 29    | 27.4  | 21.9  | 16.8  |
|      | Max temp (°C)  | 27.8       | 31    | 34.5  | 35.8  | 35.3  | 36    | 35.4  | 35    | 36.2  | 34.5  | 32.4  | 30    |
|      | Min temp (°C)  | <b>8.2</b> | 13    | 16    | 20.2  | 21.3  | 23.2  | 23.9  | 24.5  | 23.7  | 22    | 17.2  | 11    |

| Year | Parameters     | Months |       |       |       |       |       |       |       |       |       |       |        |
|------|----------------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
|      |                | Jan    | Feb   | Mar   | Apr   | May   | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec    |
| 2011 | Mean temp (°C) | 15.6   | 19.2  | 23.2  | 26.7  | 29.3  | 28.5  | 28.5  | 29.3  | 28.3  | 26.8  | 23.1  | 17.4   |
|      | Max temp (°C)  | 28.8   | 30.8  | 36.7  | 35.9  | 37.5  | 35.9  | 34.8  | 35.9  | 34.9  | 35.6  | 31.8  | 28.2   |
|      | Min temp (°C)  | 9.6    | 12.6  | 15    | 18.1  | 22.3  | 22    | 23.4  | 24.2  | 24.5  | 19.5  | 16.8  | 11.3   |
| 2010 | Mean temp (°C) | 16.7   | 18    | 24.3  | 27    | 27.9  | 28.4  | 28.8  | 28.6  | 28.7  | 26.3  | 22.1  | 19.1   |
|      | Max temp (°C)  | 29     | 30.6  | 34.6  | 36.9  | 36.7  | 35.4  | 34    | 36    | 34.8  | 34.8  | 32.3  | 29     |
|      | Min temp (°C)  | 10.5   | 10.8  | 16.5  | 19.6  | 20.3  | 22.5  | 24.6  | 23.6  | 24.4  | 18    | 16.3  | 13     |
| 2009 | Mean temp (°C) | 17     | 20.4  | 23.9  | 27.2  | 27.6  | 29.8  | 29.6  | 28.9  | 29.3  | 26.5  | 22.2  | 17.3   |
|      | Max temp (°C)  | 28.1   | 33.9  | 36    | 36.6  | 37.8  | 36.5  | 35.7  | 34.3  | 35.3  | 35.8  | 33.9  | 29     |
|      | Min temp (°C)  | 11.1   | 12.2  | 15.8  | 20.4  | 21.6  | 22.6  | 24.4  | 24.3  | 24.5  | 20.6  | 15.2  | 11.4   |
| 2008 | Mean temp (°C) | 22.4   | 24.45 | 24.55 | 26.43 | 24.44 | 25.43 | 23.45 | 24.33 | 25.4  | 23.45 | 18.12 | 19.55  |
|      | Max temp (°C)  | 24.5   | 29.1  | 32.2  | 34.4  | 33.2  | 33.4  | 31.4  | 32    | 32.7  | 30.5  | 29    | 27     |
|      | Min temp (°C)  | 14.1   | 18.3  | 22.4  | 24.1  | 24.2  | 26.8  | 25.8  | 26.6  | 26    | 24.3  | 19.8  | 15.6   |
| 2007 | Mean temp (°C) | 15.32  | 23.4  | 23.23 | 19.32 | 26.34 | 26.43 | 23.33 | 32.43 | 26.43 | 24.3  | 23.44 | 523.44 |
|      | Max temp (°C)  | 25.3   | 31.2  | 33.2  | 33.7  | 33.7  | 32.3  | 32.3  | 32.5  | 31.9  | 32.2  | 29.6  | 26.8   |
|      | Min temp (°C)  | 13.4   | 19.4  | 21.9  | 23.8  | 24.9  | 26.1  | 26.6  | 26.5  | 25.8  | 24.6  | 19.9  | 15.8   |

Source: BMD

The monthly average temperature variation in Cox's Bazar District has remained largely uniform over the last 10 years. There have been hotter days in some years but it had negligible effect on the average the temperature over this period. Therefore, constancy of the ambient temperature is crucial for fixing the design of the generators whose efficiency depends on ambient temperature and the design of the radiative cooling design.

**Annex 14: Estimation of GHG emission using IFC CEET**

**Estimation of GHG emission using IFC CEET**

Carbon Emissions Estimator Tool (CEET) by IFC is a tool to estimate the GHG emission from a particular project. Here Emission factors from IFC CEET Worksheets has been shown.

| Emission Factors and Data References        |   |   |   |                                       |
|---|---|---|---|---------------------------------------|
| CO2 Emissions per kWh of Electricity (2013) | All Fuels<br>grammes CO2<br>per kWh (2010*) | Coal/Peat<br>grammes CO2<br>per kWh (2010*) | Int'l Oil<br>grammes CO2<br>per kWh (2010*) | Gas<br>grammes CO2<br>per kWh (2010*) |
| Region/Country/Economy                      |   |   |   |                                       |
| -----                                       |   |   |   |                                       |
| Bangladesh                                  | 563.5166                                    | 1062.0321                                   | 1118.3194                                   | 537.1423                              |
| Brunei Darussalam                           | 716.7452                                    | 0.0000                                      | 858.1081                                    | 715.7151                              |
| Cambodia                                    | 792.6847                                    | 1046.2941                                   | 840.2986                                    | 0.0000                                |
| Chinese Taipei                              | 600.9449                                    | 885.3444                                    | 838.9222                                    | 426.2636                              |
| India                                       | 855.8419                                    | 1171.3906                                   | 1574.3378                                   | 404.4313                              |
| Indonesia                                   | 754.5699                                    | 1064.8256                                   | 758.4815                                    | 519.8990                              |
| DPR of Korea                                | 475.2670                                    | 1207.5764                                   | 1380.2603                                   | 0.0000                                |
| Malaysia                                    | 687.7879                                    | 953.3177                                    | 693.1484                                    | 550.9623                              |
| Mongolia                                    | 836.5729                                    | 827.0073                                    | 1022.1359                                   | 0.0000                                |
| Myanmar                                     | 254.8219                                    | 1238.6411                                   | 793.7143                                    | 724.9477                              |
| Nepal                                       | 1.0223                                      | 0.0000                                      | 1128.6667                                   | 0.0000                                |
| Pakistan                                    | 409.1106                                    | 2459.4583                                   | 705.2390                                    | 540.5872                              |
| Philippines                                 | 491.5298                                    | 952.8501                                    | 743.5018                                    | 354.5017                              |
| Singapore                                   | 499.7532                                    | 0.0000                                      | 720.6493                                    | 444.4474                              |
| Sri Lanka                                   | 469.2436                                    | 1033.9595                                   | 751.2078                                    | 0.0000                                |
| Thailand                                    | 521.9393                                    | 1012.1621                                   | 682.4282                                    | 420.1688                              |
| Vietnam                                     | 428.5934                                    | 987.6144                                    | 846.9674                                    | 409.3029                              |
| Other Asia                                  | 315.0475                                    | 980.1560                                    | 952.1636                                    | 502.1898                              |
| Asia  | 706.6864                                    | 1103.3703                                   | 833.1365                                    | 454.4685                              |
| -----                                       |   |   |   |                                       |

## Annex 15: Operation and Maintenance (O&M) Activities of Solar PV Plant

It is important to define the parameters for the operation and maintenance of a PV project during its life. These conditions must, as a minimum, cover the maintenance requirements.

Maintenance can be broken down as follows:

- ***Scheduled or preventative maintenance*** – Planned in advance and aimed at preventing faults from occurring, as well as keeping the plant operating at its optimum level.
- ***Unscheduled maintenance*** – Carried out in response to failures.

### **Scheduled/Preventative Maintenance**

The scheduling and frequency of preventative maintenance is dictated by a number of factors. These include the technology selected, environmental conditions of the site, warranty terms and seasonal variances. The scheduled maintenance is generally carried out at intervals planned in accordance with the manufacturers' recommendations, and as required by the equipment warranties. Scheduled maintenance should be conducted during non-peak production periods and, where possible, at night.

Although scheduled maintenance will both maximize production and prolong the life of the plant, it does represent a cost to the project. Therefore, the aim should be to seek the optimum balance between cost of scheduled maintenance and increased yield through the life of the system.

Specific scheduled maintenance tasks are detailed out in the following table:

**Table 14.22: Specific Scheduled Maintenance Task Details**

| Tasks                           | Description  |
|---------------------------------|--|
| Module Cleaning                 | <ul style="list-style-type: none"> <li>• The frequency of module cleaning will depend on local site conditions (for example, prevalence of dust or rain) and the time of year. However, it is generally recommended to clean the modules at least twice annually.</li> <li>• When scheduling module cleaning, consideration should be given to the following:               <ul style="list-style-type: none"> <li>✦ Environmental and human factors (for instance, autumn fall debris and soiling from local agricultural activities)</li> <li>✦ Weather patterns: cleaning during rainy periods is less likely to be required.</li> <li>✦ Site accessibility based upon weather predictions</li> <li>✦ Availability of water and cleaning materials</li> </ul> </li> <li>• If the system efficiency is found to be below the expected efficiency, then module cleaning should be scheduled as necessary. The benefit of cleaning should be seen in an improved performance ratio due to the lower soiling loss—and resultant increase in revenue.</li> </ul> |
| Module Connection Integrity     | <ul style="list-style-type: none"> <li>• Checking module connection integrity is important for systems that do not have string level monitoring. This is more likely for central inverter systems for which no string monitoring at the junction/combiner boxes has been designed.</li> <li>• In such cases, faults within each string of modules may be difficult to detect. Therefore, the connections between modules within each string should be checked periodically (this may include measuring the string current).</li> </ul>   |
| Junction or String Combiner Box | <ul style="list-style-type: none"> <li>• All junction boxes or string combiner boxes should be checked periodically for water ingress, dirt or dust accumulation and integrity of the connections within the boxes. Loose connections could affect the overall performance of the PV plant. Any accumulation of water, dirt or dust could cause corrosion or short circuit within the junction box.</li> <li>• Where string level monitoring is not used, periodic checks on the integrity of the fuses in the junction boxes, combiner boxes and, in some cases, the module connection box should be conducted.</li> </ul>  |
| Hot Spots                       | <ul style="list-style-type: none"> <li>• Potential faults across the PV plant can often be detected through thermography. This technique helps identify weak and loose connections in junction boxes and inverter connections. It can also detect hot spots within inverter components and along strings of modules that are not performing as expected.</li> <li>• Thermography should be conducted by a trained specialist using a thermographic camera.</li> </ul>  |

| Tasks                | Description   |
|----------------------|---|
| Inverter Servicing   | <ul style="list-style-type: none"> <li>• Generally, inverter faults are the most common cause of system downtime in PV power plants. Therefore, the scheduled maintenance of inverters should be treated as a centrally important part of the O&amp;M strategy.</li> <li>• The maintenance requirements of inverters vary with size, type and manufacturer. The specific requirements of any particular inverter should be confirmed by the manufacturer and used as the basis for planning the maintenance schedule.</li> <li>• The annual preventative maintenance for an inverter should, as a minimum, include:               <ul style="list-style-type: none"> <li>✦ Visual inspections&amp;Cleaning/replacing cooling fan filters</li> <li>✦ Removal of dust from electronic components</li> <li>✦ Tightening of any loose connections</li> <li>✦ Any additional analysis and diagnostics recommended by the manufacturer</li> </ul> </li> </ul> |
| Structural Integrity | <ul style="list-style-type: none"> <li>• The module mounting assembly, cable conduits and any other structures built for the PV plant should be checked periodically for mechanical integrity and signs of corrosion.</li> <li>• This will include an inspection of support structure foundations for evidence of erosion from water run-off.</li> </ul>  |
| Tracker Servicing    | <ul style="list-style-type: none"> <li>• Tracking systems also require maintenance checks. In general, the checks will include inspection for wear and tear on the moving parts, servicing of the motors or actuators, checks on the integrity of the control and power cables, servicing of the gearboxes and ensuring that the levels of lubricating fluids are suitable.</li> <li>• The alignment and positioning of the tracking system should also be checked to ensure that it is functioning optimally. Sensors and controllers should be checked periodically for calibration and alignment.</li> </ul>   |
| Balance of Plant     | <ul style="list-style-type: none"> <li>• The remaining systems within a PV power plant, including the monitoring and security systems, auxiliary power supplies, and communication systems should be checked and serviced regularly.</li> <li>• Communications systems within the PV power plant and to the power plant should be checked for signal strength and connection.</li> </ul>  |
| Vegetation Control   | <ul style="list-style-type: none"> <li>• Vegetation control and ground keeping are important scheduled tasks for solar PV power plants since there is a strong likelihood for vegetation (for example, long grass, trees or shrubs) to shade the modules.</li> <li>• The ground keeping can also reduce the risk of soiling (from leaves, pollen or dust) on the modules.</li> </ul>  |

## Unscheduled Maintenance

Unscheduled maintenance is carried out in response to failures. As such, the key parameter when considering unscheduled maintenance is diagnosis, speed of response and repair time. Although the shortest possible response is preferable for increasing energy yield, this should be balanced against the likely increased contractual costs of shorter response times. Depending on the type of fault, an indicative response time may be within 48 hours, with liquidated damages if this limit is exceeded.

The majority of unscheduled maintenance issues are related to the inverters. This can be attributed to their complex internal electronics, which are under constant operation. Depending on the nature of the fault, it may be possible to rectify the failure remotely – this option is clearly preferable if possible.

Other common unscheduled maintenance requirements include:

- ✚ Tightening cable connections that have loosened.
- ✚ Replacing blown fuses.
- ✚ Repairing lightning damage.
- ✚ Repairing equipment damaged by intruders or during module cleaning.
- ✚ Rectifying SCADA faults.
- ✚ Repairing mounting structure faults.
- ✚ Rectifying tracking system faults.

## Spares

In order to facilitate a rapid response, a suitably stocked spares inventory is essential. The numbers of spares required will depend on the size of the plant and site-specific parameters. Adequate supplies of the following components should be held:

- ✚ Mounting structure pieces.
- ✚ Junction/combiner boxes.
- ✚ Fuses.
- ✚ DC and AC cabling components.
- ✚ Communications equipment.
- ✚ Modules (in case of module damage).
- ✚ Spare inverters (if string inverters are being used).
- ✚ Spare motors, actuators and sensors should also be kept where tracking systems are used.

It is important that spares stock levels are maintained. Therefore, when some spares are been used, the stocks should be replenished as soon as possible. This arrangement will reduce the time gap between the identification of the fault and replacement of the nonoperational component. This can be of particular relevance for remote locations with poor accessibility and adverse weather conditions. Consultation with manufacturers to detail the spare parts inventory, based upon estimated component lifetimes and failure rates, is recommended.

### **Performance Monitoring, Evaluation and Optimization**

To optimize system performance, there is a need to ensure that the plant components function efficiently throughout the lifetime of the plant. Continuous monitoring of PV systems is essential to maximize the availability and yield of the system. A SCADA system is able to monitor the real-time efficiency and continuously compare it with the theoretical efficiency to assess if the system is operating optimally.

**Annex 16: Labor Assessment Report**

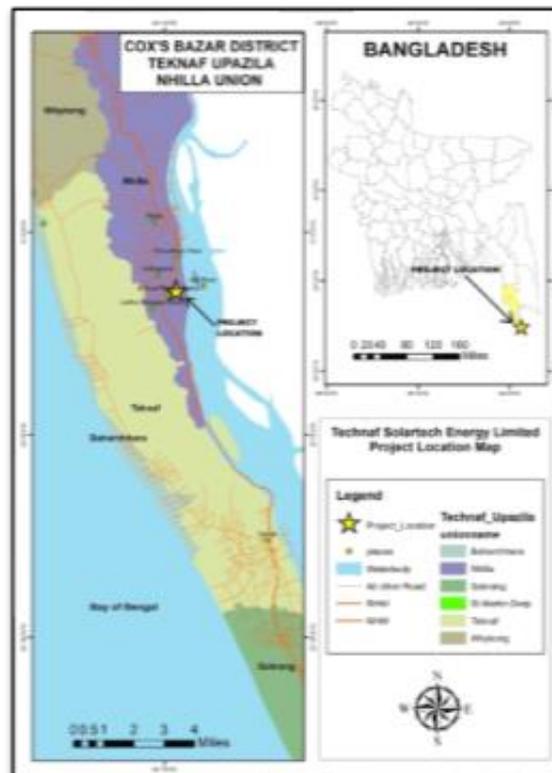
# **Labor Assessment Report**

## 1. Introduction

### 1.1. Brief Project Description

Power generation and supply is one of the vital issues in Bangladesh to enhance its ongoing development efforts. Having 149.8 million people, electricity demand is increasing day by day but the generation of electricity is not increasing as expected. The industrial production which is the driven force of economy is being hampered due to inadequate power supply. Thus foreign and local investment are being discouraged and impeded. The Sixth Five Year Plan contains information on demand-supply gap for electricity, source of electricity supply, use of different types of energy, electricity generation program and strategy for power generation.

The Renewable Energy Policy envisions that 5% of total energy production will have to be achieved by 2015 and 10% by 2020. To achieve this target, GOB is looking for various options preferably Renewable Energy resources. Government has already launched '500MW Solar Power Mission' to promote the use of Renewable Energy to meet the increasing demand of electricity. Considering the immense opportunities, Technaf Solartech Energy Limited (TSEL) has established a solar based power plant at Alikhali, South Nhilla, Cox's Bazar with 20 MW capacities as a 20 years facility to BPDB.



**Figure 16: Location Map of the Proposed Solar Power Plant Project**

The site of the project is located at South Nhilla Alikhali village of 2 no. Nhilla Union, Teknaf Upazila of Cox’s Bazar district. The boundaries of the plant location are: salt cultivation land on the north, north-west, east and south side of the project site, few low land parcels have been found on the north-east, south-east and south-west boundaries, a salt factory and a brick field are situated along the south-west boundary of the project site, River Naf flows along the eastern side of the project site. A bituminous carpeting road has passed through the western boundary of the project site.

It is further to be noted that most of the land of this project was previously used for salt cultivation, for which the landowners dug a private canal to bring saline water inside their lands. The canal inside the project boundary is completely owned by the concerned landowners – the canal is not on any khas land. TSEL has decided to conserve the canal.

**Table 14.23: Brief description of the company**

|   |  |
|---|--|
| <b>Project Company</b>                            | Technaf Solartech Energy Limited (TSEL)  |
| <b>Type of Business</b>                           | Electricity generation and distribution to gridline  |
| <b>Corporate Office Address</b>                   | Technaf Solartech Energy Limited, 2nd Floor, Colloid Center, 206/A, Tejgaon Industrial Area, Dhaka 1208. |
| <b>Plant Type and Capacity</b>                    | Photovoltaic solar power generation of 20 MW capacity.   |
| <b>Location</b>                                   | Village: South Nhilla Alikhali, Union: 2 No. Nhilla, Upazila: Teknaf, Zilla: Cox’s Bazar                 |
| <b>Plant installation area</b>                    | 117 acres of Land  |
| <b>Electricity coverage area</b>                  | Transmission to the National Grid  |
| <b>No. of beneficiaries</b>                       | All over Bangladesh  |
| <b>Major Equipment</b>                            | Multicrystalline silicon solar module, grid-tie string inverters.  |
| <b>Installation and Supervision</b>               | Installation by TSEL and Supervision by Sgurr Energy India Pvt. Ltd                                      |
| <b>Operation and Maintenance</b>                  | TSEL   |
| <b>Clearance from Nhilla UP</b>                   | September 20, 2016   |
| <b>Date of power purchase agreement with BPDB</b> | February 9, 2017   |
| <b>Date of Approval by BIDA</b>                   | March 30, 2017   |
| <b>Date of Site Clearance by DOE</b>              | September 17, 2017   |
| <b>Date of commencement of construction</b>       | September 2017   |
| <b>Date of start of operation</b>                 | September 15, 2018   |
| <b>Environmental Clearance Certificate by DOE</b> | September 20, 2018   |
| <b>Issue of Factory License</b>                   | March 25, 2019   |

|  |               |
|--|---------------|
| <b>by DIFE</b>                             |               |
| <b>Issue of Trade License by Nhilla UP</b> | July 01, 2019 |
| <b>Issue of Fire License</b>               | July 01, 2019 |

## **1.2 Background of Labor Audit for TSEL**

The Environmental and Social Action Plan (ESAP) for TSEL identified the necessity for undertaking labor audit covering own and subcontractor workers of TSEL to assess compliance with the national laws and World Bank PS2 requirements. In this regard, TSEL hired Bangladesh Centre for Advanced Studies for carrying out the labor audit.

## **1.3 Objectives and Scope of Work**

The prime objective of the labor audit was to undertake labor audit covering own and subcontractor workers of the plant to assess compliance with the national laws and WB PS2 requirements, and then suggest corrective action plans for ensuring improved labor conditions at the plant. The scope of work for the labor audit was as follows:

- Review of Bangladesh Labor Law 2015 and World Bank’s Performance Standard 2;
- Review of all HR policies and practices of TSEL;
- Review of the labor employment documents;
- Review of working hours and overtime documents of the labors;
- Review of wages and overtime payment documents of the labors;
- Check whether wages and overtime amount paid to the labors comply with the minimum wages and overtime amount defined by Bangladesh Government;
- Review the practices of non-discrimination, prohibition of child and forced labor, retrenchment, labors’ organization and grievance mechanism;
- Review the documents and observe the practices of TSEL regarding workers’ health and safety;
- Review the contractor management system of TSEL;
- Prepare labor audit report confirming compliance, and if not, recommend corrective actions as appropriate to the Project during Operation phase.

## **1.4 Limitations of the Audit**

The Labor Audit was associated with the following limitations:

- EPC Contractors were not covered under the Labor Audit due to lack of record maintenance by the EPC contractor and also the contract phase of the EPC contractor is already over and they have left 1 year back.
- Supply chain assessment was not possible as most of the machineries and equipment were imported from abroad. For the construction phase, local supplies comprised of

sand, brick, cement and steel, which were purchased from many different sources. Therefore, it was not feasible to audit all the suppliers.

### **1.5 Labor Audit Team**

The Labor Audit Team comprised of the following members from BCAS:

1. Dr. Moinul Islam Sharif, Team Leader.
2. Nahid Akhter Katha, Junior Consultant
3. Md. Billal Hossain, Social & OHS Consultant

### **1.6 Layout of this Report**

This report has been prepared in the following layout:

|           |  |
|-----------|--|
| Chapter 1 | Introduction: Brief Project Description, Background of Labor Audit for TSEL, Objectives and Scope of Work, Limitations of the Audit, Labor Audit Team and Layout of this Report  |
| Chapter 2 | Labor and Working Conditions: Human Resources Policies and Procedures, Working Conditions and Terms of Employment, Labors' Organization, Non-discrimination and Equal Opportunity, Retrenchment, Grievance Mechanism, Protecting the Work Force – Child Labor & Forced Labor, Workers' Health and Safety, Contractor Management System |
| Chapter 3 | Conclusion   |

## **2. Labor and Working Conditions in TSEL**

### **2.1 Human Resources Policies and Procedures**

#### **2.1.1 HR Policy of TSEL**

TSEL will review their HR policy. TSEL, while reviewing its HR policy, may consider the following aspects for inclusion:

- Roles and responsibilities associated with various positions need to be mentioned;
- Non-discrimination policy should be mentioned;
- HIV/ AIDS non-discrimination should also be spelt out;
- Working with Suppliers and contractors and non-employee workers may also be referred to;
- Non-tolerance of child labor and forced labor not only for employee, but for the non-employee workers if any
- Anti-Sexual Harassment Policy may be explicitly captured.

All contractors and sub-contractors within the consortium should be required to apply the principles of the TSEL HR Policy document and also ensure that their internal procedures follow local and international standards.

### **2.2 Working Conditions and Terms of Employment**

#### **2.2.1 Terms of Employment**

All the staffs working in TSEL are permanent staff and employed by the mother company Joules Power LTd (JPL). As the plant generates electricity through solar modules and does not required labor or workers to operate, there were no labors/ workers from external contractor or sub-contractor during the reporting period.

The company has provided ID cards to the staffs. During labor audit, all employees were found to be wearing ID card. Each employee has been provided with their own personal protective equipment (PPEs) such as helmet, safety jacket, shoes, etc.

#### **2.2.2 Working Hour and Overtime**

According to contemporary labor law of Bangladesh (Bangladesh Labor Law 2006, last amended in 2013), each labor should enjoy a paid weekly holiday after maximum 6 days of continuous works. This implies, there should be maximum 26/27 working days per worker per month, while the worker should be receiving the salary of the whole month. By law, daily working hour is 8 hours and daily overtime should not exceed 2 hours. Maximum working hours including overtime is 60 hours per week, but on the average this should not be more than 56 hours per week (according to Bangladesh Labor Law) per year. This means, average

maximum overtime per week is 8 hours. Maximum overtime per month should not exceed 48 hours in 4 (four) weeks.

Employees of TSEL have the provision of one day weekly holiday. A regular permanent employee can enjoy 20 days of earned leave, 10 days of casual leave and 14 days of sick leave. TSEL employees do not require to work overtime. Working hour of TSEL staff is followed as per Bangladesh Labor Law. TSEL staffs are not required to work overtime as it is one shift production facility.

### 2.2.3 Payment of Salary

The policy maintained by TSEL for payment of salary and overtime are listed in the following table:

**Table 14.24: Details of payment of salary and overtime for TSEL Staff**

| Sl. No. | Policy List          | As per benefits schedule of JPL and TSEL amended on 25/07/2019           |                                    |                   | Recommended for Approval  |
|---------|----------------------|--|------------------------------------|-------------------|---|
|         |                      | Policies   | Eligibility & Criterion            | Present Status    |   |
| 01      | Monthly Gross Salary | 60% Basic salary;<br>30% House rent allowance;<br>10% Personal allowance | All employees                      | Continuing        | In general, monthly gross salary will be:<br>Basic salary = 60%<br>House rent = 30%<br>Personal allowance = 10% |
| 02      | Over Time Allowance  | -  | For non-management level employees | Not effective now | As per Bangladesh Labor Law   |

### 2.2.4 Employment and Accommodation of Workers

Since, the construction phase is over, no labor camp for local workers is required any more.

In the operation phase, TSEL provides accommodation facility for the both permanent and contractual non-local bachelor staffs stationed at project site.

### 2.2.5 Festival Bonus, Provident Fund and Gratuity

All the permanent staffs of TSEL are entitled to festival bonus, provident fund and gratuity, while the contractual staffs are not entitled to provident fund and gratuity. The policy maintained by TSEL for Festival Bonus, Provident Fund and Gratuity are listed in the following table:

**Table 14.25: Details of Festival Bonus, Provident Fund and Gratuity for TSEL Staff**

| Sl. No. | Policy List    | As per benefits schedule of JPL and TSEL amended on 25/07/2019 |  |   |
|---------|----------------|--|--|---|
|         |                | Policies   | Eligibility & Criterion  | Present Status                          |
| 01      | Festival Bonus | 1 Basic salary per festival                                    | For both management and non- management staff including contractual staff<br>Will be provided for 2 festivals per year | Continuing                              |
| 02      | Provident Fund | As per Expo Group Policy                                       | For permanent staff only<br>Considered after commercial operation starts   | Effective from July 2019                |
| 03      | Gratuity       | As per Expo Group Policy                                       | For permanent staff only<br>Considered after commercial operation starts   | Effective from the day of Incorporation |

### 2.2.6 Other Benefits provided by TSEL

The followings are the additional compensation & benefits of TSEL employees:

**Table 14.26: Details of additional compensation & benefits of TSEL staff**

| Sl. No. | Policy List                           | As per benefits schedule of JPL and TSEL amended on 25/07/2019        |   |                |
|---------|---------------------------------------|---|---|----------------|
|         |                                       | Policies  | Eligibility & Criterion   | Present Status |
| 01      | Group Health Insurance                | Insurance coverage for self, spouse and 2 children (as per job grade) | For both management and non- management staff including contractual staff   | Continuing     |
| 02      | Group Life Insurance                  | For self only (insurance amount varies per job grade)                 | For both permanent and contractual non-management staff including contractual staff                                       | Continuing     |
| 03      | Station allowance                     | BDT 6000/month  | For both management and non- management staff only<br>For staff stationed at project site only to cover for food expenses | Continuing     |
| 04      | TA, DA and other allowance for travel | At actual   | At actual   | At actual      |

### 2.3 Workers' Organization

Rule 183 (1) of the Bangladesh Labor Rules, 2015: The owner of each company, where at least fifty permanent workers work, will form a participating committee within 3 months of starting operations. On the other hand, the occupier of the factory is required to set up a "Worker Participation Fund" and "Worker Welfare Fund" in accordance to the provisions of the Bangladesh Labor Law 2006.

As the number of TSEL permanent staff is less than 50, TSEL does not required to set up any participation committee or worker welfare fund.

### 2.4 Non-discrimination and Equal Opportunity

TSEL should ensure non-discrimination and equal opportunity through its HR Policy as well as in practice. It was observed that there is no female among the existing TSEL staffs at the plant. However this is mainly attributed to unavailability of competent female candidates capable of handling the designated chores in the power plant.

### 2.5 Grievance Mechanism

Although internal grievance is recorded in a register book, a formal internal grievance redress mechanism is yet to be developed. Internal grievance box for the staff is provided at the main gate. Till 28<sup>th</sup> January 2020, all the grievance received and redressed are shown in the following table:

**Table 14.27: Grievance records of TSEL staff**

| Sl. No. | Complain Details  | Name of Complaint       | Receiving Date | Closing Date | Remarks  |
|---------|---|-------------------------|----------------|--------------|--|
| 01      | Transportation- TSEL technician team asked for two bicycle to use inside the plant                                | Md. Shamol Ali, TSEL    | 03.03.2019     | 13.04.2019   | TSEL management has provided two bicycle for the use inside the plant                          |
| 02      | Safety Items- TSEL staff requested for new safety items (Safety shoes, helmet, etc.) as the old ones were damaged | Md. Altaf Hossain, TSEL | 09.03.2019     | 20.04.2019   | New safety gears were purchased and distributed to the TSEL staff                              |
| 03      | Recreation options for Ansar- security force at TSEL  | Md. Inul Haque, TSEL    | 10.03.2019     | 10.05.2019   | For the entertainment purpose, TSEL management has provided one 32" LED TV for the Ansar Camp. |

## **2.6 Protecting the Work Force – Child Labor & Forced Labor**

TSEL should place adequate system to ensure prohibition of child labor and forced labor. Worker below 18 years of age should not be recruited by TSEL or its contractors on any sub-contractor. During employing staffs/workers directly or through sub-contractors, child labor engagement should be strictly avoided, and National ID Card of each worker should be checked and copy of the same is to be kept in the file.

During the reporting period, no grievance has been received from any plant staff or contractor's workers regarding forced labor.

## **2.7 Workers' Health and Safety**

### **2.7.1 Policy and Plan for Workers' Health and Safety**

TSEL has established Occupational Health Protection and Safety Policy for all the employees. The plant manager maintains the EHS records and EHS personnel keeps close monitoring of EHS practices.

### **2.7.2 Work Permits**

The EHS Plan has clearly articulated the provision of work permit for all sorts of routine and non-routine jobs at the construction site with the vision of protecting the workers from occupational injuries, and it is practiced accordingly.

### **2.7.3 Job Hazard Analysis and Hazard Identification and Risk Assessment Control**

For all the operation activities, potential risk hazards are mentioned and communicated with the workers. Proper use of PPEs are mentioned in the work permit as well.

Concerned personnel have been made aware of the potential hazards and risks through provision of relevant trainings. Use of necessary PPEs are ensured and necessary measures are taken to control potential risks.

### **2.7.4 Personal Protective Equipment**

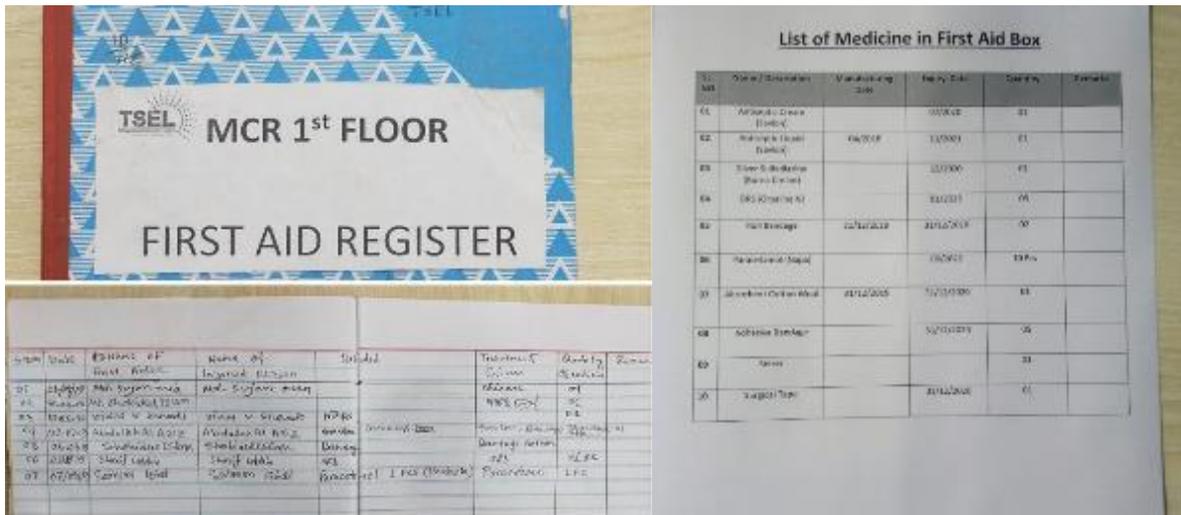
A Personal Protective Equipment (PPE) Matrix has been developed for ensuring workers' safety for different types of jobs. All the personnel/workers are bound to use mandatory PPEs i.e. safety helmet and safety shoes as well as wear or use job/site specific other PPEs i.e. safety shield, safety gloves, safety goggles, safety mask, gum boots, safety harness/belt etc. On-job-training is being imparted by EHS personnel of TSEL regarding usage of PPEs and its importance. In any case of non-compliances, work is stopped immediately and remedial actions are taken.

### 2.7.5 Health Facilities for the Labors

First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph. While checking a sample first aid box, updated list of medicines was found and the medicines inside the box were well maintained. A register logbook is also maintained.



Photo 9: First Aid Box with First Aider's Details





**Photo 10: Register book and medicine list of First Aid Box**

For any injury or medical help, the patient will be sent to Upazila Health Complex. Emergency contact details of the health complex and ambulance services are detailed in the front security office of TSEL.

#### **2.7.6 Accident/Incident Investigation**

Accident & Incident Register is in place. No accident took place during the reporting period.

#### **2.7.8 Environment, Health and Safety Trainings**

Training Calendar and mock drill calendar for 2020 is in place and also displayed and communicated with the staffs and workers.

Training Register shall be developed in a tabular format (e.g. on MS Excel) depicting the names of all staffs in one column, names of trainings for each month on different columns in chronological manner. The register should be able to clearly depict which staff should go for which training on which month. It should also depict whether the concerned staffs participated and successfully completed the trainings. This means, the Training Register shall have to be updated on regular basis.

#### **2.7.9 Plant Visit Observations on Workers' Health and Safety**

Overall workers' health and safety arrangement of TSEL is satisfactory. The plant staffs have been found to be using the necessary PPEs as and when needed.



**Photo 11: Usage of PPEs**

It is recommended that TSEL should ensure display of abstract of the key provisions of the Bangladesh Labour Rule 2015 in Bangla at the main entrance of the factory. The plant layout plan marking the dangerous or hazardous zones and routes for emergency evacuation should also be displayed.

Designated area for assembly point in case for fire hazard has been set-up and water hose pipes are also for fire emergencies.



**Photo 12: Designated Assembly Point for Fire Hazard and Fire Hydrant**

Proper LOTO (Lockout-tagout) system is ensured so that dangerous machines are properly shut off and not started up again prior to the completion of maintenance or servicing work.



**Photo 13: Practice of Lockout-tagout (LOTO) System**

All over the plant, various cautions signs are posted to ensure worker's safety from potential risks and hazards. Few of them had faded away which needs to be reposted. In restricted area such as Transformer zone, oil storage etc., "DO NOT ENTER" or "RESTRICTED ENTRY" signs may be added for the safety of workers and visitors.



**Photo 14: Caution Signs In Restricted Places inside the Plant**



**Photo 15: Faded Sign Board that needs to be replaced**

## **2.8 Contractor Management System**

TSEL shall have to develop a SOP for contractor management system. Auditing of the contractors or sub-contractors did not take place before on EHS issues. Health/injury/life insurance of the contractors' or sub-contractors' workers is highly essential for those who will be engaged in risky or hazardous jobs.

### **3. Conclusion**

Operation of a solar power plant is not that much labor intensive. At TSEL, about 12 employees work at a times. TSEL ensures that Bangladesh Labor law is strictly followed. TSEL provides various compensation & benefits to their permanent and contractual employees. Internal grievance mechanism is in place for the TSEL staff. No child labor is accepted or encouraged in TSEL. TSEL focuses on their worker's health and safety. Adequate training on various safety related issues, use of PPEs, emergency preparedness and job hazards are arranged frequently.

Given the nature of the project, the BCAS Team recommends that labor audit should be carried out half yearly monitoring for at least two consecutive years of operation.

**Annex 17: E&S Audit Report**

**1<sup>st</sup> Environmental and Social (E&S)  
Audit Report**

## **1. Executive Summary**

Technaf Solartech Energy Limited (TSEL) has been established with the capacity of 20 MW electricity generation using solar photovoltaic modules. The plant is situated at Alikhali, South Nhilla, Teknaf, Cox's Bazar.

This was the first audit to be carried out for TSEL. The primary objective of this assignment was to assess the compliance status of the Project and its various components with respect to the agreed ESAP, Operations Phase Environmental & Social Management & Monitoring Plan (ESMMP) of the ESIA, and applicable Performance Standards of World Bank.

BCAS Team was mobilized at TSEL from 12 January to 13 January, 2020. TSEL was asked to furnish required documents by one week. The first audit will cover 6 months – May, 2019 to October, 2019.

The power plant runs for 8 hours a shift. Employees of TSEL have the provision of one day weekly holiday. TSEL staffs are not required to work overtime as it is one shift production facility. All the permanent staffs of TSEL are entitled to festival bonus, provident fund and gratuity, while the contracted staffs as well as casual staffs of TSEL are not entitled to provident fund and gratuity.

Although a complain box is provided and internal grievance is recorded in a register book, a formal internal grievance redress mechanism is yet to be developed. There is an adequate system in place to ensure prohibition of child labor and forced labor.

For all the operation activities, potential risk hazards are mentioned and communicated with the workers. Proper use of PPEs are mentioned in the work permit as well. All the personnel/workers are bound to use mandatory PPEs i.e. safety helmet and safety shoes as well as wear or use job/site specific other PPEs i.e. safety shield, safety gloves, safety goggles, safety mask, gum boots, safety harness/belt etc. On-job-training is being imparted by EHS personnel of TSEL regarding usage of PPEs and its importance.

First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph. While checking a sample first aid box, updated list of medicines was found and the medicines inside the box were well maintained. A register logbook is also maintained. For any major injury or medical help, the patient will be sent to Upazila Health Complex. Emergency contact details of the health complex and ambulance services are detailed in the front security office of TSEL.

TSEL has been found to be continually updating the legal register for maintaining of all legal compliances of the project. Currently, TSEL have environmental clearance certificate, factory license, trade license from Union Parishad and fire license and all are up to date. The licenses are also displayed in the front gate office. A legal Register is maintained for all the certificates and licenses with the issue date, expiry date and next renewal date.

TSEL has engaged an EHS personnel responsible for the monitoring of EHS Plan and other ESMMP implementations.

TSEL has developed an Environmental and Social Management System (ESMS) which includes all the issues regarding Environmental Care, Health and Safety, Documentation

System, Management Responsibility, Resource Management, Customer Related Processes, Supply and Contract Work Management and scopes for improvement. The whole system is documented and kept in both hard and soft copy in a well-organized order with a TOC. It should have the signature of the designated authority. All the required pages have to be signed by designated authority.

Based on the ESMS, an Environmental, Health, Safety (EHS) Plan has been developed in tabular format with tasks, references, timeline requirements, timelines and status. This monitoring plan will be an integral part of monthly health & safety inspection and be included in the health & safety inspection report accordingly and shall also be discussed in the monthly EHS meetings.

An internal environmental and social monitoring program is not yet in place. Internal audit team should follow up the activities mentioned in the third party audits. Operation activities at TSEL do not cause any air emission, noise disturbance and wastewater generation. Internal monitoring team should monitor any activities that can cause pollution.

Training Calendar and mock drill calendar for 2020 is in place and also displayed and communicated with the staffs and workers.

TSEL has prepared an Emergency Response Plan (ERP) as per mentioned in the ESIA report. Based on the QRA and updated ERP and procedure, the plant layout plan marking the dangerous or hazardous zones and routes for emergency evacuation should be displayed. Potential risks should be disclosed to neighboring community people. Necessary awareness should be made among neighboring community people in case of any emergency situation. They should also be made part of the mock drills.

A detailed Stakeholder Engagement Plan (SEP) will be developed by TSEL and Engagement records will be maintained. SEP should include stakeholder profiling, key concerns, expectations, impact and influence, and risk rating of various stakeholder groups. It should include details on engagement strategy, disclosure, monitoring, reporting etc. The SEP should be subsequently updated with engagement records. External grievance redress mechanisms for the neighboring community are not established. A complain box has been set up for the local community and a proper external redress mechanism has to be set.

Greenbelt development has been done quite satisfactorily. As the plant boundary cannot have large trees due to shading problem in the panels, TSEL has planted medium and low height plants.

Out of 19 ESAP items, 7 items have been observed that need further improvement to comply efficiently. Besides, BCAS Team has identified 19 out of 54 World Bank PS items in which TSEL should start working on improvement.

Since, this was the first environmental and social audit for TSEL, attempts were made to observe as many items as possible in an overall or gross perspective. BCAS Audit Team will endeavor to observe various environmental, social, health and safety issues in further detail during the future audits.

## 2. Introduction and Background of the Audit

### 2.1 Brief Project Description

Technaf Solartech Energy Limited (TSEL) is in the process to establish and operate a grid-tied solar power plant at Alikhali, South Nhill, Teknaf, Cox's Bazar beside Arakan Road, around 0.5 km from the bank of Naf River, 2 km from Teknaf PBS-2, 33/11 kV sub-station at Ledha, Teknaf. The total area of the project site is about 117 acres. Because TSEL has been approved to implement and operate a 20 MW Solar Power Plant for supplying power to Bangladesh Power Development Board (BPDB) on an off-take basis for a contracted period of 20 years.

**Table 14.28: Brief description of the company**

|   |  |
|---|--|
| <b>Project Company</b>                            | Technaf Solartech Energy Limited (TSEL)  |
| <b>Type of Business</b>                           | Electricity generation and distribution to gridline  |
| <b>Corporate Office Address</b>                   | Technaf Solartech Energy Limited, 2nd Floor, Colloid Center, 206/A, Tejgaon Industrial Area, Dhaka 1208. |
| <b>Plant Type and Capacity</b>                    | Photovoltaic solar power generation of 20 MW capacity.   |
| <b>Location</b>                                   | Village: South Nhill Alikhali, Union: 2 No. Nhill, Upazila: Teknaf, Zilla: Cox's Bazar                   |
| <b>Plant installation area</b>                    | 117 acres of Land  |
| <b>Electricity coverage area</b>                  | Transmission to the National Grid  |
| <b>No. of beneficiaries</b>                       | All over Bangladesh  |
| <b>Major Equipment</b>                            | Multicrystalline silicon solar module, grid-tie string inverters.  |
| <b>Installation and Supervision</b>               | Installation by TSEL and Supervision by Sgurr Energy India Pvt. Ltd                                      |
| <b>Operation and Maintenance</b>                  | TSEL   |
| <b>Clearance from Nhill UP</b>                    | September 20, 2016   |
| <b>Date of power purchase agreement with BPDB</b> | February 9, 2017   |
| <b>Date of Approval by BIDA</b>                   | March 30, 2017   |
| <b>Date of Site Clearance by DOE</b>              | September 17, 2017   |
| <b>Date of commencement of construction</b>       | September 2017   |
| <b>Date of start of operation</b>                 | September 15, 2018   |
| <b>Environmental Clearance Certificate by DOE</b> | September 20, 2018   |
| <b>Issue of Factory License by DIFE</b>           | March 25, 2019   |

|  |               |
|--|---------------|
| <b>Issue of Trade License by Nhilla UP</b> | July 01, 2019 |
| <b>Issue of Fire License</b>               | July 01, 2019 |

## **2.2 Update on the Status of the Design/Construction/Operation Activities**

The construction phase is over and the commissioning date was 15 September 2018.

## **2.3 Key Developments and any Major Changes in Location and Design**

There were no new major developments or changes in the location and design of the project.

## **2.4 Reporting Period Covered by this Audit Report (month/year)**

BCAS Team was mobilized at TSEL from 12 January to 13 January, 2020. TSEL was asked to furnish required documents by one week. Although BCAS is supposed to carry out quarterly audit, the first audit will cover 6 months (May 2019 to October 2019).

## **2.5 Environmental and Social Auditing Team**

The Environmental and Social Monitoring Team comprised of the following members from BCAS:

1. Dr. Moinul Islam Sharif, Environmental&. Social Specialist
2. Nahid Akhter Katha, Junior Consultant
3. Md. Billal Hossain, OHS Specialist

## **2.6 Limitations**

The report is based on information provided to BCAS before, during the site visit and post the site visit. The findings and observations made herein are based on application of professional judgment. The findings should be viewed in the context of the applicable scope and objectives of the study and the limitation on time and resources made available to the consultants for the successful completion of the study. The Assessment was based on readily available information/ documentation, visual reconnaissance, and management interviews in course of site visit.

Since, this was the first environmental and social audit for TSEL, attempts were made to observe as many items as possible in an overall or gross perspective. BCAS Audit Team will endeavor to observe various environmental, social, health and safety issues in further detail during the future audits.

### **3. Audit Scope and Objective**

#### **3.1 Scope**

The audit shall be carried out on existing facilities which focuses broadly on two elements:

(a) Compliance of existing facilities and operations with relevant environmental (including occupational health and safety) and social laws, regulations, and applicable IFC and World Bank policies (namely, World Bank Performance Standards); and

(b) The nature and extent of environmental and/or social impacts, including contamination to soils, groundwater, and structures, as a result of past/ on-going activities and proposed transactions.

#### **3.2 Objective**

The objectives of environmental and social audit are to appraise project activities, specially taking into account environmental and social regulatory frameworks, environmental standards, environmental health and safety measures and sustainable use of natural resources. The objectives are:

- I. to ensure compliance with the World Bank and DOE environmental and social requirements as identified in IPFF II E&S Policy;
- II. to identify any environmental and social issues associated with a particular project/ operation;
- III. to identify and evaluate the financial implications related to environmental and social issues;
- IV. to minimize exposure to financial risks associated with these issues;
- V. to maximize opportunities for environmental or social benefits and minimize the potential for adverse environmental and social impacts (such as pollution or accidents) associated with project;
- VI. to facilitating management control of environmental practices
- VII. to exploring improvement opportunities

#### 4. Description of Audit Approach and Methodology

The overall approach and method for conducting E&S audit can be categorized into three segments of activities- pre-audit, on-site audit and post audit.

##### 4.1 Pre-audit activities

The pre audit activity aims to develop an audit plan for the on-site activities and to make the necessary preparation and arrangements for the on-site audit. The tasks at this stage are to:

- a) Indicate the objective, scope and criteria of the audit;
- b) Develop an audit plan for the on-site activities;
- c) Prepare audit questionnaire;
- d) Review background information
  - Site layout plan(s), Site history, use and activities;
  - Organizational structure at audit site;
  - Internal environmental policies, procedures and guidelines.
- e) Review operational information
  - Operational activities and process description;
  - Management system policies, procedure and program documentation;
  - Relevant records (compliance, monitoring, training, maintenance, calibration etc.);
  - Other relevant information pertaining to environmental management practices.
- f) Conduct initial site visit
  - Meet with officer-in-charge to explain purpose of audit;
  - Assess whether background information gathered is up to date and accurate;
  - Follow-up on the list of preliminary audit impressions;
  - Identify and request additional site information as necessary;
  - Confirm thoroughness of audit scope;
  - Establish adequacy of resources for audit.
- g) Develop on-site questionnaire and audit protocols
- h) Review Audit Plan and arrange logistics
  - Audit scope;
  - Audit schedule;
  - Audit protocols;
  - Allocated resources.

##### 4.2 On-site Audit Activities

The on-site audit objectives should reflect those of the environmental and social audit, which are:

- a) Verification of legislative and regulatory compliance
- b) Assessment of internal policy and procedural conformance
- c) Establishment of current practice status
- d) Identification of improvement opportunities
- e) Conduct on-site meeting
  - Present audit scope and objectives;
  - Outline the audit approach and methodology;
  - Address questions or concerns of site personnel;
  - Rally staff support and assistance.

- f) Document Review
  - Management policy and Management system documentation;
  - Operational procedures;
  - Records (utility, inventory, monitoring, calibration, transportation, training etc.);
  - Previous audit reports.
- g) Conduct detailed site inspections with aid of on-site audit protocols to look for evidence on:
  - Verification of legislative and regulatory compliance;
  - Assessment of internal policy and procedural conformance;
  - Establishment of current practice status;
  - Identification of improvement opportunities;
  - Status of operational practice;
  - Staff participation in management system.
- h) Conduct Staff Interview to obtain information on
  - Actual practices (current and past);
  - Compliance with/or deviation from statutory and departmental requirements;
  - Awareness of requirements and expectations.
- i) Review Audit Evidence to ensure adequacy of audit evidence at the conclusion of onsite audit by:
  - Reviewing information gathered;
  - Collecting additional information as needed;
  - Substantiating audit findings;
  - Summarizing and documenting all findings and observations;
  - Identifying issues requiring immediate attention/mitigation
  - Noting outstanding issues requiring follow-up.
- j) Conduct closing meeting: The closing meeting provides an opportunity at the conclusion of on-site audit to:
  - Debrief the senior site management;
  - Summarize the audit activities and findings;
  - Highlight system strengths and weaknesses;
  - Discuss preliminary findings and recommended corrective action;
  - Bring up findings requiring immediate attention;
  - Clarify any outstanding issues and Address staff questions or concerns.

#### **4.3 Post audit activities**

The post audit activity aims to produce an Audit Report with audit findings and recommendations and to contribute towards formulation of an Action Plan for continual performance improvement. The activities will be as follows:

- a) Collate information and follow up outstanding issues - should include
  - Completed pre-audit questionnaire, operational document checklists;
  - Completed on-site survey questionnaires, on-site audit protocols;
  - All relevant correspondence, memoranda, reports, diagrams and drawings;
  - Copies of records, photographs, and other information collected during the site visit;
  - Detailed inspection and interview notes and summaries.

## 5. Summary of Audit Finding

### 5.1 Assessment and Management of Environmental and Social Risks and Impacts

#### 5.1.1 Operational & EHS Performances

The summary of the project operational status and EHS performance for May 2019 to October 2019 have been presented in Table 14.29 and 14.30 below respectively:

**Table 14.29: Operational Performance – May 2019 to October 2019**

| Sl. No. | Particular                  | May     | June    | July    | August  | Sep     | Oct     |
|---------|-----------------------------|---------|---------|---------|---------|---------|---------|
| 1       | Gross Generation (MWH)      | 3331.22 | 2966.42 | 2108.62 | 2948.62 | 2532.22 | 3378.59 |
| 2       | Auxiliary Consumption (MWH) | 2.93    | 5.16    | 8.29    | 6.45    | 7.24    | 8.28    |
| 3       | Total Export (MWH)          | 3331.22 | 2966.42 | 2108.62 | 2948.62 | 2532.22 | 3378.59 |
| 4       | Total Import (MWH)          | 2.93    | 5.16    | 8.29    | 6.45    | 7.24    | 8.28    |
| 5       | Availability (%)            | 100.00  | 97.21   | 99.12   | 99.76   | 98.43   | 96.74   |
| 6       | Plant Factor (%)            | 16.65   | 6.86    | 10.18   | 14.22   | 12.22   | 16.31   |

Source:TSEL

**Table 14.30: EHS Performance– May 2019 to October 2019**

| Sl. No.  | Particular                     | May | June | July | August | Sep | Oct |
|----------|--------------------------------|-----|------|------|--------|-----|-----|
| <b>A</b> | <b>Environment</b>             |     |      |      |        |     |     |
| 1        | No. of environmental accidents | 0   | 0    | 0    | 0      | 0   | 0   |
| <b>B</b> | <b>Health &amp; Safety</b>     |     |      |      |        |     |     |
| 1        | Fatality                       | 0   | 0    | 0    | 0      | 0   | 0   |
| 2        | Lost Time Accident (LTA)       | 0   | 0    | 0    | 0      | 0   | 0   |
| 3        | First Aid Cases                | 0   | 0    | 0    | 0      | 0   | 0   |
| 4        | Near Miss                      | 0   | 1    | 0    | 0      | 0   | 0   |
| 5        | Days since LTA                 | 259 | 289  | 320  | 351    | 381 | 412 |

Source:TSEL

### 5.1.2 Legal Register

Currently, TSEL have environmental clearance certificate, factory license, trade license from Union Parishad and fire license and all are up to date. The licenses are also displayed in the front gate office.



Photo 16: Display of Licences

| S.No | NAME OF THE LICENSE/CERTIFICATE     | ISSUE BY GOVERNMENT AGENCY            | ISSUE DATE | EXPIRE DATE | STATUS  | 2024 PERSONS FOR REFRESH                   |
|------|-------------------------------------|---------------------------------------|------------|-------------|---------|--|
| 01   | NOC                                 | Union Parishad                        | 3/05/2024  |             | updated | Mr. Shantanu Talwar, Asst. Manager, Admin. |
| 02   | Env. Clearance Certificate          | Department of Environment, Bangladesh | 11/03/20   |             | updated |  |
| 03   | Factory License                     | Department of Labour, Bangladesh      | 22/09/19   | 30/06/2020  | updated | Mr. Shantanu Talwar, Asst. Manager, Admin. |
| 04   | Fire License                        | Fire Service Bd                       | 21/07/19   | 30/06/2020  | updated | Mr. Shantanu Talwar, Asst. Manager, Admin. |
| 05   | Trade License                       | Civil Service Bd, Union Parishad      | 01/09/19   | 30/06/2020  | updated | Mr. Shantanu Talwar, Asst. Manager, Admin. |
| 06   | Environmental Clearance Certificate | Dept. of Environment, Bangladesh      | 06/03/19   | 31/07/2020  | update  | Mr. Shantanu Talwar, Asst. Manager, Admin. |

Photo 17: Updated License Register Book

A legal Register is maintained for all the certificates and licenses with the issue date, expiry date and next renewal date. The list of certificate and licenses of TSEL are shown Table 14.31.

**Table 14.31: EHS License/Permit Compliance Status for TSEL**

| Name of the License/Certificate     | Issued by government agency  | Status   | Issue Date/ Renewal Date              | Expiry Date                |
|-------------------------------------|--|----------|---------------------------------------|----------------------------|
| Factory License                     | Department of Inspection for Factories and Establishments (DIFE), Bangladesh | Complied | 25 <sup>th</sup> March 2019           | 30 <sup>th</sup> June 2020 |
| Fire License                        | Fire service & civil defense Bangladesh                                      | Complied | 1 <sup>st</sup> July 2019             | 30 <sup>th</sup> June 2020 |
| Site Clearance certificate          | Department of Environment Bangladesh   | Complied | 17 <sup>th</sup> September 2017       |                            |
| Environmental Clearance Certificate | Department of Environment Bangladesh   | Complied | 6 <sup>th</sup> August 2019 (Renewed) | 16 <sup>th</sup> July 2020 |
| Trade License                       | Union Parishad   | Complied | 1 <sup>st</sup> July 2019             | 30 <sup>th</sup> June 2020 |
| NOC                                 | Union Parishad   | Complied | 20 <sup>th</sup> September 2016       |                            |

### 5.1.3 Environment, Health and Safety

TSEL has developed an Environmental and Social Management System (ESMS) which includes all the issues regarding Environmental Care, Health and Safety, Documentation System, Management Responsibility, Resource Management, Customer Related Processes, Supply and Contract Work Management and scopes for improvement. The whole system is documented and kept in both hard and soft copy in a well-organized order with a TOC.

It should have the signature of the designated authority. All the required pages have to be signed by designated authority.

Based on the ESMS, an Environmental, Health, Safety (EHS) Plan has been developed in tabular format with tasks, references, timeline requirements, timelines and status. This monitoring plan shall have to be an integral part of monthly health & safety inspection and shall be included in the health & safety inspection report accordingly and shall also be discussed in the monthly HSE meetings.

TSEL has engaged an EHS personnel responsible for the monitoring of EHS Plan and other ESMMP implementations.

The keynotes of the Environmental, health and safety and social policies displayed at the entrance gate, in front of the central control building as well as administrative building of TSEL would be more effective.

#### **5.1.4 Emergency Preparedness and Response for Operation Phase**

TSEL should develop an Emergency Response Plan (ERP) into a consolidated document with:

- Identification of, including risks associated with all project components;
- Key community and environmental sensitivities (such as village settlements, ponds, etc.) and the potential of offsite consequences along with mitigation measures;
- A common communication and emergency response process flow for onsite emergencies as well as their communication to authorities offsite;
- Disclosure to communities in the vicinity of the project on the emergency readiness of the company in case of any incidents.

#### **5.1.5 Training of TSEL Staff and Contractors' Staff on ESMMP and EHS**

Training Calendar and mock drill calendar for 2020 is in place. However, this should be displayed and communicated with the staffs and workers.

Training Register shall be developed in a tabular format (e.g. on MS Excel) depicting the names of all staffs in one column, names of trainings for each month on different columns in chronological manner. The register should be able to clearly depict which staff should go for which training on which month. It should also depict whether the concerned staffs participated and successfully completed the trainings. This means, the Training Register shall have to be updated on regular basis.

#### **5.1.6 Stakeholder Engagement**

A detailed Stakeholder Engagement Plan (SEP) will be developed by TSEL and Engagement records will be maintained.

SEP should include stakeholder profiling, key concerns, expectations, impact and influence, and risk rating of various stakeholder groups. It should include details on engagement strategy, disclosure, monitoring, reporting etc. The SEP should be subsequently updated with engagement records.

During the site visit, BCAS team has a stakeholder consultation with a group of land owners who have leased their lands to TSEL. Keynotes of the consultation is shown in the following table:

**Table 14.32: Details of Stakeholder Consultation**

|                          |   |
|--------------------------|---|
| <b>Stakeholder group</b> | Land Owners   |
| <b>Participants</b>      | Kalo Mia, Jafar Alam, Osman Goni, Fayes Ahmed, Yezhar Mia, Mohammad Ali   |
| <b>Key discussions</b>   | <ul style="list-style-type: none"> <li>• In 2017, the land owners have leased their lands to TSEL for 24 years.</li> <li>• Before construction of TSEL, the lands were used for salt cultivation.</li> <li>• Every year the land owners are getting the lease amount on time and they have no complain about it.</li> <li>• Before TSEL, they have no idea about solar plant and how clean the operation is. There is no air pollution and noise problem.</li> <li>• The operation of TSEL does not affect the community in any ways.</li> <li>• The participants expressed their opinion on their current energy access situation. Before due to load shading, their business activities were hampered. But now, there is almost 24 hours electricity access to the local people.</li> </ul> |



**Photo 18: Stakeholder consultation**

## 5.2 Labor and Working Conditions

### 5.2.1 Working Conditions and Terms of Employment

#### 5.2.1.1 Terms of Employment

Under Director Operations of TSEL, Head of Plant is responsible for plant operation. To support him, there are Technical department and General Admin & support operation department to help in regarding all the plant activities in operation phase. Table 14.33 below depicts TSEL manpower at the plant:

**Table 14.33: TSEL Manpower at the Plant**

| S. No  | Designation               | Number |
|--|---------------------------|--------|
| 1  | Head of Plant             | 01     |
| Technical Department                         |                           |        |
| 2  | Lead Engineer, Electrical | 01     |
| 3  | Asst. Engineer/ Engineer  | 04     |
| 4  | Foreman                   | 01     |
| 5  | Technician                | 03     |
| General Admin & Support Operation Department |                           |        |
| 6  | Assistant Store           | 01     |
| 7  | Admin & Cashier           | 01     |
| 8  | Admin Assistant           | 01     |
| 9  | Security Supervisor       | 01     |
| 10   | Platoon Commander         | 01     |
| 11   | Asst. Platoon Commander   | 01     |
| Auxiliary Support Staff                      |                           |        |
| 12   | Driver                    | 01     |
| 13   | Cook                      | 02     |
| 14   | Cleaner                   | 01     |
| Outsourcing                                  |                           |        |
| 15   | Ansar                     | 26     |

Source: TSEL Site Officials

TSEL will review their HR policy. TSEL, while reviewing its HR policy, may consider the following aspects for inclusion:

- Roles and responsibilities associated with various positions need to be mentioned;
- Non-discrimination policy should be mentioned;
- HIV/ AIDS non- discrimination should also be spelt out;
- Working with Suppliers and contractors and non-employee workers may also be referred to;
- Non-tolerance of child labor and forced labor not only for employee, but for the non-employee workers if any
- Anti- Sexual Harassment Policy may be explicitly captured.

All contractors and sub-contractors within the consortium should be required to apply the principles of the TSEL HR Policy document and also ensure that their internal procedures follow local and international standards.

### 5.2.1.2 Working Hour and Overtime

According to contemporary labor law of Bangladesh (Bangladesh Labor Law 2006, last amended in 2013), each labor should enjoy a paid weekly holiday after maximum 6 days of continuous works. This implies, there should be maximum 26/27 working days per worker per month, while the worker should be receiving the salary of the whole month. By law, daily working hour is 8 hours and daily overtime should not exceed 2 hours. Maximum working hours including overtime is 60 hours per week, but on the average this should not be more than 56 hours per week (according to Bangladesh Labor Law) per year. This means, average maximum overtime per week is 8 hours. Maximum overtime per month should not exceed 48 hours in 4 (four) weeks.

Employees of TSEL have the provision of one day weekly holiday. A regular permanent employee can enjoy 20 days of earned leave, 10 days of casual leave and 14 days of sick leave. TSEL employees do not require to work overtime. Working hour of TSEL staff is followed as per Bangladesh Labor Law. TSEL staffs are not required to work overtime as it is one shift production facility.

### 5.2.1.3 Payment of Salary and Overtime

The policy maintained by TSEL for payment of salary and overtime are listed in the following table:

**Table 14.34: Details of payment of salary and overtime for TSEL staff**

| Sl. No. | Policy List          | As per benefits schedule of JPL and TSEL amended on 25/07/2019           |                                    |                   | Recommended for Approval  |
|---------|----------------------|--|------------------------------------|-------------------|---|
|         |                      | Policies   | Eligibility & Criterion            | Present Status    |   |
| 01      | Monthly Gross Salary | 60% Basic salary;<br>30% House rent allowance;<br>10% Personal allowance | All employees                      | Continuing        | In general, monthly gross salary will be:<br>Basic salary = 60%<br>House rent = 30%<br>Personal allowance = 10% |
| 02      | Over Time Allowance  | -  | For non-management level employees | Not effective now | As per Bangladesh Labor Law   |

#### 5.2.1.4 Accommodation of Staffs

Since, the construction phase is over, no labor camp for local workers is required any more.

In the operation phase, TSEL provides accommodation facility for the both permanent and contractual non-local bachelor staffs stationed at project site.

#### 5.2.1.5 Festival Bonus, Provident Fund and Gratuity

All the permanent staffs of TSEL are entitled to festival bonus, provident fund and gratuity, while the contractual staffs are not entitled to provident fund and gratuity. The policy maintained by TSEL for Festival Bonus, Provident Fund and Gratuity are listed in the following table:

**Table 14.35: Details of Festival Bonus, Provident Fund and Gratuity for TSEL Staff**

| Sl. No. | Policy List    | As per benefits schedule of JPL and TSEL amended on 25/07/2019 |  |   |
|---------|----------------|--|--|---|
|         |                | Policies   | Eligibility & Criterion  | Present Status                          |
| 01      | Festival Bonus | 1 Basic salary per festival                                    | For both management and non- management staff including contractual staff<br>Will be provided for 2 festivals per year | Continuing                              |
| 02      | Provident Fund | As per Expo Group Policy                                       | For permanent staff only<br>Considered after commercial operation starts   | Effective from July 2019                |
| 03      | Gratuity       | As per Expo Group Policy                                       | For permanent staff only<br>Considered after commercial operation starts   | Effective from the day of Incorporation |

#### 5.2.1.6 Other Benefits Provided by TSEL

The followings are the additional compensation & benefits of TSEL employees:

**Table 14.36: Details of additional compensation & benefits of TSEL staff**

| Sl. No. | Policy List            | As per benefits schedule of JPL and TSEL amended on 25/07/2019        |   |                |
|---------|------------------------|---|---|----------------|
|         |                        | Policies  | Eligibility & Criterion   | Present Status |
| 01      | Group Health Insurance | Insurance coverage for self, spouse and 2 children (as per job grade) | For both management and non- management staff including contractual staff | Continuing     |

| Sl. No. | Policy List                           | As per benefits schedule of JPL and TSEL amended on 25/07/2019 |  |                |
|---------|---------------------------------------|--|--|----------------|
|         |                                       | Policies   | Eligibility & Criterion  | Present Status |
| 02      | Group Life Insurance                  | For self only (insurance amount varies per job grade)          | For both permanent and contractual non-management staff including contractual staff                                      | Continuing     |
| 03      | Station allowance                     | BDT 6000/month   | For both management and non-management staff only<br>For staff stationed at project site only to cover for food expenses | Continuing     |
| 04      | TA, DA and other allowance for travel | At actual  | At actual  | At actual      |

### 5.2.2 Workers' Organization/ Participation Committee, Worker Participation Fund & Worker Welfare Fund

Rule 183 (1) of the Bangladesh Labour Rules, 2015: The owner of each company, where at least fifty permanent workers work, will form a participating committee within 3 months of starting operations. On the other hand, the occupier of the factory is required to set up a "Worker Participation Fund" and "Worker Welfare Fund" in accordance to the provisions of the Bangladesh Labour Law 2006.

As the number of TSEL permanent staff is less than 50, TSEL does not required to set up any participation committee or worker welfare fund.

### 5.2.3 Non-discrimination and Equal Opportunity

TSEL should ensure non-discrimination and equal opportunity through its HR Policy as well as in practice.

It was observed that there is no female among the existing TSEL staffs at the plant. However this is mainly attributed to unavailability of competent female candidates capable of handling the designated chores in the power plant.

### 5.2.4 Grievance Redress Mechanism

Although internal grievance is recorded in a register book, a formal internal grievance redress mechanism is yet to be developed. Internal grievance box for the staff is provided at the main gate. Till 28<sup>th</sup> January 2020, all the grievance received and redressed are shown in the following table.

**Table 14.37: Grievance records of TSEL**

| Sl. No. | Complain Details  | Name of Complainant     | Receiving Date | Closing Date | Remarks  |
|---------|---|-------------------------|----------------|--------------|--|
| 01      | Transportation- TSEL technician team asked for two bicycle to use inside the plant                                | Md. Shamol Ali, TSEL    | 03.03.2019     | 13.04.2019   | TSEL management has provided two bicycle for the use inside the plant                          |
| 02      | Safety Items- TSEL staff requested for new safety items (Safety shoes, helmet, etc.) as the old ones were damaged | Md. Altaf Hossain, TSEL | 09.03.2019     | 20.04.2019   | New safety gears were purchased and distributed to the TSEL staff                              |
| 03      | Recreation options for Ansar- security force at TSEL  | Md. Inul Haque, TSEL    | 10.03.2019     | 10.05.2019   | For the entertainment purpose, TSEL management has provided one 32” LED TV for the Ansar Camp. |



**Photo 19: Complain Boxes for Worker/Staff and Other Stakeholders**

### **5.2.5 Protecting the Work Force – Child Labor & Forced Labor**

TSEL should place adequate system to ensure prohibition of child labor and forced labor. Worker below 18 years of age should not be recruited by TSEL or its contractors on any sub-contractor. During employing staffs/workers directly or through sub-contractors, child labor engagement should be strictly avoided, and National ID Card of each worker should be checked and copy of the same is to be kept in the file.

During the reporting period, no grievance has been received from any plant staff or contractor's workers regarding forced labor.

### **5.2.6 Workers' Health and Safety**

#### **5.2.6.1 Work Permits for Non-routine Activities**

TSEL maintains a general permit/checklist for the non-routine activities. There is procedure and practice in place for work permits for non-routine works.

#### **5.2.6.2 Job Hazard Analysis and Hazard Identification and Risk Assessment Control**

For all the operation activities, potential risk hazards are mentioned and communicated with the workers. Proper use of PPEs are mentioned in the work permit as well.

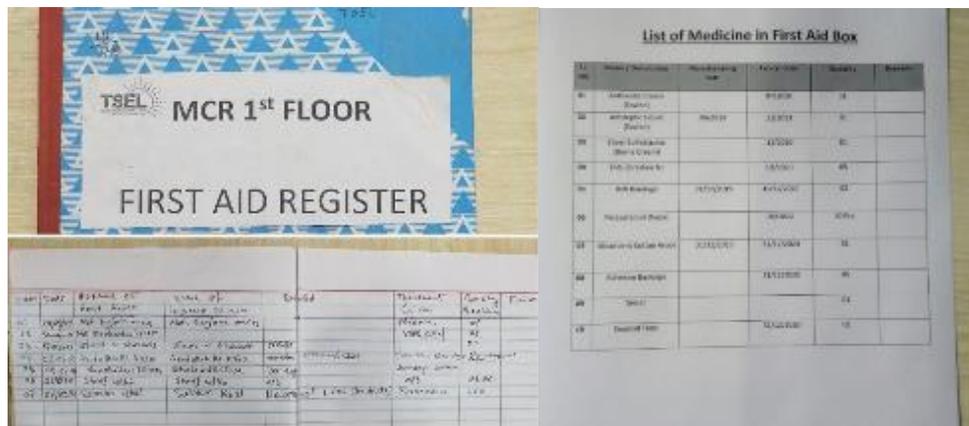
Concerned personnel have been made aware of the potential hazards and risks through provision of relevant trainings. Use of necessary PPEs are ensured and necessary measures are taken to control potential risks.

#### **5.2.6.3 Health Facilities for the Plant Staffs and Workers**

First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph. While checking a sample first aid box, updated list of medicines was found and the medicines inside the box were well maintained. A register logbook is also maintained.



**Photo 20: First Aid Box with Details of Trained First Aider**



**Photo 21: First Aid Register Book and Updated Medicine List**

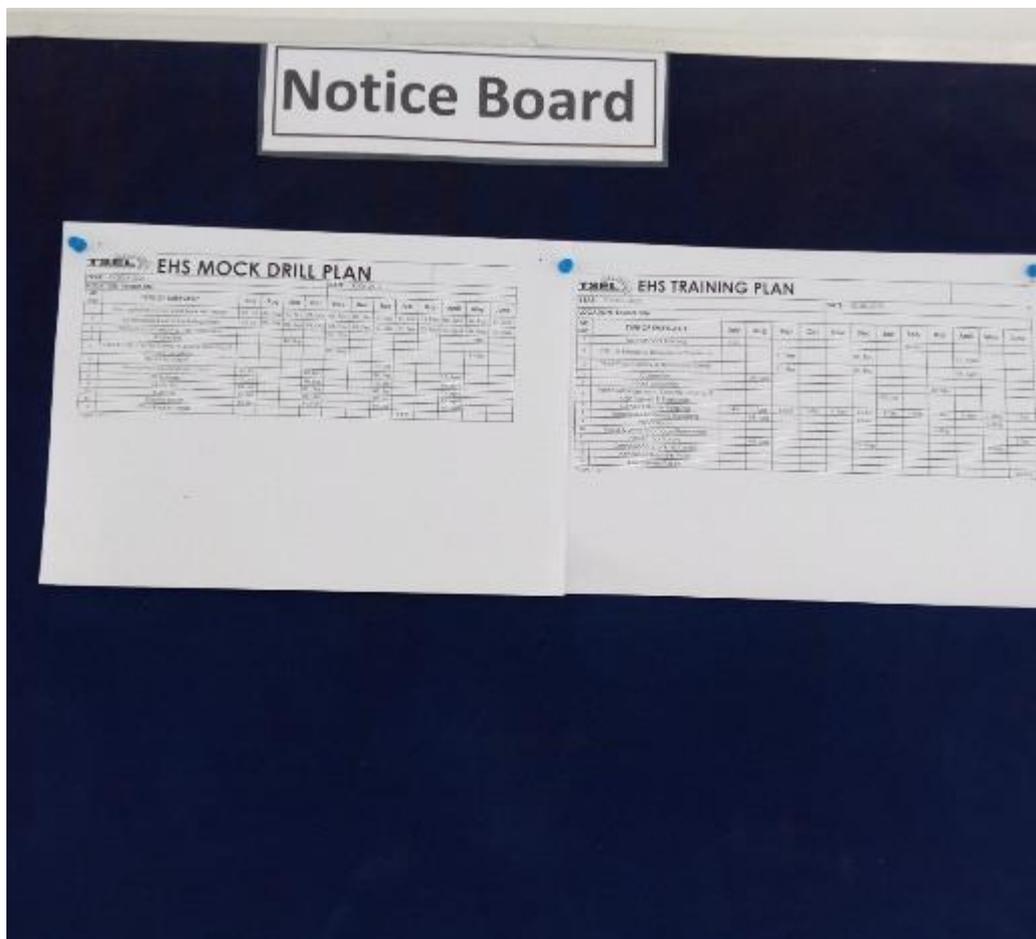
For any injury or medical help, the patient will be sent to Upazila Health Complex. Emergency contact details of the health complex and ambulance services are detailed in the front security office of TSEL.

#### 5.2.6.4 Accident/Incident Investigation

Accident & Incident Register is in place. No accident took place during the reporting period.

#### 5.2.6.5 Environment, Health and Safety Trainings

Training Calendar and mock drill calendar for 2020 is in place and also displayed and communicated with the staffs and workers.



**Photo 22: Mock Drill and Training Plan displayed on the Notice board**

Training Register shall be developed in a tabular format (e.g. on MS Excel) depicting the names of all staffs in one column, names of trainings for each month on different columns in chronological manner. The register should be able to clearly depict which staff should go for which training on which month. It should also depict whether the concerned staffs participated and successfully completed the trainings. This means, the Training Register shall have to be updated on regular basis.

### 5.2.6.6 Plant Visit Observations on Workers' Health and Safety

Overall workers' health and safety arrangement of TSEL is satisfactory. The plant staffs have been found to be using the necessary PPEs as and when needed.



**Photo 23: Mandatory PPE Usage for Worker Safety**

It is recommended that TSEL should ensure display of abstract of the key provisions of the Bangladesh Labour Rule 2015 in Bangla at the main entrance of the factory. The plant layout plan marking the dangerous or hazardous zones and routes for emergency evacuation should also be displayed.

### 5.2.7 Contractor Management System

TSEL shall have to develop a SOP for contractor management system. Auditing of the contractors or sub-contractors did not take place before on EHS issues. Health/injury/life insurance of the contractors' or sub-contractors' workers is highly essential for those who will be engaged in risky or hazardous jobs.

## 5.3 Resource Efficiency and Pollution Prevention

### 5.3.1 Monitoring of ESMMP Implementation

A good numbers of tasks mentioned in the Environmental and Social Management and Monitoring Plan (ESMMP) of the ESIA have not been found to be done in terms of timely manner and quantity required. All the tasks mentioned in ESMMP should be incorporated in the Environmental, Health, Safety and Social Monitoring Plan (EHSSMP). Reporting to DOE shall also be ensured on timely manner.

TSEL has renewed their environmental clearance certificate on 6th August 2019 and is valid till 16th July 2020.

### **5.3.2 Management System Certification**

TSEL has started the processes for documentation and practices to obtain Environmental Management System (EMS): ISO 14001 Accreditation and Health & Safety Management System: OHSAS18001 Accreditation within three years after operation.

### **5.3.3 Ambient Air Quality**

TSEL is a 100 % Green & Renewable Energy producing plant. During site visit, it was observed that TSEL does not operate any equipment which is producing air emission right now. Transport movement is also limited inside the plant which does not contribute to any air emission.

### **5.3.4 Noise Quality**

Power generation through solar modules do not cause any noise disturbance. After construction period was over, no other major activity was done which generated noise pollution.

### **5.3.5 Surface Water Quality**

Operation activities at TSEL do not generate any wastewater which contaminates the surface water.

### **5.3.6 Ground Water Quality**

Ground water is only used for domestic purpose and septic tanks are used for sanitary wastewater. So ground water does not get contaminated.

### **5.3.7 Electromagnetic Force**

ESMMP recommended for annual monitoring of Measurement of electromagnetic force by a certified agency for Transmission line, switch gears and transformers.

TSEL does not have EHV Overhead transmission lines in the plant. For transmission, 33000 V Underground cable is being used.

### **5.3.8 Terrestrial and Aquatic Habitats**

ESMMP recommended for boundary fencing to make terrestrial wildlife to choose alternative routes and planting of indigenous trees, where possible, around the boundary of the Project Site following the first year of operation.

Both fencing and planting of indigenous trees have already been ensured around the plant quite satisfactorily.

### 5.3.9 Traffic and Transportation

In practice, TSEL maintains records of every incoming and outgoing vehicle and keeps records of every incoming guests.

### 5.3.10 Waste Management

Different types of wastes have been found to be disposed in different locations of the site. Wastages were segregated and separate tagging were observed.



**Photo 24: Segregation of Wastages**

Third party waste contractor collects waste on regular basis. Scrap wastes such as scrap metals which are sold to the scrap vendors should be kept in a confined space avoid any incidents or accidents and to ensure workers' health and safety. Waste disposal register has to

be maintained regularly and auditing of the waste contractor shall have to be done accordingly.



**Photo 25: Scraps Wastes Waiting To Be Sold Off To Scrap Vendors**

Liquid wastes such as oils should be kept in secondary containment with proper excess volume in a designated storage area to avoid any kind of spillage and leakage.

Disposed or damaged solar panels are kept in the open. Damaged solar panels are categorized as hazardous wastage. So proper management mechanism should be adopted. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensure that panels should be kept in cover so that there is no contamination in ground and water through leaching.

A small quantity, apx 20 KVA battery bank is used for internal control & protection relay power supply system. Usual life time of such lead battery is 2 years. Damaged Lead-acid batteries should be disposed by selling off to the battery recycling plants and should not be given to scrap vendors.

#### **5.3.11 Treatment of Sanitary Wastes**

There has been provision for septic tanks at the plant.

#### **5.3.12 Hazardous Material Management**

In the spare oil storage and waste oil storage, proper MSDS should be displayed both in English and local language Bangla.

#### **5.3.13 Green House Gas Emissions**

Power generation through Solar Panel does not emit greenhouse gases.

## **5.4 Community Health, Safety and Security**

### **5.4.1 Community Risk Mitigation**

Potential risks should be disclosed to neighboring community people. Necessary awareness should be made among neighboring community people in case of any emergency situation. They should also be made part of the mock drills.

### **5.4.2 Traffic Management and Logistics Plan and Its Implementation**

In practice, TSEL maintains records of every incoming and outgoing vehicle and keeps records of every incoming guests.

### **5.4.3 Life & Fire Safety**

TSEL possesses fire license from Fire Service & Civil Defense, Bangladesh. The fire license was issued on 1<sup>st</sup> July 2019 and is valid till 30th June, 2020.

Inspection of fire extinguisher is done once in every month on regular basis and records are kept by the EHS personnel. Mock drill on fire prevention and use of fire extinguisher is done once in every month.



**Photo 26: Fire Extinguisher and Updated Inspection Card**

#### 5.4.4 Grievance Redress Mechanism for Community People

External grievance redress mechanisms for the neighboring community are not established. Though a complain box is provided for the local community, a proper external redress mechanism is yet to be set.



Photo 27: Internal and External Complain Box for Grievance

## 5.5 Biodiversity Conservation and Sustainable Management of Living Natural Resources

### 5.5.1 Develop Green belt within the Project Boundary

Greenbelt development has been done quite satisfactorily. As the plant boundary cannot have large trees due to shading problem in the panels, TSEL has planted medium and low height plants.



Photo 28: Plantation Activities by the TSEL Staff

### **5.5.2 Invasive Alien Species Management**

Invasive alien species management plan has been covered by the ESIA. The plant is well protected with boundary fencing and gates.



**Photo 29: Fencing for Boundary Protection**

## 6. Assessment of Compliance Status Regarding Environmental & Social Action Plan (ESAP) and WB PSs

### 6.1 Assessment of Compliance Status Regarding Environmental & Social Action Plan (ESAP)

The compliance status regarding Environmental & Social Action Plan (ESAP) based on the site visit and review of documents for May 2019 to October 2019 has been presented in Table 14.38. In order to define the status of various action items, color coding has been used for easy referencing, which is as follows:

|  |  |  |                              |
|--|--|--|------------------------------|
|  | <i>Action Item Closed/ Complied</i>    |  | <i>Satisfactory Progress</i> |
|  | <i>Partially Complied</i>              |  | <i>Not Complied/ Delay</i>   |
|  | <i>Not Due or To be Assessed Later</i> |  |                              |

**Table 14.38: Compliance Status of TSEL Regarding Environmental & Social Action Plan (ESAP)**

| SI No | Measures  | Action Description   | Deliverables   | Responsibility                  | Target Completion | BCAS Observation  | Status |
|-------|---|--|--|---------------------------------|-------------------|---|--------|
| 1     | Environmental and Social Management System (ESMS) | TSEL will implement an ESMS, including environmental policy, Social policy, aspect impact assessment, development of waste management, spill control and operational procedures with respect to handling hazardous substances and maintenance and aim to obtain ISO 14001 accreditation within the first | a) Environmental & Social policy<br>b) 1st certification audit report. | TSEL management/<br>Third party | Within next audit | TSEL has developed an Environmental and Social Management System (ESMS) which includes all the issues regarding Environmental Care, Health and Safety, Documentation System, Management |        |

| SI No | Measures | Action Description        | Deliverables | Responsibility | Target Completion | BCAS Observation  | Status |
|-------|----------|---------------------------|--------------|----------------|-------------------|---|--------|
|       |          | three years of operation. |              |                |                   | Responsibility, Resource Management, Customer Related Processes, Supply and Contract Work Management and scopes for improvement. The whole system is documented and kept in both hard and soft copy in a well-organized order with a TOC. It should have the signature of the designated authority. All the required pages have to be signed by designated authority. |        |

| SI No | Measures                          | Action Description   | Deliverables   | Responsibility                  | Target Completion | BCAS Observation   | Status |
|-------|-----------------------------------|--|--|---------------------------------|-------------------|--|--------|
| 2     | Health & Safety Management System | TSEL will implement a Health and Safety Management System including occupational Health & Safety policy, Hazard Identification & risk assessment, accident incident monitoring process & aim to obtain OHSAS18001 certification within the first three years of operation. | a) Occupational Health & Safety policy<br>b) 1st certification audit report. | TSEL management/<br>Third party |                   | Based on the ESMS, an Environmental, Health, Safety (EHS) Plan has been developed in tabular format with tasks, references, timeline requirements, timelines and status. This monitoring plan will be an integral part of monthly health & safety inspection and included in the health & safety inspection report accordingly and will also be discussed in the monthly HSE meetings. |        |
| 3     | E&S Monitoring Program            | Design environmental and social monitoring program including noise, AAQ, ground water, surface water and electromagnetic force (to be integrated with ISO 14001 process). Compare all value with the DoE guide line  | Environmental and Social Monitoring report                                   | TSEL management                 | Within next audit | An internal environmental and social monitoring program is not yet in place. Internal audit team should follow up the activities mentioned in the third party audits. Operation activities at  |        |

| SI No | Measures         | Action Description   | Deliverables   | Responsibility  | Target Completion | BCAS Observation   | Status |
|-------|------------------|--|--|-----------------|-------------------|--|--------|
|       |                  |  |  |                 |                   | TSEL do not cause any air emission, noise disturbance and wastewater generation. Internal monitoring team should monitor any activities that can cause pollution.  |        |
| 4     | EHS Coordinator  | TSEL will appoint a suitably qualified Environmental Health Safety (EHS) Coordinator, who will be responsible for implementation of the EMS. | Appointment letter & Training certificate of EHS coordinator | TSEL            |                   | TSEL has engaged an EHS personnel responsible for the monitoring of EHS Plan and other ESMMP implementations.  |        |
| 5     | Waste Management | Develop procedures for collection, storage and proper disposal of solid and hazardous waste (Integrated with ISO 14001)                      | Waste Management procedure                                   | TSEL management | Within next audit | Different types of wastes have been found to be disposed in different locations of the site. Wastages were segregated and separate tagging were observed. Waste disposal register has to be maintained regularly and auditing of the waste contractor shall have to be done accordingly. |        |

| Sl No | Measures | Action Description | Deliverables | Responsibility | Target Completion | BCAS Observation   | Status |
|-------|----------|--------------------|--------------|----------------|-------------------|--|--------|
|       |          |                    |              |                |                   | <p>Liquid wastes such as oils should be kept in secondary containment with proper excess volume in a designated storage area to avoid any kind of spillage and leakage.</p> <p>Disposed or damaged solar panels are kept in the open. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensure that panels should be kept in cover so that there is no contamination in ground and water through leaching.</p> <p>Damaged Lead-acid batteries should be disposed by selling off to the battery recycling plants and should not be given to scrap</p> |        |

| SI No | Measures            | Action Description   | Deliverables  | Responsibility  | Target Completion | BCAS Observation  | Status |
|-------|---------------------|--|---|-----------------|-------------------|---|--------|
|       |                     |  |   |                 |                   | vendors.  |        |
| 6     | Green Belt          | Provide evidence of compliance with the requirement of 33% green area as required in the environmental clearance condition.  | Plant layout identified with green area<br>Photo documentation  | TSEL management |                   | Green belt has been developed. As tall trees may cause shading on the solar panels, medium to low laying trees have been planted around the plant boundary.   |        |
| 7     | Grievance Mechanism | a) Develop an internal grievance mechanism to receive potential complaints of staff and contractors.<br>b) Develop an external grievance mechanism to receive potential complaints of from the community & other interested parties. | a) Draft Documentation of internal grievance mechanism.<br>b) Documentation of external grievance mechanism (if any). | TSEL            | Within next audit | Although internal grievance is recorded in a register book, a formal internal grievance redress mechanism is yet to be developed. Internal grievance box for the staff is provided at the main gate.<br><br>External grievance redress mechanisms for the neighboring community are not established. Though a |        |

| SI No | Measures   | Action Description   | Deliverables                   | Responsibility               | Target Completion | BCAS Observation  | Status |
|-------|--|--|--------------------------------|------------------------------|-------------------|---|--------|
|       |  |  |                                |                              |                   | complain box is provided for the local community, a proper external redress mechanism is yet to be set.   |        |
| 8     | Stakeholder (Community) Engagement & communication Program | A Stakeholder Engagement Plan will be prepared by TSEL, in order to establish clear stakeholder engagement channels. People in the neighboring villages should have clear lines of communication to TSEL; and receive, investigate and address any complaints and/or concerns from all stakeholders. | Stakeholder Engagement Program | TSEL management /Third party | Within next audit | A detailed Stakeholder Engagement Plan (SEP) will be developed and Engagement records will be maintained. Commitment Register for stakeholder engagement will be developed and maintained. A complain box for grievance from local community has been set up. |        |
| 9     | Environmental training                                     | Provide EHS related training for all employees. Such as Fire training, waste management training, Risk identification, aspect impact assessment  | Yearly training plan           | TSEL training division       | Within next audit | Training Calendar and mock drill calendar for 2020 is in place and displayed and communicated with the  |        |

| SI No | Measures       | Action Description  | Deliverables                 | Responsibility  | Target Completion | BCAS Observation   | Status |
|-------|----------------|---|------------------------------|-----------------|-------------------|--|--------|
|       |                | training.   |                              |                 |                   | staffs and workers.  |        |
| 10    | Legal register | Prepare a list of legal requirement & conduct evaluation of legal requirement as per list   | Legal register               | TSEL EHS team   |                   | <p>Currently, TSEL have environmental clearance certificate, factory license, trade license from Union Parishad and fire license and all are up to date. The licenses are also displayed in the front gate office.</p> <p>A legal Register is maintained for all the certificates and licenses with the issue date, expiry date and next renewal date.</p> |        |
| 11    | EHS Committee  | Established an EHS committee to conduct monthly Safety Meeting and present all employees for recent feedback regarding safety, environment practice and new hazard and mitigation plan. | HSE committee meeting report | TSEL management |                   | HSE Committee has been established. Monthly meeting minutes have to be mailed to all employees and sited on notice board.  |        |

| SI No | Measures                     | Action Description   | Deliverables                              | Responsibility                  | Target Completion | BCAS Observation  | Status |
|-------|------------------------------|--|---|---------------------------------|-------------------|---|--------|
| 12    | Traffic & transportation     | Develop an traffic & transportation instruction for traffic safety   | Vehicle safety instruction report         | TSEL management                 |                   | In practice, TSEL maintains records of every incoming and outgoing vehicle and keeps records of every incoming guests.  |        |
| 13    | Emergency response procedure | Develop an emergency response procedure for preparedness for any natural and manmade disaster like flood, earthquake, cyclone, fire, oil spillage all TSEL employee shall follow the “Emergency response procedure”. | emergency response procedure              | TSEL management/<br>Third party |                   | TSEL has prepared an Emergency Response Plan (ERP) as per mentioned in the ESIA report.   |        |
| 14    | Audit Mechanism              | There are two types of audit. One is external and the other one is internal audit. External audit will be faced as per lender’s schedule. TSEL will conduct internal audit half yearly basis.                        | Audit report                              | TSEL management/<br>Third party | Within next audit | Third party external audit should be done as per lender’s instruction. On the other hand, No internal audit has yet been taken place since operation started. |        |
| 15    | EHS communication            | TSEL will develop an external & internal EHS communication process to communicate EHS issues to communicate with all stake holders.  | Procedure for Environmental communication | TSEL management/<br>Third party | Within next audit | EHS plan has been established and EHS issues will be communicated with all the stakeholders in relevant trainings.  |        |

| SI No | Measures                              | Action Description  | Deliverables                                  | Responsibility                  | Target Completion | BCAS Observation  | Status |
|-------|---------------------------------------|---|---|---------------------------------|-------------------|---|--------|
| 16    | Accident prevention and Investigation | TSEL will develop an accident and incident investigation and preventative action process to reduce the frequency of injury (Integrated with ISO 18001). | accident and incident investigation procedure | TSEL management/<br>Third party |                   | Accident and incident investigation procedure is in place. No accident till operation took place.   |        |
| 17    | Facility Safety Inspection            | Facility Safety Inspections shall be performed by the plant management as often as needed (Integrated with ISO 18001).                                  | Inspection process/plan/report                | TSEL management                 | Within next audit | Facility Safety Inspections should be performed by the plant management and proper report should be documented.                                 |        |
| 18    | Fire safety                           | As Emergency response plan(13)  | As Emergency response plan                    | TSEL management                 |                   | Fire safety procedure has been covered under Emergency Response Plan.<br>The factory has obtained the fire license (valid till 30th June 2020). |        |

| SI No | Measures                               | Action Description  | Deliverables                               | Responsibility  | Target Completion | BCAS Observation  | Status |
|-------|--|---|--|-----------------|-------------------|---|--------|
| 19    | Invasive Alien Species Management Plan | <p>Invasive Alien Species are animals and plants that are introduced accidentally or deliberately into a natural environment where they are not normally found, with serious negative consequences for their new environment. They represent a major threat for their lives, and also for the plant and environment. Prevention, early warning and rapid response, and management are the three main of interventions on this regard. In this line, following initiatives will be taken:</p> <ol style="list-style-type: none"> <li>1. There will be more than man height wall around the Plant periphery to protect the animals trespassing into the plant.</li> <li>2. 24 hours basis security will be posted at gates and various security posts.</li> <li>3. There will be so many CCTV to monitor inside the plant.</li> <li>4. ERP response plan has been developed and it will be</li> </ol> | ESIA report/site visit/photo documentation | TSEL management | Within next audit | Invasive alien species management plan has been covered by the ESIA. The plant is well protected with boundary fencing and gates. |        |

| SI No | Measures | Action Description                | Deliverables | Responsibility | Target Completion | BCAS Observation | Status |
|-------|----------|-----------------------------------|--------------|----------------|-------------------|------------------|--------|
|       |          | disclosed to the plant community. |              |                |                   |                  |        |

## 6.2 Assessment of Compliance Status Regarding World Bank PSs

The compliance status regarding World Bank PSs based on the site visit and review of documents for May 2019 to October 2019 has been presented in Table 14.39. In order to define the status of various action items, color coding has been used for easy referencing, which is as follows:

|  |  |  |                              |
|--|--|--|------------------------------|
|  | <i>Action Item Closed/ Complied</i>    |  | <i>Satisfactory Progress</i> |
|  | <i>Partially Complied</i>              |  | <i>Not Complied/ Delay</i>   |
|  | <i>Not Due or To be Assessed Later</i> |  |                              |

**Table 14.39: Compliance Status of TSEL Regarding World Bank PSs**

| SI No    | Measures   | Significance | Deliverables                | Status | BCAS Observation  |
|----------|--|--------------|-----------------------------|--------|---|
| <b>1</b> | <b>PS 1: Assessment and Management of Environmental and Social Risks and Impacts</b>               |              |                             |        |   |
| 1.1      | Appoint a trained EHS Personnel for day to day monitoring of the EHS Plan and ESMMP implementation | High         | EHS Officer for the Project |        | TSEL has engaged an EHS personnel responsible for the monitoring of EHS Plan and other ESMMP implementations. |

| Sl No | Measures   | Significance | Deliverables  | Status | BCAS Observation   |
|-------|--|--------------|---|--------|--|
| 1.2   | <ul style="list-style-type: none"> <li>• Develop an Environmental and Social Management System and an Environmental Health Safety (EHS) Plan on this regard.</li> <li>• Review of all the records being maintained as part of EHS Plan.</li> </ul> | High         | <p>ESMS &amp; EHS Plan</p> <p>Records Review and Corrective Actions</p> |        | <p>TSEL has developed an Environmental and Social Management System (ESMS) which includes all the issues regarding Environmental Care, Health and Safety, Documentation System, Management Responsibility, Resource Management, Customer Related Processes, Supply and Contract Work Management and scopes for improvement. The whole system is documented and kept in both hard and soft copy in a well-organized order with a TOC.</p> <p>It should have the signature of the designated authority. All the required pages have to be signed by designated authority.</p> <p>Based on the ESMS, an Environmental, Health and Safety (EHS) Plan has been developed in tabular format with tasks, references, timeline requirements, timelines and status. This monitoring plan will be an integral part of monthly health &amp; safety inspection and be included in the health &amp; safety inspection report accordingly and shall also be discussed in the monthly HSE meetings.</p> |
| 1.3   | Display and communicate environment and health and safety and social policies of the company.  | High         | Disclosure of company policies  |        | <p>The policies will be displayed and communicated. Display of these policies at the entrance gate as well as administrative building of TSEL would be more effective.</p>   |

| SI No | Measures  | Significance | Deliverables   | Status | BCAS Observation  |
|-------|---|--------------|--|--------|---|
| 1.4   | Ensure display of abstract of the key provisions of the Bangladesh Labour Rule 2015 in Bangla at the main entrance of the factory. Contact details of the Factory Inspector as well as the registered medical practitioner engaged by TSEL should be displayed. | High         | Display of Labour Rules, 2015, contact details of the Factory Inspector and medical practitioner |        | It is recommended that TSEL should ensure display of abstract of the key provisions of the Bangladesh Labor Rule 2015 in Bangla at the main entrance of the factory.  |
| 1.5   | Develop and maintain legal register for all the Project components.   | High         | Legal Register for Operation Phase   |        | Currently, TSEL have environmental clearance certificate, factory license, trade license from Union Parishad and fire license and all are up to date. The licenses are also displayed in the front gate office.<br><br>A legal Register is maintained for all the certificates and licenses with the issue date, expiry date and next renewal date. |
| 1.6   | Develop the management plans as identified in the ESIA report and update the ESMMP with defined action items, responsibilities, monitoring indicators and review/audit mechanisms.  | High         | Management Plans as per ESIA requirement   |        | All the tasks mentioned in the ESMP of the ESIA report and E&S audit is incorporated in the ESMMP and EHS Plan.   |
| 1.7   | Develop an organizational structure for the operation phase of the Project with defined roles and responsibilities  | High         | Organization Structure – Operation   |        | Organization Structure with defined roles and responsibilities is in place.   |

| SI No | Measures  | Significance | Deliverables                            | Status | BCAS Observation  |
|-------|---|--------------|---|--------|---|
| 1.8   | Mapping of training needs of TSEL Staff and development of training calendar and training register              | High         | Training Calendar and training register |        | <p>Training Calendar and mock drill calendar for 2020 is in place and displayed and communicated with the staffs and workers.</p> <p>Training Register shall be developed in a tabular format (e.g. on MS Excel) depicting the names of all staffs in one column, names of trainings for each month on different columns in chronological manner. The register should be able to clearly depict which staff should go for which training on which month. It should also depict whether the concerned staffs participated and successfully completed the trainings. This means, the Training Register shall have to be updated on regular basis.</p> |
| 1.9   | Training of TSEL Staff as well as contractor's staff/workers relevant issues of Operations ESAP, ESMS and ESMMP | High         | Training Report                         |        | <p>Currently, EHS trainings are being given to the TSEL staff as the contractors' engagement is already over.</p>   |

| Sl No | Measures  | Significance | Deliverables                                | Status | BCAS Observation  |
|-------|---|--------------|---|--------|---|
| 1.10  | <p>Develop an emergency response plan into a consolidated document with:</p> <ul style="list-style-type: none"> <li>· Identification of, including risks associated with all project components;</li> <li>· Key community and environmental sensitivities (such as village settlements, ponds, etc.) and the potential of offsite consequences along with mitigation measures;</li> <li>· A common communication and emergency response process flow for onsite emergencies as well as their communication to authorities offsite;</li> <li>· Disclosure to communities in the vicinity of the project on the emergency readiness of the company in case of any incidents.</li> </ul> | Medium       | Emergency Response Plan for Operation Phase |        | TSEL has prepared an Emergency Response Plan (ERP) as per mentioned in the ESIA report.   |
| 1.11  | Review the emergency preparedness and response plan and include the necessary required emergencies and implement the same at the earliest.  | High         | ERP   |        | TSEL should conduct risk assessment and review the ERP and updated if needed. Based on the updated ERP and procedure, the plant layout plan marking the dangerous or hazardous zones and routes for emergency evacuation should be displayed. |

| SI No    | Measures  | Significance | Deliverables                          | Status | BCAS Observation   |
|----------|---|--------------|---------------------------------------|--------|--|
| 1.12     | Appoint a suitably qualified Emergency Coordinator for the Project  | Medium       | Emergency Coordinator for the Project |        | TSEL has formed separate team for firefighting, first aid and evacuation for any emergency situation. All the details for respective team personnel are listed in tabular format and this should be displayed for all workers. |
| 1.13     | Develop a Commitment Register as a part of stakeholder engagement process in order to document the outcomes of public consultations and respond to local community expectations, and ensure that these are communicated back to stakeholders and updates provided.  | High         | Commitment Register (Operation)       |        | Commitment Register for stakeholder engagement will be developed and maintained.   |
| 1.14     | Consider preparing a detailed SEP with stakeholder profiling, key concerns, expectations, impact and influence, and risk rating of various stakeholder groups. It should include details on engagement strategy, disclosure, monitoring, reporting etc. The SEP should be subsequently updated with engagement records. | High         | Updated SEP for the Project           |        | A detailed Stakeholder Engagement Plan (SEP) will be developed and Engagement records will be maintained.<br>A complain box has been set up for grievance from local community and stakeholders.                               |
| <b>2</b> | <b>PS 2: Labor and Working Conditions</b>   |              |                                       |        |  |

| SI No | Measures  | Significance | Deliverables             | Status | BCAS Observation  |
|-------|---|--------------|--------------------------|--------|---|
| 2.1   | <p>TSEL while finalizing its HR policy may consider the following aspects for inclusion:</p> <ul style="list-style-type: none"> <li>• Roles and responsibilities associated with various positions need to be mentioned;</li> <li>• Non-discrimination policy should be mentioned;</li> <li>• HIV/ AIDS non- discrimination should also be spelt out;</li> <li>• Working with Suppliers and contractors and non-employee workers may also be referred to;</li> <li>• Non-tolerance of child labor and forced labor not only for employee, but for the non-employee workers if any</li> <li>• Anti- Sexual Harassment Policy may be explicitly captured;</li> </ul> <p>All contractors and sub-contractors within the consortium should be required to apply the principles of the TSEL HR Policy document and also ensure that their internal procedures follow local and international</p> | High         | HR Policy and Procedures |        | <p>TSEL will review their HR policy. Roles and responsibilities associated with various positions should be mentioned. The policy should also include non-discrimination policy, non-tolerance of child labor and forced labor as well as anti-sexual harassment policy and also HIV/ AIDS non-discrimination policy.</p> <p>All the TSEL payroll employees are entitled to provident fund and gratuity. They have been covered under medical insurance for any sort of work related injury or health problem.</p> <p>On the other hand, the contracted staffs (if any) as well as casual staffs are not entitled to provident fund or gratuity or insurance.</p> |

| Sl No | Measures   | Significance | Deliverables | Status | BCAS Observation |
|-------|------------|--------------|--------------|--------|------------------|
|       | standards. |              |              |        |                  |

| SI No | Measures  | Significance | Deliverables                           | Status | BCAS Observation  |
|-------|---|--------------|--|--------|---|
| 2.2   | Contractor's position on non-employment of child, forced or bonded labor has to be clearly stipulated more specifically to the sub-contractors and their associated workforce. There should be proper checks and verification systems in place for the workforce to ensure no cases of child labor or forced labor are not allowed within the site premises.  | High         | HR Policy and Procedures of Contractor |        | This portion will be covered in detail during the next audit after finalizing the HR policy.  |
| 2.3   | <p>The Project should establish channels for management and workers to communicate and for the workers to place their concerns as well as suggestions.</p> <p>The grievance process should be made accessible for construction/operation workforce and should enable workforce to raise anonymous complaints. The grievance records should be properly documented, tracked and reviewed for redressing of the Grievances.</p> | High         | Grievance redress mechanism            |        | Although a complain box is been setup and TSEL is maintaining a record register for the grievance from the staff, a formal internal grievance redress mechanism is yet to be developed. |

| SI No | Measures   | Significance | Deliverables                                  | Status | BCAS Observation   |
|-------|--|--------------|---|--------|--|
| 2.4   | Develop a site specific health and safety manual including SOPs and work permits required to protect the operation manpower (including subcontractors' personnel) from injuries. | High         | SOPs for ESMS                                 |        | Site specific health and safety manual including SOPs and work permits have been developed.  |
| 2.5   | Develop a work permit system to carry out non routine jobs at the operation phase  | High         | SOP for work permit system and implementation |        | There is procedure and practice in place for work permits for non-routine works.   |
| 2.6   | Prepare a Job hazard analysis for all the operation activity and same should be communicated to all the workers.   | High         | Job safety analysis                           |        | For all the operation activities, potential risk hazards are mentioned and communicated with the workers. Proper use of PPEs are mentioned in the work permit as well. |
| 2.7   | Prepare a pre-use inspection checklist (activity and equipment specific) and same should be performed and attach with every permit before starting of activity.                  | High         | Activity and equipment specific checklist     |        | For every activity, a Permit To Work checklist is maintained.  |
| 2.8   | Conduct train the trainer program to increase the knowledge of the safety department.  | Medium       | Training Records                              |        | This portion will be covered in detail during the next audit.  |

| SI No | Measures  | Significance | Deliverables                       | Status | BCAS Observation   |
|-------|---|--------------|------------------------------------|--------|--|
| 2.9   | Ensure health Facilities for the Plant Staffs and Workers   | High         | Ensure necessary health facilities |        | <p>First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph. While checking a sample first aid box, updated list of medicines was found and the medicines inside the box were well maintained. A register logbook is also maintained.</p> <p>For any injury or medical help, the patient will be sent to Upazila Health Complex. Emergency contact details of the health complex and ambulance services are displayed in front of the security office of TSEL.</p> |
| 2.10  | Prepare an Accident & Investigation register to include the information related to the accident.                              | Medium       | Accident & investigation register  |        | Accident & Incident Register is in place. No accident took place during the reporting period.  |
| 2.11  | Carryout hazard identification and risk assessment (HIRA) for all operation and associated activities and preparation of SOPs | High         | HIRA Register and SOPs             |        | Facility Risk Assessment has been carried out. It is to be noted that facility risks have been measured for the scenario before use of additional control. Control measures have been mentioned to reduce risks level within acceptable limit for the moderate/ substantial/ intolerable risks.  |

| SI No | Measures  | Significance | Deliverables               | Status | BCAS Observation  |
|-------|---|--------------|----------------------------|--------|---|
| 2.12  | Carry out inspection for the potential hazards at the facility and provide the risk control as per the hierarchy of control.                        | High         | Risk control measures      |        | All the potential hazards should be listed out with their control measures.   |
| 2.13  | Provide training to workers, supervisors and employees on importance and usage of PPEs for different activities and organize PPE awareness program. | High         | Training Calendar          |        | The last training on PPE was conducted on 1st December 2019 and the next training session will be on 1st April 2020.  |
| 2.14  | Prepare training modules for job specific trainings and identify workers required to undergo job specific trainings.                                | High         | Training modules           |        | Training modules are available. However, this will be further assessed during next audit.   |
| 2.15  | Conduct the first aid training with the help of qualified first aider and make sure that first aiders are available at all times at facility.       | High         | First aid trainings        |        | First aider training should be imparted every year and should be included in the training calendar. First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph. |
| 2.16  | Develop a standard operating procedure on incident investigation with roles and responsibilities.   | High         | Incident investigation SOP |        | SOP on incident investigation with roles and responsibilities is maintained.  |

| SI No | Measures  | Significance | Deliverables  | Status | BCAS Observation   |
|-------|---|--------------|---|--------|--|
| 2.17  | Start preparing the accident/ incident statistics for each and every area and start identifying the area of concerns and prepare an action plan to address the issues by mean of alternate work procedure, trainings, special attention to the high risk jobs, increase in number of supervisor for high risk jobs.   | Medium       | Statistical analysis of accident/ incident data and corrective action |        | No accident took place during current year.  |
| 2.18  | <p>TSEL will need to put in place a formal contractor management system to audit its contractors as well as sub-contractors. The management system should include:</p> <ul style="list-style-type: none"> <li>• Compliance checklist against the Applicable Standards including applicable requirements under BLR 2015;</li> <li>• Criterion on contractor selection to minimize HSE or labor related risks and issues at the time of engagement;</li> <li>• Monitoring and audit procedures; and</li> </ul> <p>Further the contractors and the sub-contractors should be made responsible for the insurance of the</p> | High         | Contractor Management System  |        | TSEL shall have to develop a SOP for contractor management system. Auditing of the contractors or sub-contractors did not take place before in Terms of EHS issues. Health/injury/life insurance of the contractors' or sub-contractors' workers is highly essential for those who will be engaged in risky or hazardous jobs. |

| SI No    | Measures   | Significance | Deliverables         | Status | BCAS Observation  |
|----------|--|--------------|----------------------|--------|---|
|          | workers mobilized at the site.   |              |                      |        |   |
| <b>3</b> | <b>PS 3: Resource Efficiency and Pollution Prevention</b>  |              |                      |        |   |
| 3.1      | Update the EHS Plan including all the ESMMP implementation requirements during operation phase to be complied in line with the proposed timelines and review of implementation of ESMMP by EHS personnel of TSEL. Ensure reporting to DOE on this regard on timely manner. | High         | ESMMP implementation |        | TSEL has set up an EHS committee to monitor the EHS plan and will be monitoring all the activities under ESMMP. |

| Sl No | Measures  | Significance | Deliverables             | Status | BCAS Observation  |
|-------|---|--------------|--------------------------|--------|---|
| 3.2   | Environmental Management System (EMS): Ensure ISO 14001 accreditation within three years after operation. | High         | ISO 14001 accreditation  |        | Processes for documentation and practices have already been started.  |
| 3.3   | Health & Safety Management System: Ensure OHSAS18001 accreditation within three years after operation.    | High         | OHSAS18001 accreditation |        | This measure will be assessed later.  |
| 3.4   | Undertake regular monitoring of ambient air quality in line with the ESMMP.                               | High         | ESMMP implementation     |        | TSEL is a 100 % Green & Renewable Energy producing plant. During site visit, it was observe that TSEL does not operating any equipment which is producing air emission right now. Transport movement is also limited inside the plant which does not contribute to any air emission. EHS committee should monitor activities that may cause air emission and report it accordingly. |
| 3.5   | Undertake regular monitoring of noise levels in line with the ESMMP.                                      | High         | ESMMP implementation     |        | Power generation through solar modules do not cause any noise disturbance. After construction period was over, no other major activity was done which generated noise pollution. EHS committee should monitor activities that may cause noise generation and report it accordingly.   |
| 3.6   | Undertake regular monitoring of Electromagnetic Force in line with the ESMMP.                             | High         | ESMMP implementation     |        | TSEL does not have EHV Overhead transmission lines in the plant. For transmission, 33000 V Underground cable is being used. Electromagnetic force for transformer should be monitored.  |

| Sl No | Measures   | Significance | Deliverables         | Status | BCAS Observation  |
|-------|--|--------------|----------------------|--------|---|
| 3.7   | Undertake regular monitoring of surface water quality in line with the ESMMP.                  | High         | ESMMP implementation |        | <p>Operation activities at TSEL do not generate any wastewater which contaminates the surface water.</p> <p>EHS committee should monitor activities that may cause surface water contamination and report it accordingly.</p>   |
| 3.8   | Undertake regular monitoring of ground water quality in line with the ESMMP.                   | High         | ESMMP implementation |        | <p>Ground water is only used for domestic purpose and septic tanks is used for sanitary wastewater. So ground water does not get contaminated.</p> <p>EHS committee should monitor activities that may cause ground water contamination and report it accordingly.</p>  |
| 3.9   | Undertake necessary actions regarding terrestrial and aquatic habitats in line with the ESMMP. | High         | ESMMP implementation |        | <p>ESMMP recommended for boundary fencing to make terrestrial wildlife to choose alternative routes and planting of indigenous trees, where possible, around the boundary of the Project Site following the first year of operation. Both fencing and planting of indigenous trees have already been ensured around the plant quite satisfactorily.</p> |

| SI No | Measures   | Significance | Deliverables         | Status | BCAS Observation   |
|-------|--|--------------|----------------------|--------|--|
| 3,10  | Undertake necessary actions regarding traffic and transportation in line with the ESMMP. | Medium       | ESMMP implementation |        | In practice, TSEL maintains records of every incoming and outgoing vehicle and keeps records of every incoming guests.   |
| 3.11  | Undertake necessary actions regarding waste management in line with the ESMMP.           | Medium       | ESMMP implementation |        | <p>Different types of wastes have been found to be disposed in different locations of the site. Wastages were segregated and separate tagging were observed.</p> <p>Third party waste contractor collects waste on regular basis. Scrap wastes such as scrap metals which are sold to the scrap vendors should be kept in a confined space avoid any incidents or accidents and to ensure workers' health and safety. Waste disposal register has to be maintained regularly and auditing of the waste contractor shall have to be done accordingly.</p> <p>Liquid wastes such as oils should be kept in secondary containment with proper excess volume in a designated storage area to avoid any kind of spillage and leakage.</p> <p>Disposed or damaged solar panels are kept in the open. Damaged solar panels are categorized as hazardous wastage. So proper management mechanism should be adopted. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensure that panels should be kept in cover so that there is no contamination in ground and water through leaching.</p> |

| SI No    | Measures   | Significance | Deliverables                           | Status | BCAS Observation  |
|----------|--|--------------|--|--------|---|
|          |  |              |  |        | Damaged Lead-acid batteries should be disposed by selling off to the battery recycling plants and should not be given to scrap vendors. |
| 3.12     | Undertake necessary actions regarding human & sanitary wastes in line with the ESMMP.    | High         | ESMMP implementation                   |        | There has been provision for septic tanks at the plant.   |
| 3.13     | Develop a Hazardous Materials Management (HMM) Plan and implement it.                    | High         | HMM Plan – Operation phase             |        | MSDS for Transformer oil and diesel oil have to be maintained both in English and local language Bangla.                                |
| 3.14     | Provide trainings on ESMMP implementation at least annually.                             | High         | Trainings on ESMMP implementation      |        | No training on ESMMP implementation has taken place during the current year.  |
| 3.15     | Ensure no use of asbestos containing material is specified in the design of the Project. | High         | No use of Asbestos Containing Material |        | No use of asbestos containing material has been ensured.  |
| <b>4</b> | <b>PS 4: Community Health, Safety and Security</b>                                       |              |  |        |   |

| SI No    | Measures   | Significance | Deliverables   | Status | BCAS Observation   |
|----------|--|--------------|--|--------|--|
| 4.1      | Conduct a detailed QRA for the Project based on actual design and formulate an emergency response plan.  | Medium       | Quantitative Risk Assessment and Emergency Response Plan |        | The Emergency Response Plan has been established. Risk Assessment for TSEL has been done. ERP shall have to be reviewed and updated if needed. This measure will assessed further in the next audit.   |
| 4.2      | Develop a traffic management and logistics plan taking into consideration community safety   | High         | Traffic management plan.                                 |        | In practice, TSEL maintains records of every incoming and outgoing vehicle and keeps records of every incoming guests.   |
| 4.3      | Undertake specific communication on health hazards and mitigation measures on an ongoing basis against new activities and associated health and safety risks to the local community. | Medium       | Communication on health hazards and mitigation measures. |        | Based on the ERP, potential risks should be disclosed to neighboring community people. Necessary awareness should be made among neighboring community people in case of any emergency situation. They should also be made part of the mock drills. |
| 4.4      | Obtain fire license from the government and renew it on time.  | High         | Fire Safety  |        | TSEL possesses fire license from Fire Service & Civil Defense, Bangladesh. The fire license was issued on 1st July, 2019 and is valid till 30th June, 2020.  |
| 4.5      | There should be an efficient grievance redress mechanism for the neighboring community.  | High         | GRM-External   |        | TSEL has set up a complain box for GRM for the neighboring community and an external grievance redress mechanism will be established as well.  |
| <b>5</b> | <b>PS 5: Land Acquisition and Involuntary Resettlement</b>   |              |  |        |  |

| Sl No    | Measures  | Significance | Deliverables                            | Status | BCAS Observation   |
|----------|---|--------------|---|--------|--|
| <b>6</b> | <b>PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources</b> |              |   |        |  |
| 6.1      | Develop greenbelt within the project boundary.  | Low          | Greenbelt Development                   |        | Greenbelt development has been done quite satisfactorily. As the plant boundary cannot have large trees due to shading problem in the panels, TSEL has planted medium and low height plants. |
| 6.2      | Include an invasive alien species management plan in the ESMMP for the operational phase      | Medium       | Invasive alien species management plan. |        | Invasive alien species management plan has been covered by the ESIA. The plant is well protected with boundary fencing and gates.  |

## **7. Conclusions**

The corrective actions have been developed base on the status observed regarding compliance status of TSEL on ESAP implementation and World Bank PSs. Table 6.1 shows the Corrective Actions Regarding ESAP Implementation and Table 6.2 depicts the Corrective Actions Regarding World Bank PSs Achievement. Compliance with CAP attainment will be observed during the next audit. Since, this was the first environmental and social audit for TSEL, attempts were made to observe as many items as possible in an overall or gross perspective. BCAS Audit Team will endeavor to observe various environmental, social, health and safety issues in further detail during the future audits.

## Annex 18: Environmental and Social Action Plan (ESAP)

### Environmental and Social Action Plan (ESAP)

After the E&S Audit conducted by Bangladesh Centre for Advanced Studies on January 2020, TSEL was given a set of recommendation for the improvement of environmental and social aspects by on World Bank Performance Standards (WB PSs). TSEL has already implemented/complied few of them. TSEL management is committed to implement the remaining recommendations as well. The targeted timeline is set for May-June 2020 within this time TSEL will try to implement and improve the remaining corrective actions.

The detailed action plan including the recommendations, third party observation, responsible person and expected timeline is listed in the following table:

**Table 14.40: Environmental and Social Action Plan (ESAP) for TSEL**

| S. No  | World Bank PS Requirement  | Responsibility                   | Corrective Action/ Area of Improvement   | Time Line |
|--|--|----------------------------------|--|-----------|
| <b>A PS 1: Assessment and Management of Environmental and Social Risks and Impacts</b> |  |                                  |  |           |
| 1  | <ul style="list-style-type: none"> <li>• Develop an Environmental and Social Management System and an Environmental Health Safety (EHS) Plan on this regard.</li> <li>• Review of all the records being maintained as part of EHS Plan.</li> </ul> | TSEL Plant Management & EHS Team | TSEL has developed an Environmental and Social Management System (ESMS) which includes all the issues regarding Environmental Care, Health and Safety, Documentation System, Management Responsibility, Resource Management, Customer Related Processes, Supply and Contract Work Management and scopes for improvement. The whole system is documented and kept in both hard and soft copy in a well-organized order with | May 2020  |

| S. No | World Bank PS Requirement  | Responsibility        | Corrective Action/ Area of Improvement   | Time Line |
|-------|--|-----------------------|--|-----------|
|       |  |                       | <p>a TOC.</p> <p>It should have the signature of the designated authority . All the required pages have to be signed by designated authority.</p> <p>Based on the ESMS, an Environmental, Health and Safety (EHS) Plan has been developed in tabular format with tasks, references, timeline requirements, timelines and status. This monitoring plan will be an integral part of monthly health &amp; safety inspection and be included in the health &amp; safety inspection report accordingly and shall also be discussed in the monthly HSE meetings.</p> |           |
| 2     | Display and communicate environment and health and safety and social policies of the company.  | TSEL Plant Management | The policies will be displayed and communicated. Display of these policies at the entrance gate as well as administrative building of TSEL would be more effective.  | June 2020 |
| 3     | Ensure display of abstract of the key provisions of the Bangladesh Labour Rule 2015 in Bangla at the main entrance of the factory. Contact details of the Factory Inspector as well as the registered medical practitioner engaged by TSEL should be | TSEL Plant Management | It is recommended that TSEL should ensure display of abstract of the key provisions of the Bangladesh Labor Rule 2015 in Bangla at the main entrance of the factory.   | June 2020 |

| S. No | World Bank PS Requirement   | Responsibility                    | Corrective Action/ Area of Improvement  | Time Line |
|-------|---|-----------------------------------|---|-----------|
|       | displayed.  |                                   |   |           |
| 4     | Develop the management plans as identified in the ESIA report and update the ESMMP with defined action items, responsibilities, monitoring indicators and review/ audit mechanisms. | TSEL Plant Management             | All the tasks mentioned in the ESMP of the ESIA report and E&S audit is incorporated in the ESMMP and EHS Plan.   | June 2020 |
| 5     | Mapping of training needs of TSEL Staff and development of training calendar and training register  | TSEL Training Division / EHS Team | <p>Training Calendar and mock drill calendar for 2020 is in place and displayed and communicated with the staffs and workers.</p> <p>Training Register shall be developed in a tabular format (e.g. on MS Excel) depicting the names of all staffs in one column, names of trainings for each month on different columns in chronological manner. The register should be able to clearly depict which staff should go for which training on which month. It should also depict whether the concerned staffs participated and successfully completed the trainings. This means, the Training Register shall have to be updated on regular basis.</p> | May 2020  |
| 6     | Training of TSEL Staff as well as contractor's staff/workers relevant issues of Operations ESAP,  | TSEL Training Division / EHS      | Currently, EHS trainings are being given to the TSEL staff as the contractors' engagement is already over.  | June 2020 |

| S. No                                       | World Bank PS Requirement   | Responsibility        | Corrective Action/ Area of Improvement  | Time Line |
|---|---|-----------------------|---|-----------|
|   | ESMS and ESMMP  | Team                  |   |           |
| 7   | Review the emergency preparedness and response plan and include the necessary required emergencies and implement the same at the earliest.  | TSEL Plant Management | TSEL should conduct risk assessment and review the ERP and updated if needed. Based on the updated ERP and procedure, the plant layout plan marking the dangerous or hazardous zones and routes for emergency evacuation should be displayed. | June 2020 |
| 8   | Develop a Commitment Register as a part of stakeholder engagement process in order to document the outcomes of public consultations and respond to local community expectations, and ensure that these are communicated back to stakeholders and updates provided.  | TSEL Plant Management | Commitment Register for stakeholder engagement will be developed and maintained.  | June 2020 |
| 9   | Consider preparing a detailed SEP with stakeholder profiling, key concerns, expectations, impact and influence, and risk rating of various stakeholder groups. It should include details on engagement strategy, disclosure, monitoring, reporting etc. The SEP should be subsequently updated with engagement records. | TSEL Plant Management | A detailed Stakeholder Engagement Plan (SEP) will be developed and Engagement records will be maintained.   | June 2020 |
| <b>B PS 2: Labor and Working Conditions</b> |   |                       |   |           |

| S. No | World Bank PS Requirement  | Responsibility        | Corrective Action/ Area of Improvement   | Time Line |
|-------|--|-----------------------|--|-----------|
| 10    | <p>TSEL while finalizing its HR policy may consider the following aspects for inclusion:</p> <ul style="list-style-type: none"> <li>• Roles and responsibilities associated with various positions need to be mentioned;</li> <li>• Non-discrimination policy should be mentioned;</li> <li>• HIV/ AIDS non- discrimination should also be spelt out;</li> <li>• Working with Suppliers and contractors and non-employee workers may also be referred to;</li> <li>• Non-tolerance of child labor and forced labor not only for employee, but for the non-employee workers if any</li> <li>• Anti- Sexual Harassment Policy may be explicitly captured;</li> </ul> <p>All contractors and sub-contractors within the consortium should be required to apply the principles of the TSEL HR Policy document and also ensure that their internal procedures follow local and international standards.</p> | TSEL Plant Management | <p>TSEL will review their HR policy. Roles and responsibilities associated with various positions should be mentioned. The policy should also include non-discrimination policy, non-tolerance of child labour and forced labour as well as anti-sexual harassment policy and also HIV/ AIDS non- discrimination policy.</p> <p>All the TSEL payroll employees are entitled to provident fund and gratuity. They have been covered under medical insurance for any sort of work related injury or health problem.</p> <p>On the other hand, the contracted staffs (if any) as well as casual staffs are not entitled to provident fund or gratuity or insurance.</p> | June 2020 |
| 11    | The Project should establish channels for management and workers to communicate and for  | TSEL Plant            | Although a complain box is been setup and TSEL is maintaining a record register for the grievance from the   | May 2020  |

| S. No | World Bank PS Requirement   | Responsibility                   | Corrective Action/ Area of Improvement   | Time Line       |
|-------|---|----------------------------------|--|-----------------|
|       | <p>the workers to place their concerns as well as suggestions.</p> <p>The grievance process should be made accessible for construction/operation workforce and should enable workforce to raise anonymous complaints. The grievance records should be properly documented, tracked and reviewed for redressing of the Grievances.</p> | Management                       | staff, a formal internal grievance redress mechanism is yet to be developed.   |                 |
| 12    | Conduct train the trainer program to increase the knowledge of the safety department.   | TSEL Plant Management & EHS Team | To increase the knowledge capacity of the EHS team, training sessions should be conducted.                           | June 2020       |
| 13    | Provide training to workers, supervisors and employees on importance and usage of PPEs for different activities and organize PPE awareness program.   | TSEL Plant Management & EHS Team | The last training on PPE was conducted on 1st December 2019 and the next training session will be on 1st April 2020. | 1st April 2020. |
| 14    | Prepare training modules for job specific trainings and identify workers required to undergo job specific trainings.  | TSEL Plant Management            | Job specific training will be imparted and proper documentation will be kept.  | June 2020       |
| 15    | Conduct the first aid training with the help of   | TSEL Plant                       | First aider training should be imparted every year and   | June 2020       |

| S. No | World Bank PS Requirement   | Responsibility        | Corrective Action/ Area of Improvement   | Time Line |
|-------|---|-----------------------|--|-----------|
|       | qualified first aider and make sure that first aiders are available at all times at facility.   | Management & EHS Team | should be included in the training calendar.<br><br>First aid boxes are available with adequate first aider. Contact details of the first aider is displayed with photograph.  |           |
| 16    | <p>TSEL will need to put in place a formal contractor management system to audit its contractors as well as sub-contractors. The management system should include:</p> <ul style="list-style-type: none"> <li>• Compliance checklist against the Applicable Standards including applicable requirements under BLR 2015 ;</li> <li>• Criterion on contractor selection to minimize HSE or labor related risks and issues at the time of engagement;</li> <li>• Monitoring and audit procedures; and</li> </ul> <p>Further the contractors and the sub-contractors should be made responsible for the insurance of the workers mobilized at the site.</p> | TSEL Plant Management | TSEL shall have to develop a SOP for contractor management system. Auditing of the contractors or sub-contractors did not take place before in Terms of EHS issues. Health/injury/life insurance of the contractors' or sub-contractors' workers is highly essential for those who will be engaged in risky or hazardous jobs. | June 2020 |

### C PS 3: Resource Efficiency and Pollution

| S. No             | World Bank PS Requirement  | Responsibility        | Corrective Action/ Area of Improvement  | Time Line |
|-------------------|--|-----------------------|---|-----------|
| <b>Prevention</b> |  |                       |   |           |
| 17                | Update the EHS Plan including all the ESMMP implementation requirements during operation phase to be complied in line with the proposed timelines and review of implementation of ESMMP by EHS personnel of TSEL. Ensure reporting to DOE on this regard on timely manner. | TSEL Plant Management | TSEL has set up an EHS committee to monitor the EHS plan and will be monitoring all the activities under ESMMP.   | June 2020 |
| 18                | Environmental Management System (EMS): Ensure ISO 14001 accreditation within three years after operation.  | TSEL Plant Management | Processes for documentation and practices have already been started.  | June 2021 |
| 19                | Health & Safety Management System: Ensure OHSAS18001 accreditation within three years after operation.   | TSEL Plant Management | Processes for documentation and practices have already been started.  | June 2021 |
| 20                | Undertake regular monitoring of Electromagnetic Force in line with the ESMMP.  | TSEL Plant Management | TSEL does not have EHV Overhead transmission lines in the plant. For transmission, 33000 V Underground cable is being used.<br><br>Electromagnetic force for transformer should be monitored. | June 2020 |
| 21                | Undertake necessary actions regarding waste  | TSEL Plant            | Different types of wastes have been found to be disposed in different locations of the site. Wastages were  | June 2020 |

| S. No | World Bank PS Requirement          | Responsibility | Corrective Action/ Area of Improvement  | Time Line |
|-------|------------------------------------|----------------|---|-----------|
|       | management in line with the ESMMP. | Management     | <p>segregated and separate tagging were observed.</p> <p>Third party waste contractor collects waste on regular basis. Scrap wastes such as scrap metals which are sold to the scrap vendors should be kept in a confined space avoid any incidents or accidents and to ensure workers' health and safety. Waste disposal register has to be maintained regularly and auditing of the waste contractor shall have to be done accordingly.</p> <p>Liquid wastes such as oils should be kept in secondary containment with proper excess volume in a designated storage area to avoid any kind of spillage and leakage.</p> <p>Disposed or damaged solar panels are kept in the open. Damaged solar panels are categorized as hazardous wastage. So proper management mechanism should be adopted. Damaged or broken solar panels should be kept at a separate designated area and it is to be ensure that panels should be kept in cover so that there is no contamination in ground and water through leaching.</p> <p>Damaged Lead-acid batteries should be disposed by selling off to the battery recycling plants and should not</p> |           |

| S. No  | World Bank PS Requirement  | Responsibility                   | Corrective Action/ Area of Improvement   | Time Line |
|--|--|----------------------------------|--|-----------|
|  |  |                                  | be given to scrap vendors.   |           |
| 22   | Develop a Hazardous Materials Management (HMM) Plan and implement it.  | TSEL Plant Management            | MSDS for Transformer oil and diesel oil have to be maintained both in English and local language Bangla.   | May 2020  |
| 23   | Provide trainings on ESMMP implementation at least annually.   | TSEL Plant Management & EHS Team | At least one training on ESMMP implementation should take place every year.  | June 2020 |
| <b>D PS 4: Community Health, Safety and Security</b> |  |                                  |  |           |
| 24   | Undertake specific communication on health hazards and mitigation measures on an ongoing basis against new activities and associated health and safety risks to the local community. | TSEL Plant Management            | Based on the ERP, potential risks should be disclosed to neighboring community people. Necessary awareness should be made among neighboring community people in case of any emergency situation. They should also be made part of the mock drills. | June 2020 |
| 25   | There should be an efficient grievance redress mechanism for the neighboring community.  | TSEL Plant Management            | TSEL has set up a complain box for GRM for the neighboring community and an external grievance redress mechanism will be established as well.  | June 2020 |

**Annex 19: HR Policy of TSEL**

**People, Policy & Procedure (3P)**

**Of**

**Technaf Solartech Energy Limited (TSEL)**

## **Introduction**

People Policy of Technaf Solartech Energy Limited (TSEL) is a collection of corporate human resource policies and procedures developed to assist employees, managers and human resource professionals with daily human resource management activities.

### **Objective:**

People Policy & Procedure (3P) will help TSEL demonstrate, both internally and externally, that it meets requirements for TSEL's mission, vision, aim, values, staff hiring, compensation, benefits, training, development, performance, rewarding, grievance and firing as well as its commitments in relation to regulation and corporate governance of its employees.

### **Purpose:**

- To provide clear communication between TSEL and their employees regarding their condition of employment;
- To form a basis for treating all employees fairly and equally;
- To set of guidelines for supervisors and managers;
- To create a basis for developing the employee's handbook;
- To establish a basis for regularly reviewing possible changes affecting employees;
- To form a context for supervisor training programs and employee orientation programs;

### **Scope:**

People Policy & Procedure (3P) will applicable for all types of TSEL employee, including-

- Apprentice, probationary, permanent and time-limited employees;
- Regular employee, project based employee, contractual employee, service graded employee and day/hour basis labor;

## **Section-A: Employment Policy**

### 1. Policy Statement:

- i. TSEL always believes that recruiting and selecting the right people is of paramount importance to the continued success. This Employment Policy sets out how to ensure, as far as possible, that the best people are recruited on merit and that the recruitment process is free from bias and discrimination.
- ii. The goal of the launching this employment policy of TSEL is to select the best possible staff at the right time and right place along with to retain them through continuous development. The organization recognizes the policy of equal employment opportunity for its employee who has the potential to enhance and utilize their skills and knowledge. TSEL fully supports the Philosophy and belief of non-discrimination in employment.
- iii. TSEL is committed to fill-up vacant positions with qualified candidates, whether from within the organization or from outside. Whenever possible, TSEL shall try to fill job openings by internal promotions and transfers before considering any other means of hiring. This procedure covers the process the HR takes in filling current or future vacancies. Candidates' selection shall be based only on qualifications and work experience. This is to be determined through careful screening, testing and interviewing prior to making the final selection.

### 2. Principles of Employment:

- i. The organization recognizes that each employee irrespective of gender is entitled to be treated with courtesy and dignity.
- ii. Each employee is entitled to fair wages, job opportunities, in return for good job skills, co-operation, loyalty and best efforts.
- iii. The organization will demonstrate its commitment to protect the employee's organizational rights so as to improve and increase employee's motivation.
- iv. The organization is committed to develop its Human Resource to achieve the organization's mission and goals.
- v. The employees and Line Managers of TSEL shall abide by the policies, rules and regulations of the organization, which are currently in force and those that may come into force in future.

3. Non-Discrimination:

In order to provide equal employment and advancement opportunities to all individuals, employment decisions at TSEL will be based on merit, qualifications, and abilities. TSEL does not discriminate in employment opportunities or practices because of race, color, religion, sex, national origin, age or disability. This policy governs all aspects of employment, including selection, job assignment, compensation, discipline, termination, and access to benefits and training. Employees with questions or concerns about discrimination in the workplace are encouraged to bring these issues to the attention of their supervisor or HR Department. Employees can raise concerns and make reports without fear of reprisal. Anyone found to be engaging in unlawful discrimination will be subject to disciplinary action, including termination of employment.

4. Nepotism:

TSEL always discourages nepotism in hiring process. Any approach for preferential treatment will result in disqualification of the candidate. Hiring of close relatives of employees is not encouraged in TSEL. In exceptional cases, with prior approval of Managing Director, TSEL may appoint a relative of its employee only if the person is better qualified and competent than other candidates and can add extra value/ expertise to TSEL. A close relative is defined as any one of the parents, spouse, children, brother/ sister and in-laws.

5. Employment Status (Classification of Employees):

i. Regular:

A regular employee is defined as who had been employed against a permanent position in TSEL for open-ended period. All regular employees will be appointed with probationary period of 3/6 months. After which the employee may be confirmed in his/her employment. At the time employee will be 'called as "Probationary Employee" and after successfully completion of probation period if his/her job has been confirmed by the management then s/he will be called as "Confirmed Employee". Personnel from Bangladeshi citizen will be allowed to be appointed in TSEL as full time regular employee.

ii. Contractual:

A contract person is defined as who has been granted a contract to render his/her service against a specific job assignment for a specific period of time. Unless otherwise stated in the contract, the contractual payment shall be a consolidated amount per month. Expatriate may be employed as contractual basis decided by the competent authority.

iii. Casual Status:

Persons who are hired only daily basis for particular assignment and the daily wage amount is fixed based on the person's skills and abilities to perform the duties and the payment will be made as per his/her request on daily, weekly or monthly basis. The terms and conditions will be fixed which should be agreed earlier with the concerned person. The casual persons will not be eligible for any standard benefits of TSEL. The daily wages should be according to the market rate as well as government minimum wages norms.

Depending on the availability of the position a person of casual/ short term contract may be offered regular or contract employment, if his/her performance on the job was found satisfactory, after following the recruitment procedures according to TSEL's Employment policy.

6. Re-employment of Former Staff:

- i. Employees, who left TSEL voluntarily or was retrenched, may be considered for re-employment provided his/her previous performance had been satisfactory and his/her present qualifications and skills meet the current requirements for the position s/he has applied for. For such appointment will follow the policy of recruitment procedures as stated in the policy.
- ii. Employee who were dismissed or terminated or separated due to poor performance or misconduct will not be rehired or re-employed.

7. Recruitment and Hiring Process:

*i. General Policy*

TSEL is committed to selecting and employing the most suitable person(s) for the available position(s) by the way of-

- a) Effective and appropriate screening and selection;
- b) Selection standards are relevant to skills, training, experience, education and knowledge necessary for successful job performance;
- c) The hiring procedures conform to the organization's requirements and organization's policies and procedures;
- d) Under no circumstances a person employed with any other organization is appointed As full time regular or on contract in TSEL;
- e) All regular appointments in TSEL shall conform to its existing positions and salary structures;

- f) No one who is below 18 years of age can be hired as an employee for TSEL either on regular, contract, temporary or casual status;

8. Job Descriptions (Position Profile):

- i. Job Descriptions are the basis of recruitment placement, training, assignment, performance management system, performance appraisal, salaries, promotion and other HR actions for the employee of TSEL. A job description must state the functions duties, responsibilities of employees, reporting line and relationship with others in the organization. It shall be prepared based on the job's Key Result Area (KRA) or Key Performance Indicator (KPI) and include specific tasks.
- ii. Job description including Job Specification (personal profile) is a pre-condition for approval of a new position, irrespective of regular or contract. The job description should be prepared by the respective Department head or Business Unit Head in collaboration with HRD (or reviewed by HRD) and approved by Managing Director.
- iii. Job description will be provided to the employees when s/he is appointed, transferred, promoted or newly assigned. The Line Manager(s) shall ensure that their employees have the appropriate and updated job description and always modified as and when required.
- iv. The Key Element of Job Description:
  - a) the job title (which must be sex neutral)
  - b) the location of the job i.e. department/faculty /division/research group
  - c) grade of the post
  - d) the post to whom the post holder is responsible
  - e) any posts reporting to the post holder
  - f) main purpose of the job
  - g) main duties and responsibilities
  - h) any special working conditions

- v. Items that should be included in job descriptions are:
  - a) A note that indicates that, as duties and responsibilities change, the job description will be reviewed and amended in consultation with the post holder.
  - b) An indication that the post holder will carry out any other duties as are within the scope, spirit and purpose of the job as requested by the line manager or Head of Department/Division.
  - c) A statement that the post holder will actively follow TSEL policies including other local regulatory norms & policies.
  - d) An indication that the post holder will maintain an awareness and observation of Fire and Health & Safety Regulations.
  
- vi. The language in job descriptions should:
  - a) Avoid jargon and unexplained acronyms and abbreviations.
  - b) Be readily understandable to potential applicants for the post.
  - c) Avoid ambiguity about responsibilities and be clear about the post holder's accountability for resources, staff, etc.
  - d) Use inclusive language - for advice on non-discriminatory language.
  
- vii. Job Specifications (Person Profile):

The Job specification is of equal importance to the job description and informs the selection decision. The person specification details the skills, experience, abilities and expertise that are required to do the job. It should be drawn up after the job description and, with the job description, should inform the content of the advert. The person specification should be specific, related to the job, and not unnecessarily restrictive - for example only qualifications strictly needed to do the job should be specified. The job specification must form part of the further particulars of a vacancy along with the job description in order that applicants have a full picture of what the job entails. The person specification enables potential applicants to make an informed decision about whether to apply and those who do apply, to give sufficient relevant detail of their skills and experience in their application. The person specification forms the basis of the selection decision and enables the selection panel to ensure objectivity in their selection.

The Key Elements of Job Specifications:

- a) Academic Qualifications
- b) Knowledge (both technical, technological, and general related to the job)
- c) Skills and Abilities
- d) Experience
- e) Aptitudes
- f) Gender
- g) Physical & Mental conditions
- h) Appearance
- i) Working Environment etc.
- j) AGE

9. The age of all new recruits at different level in TSEL shall be governed as per following provisions:

- i. At the time of appointment of entry level management position for fresh candidates (Jr. Executive, Executive or Management Trainee) the age of the candidate shall not be less than 21 (twenty-one) and more than 28 (twenty-eight) years.
- ii. At the time of appointment of top management position (General Manager and above) the age of the candidates shall not be more than 50 (sixty) years and less than 30 (thirty) years.
- iii. For any other management position for experienced candidates, age shall not be less than 21 (twenty-one) years and more than 50 (fifty) years.
- iv. For non-management position the age shall not be less than 18 (eighteen) and not more than 40 (forty) years. But the management may relax the age limit in special cases, reasons of which shall be recorded.

Advertisement

Before proper job announcement, the following procedure must be maintained by the concern personnel through raising the prescribed hiring requisition form. Prior to requesting approval to hire a new employee, the Departmental Head will determine following:

- i. If it is necessary to fill this vacancy or if the job can be performed with existing personnel.
- ii. Prior to requisition, the Departmental Head must ensure that the manpower requirement is made according to the approved annual business plan & recent Organogram approved by the Managing Director.

Considering the above factors, the departmental heads of all companies will issue hiring requisition to the Human Resource Department for personnel required for TSEL.

10. All requests for employing personnel will be made by the Departmental Head on an Employment Requisition Form provided by the Human Resource Department, and must show the following information:

- i. Job Description of the new position
- ii. Education Qualifications Requirement
- iii. Experience requirement
- iv. Other requirement (if any)
- v. Salary Range
- vi. Proposed Date of Joining for the new position

11. After obtaining requisition for manpower requirement the Human Resource Department will consider the following issues:

- i. Find out the suitable candidates from existing employee of concern business unit or any other business units under TSEL for transfer/promotion/placement if any.
- ii. Arrange immediately in-house recruitment announcement through internal memo/notice board/e-mail in consultation with Corporate HR department or find out the prospective candidate's CV from CV data bank available in the concern business unit or Corporate Office.
- iii. In all cases, the internal candidates must be competent enough and capable to prove competencies with external candidates.
- iv. Announcement outside: If the vacancy cannot be filled up by the internal sources, HR department should use the following alternatives-

- a. Job Portal: The announcement must be posted for the vacancy utilizing job web portal “www bdjobs.com” within a week from the date of approval.
- b. Local Newspapers: TSEL standard Career Advertisement can be utilized to release for any vacancies in the local newspapers within a week from the date of approval of Employee Requisition Form by the Managing Director.
- c. Local Hiring Agencies: Local-hiring agencies could be explored and utilized if all the above do not fulfil the need. It is advisable to check with the agency's clients before utilizing their service.
- d. Personal references.

#### 12. Short Listing/Screening of Applications:

The concerned HR department of individual Business Unit or HR-in-charge or a committee (as deemed appropriate) along with the Line Manager of concern department who raised the requisition for hiring will short list the CVs. Applications shall be short listed upon a careful review based on the organizational need, applicant’s qualifications, experience and their suitability for the position. In the case of internal candidates, the employees' personal file, performance record and Line Manager's comment I recommendation should be taken into consideration. The screening process must be completed within a week from the last date of receiving of applications from candidates. While screening the application, the following topics must be reviewed carefully:

- i. Job application
- ii. Qualification and education
- iii. Proper experience for the vacant job (if needed)
- iv. Job history
- v. Reference check (if necessary)

#### 13. Personal Information Form:

To know in details about the applicant’s personal details an Application Blank (well known as Management Application Form/ Employee Information Form) may be provided to the short listed candidates for submission to the interview board.

14. Test and Interview Process:

- i. Short listed applicants may be called for interviews and appropriate testing procedures. Only sort listed candidates will call for interview. No candidate both from internal or external sources can be assured or guaranteed for an interview. TSEL may undertake some or all of the following tests and adopt any other appropriate devices in selection process.
  - a) Written test
  - b) Aptitude test
  - c) Viva Voce
  - d) Practical operation/technical test
  - e) On the job test
- ii. The HR Department will contact the sort listed candidates by letter or phone for appearing in the test/ interview. No TA/DA or other allowances will be provided to the candidates to attend the interview. Top Management of TSEL at their own discretion may make any exception to this rule for the cases of extended interview or subsequent series of interviews for the external candidates.
- iii. The interview panel or selection committee will be comprised usually of three or four members, which will include the Line Manager. For the selection of the senior positions the Managing Director will also be in the panel in the final interview. If deemed necessary, an external person may also be included in the panel.
- iv. During the final interview panel members will make an assessment/ rating for each candidate

15. Duration of Recruitment Process:

HR Department should complete the recruitment process within 45 days from the date of receiving approval of employee requisition by the managing Director/Director.

16. Final Selection:

Upon completion of the test and interview the selection committee will discuss about candidates among themselves and make a recommendation/approval about the selection with signature.

17. Approval for Appointment Decision:

The final selection and appointment in TSEL, employees must be endorsed/ approved by Managing Director.

18. Appointment/Contract Letter:

- i. Before issuing the appointment letter/contract, HR Department, where necessary, will check the candidate's references (preferably two) of which, at least one is official (present/last employer). Any employment will be contingent upon the reference check with personal referee (s) and the clearance of present or last employer.
- ii. The selected candidate (s) will be offered employment signed by HR responsible. The job description must be attached with the appointment letter/ contract.
- iii. When appointed, a new employee on regular status will usually be placed at the 1st step of the respective Grade of the salary chart. In exceptional cases a person having higher education, skills and experience, may be appointed at the higher step of that Grade which at the discretion of the Managing Director. The remuneration of a person on contract will be determined based on the job, and the level of his/ her education, skills, knowledge and experience.
- iv. The selected candidates, after employment, must be asked to submit their clearance certificates from his/ her employer.

19. Required Documents:

The following documents must be submitted by the applicant at the time his/her joining with TSEL:

- i. Latest resume of the candidates
- ii. Academic certificates (with original for verification)
- iii. Training certificates (if any)
- iv. Experience certificate (if any)

- v. Clearance letter (if any)
- vi. Photo (PP- 3, stamp- 1)
- vii. Nationality certificate/ photocopy of passport
- viii. Medical Certificate from any recognized registered MBBS doctor about sound health
- ix. Employee Information Form
- x. 02 Reference Letters

#### 20. Opening of New Employees File:

HR department will open personal file for new employee and related documents should be kept collecting from the employee. Personnel files are the property of TSEL and access to the information is restricted. Management personnel of TSEL who have a legitimate reason to review the file are allowed to do so.

#### 21. Salary & Benefits:

During probation period the employee will get a consolidated agreed amount of remuneration as per the terms and conditions of employment. Other admissible benefits against the position will be applicable as set out in TSEL's policy. In general, break-up of Monthly Gross Salary will be as below:

- i. Basic = 60% of Gross Salary
- ii. House Rent = 30% of Gross Salary
- iii. Medical Allowance = 6% of Gross Salary
- iv. Transport Allowance = 4% of Gross Salary

22. Provident Fund: 10% of basic salary both by the Employee & Employer shall be contributed in the provident fund. Provident fund shall be maintained as per provident fund deed and provident fund rules.

23. Gratuity Fund:

Eligibility of Gratuity:

- a. Service Condition: Continuous service for 6 months and above from the date of joining.
- b. Effective date of entitlement: From the date of joining

Calculation of Gratuity amount:

- a. Service lengths: More than 6 months but not exceeding 10 years; 1 month last basic per completed year of service and 100% thereof in excess of six months or above.
- b. More than 10 years; 1.5 months' last basic per completed year of service.
- c. On death or any other approved ground; 1.5 time of last basic per completed year of service.

Length of Service: From the date of joining.

24. Probation Period and Probation Evaluation for Confirmation Process:

- i. The objective of probation evaluation would be any one of the below three options and be notified to the concern employee before end of probation period.
  - a) Job Confirmation
  - b) Probation period extension with performance improvement plan (PIP)
  - c) Termination from the job (Non-confirmation)
- ii. Salary increment or any other financial enhancement should be considered during/under yearly pay review process. In probation period, employees can avail sick leave and casual leave.
- iii. Only special notes/recommendations during employee selection process can be considered, which has to be mention on recruitment proposal sheet.
- iv. During probation period, a new employee whose performance is being evaluated to determine whether further employment in a specific position or with TSEL is appropriate or not. When an employee completes the probationary period, the employee will be notified of his/her new status with TSEL after proper evaluation system. The probationary period is only appropriate for those employees who have been appointed to

be a regular employee after successful completion of probation period. The following timeline are determined as probationary period for the specific positions.

| Position                           | Probation Period                       |
|------------------------------------|--|
| Assistant General Manager to Above | 3 months                               |
| Manager to Senior Manager          | 3 to 6 months (based on the situation) |
| Non-Management to Deputy Manager   | 6 months                               |

However, management has the right to increase or decrease the duration of probationary period for a further period of time if the performance of the employee is not found satisfactory or any other reasons.

- v. A performance review should be carried out at the end of the probationary period using the Assessment & Employment Confirmation Form. If performance is found up to standard, then employment may be confirmed. If there were any changes with the package or title, it should be notified to the concern employee by issuing a letter of job confirmation.
- vi. TSEL has the right to terminate employment at any time during this probation period without a prior notice in case employee fails to meet job requirement. At the same time, employee may ask to quit anytime during this period without a prior notice.
- vii. Upon satisfactory completion of the probationary period, a review will be given and benefits will be entitled as appropriate. All employees, regardless of classification or length of service, are expected to meet and maintain company standards for job performance and behavior.

#### 25. Induction & Orientation Program:

- i. It is the policy of TSEL to conduct orientation and training programs to familiarize employees with TSEL and enable them to learn their assigned jobs and to develop the skills required for efficient job performance.
- ii. Orientation is a formal welcoming process that is designed to make the new employee feel comfortable at their workplace, remove their natural shyness, informed the details activities of TSEL, and prepare them as a resource for their position. New employee orientation is conducted by the Human Resources Department, and

includes an overview of TSEL history, an explanation of TSEL core values, vision, and mission; and company goals and objectives. In addition, the new employee will be given an overview of the HR policies, benefits, legal issues, and complete any necessary paperwork.

- iii. Employees should be notified about all the code of conducts and procedures needed to navigate within the workplace. The new employee's supervisor then introduces the new hire to staff throughout TSEL, reviews their job description and scope of position, explains TSEL's evaluation procedures, and helps the new employee get started on specific functions.
- iv. All employees must attend a general orientation conducted by Human Resources Department which includes on orientation to the organization as well as a benefits orientation when applicable. The necessary and brief action of Induction & Orientation Program:
  - a) Introduce to all possible employees within TSEL
  - b) Issue a Circular introducing the employee to the respective concerned
  - c) Ensure employee registration IT system for attendance purpose
  - d) Explain vacations and leaves policies and procedures
  - e) Explain work schedule and attendance policy
  - f) Explain Probation Period policy and procedure
  - g) Ensure that a copy of an updated Job description is given to employee based on his position
  - h) Show employee of his/her seating arrangement
  - i) Provide employee with necessary office supplies & stationary

#### 26. Physical Fitness:

No person shall be appointed in the service of TSEL if s/he is declared physically and mentally unfit by the registered medical officer. Before joining, every employee must submit a medical fitness certificate from any registered medical PR actioner about his/her mental and physical fitness. No cost regarding medical fitness to be reimbursed from TSEL. This type of medical certificate also can be taken from our' nominated doctor of TSEL, where no consultation fees will be charged to any employee.

27. Issuing ID Cards:

- i. All the employees of TSEL and its associated company will provide an "ID" card
- ii. ID card should be issued as soon as employed by TSEL
- iii. The ID card should contain the following information on the top side-
  - a) Company name
  - b) Company logo
  - c) Name of the Person
  - d) Designation
  - e) Department
  - f) Blood Group
  - g) Authorized Signature
- iv. The back side of ID card should contain the address & telephone of TSEL, ID Number & conditions of uses. Considering the position and income, lower grade (grade - 1 & 2) employee will get blood group test expenses at actual from TSEL if the person does not have any prior blood group test result.

28. Issuing Business Cards:

It is the policy of TSEL to provide all its management employees business cards. The definition of Management Employees is determined from the position of Executive to Above Positions. The quantity of cards will depend on the uses of cards by the respective employee. ID card may be given during probation period. Every new management employee has to make a requisition prior to request for visiting cards to the HR/Admin dept. by requisition form. The requisition from has to be recommended by the departmental head.

29. Separation of Employment:

- i. During probation period, in case of termination/resignation or any kind of separation of service, 02 (two) weeks' notice from either side will be required except that this notice will not be necessary if one's service were to be terminated by the management for misconduct.

- ii. After confirmation in case of termination/resignation or any kind of separation of service, from either side, 03 (three) months' notice or three month's salary (basic salary) in lieu of notice from either side will be required except-that this notice will not be necessary if one's services were to be terminated by the management for misconduct.

## **Section-B: Employment Policy Only for Expatriate**

### 1. Policy Statement:

Considering the global business diversity and select the best talents, the company sometimes recruit the Expatriate Employees in the special field where local resources are not available. The objective of this recruitment is to develop the local counterparts in association with the foreign Expatriate and transfer the knowledge, skill, technology and job related know how for the overall development of the business and the economy of the country as a whole.

### **Employment Status:**

The Foreign Expatriate recruitment is totally contractual basis for a specific period. Generally, an expatriate employee is recruited for a period of 02 (two) years which may be extended for a further period of time subject to mutual agreement of both parties. To recruit expatriate, the company follow local regulatory norms.

### **Selection Process:**

The recruitment and selection process for expatriate employment is merely similar to local process except few areas. The brief selection processes are as under:

- i. Raised hiring requisition by the Business Unit Head/Director/CEO and must be taken approval from MD.
- ii. Should find out the sources of recruitment such as advertisement in home or abroad, reference, through overseas office etc.
- iii. Placed the advertisement according to the Job Description and Job Specification.
- iv. Collect resume along with passports size photograph and photocopy of passport of potential candidates.

- v. Interview in home or abroad where the presence of Managing Director, Concern Business Unit Head and Head of HR is must as a common selection committee.
- vi. Managing Director has the sole discretion for selecting any expatriate without following all the process considering the necessity and other factors.
- vii. Proposal, Deed of Contract Agreement and Appointment Letter to be placed for MD's approval with details terms & conditions.
- viii. Handed over the appointment letter and deed agreement to the employee.

2. Other formalities for joining:

- i. A visa request letter to be issued to the Bangladesh Embassy/High Commission of the respective country of selected employee for E-Visa for Bangladesh. For other country, necessary formalities must be done according to the respective country's laws.
- ii. Air Ticket to be issued in favor of selected candidate and his family members (if required).
- iii. Medical certificates for the selected candidate and his family members to be produced to the company mentioning the candidate mental and physical fitness. As a matter of policy, the company may not consider any employment if the candidate or his dependents (who will accompany with candidate) have any HIV/HBS symptoms.
- iv. Management may arrange an alternative medical checkup both for the candidate or his family members in Bangladesh if desired so.
- v. Arrange a residence and vehicle (if required) for the employee within the range of his/her ceiling
- vi. HR department will also ensure other logistic support in connection with the employee office and residence.

3. Formalities after Joining:

- i. For Bangladesh-
  - a) Submit necessary document such as appointment letter, E-visa, photocopy of passport to get work permit from Board of Investment (BOI) for Bangladesh.

- b) Apply for Multiple Employment Visa from Department Immigration & Passport, Bangladesh.
  - c) Get a Clearance from the employees native Embassy/High Commission in Bangladesh.
  - d) Get Police clearance form Intelligent Department and Special Branch in Bangladesh.
  - e) Received E-Visa for a specific period from Department Immigration & Passport of Bangladesh.
- ii. For Other Country-

Necessary formalities must be followed according to the respective countries laws and regulation.

#### 4. Job Descriptions (Position Profile):

A standard job description will be provided to the newly appointed employee at the very beginning of his/her joining.

#### 5. Personal Information Form:

To know in details about the employee's personal information, an Application Blank (well known as Management Application Form/ Employee Information Form) to be provided to the employee for submission to the HR department.

#### 6. Opening of New Employees File:

A personal file for every new employee must be open ensuring that all related documents are kept in the file.

#### 7. Induction & Orientation Program:

HR department will conduct orientation and training programs to familiarize employees with the company and enable them to learn their assigned jobs and to develop the skills required for efficient job performance.

8. Issuing ID Cards:

All the employees of the company and its associated company will provide an "10" card according to the standard format. ID card should be issued as soon as possible.

9. Issuing Business Cards:

The entire management employee must get business cards according to the approved format of the company.

10. Duties:

During the employment, the employee shall devote all of his/her time and energy to perform such duties and exercises, such functions as may from time to time be assigned to or vested in him/her by the Managing Director or his/her immediate supervisor of the Company and shall not either directly or indirectly work or take on job for any other company and person. The employee is obliged to observe the company's established general rules, guidelines, regulations and policies and any subsequent amendments or modifications thereto issued by the Company

11. Salary & Benefits:

Salary and other admissible benefits against the position will be applicable as per the terms conditions of appointment and existing company's policy. The general terms and conditions are as given below:

- i. The employee shall be paid a fixed net monthly salary in USD or BDT to be paid by the 5th of next month from the date of joining.
- ii. The Salary is agreed inclusive of local, maid and all other allowances and is free of taxes, which will be paid by the Company.
- iii. The Company will provide 02(Two) bonus equivalent to One Month's Basic salary, Two in a year within the accounting year. Generally, this bonus is paid at the time of Eid Ul Fitre and Eid Ul Adha.

12. Accommodation:

The Company will provide a suitable accommodation however the cost of rent and utilities does not exceed the ceiling (will fixed by the management) per month (Utility include electricity, water, gas, and maintenance). Any additional amounts, if required, will be paid by the employee from his/her personal account. Company supposed to provide a minimum furnished house (not in lavished) where most essential house hold items should be included. No luxurious or optional items to be provided. The house will be minimum furnished and the following house hold equipment/furniture will be available-

- i. Washing Machine – 01
- ii. Refrigerator- 01
- iii. Iron
- iv. TV with Stand (satellite connection charge and monthly bill will be paid by the employee, if required)
- v. Air Condition
- vi. Sealing Fan - as per room requirement
- vii. Sofa for Guest Room (5 seaters)- 01 set
- viii. Dining Table (6 seaters)- 01 set
- ix. Bed Set - max 3 set
- x. Wardrobe - 02 set
- xi. Reading Table- 01 set
- xii. Dressing Table- 01 set
- xiii. Window/Door Screen
- xiv. Kitchen Gas Burners
- xv. Water Filter- 01 set
- xvi. Microwave Oven- 01 pc

13. Car:

A company maintained car would be provided according to the car policy. The car would be self-driven by the employee and the employee will be provided fuel or gas according to the company policy. Management may provide personal driver's allowance or company provided driver for senior position based on the situation and other measurable issues upon its own discretion power which must be mentioned in the agreement.

14. Mobile Phone:

The company will provide a mobile phone. The company will bear: the monthly mobile bill ceiling according to the policy. All overseas personal calls, which will be on account of the employee. However, all overseas official calls will be borne by the company.

15. Schooling for the Children:

i. For Bangladesh-

The company will bear the cost of schooling of the employee's children subject to a maximum of 02 (two) children up to Grade XII and subject to the maximum of the following amounts per month:

- a) Up to Grade V : US\$ 50.00
- b) Grade VI to VIII : US\$ 75.00
- c) Grade IX to XII : US\$ 100.00

ii. For Other Country-

The company will bear the cost of schooling of the employee's children subject to a maximum of 2 (two) children commensurate with the country's standard of educational cost. In this regard, the company will pay registration cost once only during the service tenure in the same country. Tuitions fees will be paid by the company at actual. No other cost related to education will be borne by the company. In this regard a proposal must be submitted for management approval at least 02 weeks before the admission of children(s).

16. Medical:

The Company will bear at actual medical coverage for the Employee and his family member's health and medical expenses for normal sickness and accident. The medical coverage will

include all the cost related to doctor consultation fees, test and drugs. Dental and Eyes are not included in the medical coverage except only for the doctor consultation fees.

#### 17. Leave Entitlement:

The employee is entitled to the following leave facilities for a period of 01 (one) completed year of service in the company from the effective date of employment contract:

- i. Casual Leave- 28 days
- ii. Sick Leave - 07 days

This entitlement is not cumulative and, if not exercised during one year, cannot be carried over to the next year end-cashed. Annual Leave will be provided for any kind of personal overseas trip. If the employee desires not to leave country to enjoy holiday, s/he can enjoy his/her Annual Leave in his/her posting country within its surroundings. In that case s/he will be only entitled travel related expenses during his/her leave within the country if any.

#### 18. Travel Expenses:

- i. On joining, Company will pay the actual cost of travel by air from home country to workstation for the employee and his family members.
- ii. The Company shall provide roundtrip air tickets to the employee and his/her family once in a year for traveling from work station to home country and back during the period of his/her employment. This entitlement is not cumulative and, if not exercised during one year, cannot be carried over to the next year or en-cashed. If any expatriate wants to visit abroad several times due to personal reason, s/he will bear the cost by his/her own and the duration of his/her leave period will be counted as Leave without Pay (LWP) if s/he do not have any balance Annual Leave.
- iii. On return to home country permanently, the company will pay USD 750.00 (USD Seven hundred fifty) only as transfer cost to the employee and his family from workstation to home country as cost of travel by air.

#### 19. Termination of Employment:

It is envisaged that the period of employment of the concern employee will be only for contract

Period as mentioned in the appointment letter. Either party may terminate this contract by giving 90 days' notice in writing or payment in lieu of notice, provided the Company may terminate this contract at any time without giving any notice or payment in lieu thereof, if you are found to be guilty against misconduct, disobedience, insubordination, misbehaviour, gross carelessness or other conduct, detrimental to the interest of the Company.

#### 20. Other Terms and Conditions:

##### i. Secrecy of the business:

During his employment and during a period of two years thereafter, the employee undertakes to observe complete secrecy concerning the business, including but not limited to the affairs, finance, customers or trade connection of the Company. S/he should also not divulge to outsiders - or otherwise irrelevant persons - matters that come to his/her knowledge in his position as an employee in the Company.

##### iii. Required documents:

In order to complete the enrolment/ the employee should provide us the following:

- a) A set of complete resume
- b) 2 copies of passport size photograph
- c) Copy of passport
- d) Copy of all educational certificates
- e) Release letter from the previous employer
- f) Spouse details and passport photocopy
- g) Children details and passport photocopy
- h) Blood Group
- i) Driving license (Local & International)
- j) Medical certificates (for employee and his family members)

iv. Visa / Work -Permit:

Visa or work-permit will be processed by the company at its own cost. At the end of this contract or prior determination of the contract the visa I work permit will be cancelled by the company and the employee will be required to return it to the embassy/high commission of Bangladesh or respective country's diplomatic mission at his/her own country of residence.

v. Arbitration:

The agreement shall be governed by the law in force in Bangladesh. Disputes arising from this agreement shall in the final instance be settled by arbitration/ according to the rules of Bangladesh Arbitration Act. The arbitration will take place in English language.

vi. Signature:

The deed agreement should be signed by the employer and accepted by the employee knowing and agreeing all the terms and conditions as mentioned. This agreement should be endorsed by at least two witnesses.

21. Management Discretion:

The Management reserves all the right to change, modify, amend, cancel or waive any or all of the provisions of this policy at its absolute discretion and without any prior notice and any reason whatsoever.

## **Section C-Leave Policy**

1. Policy Statement:

This policy encourages TSEL's employees to take a break from work as this provides for healthy, stress free and more productive staff. The leave policy sets out the various types of leaves that an employee is eligible for and outlines the procedure for taking leave. And Leave policy will be maintained as per financial year (i.e. July-June / January-December).

2. Types of Leave:

i. Casual Leave (10 days):

- a) A confirmed employee is entitled to have Casual Leave at the rate of 10 (Ten) days with pay in a calendar year, which cannot be carried forward to next year. Casual leave can be taken within one-day notice under the discretion of the authority.
- b) In case of emergency, Casual Leave may be granted on the same day if it is required.
- c) Maximum 03 days Casual Leave may be allowed in a single occasion.
- d) In case of suffix and prefix situation, casual leave cannot be attached to the public holidays. Under the special circumstances, one can take maximum 03 (three) days casual leave including either suffix or prefix.
- e) Casual leave cannot be extended beyond 3 days. If same happened, it should be automatically counted as Annual Leave. If the balances Annual (Earned) Leave of that specific employee are not available, the additional absent days will be counted as Leave without Pay (LWP).
- f) In any case casual leave cannot be attached with Annual (Earned) Leave consecutively.

ii. Annual / Earn Leave (20 days):

- a) A confirmed employee is entitled to obtain 20 (twenty)-days Annual (Earned) Leave in a Calendar Year and can enjoy on the basis of accumulation.
- b) This leave will be commenced and calculated from the date of joining (Probation period included).
- c) During the probation period no leave will be allowed for probationary employee. But in case of special event/emergency purpose management can allow Leave without Pay (LWP) or advance leave to be adjusted from accumulated Annual (Earned) Leave after confirmation. During probation period maximum 06 (six) days Annual (Earned) Leave may be allowed for emergency purpose. If it is more than 06 days, the leave will be automatically counted as Leave without Pay (LWP) and salary deduction will be made according monthly remuneration.

- d) It has been observed from experience that due to exigencies of service almost all the employees cannot enjoy their full annual leave. Management has decided that all the confirmed employees must enjoy at least 05 (five) days mandatory Annual (Earned) Leave in a year at their convenient. The objectives of this mandatory leave is to grow close attachment. Towards family by giving a longer period at least once in a year, to improve productivity & reduce cost and to enhance corporate image as part of better management practice.
- e) The balance Annual (Earned) Leave (i.e. maximum 15 days or at actual balance after availing from this 15 days) will be forwarded for encashment at the time of closing of each calendar year (before 2nd week of July) and payment must be ensured within July.
- f) Annual (Earned) Leave can be carried forward up-to 60 days. In that case the concern employee must have to notify the management about his/her intention to carry forward.
- g) In general case, the application for Annual (Earned) Leave must be submitted at least 3 (three) days before the leave availing date and the leave will be granted at the sole discretion of the authority.
- h) For the purpose of mandatory 05 (five) days earn leave at a time, Head of Operation/ Department will prepare a leave calendar for their employee and submit it to Unit Head for information & approval. Once the approval was made by the Unit Head it should be forward to respective HR representative for their record. For emergency purpose, individual employee can apply for rearrange/change it, once in a calendar year. But management has its sole discretion to rearrange/ reschedule/ change the leave plan in case of emergency or based on business priority or requirement.
- i) The calculation of encashment for earn leave will be based on monthly gross salary (i.e. 30 days - in a month) for a maximum period of 15 days or below (at actual after availing annual leave).
- j) In case of suffix and prefix situation, annual leave cannot be attached to the public holidays. However, under the special circumstances, one can take maximum 03 (three) days annual leave including either suffix or prefix.
- k) In any circumstances, if the mandatory Annual (Earned) Leave is not availed by the employee, shall not be carried forward in next year or shall not be end-cashed for the same.

iii. Sick Leave (14 days):

Confirmed employee is entitled to avail 14 (fourteen) days sick leave in a calendar year with full pay on the ground of physical unwell or sickness. In case of extension of sick leave longer than the specified period (14 days), remaining casual leave or annual (earned) leave, which is favorable, will be considered as sick leave.

In case of serious accident or serious illness, the Higher Management (Unit Head & MD) may sanction I extend special leave at their own discretion. However, special leave on the ground of sick should not be more than 30 days and- the leave will be without pay (LWP).

All sick leave applications must be supported by a registered physician's certificate, if it is more than 2 days.

- a) Respective authority may seek if needed a second opinion by another competent medical practitioner on the merit of the Sick Leave application.
- b) If an employee is feeling sick on weekend or on a public holiday and the sick days continue up-to a certain period of day(s), the initial holiday will not be counted as sick day and the rest availing number of sick day(s) will be counted as Sick Leave.
- c) Sick leave cannot be carried forward to the succeeding year and cannot be encashed.

iv. Maternity Leave (16 Weeks /112 days):

- a) A female employee who have rendered her services for 06 months will be entitled to enjoy Maternity Leave for 16 (sixteen) weeks, which shall include the Public Holidays, and Weekends days (non-working days).
- b) A female employee will be allowed maternity leave up-to twice in her service life for 1<sup>st</sup> and 2<sup>nd</sup> issues.
- c) The entitlement to maternity leave is to be availed as follows (8 weeks by 8 weeks' ratio):
  - 8 weeks immediately preceding and including the day of delivery (Pre-natal)
  - 8 weeks immediately following the day of delivery (Post-natal)
- d) The concern employee should submit registered doctor's certificate mentioning the EDD for obtaining the leave.

- e) If the employee is fully capable and desires to continue her office work immediately preceding 4 weeks before the expected date of delivery (EDD), management may consider her leave as 4 weeks (pre-natal) + 12 weeks (post-natal) ratio, in this case, employee needs to submit a doctor certificate mentioning her capability to work up-to the pre-natal days.
  - f) The days availed as Maternity Leave should not be added to calculate Annual Leave (Earned Leave) and annual leave will be calculated accordingly.
  - g) Management may consider additional leave on Maternity ground from her authorized Sick Leave/Casual Leave /Annual (earned) Leave /LWP as per management discretion.
- v. Other Leave:
- a) Days or periods of absence from work without an acceptable reason and without prior permission of management will be counted as LWP.
  - b) Late attendance for each 3 (three) working days in a month will be considered as 01 (One) day LWP. Management may consider to adjust this late attendance with 01 (one) day annual (earned) leave on special ground.
  - c) If an employee already enjoyed all types of leave facilities in a year and desires for more leave with valid and justified reason, in that case s/he will not be entitled any advance leave but management may allow him/her expected leave as "leave without Pay". If this sequence continues up-to 30 days, his/her job may be terminated from TSEL.
  - d) If any employee availed advanced annual (earned) leave during probation period with the consent of competence authority for emergency purpose, those leave will be adjusted from his/her annual (earned) leave after confirmation.
  - e) Compensatory leave may be granted to the management employee if s/he worked for at least six hours on Public Holidays or on Weekends day. If overtime or other benefits are provided for the working holiday, the compensatory holiday will not be provided. The compensatory holiday must be enjoyed within the next month.
  - f) On special ground Management may allow maximum 45 days Hajj Leave with pay for the Muslim employees once in their service life. Additionally, for Umrah, 15 days Leave with pay is allowed once in service life. The pre-

condition of getting this leave, one should continue their job for a minimum period of 05 years. If someone desires to avail this leave earlier and leave TSEL before 5 years, she/he will be required to debit the entire salary amount (for leave period) to TSEL.

- g) Any kind of leave such as Study Leave/Marriage Leave/Paternity Leave etc. may be considered as Leave without Pay (LWP) upon discretion of management.
- h) To avail any type of leave, prescribe Leave Application Form must be filled-up by the respective applicant.
- i) A contractual employee will get 10 days Casual Leave and 14 days Sick Leave in a Calendar year or proportionately. No Annual (Earned) Leave will be allowed if it is not mentioned in the terms & conditions of employment. All the leave allocation will be proportionate in a Calendar year.
- j) In the event of staff leaving or separation from TSEL, the concern employee will get benefit for encashment of his/her balance Annual (Earned) Leave on pro-rata basis which will not be exceeding 15 days.
- k) Management discourages to take short leave in office hour. In case of emergency half (1/2) day leave may be approved from his/her annual (earned) leave. To take half (1/2) day leave, the person must be ensured that his/her pending job will not affect his day to day business operation. An employee can take maximum 12 days short leave in a calendar year or financial year.
- l) The leave approval must be done according to the hierarchy of the organizational structure. In this case, concern supervisor will recommend the leave and head of business unit will approve the same. For head of business unit or similar position, the leave recommendation and approval will be done by Managing Director. During leave period, the duties must be carried by a responsible person to be selected by the applicant and his supervisor.
- m) All types of approved leave must be kept in record by HR Department for their future reference. A monthly leave status report must be submitted to Corporate HR department for their record.

## **Section D- Car and Transport Policy**

### A. Objective:

1. To ensure faster movement at office work and provide personal support/requirement to staff as and when required;
2. To ensure smooth function of transportation management;
3. To help the allotters to grow their career with TSEL and thereby motivating them to have more productivity towards company;
4. To look into outsourcing alternative to provide transportation to the staffs;

### B. Eligibility for Availing Full Time Car Facilities:

1. This policy will be applicable to all management level employees starting from Manager (Band I) to above positions considering the job nature and urgency of service.
2. Higher Management (MD, Chairman, Director, DMD, CEO, COO and all CXOs above General Manager position) will get company provided car along with fuel, maintenance & driver at actual.
3. An eligible Higher Management personnel may apply for the car facility to the Human Resources Department in writing. The car will be procured as per the prescribed form (capital expenditure form of procurement policy) or rented as per this policy.
4. The entitlement of car allowance will be enjoyed by the employees only after submission of valid documents (both whether purchased or hired) and approval of the same.

### C. Entitlement for Higher Management:

1. The following limit/capacity shall be allowed by TSEL to following higher Management positions for using official cars:

| <b>Designation</b>                           | <b>Vehicle Capacity (Maximum CC)</b> | <b>Maximum Ceiling to Purchase/ Rent the Vehicle</b>  | <b>Fuel, maintenance &amp; other expenses</b>   | <b>Driver Category</b>  |
|--|--------------------------------------|---|---|-------------------------|
| MD/ Director/ CEO                            | As per management decision           | As per Board decision   | At actual subject to the provision of this policy   | Company provided driver |
| Higher Management other than MD/Director/CEO | 1500 cc                              | For purchase: ceiling will be up to BDT 35,00,000 only.<br>For rent: vehicle condition will be equivalent/ similar to purchasing ceiling conditioned vehicle. | Fuel ceiling will be up to 250 liters per month. However, maintenance and other expenses will be at actual subject to the provision of this policy. | Company provided driver |

**D. Entitlement of Other Management Positions:**

1. Other positions starting from Manager (Band I) up to General Manager are eligible to get only car allowance not eligible for company provided car. and avail the benefits according to bellow Structure:
2. Management encourages employees to buy and use good Conditioned vehicle which will represent company images and staff's safety. However, car purchasing/rental document/agreement are not mandatory to avail the car.

**MONTHLY CAR ALLOWANCES (ALL INCLUSIVE)**

| <b>Designation</b>  | <b>Monthly Transport Allowance &amp; other expenses</b> |
|---|---|
| General Manager   | Tk. 70,000 per Month                                    |
| Assistant General Manager to Deputy General Manager   | Tk. 65,000 per Month                                    |
| Manager (Band-I) to Senior Manager  | Tk. 60,000 per Month                                    |
| Note: If fuel/CNG price go up/down, management may adjust and commensurate the above ceiling accordingly. |   |

3. Car Drop & Pickup Facility Cost (incurred from Employee Salary):

| <b>Designation</b>   | <b>Transport Availing Charge/ Month (BDT)</b> |
|--|---|
| Non-Management to Executive  | 1,000   |
| Senior Executive   | 1,500   |
| Assistant Manager  | 2,000   |
| Deputy Manager   | 2,500   |
| Manager (Band-III)   | 5,000   |
| Manager (Band-H)   | 6,000   |
| Note: Management may adjust the above rates at their own discretion. |   |

**Note:**

\* The car model shall not be more than 10 years old at the time of entitlement of the benefit.

\* The existing employees who are enjoying the benefit under current policy but the car model year is more than 10 years at effective date shall have to buy car complying with the new policy in order to avail the benefit. However, they will be provided with the existing benefits under old policy for the said six months and thereafter will not be provided any benefits on their existing cars.

\* The existing employees who are using outsourcing cars will have to purchase own car by the effective date of this policy to avail benefit under the new policy.\* The employees working in Sales Department can avail Taka 4,500 additional along with the entitled car ceiling.

4. To avail this opportunity, the approval of entitlement along with ownership documents of the car must be submitted to corporate HR & Admin Department. Corporate Audit, HR & Finance will evaluate and fix the car and recommend accordingly.

5. If fuel/CNG price go up/down, management will increase/decrease and commensurate the above ceiling accordingly.
6. The car must be used as full time for official as well as personal usages as and when required. Any interruption or negligence for using the car for official purpose, management may decide to stop paying the monthly ceiling amount subject to have proof of the allegation(s).
7. This benefit will continue until the entitled employees' continuation of service /legal association with TSEL. However, management may discontinue this benefit without showing any reason

**E. Conditions of Outsourcing of Cars for Higher Management:**

Management may decide to provide car to the entitled higher management personnel through outsourcing agents. In that case, company will provide full time car, driver, fuel & maintenance and other related costs through outsourcing agent on monthly basis.

The following terms & conditions will be applied to use the outsourcing cars:

1. Outsourcing company will provide brand new/reconditioned car in showroom conditions with all the modern car amenities (AC, POWER STEERING, POWER WINDRO, CD, CASSETE, NEW ALLOY, NEW TYRE, AND STANDARD TOOLS & ACCESSORIES). The car should be converted by CNG. The car manufacturing year should not be more than 5 years old. Company will be pay monthly rent of vehicle to the supplier as per the contract for higher management.
2. The driver will get compensation and other benefits as per company policy.
3. Others terms & conditions with suppliers will be maintained according to the written agreement and as per contract set forth by parties.

**F. Terms & Conditions of Using Car for Higher Management:**

1. Higher management will get company provided car according to their ceiling as per Clause-C.
2. Company will procure car from any sources and the car will be asset of TSEL or its financier until full settlement of liabilities. To procure a car, company may not seek or honor any alternative choice from the employee concerned about its

model, color, specifications and any other issues. Management has the sole discretion to take any decision in this regard.

3. The vehicle to be run by Octane. No CNG conversion is accepted.
4. The car will be insured with 1<sup>st</sup> party insurance facility having full coverage. The insurance premium will be paid by TSEL.
5. Minor denting and painting work will not be done frequently until major denting & painting is required. For major denting & painting work proper insurance claim to be lodged to insurance company for the respective car, if possible. Admin department will evaluate the necessity of denting & painting issue.
6. For any accidental damage, proper insurance to be claimed from insurance company. In this regard, necessary formalities such as valid driving license, general dairy, up to date document must be updated and ensured by HR & Admin and allottee's concerns.
7. TSEL will bear the cost related to periodic maintenance, general maintenance, changes of tires, wheels, battery, denting painting and other cost related to vehicle maintenance. The standard schedule of the mentioned work will be maintained by HR & Admin department. Flexibility is only acceptable upon inspecting the physical condition of the car and the significance of problem. Engine overhauling and other major maintenance work will be done considering the physical conditions of car, mileage, duration and other standard considerable points and also according to the standard practice of TSEL.
8. Periodic maintenance (including servicing) should be done after every 3,000 kilometers running of the vehicle. However, formal requisition should be raised in this regard through HR & Admin department. Regular washing and cleaning are the sole responsibility of the allottee's driver.
9. For decorating the car and other necessary items, the following shall be provided from TSEL:
  - I. Carpeting – change after every 3 years
  - II. Seat cover – change after every 2.5 years
  - III. Tub & mug – once in a year
  - IV. Plastic carpet/inside carpet – once only
  - V. Umbrella – once in a year
  - VI. Log book and pen – as per actual requirement

10. If any spares or parts are lost, damaged or theft due to the willful negligence of the driver or allottee, immediate replacement will be done by the allottee. Company will not bear any cost in this regard.
11. Official drivers will be recruited as per Company recruitment policy.
12. Allottee is also be requiring to have their valid driving license for driving TSEL car. Without driving license no one is allowed to play the vehicle on the road. If any accident occurred due to unskilled driving and without driving license, then the concerned personnel will be responsible to bear the cost and thus company will not be any more responsible for the same.
13. The allottee shall be fully responsible for keeping the car in neat and clean conditions at all times and do proper attention for its safety and security.
14. Management has all the right to audit, check and inspect vehicle at any time and placed necessary advice, suggestion, and recommendation for the betterment of TSEL.
15. Fuel shall not be transferred to one car to another car whatever the case it is. Practicing this kind of illegal thing will be treated as gross violation of company's code of conduct.
16. The allottee must always use the car for business as well as his personal purpose and shall not be used for any commercial purpose.
17. The allottee shall not be paid any conveyance allowance or traveling expense for his/her day to day official duty. But company may provide pool car as temporary support at the time of non-availability of car due to technical problems or maintenance work.
18. The car must not be used for any unlawful activities.
19. Car safety and security shall be ensured by the allottee himself/herself or by appointing.
20. It is the management discretion to withdraw or cancel the car facilities provided to the higher management of TSEL. In that case, the allottee must return the car to TSEL with immediate effect.
21. Fuel consumption will be considered as average of 03 months ceiling.
22. TSEL will bear all the expenses related to tax token, fitness, route permit etc. of the car.

23. It is the allottees' option to make TSEL's car in his name. However, TSEL shall transfer ownership in favor of allottee on the following manner:

| Year | Cost | Depreciation | Markup value on depreciated value | Transfer value |
|------|------|--------------|-----------------------------------|----------------|
| 1    | 100  | 20           | 0%                                | 80             |
| 2    | 80   | 20           | 5%                                | 63             |
| 3    | 60   | 20           | 7%                                | 42.8           |
| 4    | 40   | 20           | 10%                               | 22             |
| 5    | 20   | 20           | 15% of cost                       | 15             |

24. The above payment schedule will be distributed to the allottee's at the time of handover the car. The depreciation is calculated in straight line method. The allottee can take over the car ownership at the time of his separation from TSEL by paying the value as specified above. After completion of 5 years the allottee must pay 15% of the purchase amount to transfer the ownership in favor of them. TSEL will initiate the process to transfer the ownership to the allottee.

25. After five years, company will provide a new car to the allottee according to the policy.

26. All the relevant cost regarding transferring the ownership in favor of employee to be borne by TSEL.

27. Allotment of vehicles towards contractual employee is the sole discretion of management and a separate terms & conditions will be applicable for those cases.

G. Guidelines for Using Staff Bus for Pick & Drop Service:

1. Executive to above who are not entitled for car shall be nominated for pick and drop service subject to availability of space. Female employees will get priority to avail this facility if they are willing to use it. All the allotment is on temporary basis subject to availability of space.
2. Prescribed Form must be filled up to avail staff bus/ transport facility. This form should be properly filled up and recommendation to be taken from respective supervisor for management approval.

3. Monthly transport availing charge 1000/month will be deducted from salary.
4. Route will be planned by HR & Admin department. User will avail this facility at the nearest point of his/her locality. User will stay at their nearest preset point at least 5 minutes before his/her schedule time. Vehicle will not provide home service or door to door service for carrying staffs. The route will also be planned considering the office timing, so that the vehicle reach office at least 5 minutes before the attendance timing.
5. If anybody fails to avail pick/drop facility by any reason, he/she will not be able to claim compensatory conveyance for the same purpose.
6. User should notify to the driver or other users of HR & Admin department earlier, if he/she is not being able to avail staff bus for any specific day(s) for avoiding extra time consumption of the users.
7. The staff carrying facility may be temporarily stopped for any emergency and important assignment for the broader perspective of business or maintenance purpose of the vehicle. HR & Admin department will notify to all the users earlier for their convenient and try to solve the problem as early as possible. No compensatory convenience allowances to be provided in this regard.
8. User's coordination is very much essential to ply the staff bus on the route for its smooth and convenient operation.
9. If any employee wants to take company vehicle against requisition for personal use after office hour or in holiday, she/he to pay the following charges to TSEL:
  - A. Tk. 10 X Per Kilometer
  - B. Tk. 25 X Per hour waiting time
  - C. Tk. 250 as service charge
10. Users shall take maximum care during his/her use time of vehicles. Smoking, illegal goods carrying and other unlawful activities are strictly prohibitive.

## **Section E- Insurance Policy (Life, Health & Out Patience)**

### 1. Employee Medical Benefit Policy:

Sound mental and physical health always ensures highest level of productivity at work. To ensure maximum productivity by minimum human resources, the employee concern as well as the organization directly or indirectly can play vital role for ensuring sound mental and physical health of each and every individual. TSEL always believes the modern human resources practice within the organization. As part of continuous development of HR policies and procedures, TSEL have started to review its existing policies aligning with the best HR practice in different organizations over the country. Employee Medical Benefit Policy is applicable for all the permanent nature of employment (except contractual, casual, daily basis) employees of different business units under TSEL, Bangladesh.

### 2. Objectives:

- i. To ensure sound mental and physical health of the employee and authorized member of the family
- ii. To ensure highest level of productivity at work
- iii. To attract, recruit and retain the talents
- iv. To enhance the image of TSEL
- v. To follow a standard practice within the organization

### 3. Company Doctor:

TSEL already engaged a part time General Medical Practitioner to check employee's health in a weekly basis. The schedule of Doctor's consultation time already been circulated to all concerns in different business units under TSEL.

### 4. Hospitalization Plan:

Almost everyone can afford outpatient treatment, but when hospitalization is required the heavy expenditure incurred for hospital treatment adds to the worry and anxiety. In order to be free be free from the worry and anxiety of hospitalization treatment expenses, TSEL decide on a health insurance scheme with life insurance. To provide the best service towards

employees TSEL paid the insurance premium by its own in favor of the employee (self, spouse and up to 02 children) to ensure maximum relief from the hospitalization treatment expenses.

#### 5. How The Employee Will Get the Benefit:

The following benefits will be provided to the employee by the Insurance Company:

- i. The plan is only for hospitalization (minimum hospital stay is 24 hours)
- ii. No restriction to choose hospital/clinic to be treated in. no registration of consultation by whom to be treated. There are some enlisted hospitals of Insurance Company where special care or direct of the bill be ensured.
- iii. Virtually all members of a given group may be insured, regardless of their prior health history.
- iv. As the plan of non-contributory by the employee, the employer pays the coverage that employees would otherwise have to pay for with personal money.
- v. Each member of the plan will get a personal health insurance card with photograph, if required so.
- vi. Easy to admission in the designated hospital by showing Health Insurance Card.
- vii. Direct settlement of hospital bills in case of admission in the designated hospitals.
- viii. Maternity coverage for married women without any extra premium. Maternity benefit shall be effective after 6 (six) months of membership under the plan for the spouse of a male employee. However, for female employees, maternity coverage shall be from the date of commencement.
- ix. Overseas treatment in India/ Thailand/Singapore is also allowed as per mutual agreement.

#### 6. What will Cover:

- i. Hospital accommodation in private room
- ii. Consultation with physicians and /or surgeons during hospitalization
- iii. Medical investigation and test during hospitalization
- iv. Major and intermediate surgical operations

- v. Use of operation theatre, anesthesia and other services
- vi. Medicines during Hospitalization
- vii. Ancillary services like, Labor room, Post-operative care and Intensive care facility, Blood transfusion, Oxygen therapy etc.

#### 7. Hospitalization and Claim Procedure:

Prior to admission in the hospital/clinic the patient (employee) will simply complete a Claim Notification Form (available in HR Dept.) and submit it to HR department along with consulting Doctor's Advice Note. The HR department will send it to the Insurance company Life Office to obtain a letter of authorization for admission and advise the patient accordingly. The patient shall submit the claim through the HR dept. in the prescribed form along with the supporting original documents for reimbursement of expenses. In case of emergency, prior authorization is not necessary but Insurance Company should be notified through the Employer within 48 Hrs. of submission.

#### 8. Exclusion of the Plan:

- i. Any congenital infirmity
- ii. Any pre-existing condition
- iii. Any food or food supplements, antiseptics, cosmetic cream etc.
- iv. Any pre-hospitalization expenses
- v. Mental, emotional or physical disorders, alcoholism or any narcotic addiction
- vi. Any procedure which is experimental or not generally accepted by the medical profession i.e., acupuncture.
- vii. Any cosmetic or plastic treatment/surgery unless required as re-construction surgery as a consequence of injury due to accidents/burns.
- viii. Rest, convalescence or rejuvenation cures, thermal baths or confinement for the purposes of slimming or beautification
- ix. Treatment for family planning purposes including termination of pregnancy, dilatation curettage or sterility.
- x. Abortion, miscarriage, ectopic pregnancy, fetal death or any complication and or sequel there from.

- xi. Attempted suicide, violation or attempted violation of the law, injuries willfully or intentionally self-inflicted or due to instantly or under the influence of a drug.
- xii. The examination, fitting or replacement of spectacles including contact lenses or hearing aids.
- xiii. Health checkups, radiography, chemotherapy, in form of investigation/treatment when not incidental or necessary to the treatment of the injury/illness which caused hospitalization.
- xiv. Circumcision
- xv. Aids and HIV related diseases
- xvi. Any dental treatment like route cannel, scaling, filling, and other auxiliary dental issues.
- xvii. First Tk. 500/= of each claim.

#### 9. Entitlement of Group Health Insurance Plan

| Benefits/Year Including Dental & Optical  | (NE: 1-3) | (E: 10-13) | (E: 6-9) | (E: 4-5) | (E-3)   | (E: 1-2) |
|---|-----------|------------|----------|----------|---------|----------|
| Max. Coverage Per Member Per Disability   | 60,000    | 90,000     | 120,000  | 125,000  | 175,000 | 185,000  |
| Total Hospital Room Rent limit (at actual or Max.)  | 24,000    | 36,000     | 48,000   | 50,000   | 70,000  | 74,000   |
| Daily Hospital Room Rent limit (at actual or Max.)  | 4,000     | 5,000      | 8,000    | 10,000   | 15,000  | 30,000   |
| ICU/CCU Limit per confinement   | 14 days   | 14 days    | 14 days  | 14 days  | 14 days | 14 days  |
| All other In-Patient treatment expenses inclusive of surgical charges, consultation fees, medicines, Ambulance and relevant medical investigations related to the ailment and other ancillary | 36,000    | 54,000     | 72,000   | 75,000   | 105,000 | 111,000  |

|   |  |  |  |  |  |  |
|---|--|--|--|--|--|--|
| services (excluding Room & ICU/CCU charges) maximum per person per Disability |  |  |  |  |  |  |
|---|--|--|--|--|--|--|

- i. Every regular employee whose job is permanent in nature will covered by this health insurance scheme along with their family members (self, spouse, and maximum 02 child).
- ii. All contractual employees (only self-other than their family members) will be entitled for this scheme for their contract period only.

#### 10. Group Life Insurance(GLI)

| SN | Grade      | Group Life Coverage | Term (GT) | ADB Coverage | PTD Coverage | PPD Coverage    | CI-18 Coverage |
|----|------------|---------------------|-----------|--------------|--------------|-----------------|----------------|
| 1  | (NE: 2-3)  | 200,000             |           | 400,000      | 200,000      | As per Schedule | 600,000        |
| 2  | (NE: 1)    | 250,000             |           | 500,000      | 250,000      | As per Schedule | 700,000        |
| 3  | (E: 12-13) | 350,000             |           | 700,000      | 350,000      | As per Schedule | 700,000        |
| 4  | (E: 10-11) | 600,000             |           | 1,200,000    | 600,000      | As per Schedule | 800,000        |
| 5  | (E: 6-9)   | 650,000             |           | 1,300,000    | 650,000      | As per Schedule | 800,000        |
| 6  | (E: 3-5)   | 900,000             |           | 1,800,000    | 900,000      | As per Schedule | 800,000        |
| 7  | (E: 2)     | 1,500,000           |           | 3,000,000    | 1,500,000    | As per Schedule | 800,000        |
| 8  | (E: 1)     | 2,000,000           |           | 4,000,000    | 2,000,000    | As per Schedule | 1,000,000      |

#### 11. Medical Benefits for Out-patient Treatment:

In addition of the above Group Hospitalization Insurance Plan, the employee will get yearly fixed amount of Outpatient Treatment Allowance according to the following entitlement:

|   |   |            |            |          |          |         |         |
|---|---|------------|------------|----------|----------|---------|---------|
| General OPD Including Dental & Optical Max. 70% per person  | (NE: 1-3)                                   | (E: 12-13) | (E: 10-11) | (E: 6-9) | (E: 3-5) | (E-2)   | (E-1)   |
| Maximum Limit per family per year   | 15,000                                      | 20,000     | 30,000     | 50,000   | 120,000  | 400,000 | 500,000 |
| Max. Consultation Limit per family per year   | 4,050                                       | 5,400      | 8,100      | 13,500   | 32,400   | 108,000 | 135,000 |
| Specialist visit / General Practitioner Visit   | At Actual, up to maximum consultation limit |            |            |          |          |         |         |
| Investigation Limit per family per year   | 4,800                                       | 6,400      | 9,600      | 16,000   | 38,400   | 128,000 | 160,000 |
| Medicine Limit per family per year  | 4,050                                       | 5,400      | 8,100      | 13,500   | 32,400   | 108,000 | 135,000 |
| For dental Root Canal Treatment, Amalgam, Resin Plastic, Temporary Fillings, Medication, X-rays & optical Lenses, spectacles per family per year. | 2,100                                       | 2,800      | 4,200      | 7,000    | 16,800   | 56,000  | 70,000  |

12. Other Terms and Conditions:

- i. Starting from non-management employee to Sr. Manager yearly allowance will be paid as per above limits. No bills are required for the allowances.
- ii. Starting from AGM to GM reimbursement will be allowed at actual or maximum ceiling of Tk. 36000 per annum whichever is low, against submission of Medical Bills
- iii. At actual ceiling will be applicable for the employee (self), spouse, and maximum 02 children (up to their age of 22 years)
- iv. Expatriate employee COO/CEO/Director/Executive Director/Managing Director's reimbursement will be allowed at actual against submission of Medical Bills.

- v. Additional expenses after receiving the claim from Insurance Company, if any, will also be paid by TSEL.
- vi. At actual reimbursement will be entertained only if the following documents (as applicable) are enclosed with the claim:
  - a) Original cash memo of medicines purchased;
  - b) Receipt of Doctors fee;
  - c) Doctor's advice for tests need to be produced for claim;
  - d) Original receipts in connection with reports like pathological tests/X-Ray/ECG/Scanning etc.
  - e) Cash Memo for spectacles purchased under Medical Prescription;
  - f) Doctors recommendation for Nurses/Attendant;
  - g) Nurse/attendant's receipt.

### 13. Out Patient Allowances:

- i. Outpatient allowances to be disbursed amongst the regular/permanent employees at the end of the financial year as per the mentioned structure.
- ii. At actual bill will be provided at the end of the month for the entitled positions (if any). All the consultation against the treatment must be carried out by Registered Medical Practitioner. TSEL reserves the right to approve and verify the Medical Practitioner's advice. Purchase of medicine and conduct diagnosis must be done as referred by the Medical Consultant.
- iii. Dental treatment included as preventive measures, TSEL will reimburse for upper & Lower dental cleaning twice in a year.
- iv. Reimbursement of the cost will be restricted to the treatment of the employee, spouse and maximum 02 dependent (unmarried, unemployed) children (age up to 22 Yrs.)
- v. Relevant details including name and date of birth of spouse and the eligible children must be sent to HR dept. for record/documentation.
- vi. Children attaining 22 years of age or getting married, whichever is earlier will not be entitled to reimbursement of the cost of medical-treatment.

- vii. Claims for reimbursement not supported by prescriptions and receipted bills/vouchers will not be entertained. All claims for reimbursement should be submitted within 01(one) month of the treatment, failing which, such claims will not be entertained.
- viii. Concern personnel are requested to complete the Medical Reimbursement Form (along with the above mentioned documents) and submit to the Audit Dept. through HR dept. to complete the procedure of Medical Payment Reimbursement.
- ix. The following expenses cannot be claimed and TSEL will not reimburse the same:
  - a) The supply of dentures and the false caps
  - b) Any cosmetic dental work.
  - c) Any cosmetic treatment/surgery for beautification
  - d) The supply of spectacle frames
  - e) Special diets except in hospital under medical advice
- x. Any kind of falsifying or miss-management in regards of submission bills may be treated as misconduct and management may take disciplinary action against it.
- xi. Maternity Benefits:

Applicable as below only for permanent employee-

| Plan                        | (NE: 2-3) | (E: 12-13, NE: 1) | (E: 6-11) | (E: 3-5) | (E: 1-2) |
|-----------------------------|-----------|-------------------|-----------|----------|----------|
| Caesarean Delivery          | 40,000    | 50,000            | 75,000    | 100,000  | 150,000  |
| Normal Delivery             | 20,000    | 25,000            | 37,500    | 50,000   | 75,000   |
| Legal Abortion /Miscarriage | 10,000    | 12,500            | 18,750    | 25,000   | 37,500   |

#### 14. Disclaimer:

This policy can change time to time on the contract agreement with 3<sup>rd</sup> party Insurance Company. Management of TSEL reserves all the right to cancel, amend, alter, change, and modify the policy at any time or to increase and decrease the facility to all or any individual employee with valid and justified reason without showing any formal written documents.

## **Section F- Different Types of Allowances**

### 1. Holiday Allowance:

- i. Minimum working hour should be not less than three (03) hours in a day to provide this benefit-

| Position                                       | Entertainment Allowance in BDT (Applicable for minimum 06 hours duty/stay in office) | Entertainment Allowance in BDT (Applicable for minimum 03 hours duty/stay in office) |
|--|--|--|
| Manager, Sr. Manager , AGM, DGM, GM, and above | At actual  | At actual  |
| Assistant Manager to Deputy Manager            | 600/=  | 400/=  |
| Executive to Senior Executive                  | 500/=  | 300/=  |
| Junior Executive                               | 250/=  | 150/=  |
|  | (no overtime is entitled )   | ( no overtime is entitled )  |
| Other non-management staff                     | 01 day of Gross Salary payable with Monthly Salary                                   | ½ day of Gross salary payable with Monthly Salary                                    |

- ii. Minimum working should not be less than three (03) hours for half day holiday work and six (06) hours for full day holiday subject to prior permission taken from respective supervisor mentioning the justification.
- iii. Employees will be either entertained holiday allowance or compensatory Holiday (depends on requirement).
- iv. For Major Religious Festival Holidays (Eid-UI-Fitre, Eid-UI-Azha, Durga Puja, Boudhdho Purnima, Christmas Day), the employees of the specified religious belief may be required to work on festival holiday, but two day's

compensatory holidays with wages and a substitute holiday shall be provided for the employee.

- v. No official transport or transport allowance will be entertained under this scheme.
- vi. No overtime will be entertained under this scheme.
- vii. Lunch bill will be given as per “section-i” subject to completion of equivalent full office hours. If anyone works below the full office hours, will be entertained only holiday allowance.

2. Lunch, Refreshment & Dinner Allowance:

- i. Considering the job nature sales, marketing and other staffs (who supposed to work outdoor frequently) are not allowed to claim Lunch or Dinner allowances.
- ii. Official staffs will be allowed to claim Lunch Bill subject prior approval to respective supervisor with justification of claim the bill.
- iii. No transport allowances/conveyance are allowed from Residence-Office-Residence.
- iv. Management staffs will get Taxi/auto-rickshaw fare at actual for official visit outside. If required, company Vehicle will be provided (if requisition is raised earlier).
- v. Non-Management staffs will get only bus fare for official visit. For emergency, company vehicle will be provided.
- vi. Rate of Allowances as below mentioned-

| Positions            | Lunch ( if anyone work outside office from 12.00 PM to 3.00 PM for official special duty)- in BDT | Refreshment allowances (if work up to 8.00 PM)- in BDT | Fixed overtime- in BDT | Dinner (if anyone continue work after 9 pm or above)- in BDT |
|----------------------|---|--|------------------------|--|
| Management staff     | 300   | 35   | Nil                    | 300  |
| Non-Management staff | 200   | Nil  | At actual              | 200  |

3. Night Allowance:

- i. Night Allowance will be given as per schedule-3 in addition of the refreshment and dinner allowance.
- ii. Non-management staff (excluding jr. executive) will get OT at actual beyond their schedule working hours.
- iii. No Transport allowance/conveyance is allowed from residence-office-residence.
- iv. Rate of Allowances as below mentioned-

| Position                             | Night Allowance (if anyone really need to work till 11.00 pm at night)- in BDT | Night Allowance (if anyone really need to work till 06.00 am)- in BDT |
|--------------------------------------|--|---|
| Assistant Manager to Dy. Manager     | 200 (as per Receipt)   | 300 (As per Receipt)  |
| Junior Executive to Senior Executive | 125 (as per Receipt)   | 200 (As per Receipt)  |

4. **Overtime Allowance:** Where a worker/employee works for more hours than the hours fixed, over time Allowance shall be paid at the rate of twice of ordinary rate of basic wages. Overtime Allowance shall be paid with the monthly salary of the employee.

5. Station Allowance:

Employees stationed at TSEL plant/project site (outside of Dhaka city) can avail the Station Allowance to cover their food expenses. Procedures are:

- i. All types of employees (i.e. Permanent, Contractual, Management level & Non-Management, etc.) can avail the station allowance;
- ii. Station Allowance will be BDT 6,000/= per month irrespective of employ's salary, grade and designation;

6. Accommodation Facilities:

The objective of this policy is to motivate TSEL employees to work and stay at remote place/plant/project/site. Procedures are:

- i. Employees stationed at TSEL plant/project site (outside of Dhaka city) can avail the accommodation facilities provided by TSEL;
- ii. Only non-local employees can avail the facilities to stay at remote place/plant/project/site;
- iii. Single accommodation will be provided for employee only (family members not allowed);
- iv. All types of employee (i.e. Permanent, Contractual, Expatriate, etc.) can avail the facilities subject to availability of seat/bed/room/accommodation;

7. Subsidized Lunch Benefit:

- i. The subsidized lunch benefit towards all the staffs of TSEL will add value for harmonious HR practices amongst all the employee. This lunch facility will be provided for all the employees located in different places.
- ii. Subsidized Lunch Benefit as Given Below:

a) Proportion of Contribution-

| Position                     | Company Contribution | Employee Contribution |
|------------------------------|----------------------|-----------------------|
| Manager to Managing Director | 50%                  | 50%                   |
| Executive to Deputy Manager  | 60%                  | 40%                   |
| Below Executive Level        | 70%                  | 30%                   |

- a) All branch/offices under TSEL will be provided the same subsidized lunch benefits.
- b) Considering the job nature, the sales personnel will be provided cash benefit of BDT 100/= for working day (excluding Friday, Saturday and govt. holidays).

- c) However, the employees who already availing Lunch/Dinner allowances will remain unchanged.

## **Section G- Bonus Policy**

### 1. Policy Statement:

This objective for providing this bonus is to assist all employees to celebrate their festivals with their family members for meeting extra expenses of their individual festival occasions and meet the extra financial obligations if any. The following articles should be followed in order to ensure smooth and proper distribution of Bonus (Festival/Incentive) amongst the employee.

### 2. Festival Bonus:

- i. All the confirmed and permanent employee under different units of TSEL, whose job is under permanent nature will be entitled to get 02 (two) festival bonuses in a year. The amount of festival bonus will be sanctioned and announced by the management by its sole discretion at the time of festival occasions. The bonus will be distributed a justified and rational time before the festival occasion.
- ii. Probationary employees, whose job not confirmed will get the festival bonus according to the recommended schedule (section vi & vii). The employee whose job is eligible to confirm but due to process/system gap the job was not confirmed on time she will be entitled full bonus. The employee whose probation period is extended for a further period of any specific tome/duration due to unacceptable performance, she will be entitled bonus according to the recommended schedule.
- iii. The employee who are in the employment of TSEL as daily or casual basis would not be entitled festival bonuses. But if any employee continued his/her job as daily or casual basis for aneroid of more than 01 (one) year, the concern employee will be entitled 02 festival bonuses where each festival bonus will be equal to 50% of their gross salary.
- iv. Contractual employees (except foreign expatriates) will be entitled festival bonuses according to the terms & conditions of their contractual employment. If nothing is mentioned in the employment, then they will be entitled two festival bonuses equivalent to their basic Salary.

v. For all cases the basic salary will be fixed according to the pay structure (i.e. Basic Salary = (Gross Salary – House Rent, Fixed DA, Fixed Medical, Fixed Conveyance and House Rent).

vi. Recommended schedule for Festival Bonus Payment-

| Service Length                               | Distribution           |
|--|------------------------|
| Less than 3 months (on probation)            | 50% of declared Bonus  |
| More than 3 months (on probation)            | 75 of declared Bonus   |
| Confirmed or Eligible to confirm on due time | 100% of declared Bonus |

vii. Schedule of Festival Occasions

| Religion  | 1 <sup>st</sup> Bonus Occasion | 2 <sup>nd</sup> Bonus Occasion |
|-----------|--------------------------------|--------------------------------|
| Muslims   |                                | Eid-ul-Azha                    |
| Hindu     | Eid-UI-Fitr                    | Durga Puja                     |
| Buddhist  |                                | Buddha Purnima                 |
| Christian |                                | Christmas Day                  |

3. Incentive Bonus:

i. TSEL may provide incentive bonus amongst its employees depends on TSEL's profitability. The eligibility of the incentive benefits will be determined by the management based on the performance of individual business unit. Based on the profitability and overall situation including financial stability and management will sanction the same by its sole discretion.

ii. The incentive bonus will be declared for a specific financial year. As incentive is concern so to motivate all level of employee, the incentive bonus should be distributed to all permanent nature of employee, on prorata basis who were in TSEL's employment for the specific financial year either fully or partially. The payment will be made according to the recommended schedule (Article - 14).

iii. The incentive will be distributed amongst employee at the convenient time after closing the balance sheet of previous financial year and completion all

other formalities. Concern Accounts & Finance Department will submit their proposal to Managing Director for his early decision and disposal.

- iv. The amount of incentive bonus will be sanctioned and declared by the management by its sole discretion considering the profitability company's overall financial strength and other admissible issues before distributing the incentive. The sanctioned incentive bonus figure may be varied from year to year.
- v. The employee who have already completed their full 01 year service with TSEL for the specific financial year will be entitled to get full incentive bonus. Probationary employee will also be entitled to get incentive bonus according to the recommended schedule on pro rata basis contractual daily and casual nature employee will not be entitled to get incentive bonus if it is not mentioned with their service or appointment terms & conditions.
- vi. Due to job nature and full involvement with the business process of different business units, Group/corporate employees are supposed to get incentive bonus from each and every profitable company. In that case management any sanction special incentive bonus package for group/corporate for recognizing their contribution toward all the business units the Group.
- vii. Recommended Schedule for Incentive Bonus Payment-

| Service Length  | Distribution                         |
|-----------------|--------------------------------------|
| 01 year & above | 100% of declared incentive           |
| Below 01 year   | Pro-rata basis of declared incentive |
- viii. The Management reserves the right to cancel amend, change, modify the policy at any time and will have also right to increase and decrease the bonus /incentive facility to all or any individual employee with valid and justified reason without showing any formal written document.

## **Section H- Mobile Allowance Policy**

### Policy Statement:

TSEL ensures best assistance towards its employees along for business purpose. Most of the management employees have been provided Mobile SIM along with the Ceiling for smooth business communication and availed the best as per Mobile Phone Policy. Considering the best use of communication assistance Management has fixed position wise Monthly Ceiling which is including VAT & TAX. Management has decided to consider the Mobile Ceiling facility considering only usage bill excluding VAT & TAX. The Management of TSEL has comprehended that to build a faster communication network between different units, persons, and offices through mobile phone to carry out professional duties more efficiently and effectively the use mobile are increasing day by day. In view of this, management has intended to provide mobile facility through a policy. Based on the position & nature of job responsibilities the following articles are recommended to implement a structured Mobile policy.

#### 1. Procedure:

- i. Considering the job nature and exigency of services, management may allow entitlement of Mobile facility to any deserving employee of TSEL and its associated companies. The recommendation must be raised through a prescribed form by the respective head of department and head of operation with rational and justified reason.
- ii. Management may provide any mobile line from existing mobile operators in Bangladesh including the brand of mobile set at its own discretion and convenient. Range for procure a set for GM and above is Tk. 8000- 10000, Manager to DGM is Tk. 6000 - 8000 and Assistant Manager to below is Tk. 4000 - 5000 (if any).
- iii. For Managers and above positions, company will arrange to provide mobile line and set. If the person desires, s/he can use his/her personal mobile number for official use and can get monthly ceiling facilities. For this purpose, the mobile line must be a postpaid one from any mobile operators.
- iv. For Jr. Executive to Deputy Manager, only the ceiling will be provided as per recommended schedule. The mobile line and set will be arranged by the concern employee at their own. If require and anybody desires, company will provide loan to the concern employee to procure a personal mobile for official use which will be deducted from monthly salary within 6 months from the date of receiving the loan.

- v. Maximum monthly ceiling of mobile allowance including line rent will be as per recommended schedule. The individual ceiling will be notified through official letter signed by Head of HR or Head of Operations.
- vi. Monthly mobile bills will be paid by the company at actual basis within the sanctioned limit for the respective positions as approved by the management. Any access bill, if any, will be borne by the employee and the amount will be deducted from his/her monthly salary. For personal mobile, all are requested to submit their monthly mobile bill for necessary payment adjustment.
- vii. Those who are entitled overseas call for official purpose, item wise bill must be collected and payment will be made on actual basis. No personal overseas call is allowed to any employee and office will not bear any cost related to personal overseas call if any.
- viii. If an employee is terminated or left from the company or vice-versa, and using official mobile phone facilities, s/he must surrender mobile set and line to the respective HR representative before the last day of his/her association with the company. The last mobile bill payment will be adjusted at the time of his/her final settlement.
- ix. The user will maintain the mobile set and the charger in a very good condition during the period under control by the user. The safety of the set should be ensured and the user will be fully responsible if the set/charger is lost or stolen. S/he is liable for damage, malfunction of the- set & charger caused due to mishandling. In such case, the user shall purchase a new set of existing brand & model or repair the damage at his/her own cost immediately after such occasion. The expenses related to periodical maintenance/ battery change/ minor repairs if required will be borne by TSEL.
- x. No residence telephone bill will be provided to any official for business purposes. Everybody must be reachable over mobile for 24 hours a day. The set is not transferable or should not be handed over to anybody. If the person is transferred within the group, s/he will surrender his/her mobile to concern unit HR representative. Management may approve to transfer the set and line to the person's new assigned unit. In that case necessary inter-unit assets transferring formalities will be done by the concern accounts department of both units.

xi. Recommended mobile ceiling including line rent (recommended schedule)

| Position                       | Operations / Sales /<br>Marketing / Import<br>/ Customer Service | HR & Admin /<br>Accounts &<br>Finance /<br>Logistics | Audit / IT<br>/ Others |
|--------------------------------|--|--|------------------------|
| Director                       | 5000   | 5000   | 4500                   |
| GM                             | 4000   | 4000   | 3500                   |
| DGM                            | 3500   | 3500   | 3000                   |
| Manager                        | 2500   | 2500   | 2000                   |
| Dy. Manager / Asst.<br>Manager | 2000   | 2000   | 1800                   |
| Sr. Executive                  | 1500   | 1500   | 1500                   |
| Executive                      | 1200   | 1200   | 1200                   |
| Jr. Executive                  | 600  | 600  | 600                    |
| Others                         | 600  | 600  | 600                    |

xii. For Expatriate employees the ceiling will be according to their contract and other terms and conditions will be according to the policy.

xiii. Management may allow highest or lowest ceiling to any employee considering their job nature and necessity of mobile use for the greater interest of the company.

2. Disclaimer:

The management also reserves all the right to cancel, amend, alter, change, modify the policy at any time and will have also right to withdraw the mobile from any employee without showing any reason.

## **Section I- Attendance Policy**

### 1. Objective:

The purpose of this policy is to set forth company policy and procedures for handling employee absences and delay to promote the efficient operation of TSEL and minimize unscheduled absenteeism. This practice may ensure work life balance, improved employee motivations as it will increase the employee engagement.

### 2. Procedure:

Punctual and regular attendance is an essential responsibility of each employee of TSEL. Employees are expected to report at work as scheduled, on time and prepared to start working. Employees also are expected to remain at work for their entire work schedule. Late arrival, early departure or other absences from scheduled hours are disruptive and must be avoided.

### 3. Working Days & Weekly Holidays:

- i. Generally, working days for TSEL will be from Sunday to Thursday.
- ii. However, Management of TSEL may choose different days or off days according to business nature.

### 4. Office Timing:

- i. In general, in working day check-in time will be on/before 10:00 AM and check-out time will be on/after 6:30 PM.
- ii. Lunch time for all cases will be thirty (30) minutes maximum and standard time is from 1:30 PM to 2:00 PM.
- iii. Minimum Eight and half (8.5) hours in a row should be completed per working day (including lunch time).
- iv. Minimum four (04) hours should be completed for half-day office, and staff can avail either 1st half or 2nd half (before/after 1:00 PM from starting and ending time). To avail half day leave, employee must have prior acknowledgement from superior and/or team.

- v. Working days and time can be re-fixed by the authority based on necessity.
- vi. Office timing can be customized only for special reasons by the concerned SBU/department and be informed to HR with approval copy. And the concerned authority can change and modify their office time. However, shared services like transportation service will strictly follow general office hours (10:00 AM – 06:00 PM).
- vii. Employee can avail customized working hour upon prior approval, as flexi hour is not solution for alternative office hour.
- viii. In case of adversity the authority may keep the office open on weekends or holidays.

#### 5. Flexible Working Hour:

- i. Check-in time will be from 10:00 AM to 06:30 PM.
- ii. Check-out time will be from 6:30 PM.
- iii. Staffs should contribute minimum eight and half (8) hours per day to ensure his/her full day attendance.
- iv. Female staff may not be obliged to visit during the menstruation and entitled desk work in the office for at least two (02) days in a month. In case of special needs of female staff like maternity period, pregnancy, post-delivery and breastfeeding period, rules and regulations, travel and work hour shall be considered. Breastfed mothers shall be entitled to thirty (30) minutes additional break during lunch time.
- v. Without prior approval, flexible working hour cannot be availed more than five (05) days in a month.

#### 6. Attendance Record:

- i. All staff must come to office within fixed office time.
- ii. The staff shall record their attendance by attendance register/biometric attendance system /swiping ID-card.
- iii. If staff needs to stay away from work station, s/he must write it clearly in the attendance register/apply through HRIS system. Staff shall record his/her visit entry in the prescribed attendance register/HRIS system.

- iv. Staff who does not attend the office within fifteen (15) minutes of start time, shall be treated as late.
- v. If earn leave is not available, then it shall be treated as leave without pay.
- vi. All staff must write the type and the duration of leave in the leave register/HRIS system.

#### 7. Absence:

“Absence” is defined as the failure of an employee to report for work when he or she is scheduled to work.

- i. The employee provides to his or her supervisor sufficient notice at least two (02) working days in advance of the absence.
- ii. The absence request is approved in advance by the employee's supervisor.
- iii. The employee has sufficient accrued paid time off to cover the absence.
- iv. Employees with three or more consecutive days of excused absences because of illness or injury must give TSEL proof of physician's care and a fitness for duty release prior to returning to work.

#### 8. Delay and Early Departures:

Employees are expected to report to work and return from scheduled breaks on time. If employees cannot report to work as scheduled, they must notify their line manager (1<sup>st</sup> supervisor) before than their regular starting time.

- i. This notification does not excuse the tardiness but simply notifies the supervisor that a schedule change may be necessary.
- ii. Employees who must leave work before the end of their scheduled shift must notify the supervisor immediately.
- iii. Tardiness and early departures are each one-half an occurrence for the purpose of discipline under this policy.

9. Disciplinary Action:

Excessive absenteeism/unauthorized leave may take under disciplinary action. Employee self and line manager should notice to address the issue.

**Section J- Travel Policy (Local & Overseas)**

1. Policy Statement:

Travel policy applies to all TSEL employees and ‘travel’ meaning purposeful business trip. This policy doesn’t refer to traveling to and from the office on a daily basis for work.

2. Local Travel Policy:

The TA/DA/Accommodation expense policy for local tour for the management/non-management staffs of TSEL as below:

i. Daily Allowance (DA), Transport Allowance (TA) & Hotel Accommodation Expenses:

| Designation                              | TA  | DA<br>(EX-HQ)<br>(Taka)<br>Below<br>60 K.M | DA<br>(Out<br>Station)<br>(Taka) | Hotel<br>Accommodation       |
|--|---|--|----------------------------------|------------------------------|
| CEO / COO /<br>Director or<br>Equivalent | Company transport / Car<br>(under Car Policy) / Air/ AC<br>Bus / AC Train / Highest<br>Class of Steamer | 1000                                       | 2000                             | Standard with<br>AC (Single) |
| General<br>Manager or<br>Equivalent      | Company transport / Car<br>(under Car Policy) / Air/ AC<br>Bus / AC Train / Highest<br>Class of Steamer | 800  | 1600                             | Standard with<br>AC (Single) |

|  |   |     |      |                              |
|--|---|-----|------|------------------------------|
| DGM / AGM /<br>Equivalent  | Company transport / Car<br>(under Car Policy) / Air/ AC<br><br>Bus / AC Train / Highest<br>Class of Steamer | 600 | 1200 | Standard with<br>AC (Single) |
| Deputy<br>Manager /<br>Assistant<br>Manager or<br>equivalent   | Company Transport/ AC Bus /<br>Train (1st class with AC) /1 <sup>st</sup><br>Class Steamer                  | 500 | 1000 | AC (Single)                  |
| Sr. Executive /<br>Executive /<br>Equivalent   | AC Bus / 1st Class Train/ 1st<br>Class Steamer/   | 400 | 800  | Non AC                       |
| Jr. Executive /<br>Officer / Sr.<br>Office assistant /<br>Sr. Assistant /<br>Equivalent                | Bus (Non AC) / Train (Non<br>AC)  | 300 | 600  | Non AC                       |
| Security Guard /<br>Messenger /<br>Peon / Office<br>Boy / Driver /<br>Office assistant /<br>Equivalent | Bus (Non AC) / Train (Non<br>AC)  | 100 | 200  | Non AC<br>(Economy)          |

ii. The following conditions shall be observed to claim the allowances:

- a) Ex-HQ means traveling outside base station and being able to return on the same day and the minimum distance from base station should not be less than approximately 60 km (one way).
- b) If work is involved for the whole day (at least 6 hours) in the visited EX-HQ place and traveling starts after work and reaches base station after 10 PM, he/she will be entitled to get EX-HQ DA for the day.
- c) Out Station means traveling outside base station where at least one-night halt is essential.
- d) The basis of calculation of DA (Per Diem) shall be as follows (including reporting time at Airport/Station):

|                          |                   |         |
|--------------------------|-------------------|---------|
| I. Form Day of Departure | Before 12:00 Noon | Full DA |
|                          | After 12:00 Noon  | Half DA |
| II. Arrival              | Before 12:00 Noon | Full DA |
|                          | After 12:00 Noon  | Half DA |

- e) The Daily Allowance is given to a person considering his/her expenses for food & entertainment, pocket money, disturbance, incidents, incentive and other related costs during one's stay at outside of his workplace.
- f) For Tours on weekly or public holidays the EX-HQ & Out Station Allowances will be 1.5 times of the normal approval rate and if required the staff will work on the same day for official work.
- g) If an employee uses Company Car for official traveling with prior approval from management, he/she will be entitled to reimburse actual fuel/CNG cost for such travel. If the personal driver is accompanying with the concern personnel, the concern personal driver (not in company payroll) will also get the TA/DA as same as official driver.
- h) An employee may be avail a faster moving transport or a higher class treatment beyond his/her entitlement, if so required for EMERGENCY- SITUATION subject to the approval of management. Management encourages Air Travel only for emergency situation.
- i) If any employee is placed in another workstation for a temporary period of maximum 15 days, s/he will get the normal DA applicable to him/her. If s/he is required to stay up to 30 days, s/he will get 75% of his/her D.A for the rest 15 days. If s/he is required to stay more than 30 days, a transfer letter will be issued in favor of him/her and no question of DA will be raised for onward period. If this stay requires above 03 (three) months in continuous basis, in this case management may consider one extra basic salary as Out Station Allowance based on the situation, profitability and other related issues.
- j) Necessary supporting documents such as ticket, bills and other payables etc. must be enclosed at the time of submission of tour bill.
- k) If company provides Guest House I Accommodation facility to the employee, the employee must be availed that and no question of Hotel Accommodation allowance will be raised for this reason.

- l) If any employee desires to stay with his/her relation during official visit, management may allow additional 50% of their daily allowance as accommodation allowance.
- m) For normal working day if anyone who works outside office for any assignment will get actual travel fare. Prior approval of his/her respective supervisor through outside visit/movement form is must to claim this bill.
- n) Management staffs who are supposed to work to complete emergency assignment in the office on holiday/weekly off day will be entitled to get allowances as under. To claim this, benefit the employee should work at least 04 (four) hours for the same day. Allowances includes Lunch/Dinner/Refreshment and supplementary expenses. Prior approval must be taken from his/her supervisor in this regard.

| Designation               | For Claiming Allowance the minimum working hour should be less than 04 hours |                         |
|---------------------------|--|-------------------------|
|                           | TA   | Entertainment Allowance |
| General Manager           | Not Applicable   | 500                     |
| Deputy General Manager    | Not Applicable   | 450                     |
| Assistant General Manager | Official Car / TK. 100   | 400                     |
| Manager                   | Official Car / TK. 100   | 350                     |
| Deputy Manager            | Official Car / TK. 100   | 300                     |
| Asst. Manager             | Official Car / TK. 100   | 250                     |
| Sr. Executive             | Official Car / TK. 75  | 200                     |
| Executive                 | Official Car / TK. 75  | 150                     |

- o) Non-Management staffs (Jr. Executive to below) who are supposed to work to complete emergency assignment in the office on holiday/weekly off day will be entitled to get overtime allowances as per company policy. No TA or other allowances to be provided in this regard.
- p) Local travel expenses and other miscellaneous expenses which are required for official purpose at the time of staying Ex- HQ or Out Station will be billed at actual and this cost will be borne by TSEL.

- q) If any employee desires to get compensate holiday in replacement of a specific holiday, s/he will not get any TA/OT/Allowances or any other benefits for the same and his/her office.

3. Overseas Travel Policy:

i. Terms & Conditions:

- a) For travel outside Bangladesh, Director and above position are entitled to Business Class Air Fare;
- b) All other officers are entitled for Economy Class Air Fare and other related travel expenses such as visa fees, Travel tax, Terminal Tax, embarkation fees, which would be reimbursed at actual on the basis of supporting documents/vouchers etc.
- c) Management may allow higher class Air Fare beyond the entitlement if so required for emergency situation.
- d) Hotel Fare will be billed at actual including breakfast and the payment will be made by TSEL.
- e) If the visited country has any offices of TSEL, they may be requested to arrange the hotel and pay the bill at actual upon submission a request from Bangladesh Office.
- f) Accounts Department will adjust the bill at their convenient.
- g) Expenses related to transport and other Tariff for official purpose in abroad will be billed at actual.
- h) If possible, and wherever applicable actual vouchers should be enclosed with the tour bill.
- i) At least 01 (one) week before leaving the country, the respective person will prepare a budget for his/her entire tour and submit it to HR Responsible to get approval.
- j) Accounts department will disburse the payment in advance/accordingly.
- k) The tour/visit approval will be recommended by the concern designated channel and must be approved by the Managing Director of TSEL by any media (i.e. Hard Copy, soft copy, e-mail, etc.).

ii. Entitlement of Hotel and Daily Allowances:

| <b>Level of officers</b>                                    | <b>Normal Limit ( in US\$) per day</b>            | <b>Hotel Standard</b> |
|---|---|-----------------------|
| Managing Director   | US\$ 150 For SAARC & US\$ 175 for other countries | 5 Star                |
| Director/COO/CHRO/CFO                                       | US\$ 100 For SAARC & US\$ 125 for other countries | 5/4 star              |
| General Manager   | US\$ 75 For SAARC & US\$ 100 for other countries  | 5/4 star              |
| Deputy General Manager, Assistant General Manager, Manager  | US\$ 75.00 Per Day for all countries              | 3 star                |
| Deputy Manager, Assistant Manager, Sr. Executive, Executive | US\$ 50.00 Per Day for all countries              | 3 star                |

iii. The DA entitlement will be effected under the following rules and regulations:

- a) The daily allowances are given to a person considering his/her expenses for food and entertainment, pocket money, disturbance, incidents, incentive, and other related costs during one's stay at outside country.
- b) Main visit place(s) will be the basis for claiming DA. Transit point will not be counted for DA entitlement (if not exceed 12 hours in transit point).
- c) The basis of calculation of DA (per Diem) shall be as follows (including reporting time at Airport/ Station):

|                          |                   |          |
|--------------------------|-------------------|----------|
| I. From day of Departure | Before 12:00 Noon | Full D.A |
|                          | After 12.00 Noon  | Half D.A |
| II. Arrival              | Before 12:00 Noon | No D.A   |
|                          | After 12.00 Noon  | Half D.A |

iv. Others Procedures:

- a) In principal, unit HR responsible will assist to concern employee to make their visit smooth and ensure all the process done accordingly. Hotel booking and Air Ticket will be arranged by the office in consultation of the concern employee.
- b) All the employee will take an advance submitting the approval of his/her tour plan to concern Accounts Department. After return from tour/visit, the employee must submit the actual bill and Voucher to Accounts Department for adjustment of advance (Excluding DA) within 07 days of his/her arrival. The employee must submit a report on his/her visit/tour and give a clear outcome for the same.
- c) For training purpose, a standard bond must be signed by the employee concern mentioning that he will return back from the training, join TSEL, use his learning outcome for the betterment of TSEL and will stay with this company for at least the time frame as mentioned in the bond.
- d) While representing TSEL in abroad, it is expected that everybody will maintain a high reputation and value of TSEL and uphold the zeal and enthusiasm at their best.

4. Disclaimer:

TSEL management reserves all the right to cancel, amend, alter, change, modify, the policy at any time and will have also right to increase and decrease the facility to all or any individual employee with valid and justified reason without showing any formal written document.

## **Section K- Recruitment Policy**

1. Policy Statement:

Recruitment policy, manuals, processes, forms are established to ensure that the best available candidates are considered for new or vacant positions. These will seek to ensure openness in developing criteria and in the process of identifying qualified candidates and selecting new staffs, and to minimise problems related to cronyism or nepotism.

2. Staff Forecasting:

The team recruitment is responsible to start annual staff forecasting between June of every year/or fiscal year in consultation with the respective department head of each business unit.

In line with the budget, team recruitment will prepare their annual sourcing plan including active and proactive recruitment plan of visiting universities, job fairs and associations.

### 3. Requisition:

The formal recruitment will begin upon receiving the complete form of requisition, for national or international hiring approved by the respective authority with 60 days' lead time. The replacement to be raised immediately upon resignation of staffs and it will be checked and verified in line with the respective department/unit organogram, job description along with other indicator by the Human Resources be approved by the respective Head of the Business/Chief Executive Officer/ Director of the group for cases of replacement and Managing Director for New Positions.

### 4. Lead Time:

The normal lead time for sourcing, selection and on boarding is 60 days from date of receiving the approved requisition; 10 days for advertisement and sourcing, following 5 days for primary shortlisting, 10 days for selections, 5 days for approval and making the offer including operational tasks and lastly 30 days for candidate notice period. This lead time may shorten depending on the business unit demand on reality ground and HR ability to supply as well as candidate notice period from their current employer.

### 5. Sourcing:

The channel of sourcing depends upon the respective positions; however, team recruitment will be highly aligned with the recruitment cost under control and publish advertisement online offline and internally. The in house recruitment using our own resources is highly encouraged but may opt for Executive Search Company in need for some critical positions. HR dept. will regularly post the vacancies circular internally to invite internal applicants to apply and with requesting them to share the vacancies to their own networks. The internal applicants will follow the same applications process with prior consent from the SBU Head channelled through line Manager.

### 6. Referral Candidates:

Management may entertain referral candidates in condition that it is declared the connections and relations with the candidates at the prior stage to HR dept. The concern person who will refer someone must not be involved in the selection panel or interview board.

7. Selection:

i. Non-Management Positions:

- a) Entry level non-management approved position can be recruited by the business unit if. The concern Unit HR Lead will be the HR Representative and will take part in all sort of dealings till final interview.
- b) The final interview hiring decision will be made by the concern Business Unit Head or delegated person.
- c) The interview board will be consisting of three persons, 1 from HR (mandatory), 1 from concern business unit (mandatory) and 1 from relevant office or department (Mandatory). Each one will fill up the interview rating sheet for each candidate.
- d) Unit HR Lead process the recruitment final hiring process, and get approval from the Head of the Business on the recruitment proposals and issue the appointment letter, prepare personal file and preserve locally.
- e) For those independent business unit don't have unit HR Lead on board, may drop the requisition by the Unit Head to Corporate Talent Acquisition team for further processing of hiring and to carry all the relevant processes. However, in case, corporate HR's involvement is required, may follow the aforesaid process as appropriate in the clauses 4.01, a to d.
- f) For hiring the daily labour, for immediate/casual demand, the requirement should be analysed properly and be approved it by the Unit Head of Business. Concern functions will propose, concern HR and Finance Accounts will check before channelled to approval.

4.02 Management Positions:

The positions those falls under management categories will directly be processed by the Corporate Human Resource Office following same procedures outlined here upon receiving requisition, from Units. Each one will fill up the interview rating sheet for each candidate. Upon discretion of Management and Corporate Human Resources, Executive/Sr. Executive positions recruitment can be delegated to Unit HR, considering their readiness and ability to maintain compliance.

#### 4.02.01 Written Test:

In order to find the specific functional readiness of the position specific, business unit or concern hiring manager may request for written test. The written test questions may contain cases or questions on language ability, management and leadership track judgment, behavioural judgement, logical writing, aptitude indicator and on functional/technical competencies. For the functional/technical aspect the concern hiring units will be responsible to prepare the questions and share to HR in advance. HR team will prepare and design the final written questions. Written test may go mandatory for Executive and Sr. Executive level; however, others positions can go directly to follow 4.02.02.

In absence of written test request from concern business unit/hiring manager, HR may seek for written test as part of their shortlisting process case to case basis.

#### 4.02.02 Preliminary Interview:

Preliminary Interview can be substitute of clause 4.02.01 for Executive or Sr. Executive level. However, for other positions its mandatory to conduct preliminary interview before placing the shortlisted candidates to the hiring manager or management for final interview, concern team in Human Resource should assume that the shortlisting was accurate and there is high probability of hiring the final candidate upon completion of final interview by the board.

#### 4.02.03 Final Interview:

Upon completion of clause 4.02.01 and 4.02.02, final interview will be called upon. In order to align with the recruitment compliance, HR is supposed to ideally provide minimum 2 candidates for a single position to select the final & right potential incumbent.

#### 5.0 Interview Board:

The board consist of minimum 3 people. One from Human Resources Representative (mandatory), one from concern business/functions (mandatory) and one from relevant functions (mandatory). Interview board note, will be prepared with recruitment history of the relevant recruitment by the team recruitment for attaching with recruitment proposals.

#### 5.01 Interview Board Member:

The manager and above and below Head of Business positions preliminary interview will be conducted by the Head of Human Resources and the final preliminary interview will be conducted by the Head of the concern department along with Head of Human Resources.

For the other positions, below managerial level, the Talent Acquisition Lead may conduct the preliminary round along with written test if necessary.

In case of Head level positions, final interview will be conducted by the Head of Business unit/HoHR/CEO/Managing Director or as delegated by them.

In terms of hierarchy the interviewer will be at least one level higher than the position of the interview to be conducted.

#### 6.0 Hiring Decisions:

The board is the sole authority to recommend the finalist and panel list. HR Recruitment Team will prepare a matrix. All the written score and interview score will be added and based on the score and overall recommendation from the board, ideal candidate will be selected.

Based on the board member recommendations and matrix results, the team recruitment will prepare a recruitment proposal. Which will be acknowledged by concern business unit and HR Head and be approved by Chief Executive Officer for replacement hiring and Managing Director for new hiring with the exception of clause 4.01.

#### 7.0 Joining Formalities & Personal file:

All the new joiners personal file will be prepared by the Talent Acquisition Team and hand over to HR Operations for records keeping. The list of document which needs in respective personal file e.g. personal/employee information forms, academic certificates, recruitment process papers, rating sheets, interview board notes, experience certificates according to the candidates' declaration in his/her resumes, pictures, nominations details, Minor Beneficiary Details Form, reference check forms, if conducted for critical positions according to the relevant policy.

#### 8.0 Reference Check:

The final selection depends upon reference check, positive feedback received by the referees, at least 2 reference. Business unit may request those positions needs reference checks. However, HR will assume to check reference for some critical positions on needs but ideally not for every positions unless management has different decisions. For some critical positions

team recruitment must go for background check by the external professional firms if necessary or does internally.

#### 9.0 Signatories:

Except clause 4.01 a to d, all appointment letter will be signed by the Managing Director/CEO/Head of Human Resources depending on the position. Head of the Business Unit appointment letters will be signed preferably by the Managing Director or CEO for some cases. All other positions appointment letter may be signed by the Human Resources Head of the Group.

The appointment letter template to issue upon contextualisation according to the business unit benefits scheme and individual negotiations for Management Staffs, Non-Management contractual staffs, Non-Management permanent staffs, Management Contractual staffs and International staffs.

Except clause 4.01, all new/replacement recruitment proposals will be initiated by the Corporate Human Resources Office, acknowledged by the concern hiring manager/department and reviewed by CEO, finally be approved by the Managing Director.

#### 10.0 Probation Evaluations:

All new joiners will be undergoing a certain period of probation in line with the final selection process according to the law of Bangladesh and be reviewed their probation performance accordingly, pass them, extend them or terminate them according to the internal employee discipline policy and Bangladesh labour law.

Ideally the duration of probation will be 3 months for Manager and above and 6 months for other positions. However, may vary from case to case basis with options to extend to further 3 months or shorten based on performance.

All the evaluations process must be completed in advance and written message of evaluation results must reach to the staffs before expiry of the probation period.

The message of probation performance evaluations will be processed to the candidate in written either extensions, offering permanent status with all regular company benefits or terminations for poor performance.

11.0 Compliance:

All recruitment process, hiring decisions must be in line with the policies and processes of TSEL. The biased and non-compliant recruitment may lead to seek for disciplinary hearing of the parities/staffs involved.

12.0 Documentations:

The recruitment process papers for unsuccessful candidates and associated all documents must be in safe custody for at least 3 months preferably 6 months for audit purposes.

13.0 Communication to Unsuccessful Applicants:

Team Talent Acquisition will send regret message to the unsuccessful final list candidates upon successful candidates joining of the position concern.

## **Section L- Employee Entry & Exit Policy**

### Policy Statement:

Purpose of the entry policy is to ensure the warm welcome of an employee and give him/her detailed idea about TSEL's Vision, Mission, Strategy, values and etc. It will help him/her to make them feel belongingness to TSEL that will ultimately create maximum satisfaction for an employee and also help them to be loyal towards TSEL. And also try to give a memorable farewell and positive image about TSEL during separation.

### **Recruitment Procedure:**

All new hiring activity, sourcing, interview and final selection, communication with candidates and joining activities along with other relevant recruitment tasks will be guided and followed by relevant policy.

#### **1. On-Boarding:**

All new joiners will go through a certain period of on boarding programme to make the employee feels welcomed and comfortable in the new environment, to swiftly align the new employee's productivity with the new workgroup to support the employee retention. It will also establish a standardized tool for Line Manager and HR in welcoming, handling, and

developing new team members in the group. All the transactions, activities of welcoming or on boarding any new joiners will be guided by the on boarding programme manuals, forms, process and procedures written for Buddy, HR, Line Manager and New Joiners for survey to streamline effectiveness.

## 2. Orientation:

HR will ensure that an employee must get his orientation within 30 days of his/her joining according to the class room session. The content can be changed time to time according to the needs or business information. 1<sup>st</sup> day and 15<sup>th</sup> day of every month will be the tentative joining date for all employees to align with orientation programme. However, depending on the request or business requirement date of joining can be changed accordingly.

### i. Welcome Kit:

Employee should be welcomed with the kit during orientation or after the orientation when new employee is handed over to line manager. The line manager is requested to prepare and handover the welcome kit to the new joiners with an introductory speech to impress the new joiners. Kits items are a token of appreciation arranged by line manager in consultation with HR. It can be even a single diary, view card or anything in a formal way.

### ii. Welcome lunch:

Line manager may arrange a welcome lunch with the new staffs in the office cafeteria or in budgeted and cost effective place to easy professional relationship between them.

### iii. New Employee Welcome Packets:

HR Team is responsible to prepare a new employee kits which might contain, new employee on boarding role, job description, employee hand book, organization vision, mission, value proposition hand-outs/booklets, pen/diary in a formal way to the new joiners.

### iv. Handover to Concern Department:

After finishing the orientation program, the Team HR will introduce him/her in the relevant colleagues/fellows in the same place in person one to one visits in the same areas and finally will hand over him/her to the concerned departments.

## **Joining Intimation:**

Before joining of an employee to his/her concern department, HR needs to make sure about his/her potential arrival date and all logistics e.g. sitting arrangement, Laptop/Desktop, notebook and other work relevant stationaries are ready. In line with that, Talent Acquisition

Team will circulate a Joining Intimation, letter/ e-mail to respective department to nominate one Buddy, coordinate with concern department for logistics arrangement. e.g. for visiting card and sitting arrangement need to contact with admin, new email to request to IT and to take potential preparations to welcome new joiners on board, according to the on boarding guidelines.

**Exit Processes:**

- v. Employees are advised to discuss his potential plan of separation to his/her concern supervisor or directly fill the prescribed form of resignation to submit official resignation with the terms of his/her appointment letter as stated clearly to Human Resource/Concern Department/ Line Manager.
- vi. Responsible personnel according this policy must conduct exit interview in the prescribed Exit Interview Form.
- vii. Upon approval of resignation letter, employee will get the Resignation Acceptance Letter from Human Resource Department.
- viii. The concern employee is advised to visit Concern Human Resource Office to submit the proper handover and taking over prescribe standard format which is signed by all the parties to ensure proper exit process.
- ix. HR Operations/ Unit HR will verify the handing and taking over processed completed properly including but not limited to sales portfolio, clients lists, accounts list and other important issues depending on the positions. The outgoing sales staffs are advised by this policy to introduce his/her all the clients, preferably by client visits, he is used to deal to the replaced staffs for his/her quick on boarding. The handing and taking over documents to be preserved in concern staffs personal file and be supplied a to concern employee as a token of proper exit from TSEL.
- x. HR Operations/Unit HR will begin the final settlement process as stated along with provident fund and gratuity fund in association with Accounts and Finance.
- xi. This final payment should be released in account payee cheque or direct bank transfer according to the financial policy of TSEL in preferably 40 days from the day from the resignation approved.
- xii. After all the exit clearance procedure done, employee will get their experience certificate according to the prescribed format.

### **Employee Farewell:**

To pass the good memory of TSEL and future potential company branding by outgoing employees, the concern department may organize a farewell gathering in a modest way using our own resources, or as agreed by the concern department/units, conveying gratitude speech for his/her contributions during farewell session at the last day of works.

## **Section M- Employee Transfer Policy**

### **1. Objective:**

Transfer policy, manuals, processes, forms are established to ensure that the internal staff movement is being carried out with best possible easy way to put positive impact on the business and ensure transfer is for the business purpose and no misuse of it.

### **2. Scope:**

Since TSEL's activity is spread throughout the country as well as overseas, all types of staff can be transferred to any working area in the interest of the organization. Staff, irrespective of gender, posted in supervisory capacity can be transferred anywhere inside or outside of the country. The staff under order of transfer shall be obliged to join at the new work place.

### **3. Types of Transfer:**

- i. Transfer Within Department
- ii. Transfer/employment transactions Across TSEL

**4. Table of Authority for Transfer** (applicable for all types and levels of employee):

| Type of Transfer                               | Proposed by Existing BU | Recommended by New BU | Acknowledged by Dept. Head – EG (if needed) | Acknowledged by Finance dept. (if needed to check the budget) | Acknowledged by HR dept. | Approved by             |
|--|-------------------------|-----------------------|---|---|--------------------------|-------------------------|
| Transfer Within Dept.                          | Head of BU              | Head of BU            | Head of Department-EG                       | Head of Finance-EG  | HR Business Lead         | Head of Dept.           |
| Transfer / Employment Transactions Across TSEL | Head of BU              | Head of BU            | Head of Department-EG                       | Head of Finance-EG  | Head of HR               | CEO / Managing Director |

**5. Transfer Order Issue:**

- i. Transfer Order of section 3(i) will be issued by HR Business Lead
- ii. Transfer Order of section: 3(ii) will be issued by Head of HR

**6. Rules of Transfer:**

- i. Transfer order will be valid for thirty (30) days and be effective from the day of joining.
- ii. Transfers must be conducted prescribed Transfer Order. Line manager should fill-up the Transfer Proposal and process through HR department.
- iii. Once Transfer Proposal approved, HR will issue Transfer Order. And note that, no transfer be valid till it's written and duly completed the transfer process.

- iv. Staff shall not be transferred more than twice in a year in general. However, there can be exceptions for the interest of the organization.
- v. Employee, especially female and mother of baby, can be transferred to any suitable place according to discussion with them. Female staff shall not be transferred from one place to another during the period of conception to six (06) months after delivery of the child. Exceptions shall be accepted by the MD's special approval or written prayer of concerned staff.
- vi. Transfer is not a long-term solution to low performance or behavioral problem of staff. Therefore, in such a case staff development initiative shall be initiated or administrative action shall be pursued.

#### **7. Responsibility Hand Over and Take Over:**

- i. Staff having transfer order must hand over all responsibilities including all papers, documents, equipment and stocks to his/her replacement within one month.
- ii. After joining at the new place, staff shall fill up the Joining After Transfer properly and be ensured to send it to HR department and other concerned dept./unit with supervisor's approval.
- iii. Transfer shall be effective after responsibilities are handed over to the replacement.

#### **8. Transfer Leave:**

- i. Transfer within the country-

Employee will have entitled for two (02) days leave with pay (except clause 9.i.a).

- ii. Transfer outside the country-

Employee will have entitled for five (05) days leave.

- iii. This leave shall applicable in addition to earned leave and treated as transfer leave and have to enjoy within thirty (30) days of transfer effective date.

**9. Transfer Allowance and Bill:**

- i. For transportation of household goods to the new place (with/without family), transferred staff shall be entitled as follows:
  - a) Transfer allowance and transfer leave will be applicable for more than 10 KM distance from previous job station to new job station.
  - b) Employee married/unmarried (with/without family) shall be entitled to reimbursement of reasonable actual cost of transportation for goods (furniture/household items).
  - c) Transferred employee shall be entitled to actual transportation fare for his/her family members (maximum five members including employee) and applicable as per TA/DA policy.
- ii. Transferred staff shall receive traveling and other bills (related to transfer) from the new working place.
- iii. HR and Accounts department will complete all relevant task and bill-voucher for smooth salary posting at new place.
- iv. The transferred staff shall draw his/her salary from the new office irrespective of the transfer date.

