AECOM

Environment

Volume II Introduction to Land Use (Chapter 2-7)

Submitted to:

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Environmental Impact Assessment Study

635 MW Coal based Thermal Power Plant, Munshiganj District, Bangladesh

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2. Introduction

2.2 Background

Orion Group is one of the leading industrial conglomerates in Bangladesh with operations in the power and energy pharmaceuticals, cosmetics, infrastructure development, real estate and construction, high-tech agro products, hospitality, textiles and garments, sports event managements and trading sectors. Orion is one of the major players in the power sector in Bangladesh and has extensively focused on investments in the power generation and energy sector. Orion is already operating two HFO based power plants of 100 MW capacity each and is distributing power to the National grid while another 100 MW HFO based Plant is under development.

Bangladesh Power Development Board (BPDB), Ministry of Power, Energy and Mineral Resources of the Government of Bangladesh (GOB) is responsible for the management of power generation, transmission and distribution of electricity in the country. Considering the severe shortage of power, BPDB plans to augment the power generation facilities to reduce the power deficit in the country.

BPDB had issued a Letter of Intent to Orion Group to design, finance, construct, own, commission and maintain coal based power plant (CPP) in Munshiganj district of Bangladesh for a period of 25 years. Subsequently, Orion Power Unit-2 Dhaka Limited (hereafter referred to as 'OPDL-2') has been awarded the Implementation Agreement and Power Purchase Agreement for setting up a 635 MW CPP on Build Own and Operate (BOO) basis.

OPDL-2 has engaged AECOM India Private Limited to undertake an Environment and Social Impact Assessment (ESIA) for the project as per the requirements of the Environment Conservation Rules, 1997 and International Finance Corporation (IFC's) Performance Standards, 2012 and Environment, Health and Safety (EHS) guidelines. This ESIA report has been prepared on the basis of a reconnaissance visit to the site, environmental monitoring, data analysis, consultations and discussions with relevant stakeholders.

2.3 Project Overview

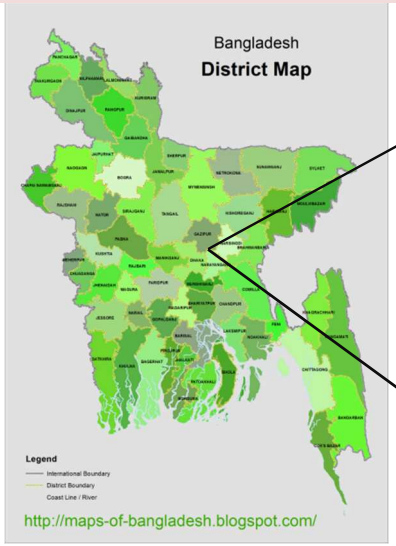
OPDL-2 proposes to develop a coal based power plant in Munshiganj District, Bangladesh. The project site is located at a distance of about 40 km from Dhaka in the southeast direction. The district headquarter, Munshiganj is located at an aerial distance of about 5 km from the project site. The project site constitutes a part of a V - shaped island formed through meandering of River Meghna from its main course and is located at an elevation of 2-5 m above mean sea level. At present, the site is not approachable by road and can be accessed only through country boats. The location of the project site is illustrated in *Figure 2.1*

The power plant will be based on ultra-supercritical technology with a gross and net power generation capacity of 680 MW and 635 MW respectively. The plant will comprise of one boiler and one steam turbine unit. The coal for the project will be sourced from Australia and Indonesia and will be bought to the Chittagong port in mother vessels and will be discharged to lighters. The cooling water for the project will be sourced from Meghna River. The power generated will be evacuated to

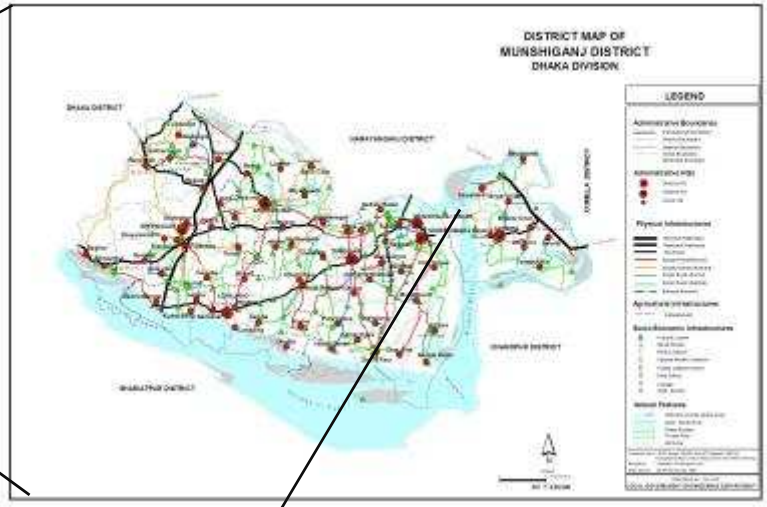
the nearest Bangladesh Power Development Board's substation located at about 3.5 km away from the proposed project site.

Figure 2-1: Location of Projectt Site

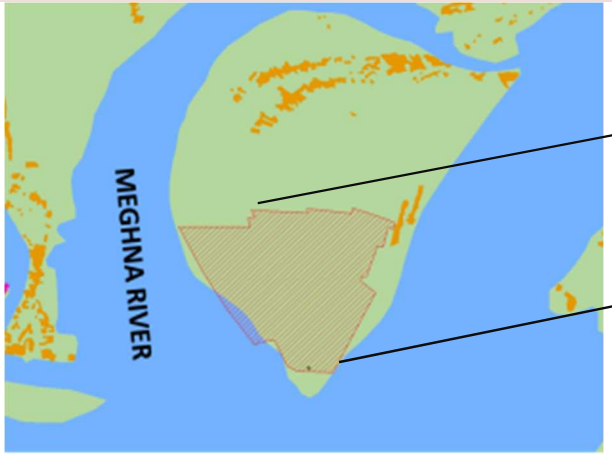
Map of Bangladesh



Map of Munshiganj District



Proposed Site



Map of Gazaria Upazila

2.4 Purpose of the Study

The proposed 635 MW coal based power plant falls under the red category project as per Environment Conservation Act, 1995 and Environment Conservation Rules, 1997. OPDL-2 needs to obtain Site Clearance Certificate and Environmental Clearance Certificate from the Department of Environment (DoE). This ESIA study has been commenced with the objective of obtaining Environmental Clearance Certificates from the DoE.

The environmental and social assessment has been carried out against the following reference framework:

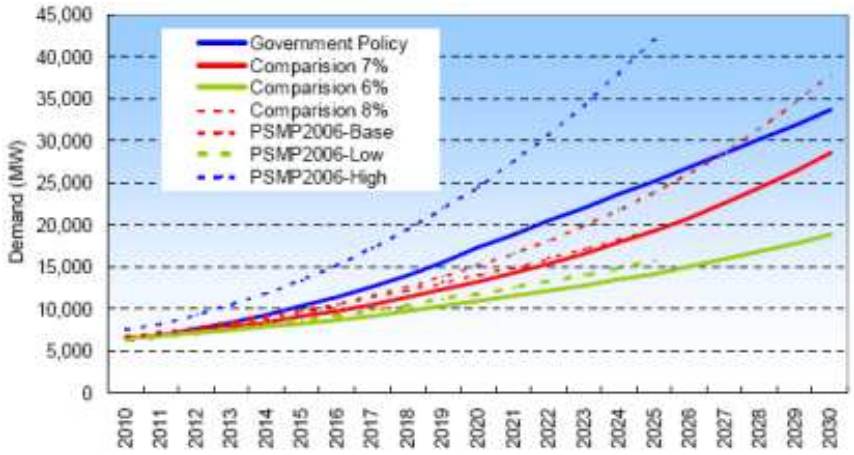
- Terms of Reference provided by Department of Environment;
- Applicable national and local regulatory requirements;
- IFC's Performance Standards for Environmental and Social Sustainability;
- Equator Principles, June 2013
- IFC's General EHS Guidelines;
- IFC's Environmental, Health, and Safety Guidelines for Thermal Power Plants; and
- IFC's Environment, Health and Safety Guidelines for Electric Power, Transmission and Distribution

2.5 Need of the Project

At Present, 62% of the country's population has access to electricity and the per capita generation is 321 kWh.[1] Government of Bangladesh has assigned top priority to the development of power sector realizing its importance in economy, industrial and social development of the country. In this regard the government has set the vision to provide access to affordable and reliable electricity to all by the year 2021. The government is further focusing into its vision targeting the upcoming years up to 2030 and prepared the Power System Master Plan (PSMP) in 2010. The Plan formulated by the Ministry has anticipated a peak power demand of 24,000 MW by 2021 and 34,000 MW by 2030. Power supply targets of 24,000 MW and 39,000 MW have been envisaged under the Plan in the respective years in order to meet the rising power requirements.

Figure 2-2: Power Sector Master Plan

[1] http://www.powerdivision.gov.bd/user/brec1/30/1



Source: Power Sector Master Plan, 2010 (MoPMER, Bangladesh)

The government has designed a strategy to overcome the crisis and at the same time meet the ever increasing demands for power. It launched short, medium and long term programs to increase power supply based on introduction of fuel mix (gas, coal ,liquid fuel, nuclear energy and renewable), demand side management, energy efficiency and conservation. After assessing the latent demands, the government has revised upward its targets for increasing power generation. It now plans to generate 9,600 MW by 2013 and around 15,000 MW by 2016. The government policies and plans are focussed at increasing the grid supply coverage in the country, which is currently less than 40%. The proposed project is part of the overall effort of the government to mitigate the energy crisis. Hence, to serve the purpose, Orion Group has taken initiative to install the proposed plant in Munshiganj, Bangladesh.

2.6 Importance of the Project

As per data revealed by Power Cell, Bangladesh, more than 82% of evening peak electricity is generated by using natural gas. This is followed by liquid fuel and coal with generation shares of 12.61% and 2.49 % respectively. Hydro power accounts for 2.78 % of generation. The market for electricity includes households, agriculture, industries, and transport. In Bangladesh, about 50 percent of the population currently has access to electricity. The remaining 50 percent represents the market yet to be brought under the national grid. The proposed power plant, being a coal based power plant will add 635MW electricity to national grid that will improve present electricity generation capacity of Bangladesh.

The project will necessitate the overall development of the project area in terms of more employment opportunities, increased rural electrification and boost to local business.

Justification – Once Through Cooling System

Siting Decisions for power plants are preliminary depends upon availability of water for cooling purposes, electricity transmission corridors, and fuel transport. Considering the aspect of water requirements two methods are widely available for heat transfer viz; cooling towers and once through systems. Cooling towers are the most common method used to dissipate heat in open recirculating cooling systems while once through cooling systems utilizes water's cooling capacity a single time.

Once-through cooling systems (including cooling reservoirs) have certain advantages over closed-cycle cooling. These advantages may be summarized in the following points: lower capital costs; lower consumptive use of water; lower consumption of energy for pumping of cooling water; dissipation of waste heat to the atmosphere over large area; greater thermal inertia.

In cooling towers additional energy is consumed resulting fall of efficiency of the power plant. A comparison is made below:

Cooling System	Yearly average reduction percent in comparison to Once through cooling system	Maximum summer daily reduction (Due to increased humidity)
Once-through	0	0
Cooling Pond	2.1	3.4
Wet Cooling Tower	3.1	6.8
Dry Cooling Tower	4.9	7.8

Source: OPDL-2

Power plants near to large water body, is well suited for once through cooling system as the large water body has great thermal inertia which means that they do not react rapidly to changing meteorological conditions or varying rates of waste heat discharge from power plants due to load

change. Change in intake water temperature for once-through systems on large water bodies are of the order of several days while in closed cycle cooling system, change can occur within few hours.

2.7 Scope of ESIA Study

The scope of work for the study includes the following:

- Reconnaissance survey and primary field visits to assess the existing environmental conditions in the project area, including the identification of the environment and social receptors;
- Consultations with local community to understand public perception and their expectations from project;
- Collection of additional secondary environmental, social and demographic information;
- Collection of information on forestry, flora and fauna, and natural habitats and species of special conservation/scientific interest through primary ecological survey of the study area;
- Identification and review of the applicable standards and identification of key issues;
- Evaluation of potential social impacts of the Project and its components (including associated facilities like coal transportation facilities, transmission line,. as per the details available); and
- Formulation of a management plans for mitigation of identified impacts. Preparation of Environmental and Social Management Plan (ESMP) based on the findings of the ESIA and develop procedures for mitigation and monitoring of environment and social impacts on an on-going basis and to identify any impacts/mitigation requirements that may occur subsequent to the completion of the ESIA.

2.8 Approach & Methodology

The Environment and Social Impact Assessment study for the project has been carried out as per the requirements of the Environment Conservation Rules, 1997 and IFC's Performance Standards. The study has been conducted following the ToR approved by the DoE (attached as Annexure A). A brief overview of the methodology has been presented below:

- A regulatory review was undertaken in order to understand the applicable, local and national legislation and regulatory frameworks;
- A detailed social and environmental assessment of site and the surrounding areas was undertaken through:
    - Reconnaissance surveys of each of proposed project components to understand site specific issues;
    - Discussion with the local community in the project influenced villages to understand their perception about the project and identification of key issues pertaining to similar projects in the region;
    - Collection of baseline information regarding ambient air quality, water quality, soil quality and noise levels in the Project area through primary monitoring; and
    - Ecological assessment for the Project area through primary and secondary surveys.
- Collection of secondary information on social aspects of the site and consultations with the local community to understand community perception with regard to the project and its activities;
- Assessment of impacts, including cumulative impacts, based on understanding of the project activities and existing baseline status; and
- Preparation of Environment and Social Management Plan (ESMP).

Review of Regulatory and Legislative Framework - A desktop study was carried out to identify the environment and social legislations applicable for the proposed project. The requirements as per the International Finance Corporation's (IFC's) Performance Standards, Environment, Health and Safety (EHS) Guidelines General Guidelines and EHS guidelines for Thermal Power Plants have also been identified.

*Reconnaissance Survey -*A reconnaissance survey of the project area, site surroundings and project associated facilities such as substation, transmission line route etc. was carried out by a four member team of AECOM from 11th-15th February, 2014. The survey focussed on evaluation of existing land use of the site, its surroundings, identification of receptors such as settlements/households and culturally important sites located in and around the Project components. AECOM also participated in the public hearing organised by Orion on 15th February, 2014

*Environment and Social Appraisal of Site -*An environment and social appraisal of the site was undertaken through primary and secondary surveys to understand the site settings, the land use pattern, identifying primary monitoring locations and the ecological profile of the region. A study area of 5 km from the Project boundary was considered for the evaluation of environmental and social existing status and potential impacts. Information regarding the socio-economic profile of the project influence villages and perception of the community about the project was also collated.

Primary baseline monitoring was carried out by Adroit Consultants, Bangladesh for one season, i.e., three months starting from mid-December to mid-March, 2014 for meteorology, air, water, noise and soil quality. Social Surveys were also conducted by Adroit in the project influenced villages. Various government departments and other agencies were contacted to gather information relevant to the project or the project area.

Land Use Mapping and Analysis - Based on the geographic coordinates of the Project area, the satellite imagery were geo-registered and geo-referenced with respect to ground control points from GPS. 2nd order polynomial transformation was used to achieve higher accuracy in geo-referencing.

Satellite images were processed in ERDAS Imagine for preparation of land use land cover using unsupervised classification technique. Major land use classes have been delineated as agriculture land, industrial land, settlements, water body and river. The digital classified map was verified for the accuracy assessment for major land-use classes present in the study area and land use land cover map has been finalized.

Impact Assessment - The assessment of impacts due to the construction and operation of the Project has been carried out by developing an impact evaluation and significance criteria. The first step of the Impact Assessment involved identification of impacts based on the review of available project information; discussions with the local community; representatives of the project proponents and other sector specific professionals. The assessment of impacts has been based on the range of

potential impacts and extent of their severity on environment, ecology, socio-economic resources, demographics, livelihoods, as well as access and infrastructure issues. Mitigation measures for the identified impacts have also been proposed.

Formulation of Environment and Social Management Plan - An Environment and Social Management Plan (ESMP) has been developed for the Project based on the impacts identified. The ESMP provides economically feasible control technologies and procedures to minimize any impact on environment and mechanism for continuous consultation and involvement of the community throughout the various stages of the Project. The ESMP also describes the desired outcomes as measurable events to the extent possible, such as performance indicators, targets or acceptance criteria that can be tracked over defined time periods, and indicating the resources and responsibilities required for Implementation. Following plans have been developed for the project:

- Air Quality Management Plan;
- Contractor Labour Management Plan ;
- Waste Management Plan;
- Environment and Social Monitoring Plan;
- Emergency Response and Preparedness Plan;
- Occupational Health and Safety Plan; and
- Livelihood Restoration Plan.

2.9 ESIA Team

AECOM has formulated a multidisciplinary team of professionals having experience of conducting Environmental Impact Assessment and Social Impact Assessment. Table below presents the professionals' names with their Area of expertise and Qualifications.

Table 2-1: Professionals involved in ESIA Study

Name of the Professional	Area of Expertise	Qualifications
Dr. Somnath Mukherjee	Review of the Final ESIA Report	Ph.D. in Environment (IIT Bombay)
Ajay Pillai	Water Pollution Monitoring, Prevention & Control	Masters in Environmental Science (University of Indore)
	Meteorology, Air Quality Modelling & prediction	
	Risk and Hazards Management	
Nguyen, Hoai Thanh	Water Resources and Water Quality Assessment and Hydrological modelling	Masters and Bachelors in Engineering
Dr. Ritu Paliwal		Ph.D in Environmental Policy Intervention Analyses (TERI University)
Ishita Shah	Solid and Hazardous Waste Management and Noise &Vibration	Masters in Environmental Management and Technology (University of Manchester)
Jayakrishna Vasam	Land use and GIS Mapping	M.Tech in Geomatic Engineering (IIT, Roorkee)
Pallavi Ranjan	Socio-economic Assessments	Master's in Public Health (National University of Singapore)

		Masters in Social Work (MS University, Baroda)
Parth Bapat	Biodiversity Assessment, Ecological Survey and Ecological Impact Assessment	Bachelor in Physics (Mumbai University)
Deepti Bapat		Masters in Botany (Mumbai University)
Reela Mishra	Environmental Impact and EHS Assessments	Masters in Energy Systems (University of Petroleum and Energy Studies)
Anchal Jain	Field Survey, Data Collection for Environmental Assessments and report preparation	Bachelor of Environmental Engineering (Delhi College of Engineering)
Saurav Basu	Field Survey, Data Collection for Environmental Assessments and report preparation	Bachelor of Environmental Engineering (Delhi College of Engineering)

Source: AECOM

2.10 Limitations

The impact assessment study for the proposed project is based on various surveys and investigations undertaken in the project area. Any change in project location, orientation, proposed plant components, proposed project activities is likely to result in variation of the environmental impacts. It is to be noted that any technological advances during the course of construction and execution of the project will alter the extent and severity of impacts on the surroundings.

2.11 Report Structure

The report fulfils the requirements of EIA study under ECR, 1997 and has been prepared in accordance with the ToR approved by the DoE. The report contains seventeen chapters and the chapter details are outlined below:

The layout of the report is as provided below:

Chapter 3: outlines **Legal Policy and Administrative Framework**
Chapter 4: describes **Project Data sheet**
Chapter 5: provides an **Process Description**
Chapter 6: details **Analysis of alternatives**
Chapter 7: provides details on the **Land Cover/ Land Use**
Chapter 8: analyses **Description of Environment**
Chapter 9: presents **Environment Impacts**
Chapter 10: provides **Impact Evaluation**
Chapter 11: presents the **Mitigation of Impacts**
Chapter 12: presents the **Environment Management Plan**
Chapter 13: presents the **Risk Assessment**
Chapter 14: presents the **Environment and Social Monitoring Plan**
Chapter 15: presents the **Project Benefits and Cost**
Chapter 16: presents the **Public Consultation**
Chapter 17: presents the **Conclusion and Categorization of Project**

3. Legal, Policy and Administrative Framework

This section outlines the legal framework and highlights the environmental and social regulations applicable to the Project. It broadly focuses on the:

- Legal Enforcement Agencies;
- Applicable national and local Environmental and Social Laws, Regulations and Policies;
- IFC Performance Standards;
- Applicable Standards; and
- Applicable International Conventions/Protocols.

3.1 Legal Enforcement Agencies

The responsibility of formulation, implementation and modification of national level environmental laws in Bangladesh lies with the Ministry of Environment and Forests (MoEF). The Department of Environment (DoE) established under the Environmental Pollution Control Ordinance, 1977 functions under the MoEF. It is responsible for carrying out the purposes and provisions of the Environment Conservation Act, 1995 as amended till 2010 (hereinafter referred as ECA) which is the umbrella legislation regulating environmental issues in the country.

A brief description of the relevant legal relevant enforcement agencies has been described in the *Table 3-1.*

Table 3-1: Relevant legal enforcement agencies and their functions

S.N	Agency	Functions
1.	Ministry of Environment & Forests (MoEF)	The MoEF is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. It oversees all environmental matters in the country and is a permanent member of the Executive Committee of the National Economic Council. It plays a pivotal role as a participant of the United Nations Environment Programme (UNEP). Its principal activities include: • Conservation & survey of flora, fauna, forests and wildlife; • Prevention and control of pollution; and • Forestation & regeneration of degraded areas and protection of environment in the frame work of legislations.
2.	Department of Environment (DoE)	An Environment Pollution Control Board was setup under the Environment Pollution Control Ordinance, 1977. It underwent a series of subsequent restructuring and was finally renamed as Department of Environment in 1989. It is headed by a Director General appointed by the Government. The DoE through its head, divisional and district level offices conducts the following principal activities : • Advising the Government to avoid such manufacturing processes, commodities and substances which are likely to cause environmental pollution; • Advisory and issuing directions to the concerned person regarding the environmentally sound use, storage, transportation, import and

S.N	Agency	Functions
		export of a hazardous substance or its components; • Conducting inquiries and research activities on conservation, improvement and pollution of the environment and rendering assistance to any other authority/organisation regarding the same; • Collection and publication of information about environmental pollution; • Conducting programs for observation of drinking water quality and issuing directives if necessary for adherence to drinking water quality standards; • Formulation of environmental guidelines; • Prescribing and modifying environmental quality standards pertaining to air, water, noise, vehicular emissions etc.; • Issuing Location Clearance and Environmental Clearance Certificates to projects; and • Implementation of provisions of ECA and rules made there under.
3.	Bangladesh Forest Department (BFD)	It was established under the MoEF and is responsible for identifying and declaring of certain areas as reserved or protected or private forest lands. It implements the provisions of Forest Act, 1927 and National Forestry Policy, 1994. It's also responsible for wildlife preservation and protection through implementation of Wildlife (Preservation & Security) Act, 2012.
4.	Water Resources and Planning Organisation (WARPO)	It was established under the Water Resources Planning Act, 1992. Its core functions include: • Monitoring the implementation of National Water Management Plan (NWMP); • Upkeep of water resource assessments; • Maintenance, updating and dissemination of the National Water Resources Database (NWRD) and MIS; • Secretariat to the National Water Resources Council (NWRC) and the Executive Committee of the National Water Resources Council (ECNWRC); • Responding to the NWRC/ECNWRC requests for information and advice; • Periodic update of the NWMP; • Assisting other agencies in planning, monitoring, studies and investigations; • Adhoc advice on policy, strategy, institutional and legal issues; • Laying down effluent discharge standards into river in consultation with DoE; and • Special studies and research as required.
5.	Ministry of Shipping (MOS)	It is responsible for: • Development and maintenance of waterways, inland water transport, ports, ocean shipping etc. • Overseeing the safety and environmental matters of maritime shipping, ports etc. • Formulation and implementation of act, rules and policies regarding the aforementioned issues.
6.	Bangladesh Inland Water	It was setup in 1958 under the provisions of East Pakistan Inland water

S.N	Agency	Functions
	Transport Authority (BIWTA)	Transport Authority Ordinance 1958. Its specific functions include: • Carry out river conservancy works; • Disseminate navigational and meteorological information including publication of river charts; • Draw up programmers of dredging requirements and priorities for efficient maintenance of existing navigable waterways and for resuscitation of dead or dying rivers, channels, or canals, including development of new channels and canals for navigation; • Develop, maintain and operate inland river ports, landing/ferry ghats and terminal facilities in such ports or ghats; • Implementation of provisions under Inland Shipping Ordinance, 1976 as amended by Inland Shipping (Amendment) Act, 2005.
7.	Ministry of Fisheries and Livestock (MOFL)	The main functions of the MOFL include: • Preservation of fisheries resources; • Fulfilling the requirement of animal protein through proper management and planned development; • Increasing socio-economic conditions of fishermen • Creating employment opportunities for rural unemployed and landless people • Expanding foreign exchange earnings by exporting fish and fishery products; • Developing innovative technologies through research for fisheries development and preservation; and • Protection of fishes through implementation of Protection and Conservation of Fish Act, 1950 as amended till date.
8.	Bangladesh Power Development Board (BPDB)	It is a statutory body created in May 1, 1972 and is responsible for major portion of generation and distribution of electricity mainly in urban areas except Dhaka and West Zone of the country. It has undertaken a massive capacity expansion plan to add about 10500 MW generation capacity in next 5 years to achieve 24000 MW Capacity according to Power System Master Plan (PSMP) 2021. *Application of power requirement during construction phase has been filed by OPDL-2 to Comilla Vidyut Palli Samiti, Bangladesh. Power*
9.	Bangladesh Energy Regulatory Commission (BERC)	It was established under the Bangladesh Energy Regulatory Commission Act, 2003. Some of its key functions include: • Issue, cancel, amend and determine conditions of licenses, exemption of licenses and determine the conditions to be followed by such exempted persons; • Regulation of generation, storage, supply, and transmission of energy; • Determine tariff for electricity distribution etc.; • Ensure control of environmental standard of energy under existing laws; • Extend co-operation and advice to the Government, if necessary, regarding electricity generation, transmission, marketing, supply, distribution and storage of energy.
10.	Ministry of Power, Energy	The Ministry was setup with vision of providing access to affordable and

S.N	Agency	Functions
	and Mineral Resources (MPEMR)	reliable electricity to the entire country by the year 2021. The major functions of the ministry include: • Coordinating activities related to power generation, transmission and distribution; • Managing all matters and policies related to the power sector; • Expand, rehabilitate and modernize power generation, transmission and distribution services in line with the increasing national demand and prepare action plans and programs accordingly; • Encourage private and joint venture in power sector besides government investment; • Monitor revenue earnings and commercial activities of utilities; and • Promotion of renewable energy and energy efficiency through formulation of policy/regulation, different incentive mechanism and Research and Development.
11.	Ministry of Labour and Employment (MOLE)	It was established with following objectives: • Creation of employment opportunity; • Creation of semi-skilled and skilled manpower; • Enhancement of productivity of factories by creating friendly working environment between workers & employers; • Ensuring welfare of workers in different industrial areas; • Implementation of labour laws; • Fixing up minimum wages of labour; and • Ensuring justice through Labour Court. It has been divided into four departments viz. • Directorate of Labour • Chief Inspector of Factory and Establishment • Minimum Wages Board • Labour Appeal Tribunal
12.	Chief Inspectorate of Boilers	The Office of Chief Inspectorate of Boilers was established under the Boiler Act, 1923 (as amended till 1990) for performing the following functions: ▪ Registration of newly installed boilers ▪ Yearly inspection of registered boilers for renewal ▪ Conducting examination of Boiler Attendants ▪ Certification of Locally manufactured boilers
13.	Ministry of Law and Parliamentary Affairs	This ministry is divided in to the Law and Justice Division and the Parliamentary Affairs Division for functional purposes. The Law and Justice Division of the Ministry of Law, Justice and Parliamentary Affairs has the responsibility of providing legal advisory services to other ministries, divisions, departments, and organizations of the Government. The parliamentary affairs division is assisted by the law commission and the human rights commission and its main function lies in formulating, scrutinizing and preparing legislations. When needed, it provides legal opinions and translations for other ministries.
14.	Ministry of Land	The ministry of land is in charge of land administration, management and development for the overall growth of the nation. The Ministry

S.N	Agency	Functions
		manages Government owned lands, vested properties and abandoned properties. It is responsible for the collection of land development tax, land surveying and record keeping and updating. Land Acquisition and requisition fall under the responsibilities of this ministry.
15.	Ministry of Social Welfare	The ministry of Welfare is responsible for formulating policies and implementing programmes towards the benefit of the vulnerable and disadvantaged sections of the society. These include destitutes, juveniles, abandoned, orphans, poor amongst the mentally and physically handicapped, and the poorest amongst the economically weak.
16.	Ministry of Health and Family Welfare	The ministry of Health and Family Welfare oversees three main aspects, these being Public Health, Medical Education and Health services. The ministry is in charge of formulating and implementing public health programmes such as child immunization, preventive disease – surveillance, DOTS, Polio control etc. It is also entrusted with the duty of regulating health care resources including medical practioners, and laying guidelines for health services in the country.

Source: Assessment of legislative bodies present in Bangladesh

3.2 Applicable Environmental and Social Laws, Regulations and Policies

The relevant Acts and Rules pertaining to the project have been summarised in the ***Table 3-2.***

Table 3-2: Applicable Environmental and Social Laws, Regulations and Policies

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
ENVIRONMENT			
1.	**National Environment Policy, 1992 and Action Plan** It sets out the framework for establishment of legislations related to 15 sectors including environment, water, agriculture, water resources development, forest &wildlife, fisheries etc. The key provisions of the policy are: • Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) of all new public and private sector industrial projects is mandatory • Adoption of corrective measures by polluting industries in phases. • Prevention of land erosion, and environmentally sound management of newly accreted land. • Conservation of wildlife, bio-diversity, forest, fisheries and livestock.	MoEF DoE	***OPDL-2 shall ensure that project activities comply with the provisions made under the policy and the legislations made there under for implementing the same.***
2.	**The Environment Conservation Act, 1995** *as amended till October 5, 2010* (hereinafter referred as ECA) **The Environment Conservation Rules, 1997** *as amended till February 16, 2002*(hereinafter referred as ECR) The salient features of the Act are as follows: • A **Department of Environment (DoE)** to be established subsidiary to the MoEF to exercise the provisions of the Act. • The Government of Bangladesh (GoB) will declare	MoEF DoE	The proposed project being a thermal power project hence it falls under the Red category as classified under Schedule- I of the ECR. OPDL-2 shall ensure compliance with the applicable provisions of the Act and the Rules made there under. *OPDL-2 has received a No Objection Certificate (NOC) from Hosseindi Union Parishad dated 24th May, 2013 for the project site which has been attached as an Annexure C. According to one of the conditions stipulated in NOC, all*

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	Ecologically Critical Areas (ECA) and specify the activities or processes that cannot be initiated or continued in an ECA. • An industrial unit/project cannot be established without obtaining an **Environmental Clearance Certificate (ECC)** from the Director General of DoE. • Publication of environmental guidelines related to environmental pollution control and mitigation, conservation and improvement of the environment. • Prescription of rules for implementing the provisions of the Act. The provisions under the ECR are summarised as follows: • The industries for the purpose of obtaining ECC have been classified into the following 4 categories based on their site and impact on the environment: **i. Green** **ii. Orange –A** **iii. Orange – B** **iv. Red** *The list of industries falling under each category has been annexed in the Schedule – I to the ECR.* • For proposed industries falling under the Orange A&B and Red categories, a **Location Clearance Certificate (LCC)** needs to be obtained from DoE prior to the issuance of ECC. • The project entrepreneur shall apply for ECC in ***Form 3*** along with prescribed documents and application fees. • **ECC (for Red category) will be valid for 1 year** from the issuance date and shall be **renewed at least 30 days prior to expiry.**		*the clearances mandated by DOE shall be obtained.* OPDL-2 shall ensure that Location Clearance Certificate (LCC) for the proposed project site is obtained. Furthermore, OPDL-2 shall apply for the Environmental Clearance Certificate (ECC) in the requisite manner along with prescribed documents. The EIA to be submitted along with ECC application shall be as per the TOR provided by the DoE as an annexure to the LCC. OPDL-2 shall ensure that the stack height, pollutant emissions/discharges from various sources etc. during project activities are well within the standards prescribed in the Schedules 2-12 of the ECR 1997. Some of the standards have been revised by the DoE viz. • Ambient Air Quality standard • Vehicular Emission standards • Ambient Noise Standards ***The various applicable standards have been provided n subsequent sections. Compliance to such standards shall be ensured by OPDL-2.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	• Various environmental quality standards pertaining to air, water, sound, odour etc. have been laid down in the schedules attached to the Act. • Emissions and waste discharge standards have been laid down in Schedules 9-11. • The person in charge of facility/unit shall notify the Director General, DoE in case of pollutant emission/ discharge in excess of prescribed standards or where there is a possibility of the same.		
3.	**The Forest Act, 1997** *as amended through April 30,2000* Under the provisions of the Act, the government can declare certain areas as Reserved Forests and Protected Forests and restrict activities in and around such areas.	MoEF BFD	An area of 10km radius (measured form the boundary) around a Reserved Forest is declared as Protected Area under the Act. No industrial/commercial activities can be conducted in such an area. ***The proposed project site does not fall within 10km radius of any Reserved Forest. Hence, it does not come within the purview of the Forest Act.***
WATER			
4.	**National Water Policy, 1999** This policy aims to provide direction to all agencies working with the water sector, and institutions that relate to the water sector The WARPO shall : • Establish zoning regulations for location of new industries in consideration of fresh and safe water availability and effluent discharge possibilities ; and • Establish standards for effluent disposal into common water courses in consultation with DoE. The effluent disposal will be monitored regularly by relevant Government agencies in order to prevent water pollution.	WARPO	***OPDL-2 will ensure that the project effluent disposal meets the prescribed quality standards set down by the DoE.***
5.	**Bangladesh Water Act, 2013** The key features of the Act are:	WARPO	This Act was implemented in 2013 and the NWRC and Executive Committee are yet to be formulated. Upon formation of the aforementioned bodies,

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	• A **National Water Resources Council (NWRC)** to be established for implementing the provisions of the Act • A National Water Policy shall be adopted by the Council addressing the following issues: i. Purpose and sectors of water use ii. Affordability of water users iii. Actual cost of water abstraction and distribution iv. Financial ability and backwardness of water users of any group thereof v. Water demand and supply vi. Any other issues considered relevant by GoB 1. An **Executive Committee** of the Council shall be established or ensuring efficient performance of the Council. 2. The GoB can declare certain areas as Water Stress Areas for the protection of water sources or aquifers. 3. Water zone demarcation (industrial, agricultural, brackish water aquaculture and hatchery water zones) through gazette notification and issuance of protection order for efficient water management in such zones	NWRC	water stress areas and related provisions may be prescribed. OPDL-2 shall comply to the following : • OPDL-2 shall ensure that it has appropriate water right for extraction of water from Meghna River for cooling purposes; • OPDL-2 may apply to an authority designated by the government to have a water use, which is permissible, declared to be an existing lawful water use; • OPDL-2 shall ensure that water use must be licensed by the authorities empowered under existing laws and in accordance with the standards set by the Ministry of Water Resources; • OPDL-2 shall ensure that waste treatment, pollution control and monitoring equipment to be installed, maintained and operated as per the specifications; • OPDL-2 shall ensure that area from where water will be extracted does not fall under water stress areas of Meghna River; • OPDL-2 to ensure a person may not drill, construct, enlarge or otherwise alter a borehole, engage in a borehole drilling program, for the purpose of exploring for ground water, except in accordance with the standards set by the Ministry of Water Resources; and • OPDL-2 shall ensure that ground water is not contaminated by means and develop proper drainage channels around the proposed plant; • OPDL-2 shall ensure compliance with legal requirements as mentioned under Chapter XI 'General Provisions" if applicable.
6.	**National River Protection Commission Act, 2013 Bill** This Act has been drafted and it aims at protecting the country's river resources from illegal encroachment. A commission will be		Since the Act is in the draft stage hence it won't be applicable to the project. However, on the formulation of rules by the proposed commission, the project may come within the purview of the Act.

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	formed which will formulate rules for implementing provisions of the Act.		***OPDL-2 shall ensure compliance with the applicable provisions of the Rules as may be formulated.***
FISH			
7.	**National Fisheries Policy,1998** The objectives of the fisheries policy are: • Enhancement of the fisheries production; • Poverty alleviation through creation of self-employment and improvement of socio-economic conditions of the fishermen; • Fulfilling the demand for animal protein; • Achieve economic growth through earning foreign currency by exporting fish and fisheries products; and • Maintain ecological balance, conserve biodiversity, ensure public health and provide recreational facilities. The policy broadly aims at fisheries development, regulation of aquaculture, biodiversity conservation and formulation of laws to ban the disposal of any untreated industrial effluents into the water bodies.	MoFL Department of Fisheries	***OPDL-2 shall ensure that during project operation, no untreated effluent is disposed into the river. The treated effluent shall also meet the standards stipulated under the ECR.***
8.	**Protection and Conservation of Fish Act, 1950** *as amended through February 16, 1995* This Act was promulgated for conservation of fish in Bangladesh and their protection against indiscriminate fishing, poisoning due to industrial effluent disposal into the water, oil spills etc.	MoFL DoF	--
9.	**Protection and Conservation of Fish Rules, 1985** The Rules were prescribed under the provisions of Protection and Conservation of Fish Act. It provides the regulations for prohibition of fishing during certain periods, licences for catching fishes, prevention of fish destruction due to explosives and	MoFL DoF	***OPDL-2 shall ensure that untreated effluent is not disposed into the river. The treated effluent shall comply with the discharge standards stipulated under the ECR.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	industrial effluent disposal etc.		
PORTS			
10.	**Ports Act,1908** The Act was promulgated to consolidate the enactments related to the ports and port charges. The key points to be noted under this Act are as follows: • As per Section 21, **throwing of ballast or rubbish** (likely to form bank or shoal or to be detrimental to navigation) or **oil/oil mixed with water** is **prohibited** without the consent of port conservator into the port or upon any place from which the same is liable to be washed into any such port either by ordinary/high tides/storms/land-floods etc. • As per Section 31, no vessel of measurement ≥200 tons shall enter/leave into any port without a pilot. A vessel of measurement >100 but <200 tons shall enter a port without a pilot authority in writing so to do has been obtained from the conservator or some officer empowered by him to give such authority	MoS	***OPDL-2 shall ensure that during coal transportation the provisions under Section 21 and 31 of the Ports Act are complied with.***
11.	**Ports Rules, 1966** • Section II deals with discharge of passengers/ballast/cargo. Under Rule 31, **a survey certificat**e or **route permit** is a pre-requisite for a vessel to transport, load and unload passengers/cargo/fuel onto a port which shall be issued by the port Conservator/competent authority. • Section III of the Rules prohibits the discharge of oil/oil mixed with water into water within the limits of port without the permission of the port Conservator • The disposal of oil/oil mixed with water shall be done outside the port limits by the vessel owner by making his	MoS	***OPDL-2 shall ensure that vessels to be plied for coal transportation are in possession of a valid survey certificate/route permit issued by the Port conservator. It shall also be ensured that discharge of oil/oil mixed with water (if any) is done as per the provisions of the Rules.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	own arrangements.		
12.	**Inland Shipping Ordinance, 1976** *as amended through Inland Shipping (Amendment) Act, 2005* Chapter VA of the Ordinance deals with prevention of inland water from pollution. • No inland ship/ facility plying in and around inland waterways shall be used without prescribed registration and sanitation facilities. • Every inland ship shall be granted yearly renewable **Pollution Prevention Certificate(s) (PCC)** by the surveyor on application from ship owner in the prescribed format and application fees. The PCC shall be carried on board at all times.	BIWTA	***OPDL-2 shall ensure the following as mandated by the Ordinance:*** • ***All the inland ships shall have a valid route permit granted by the GoB/relevant authority.*** • ***Inland ship shall be equipped with firefighting equipment's, lifesaving apparatus and measures against explosion, collision and other accidents as prescribed.*** • ***Every inland ship while underway shall comply with rules for collision prevention/ steering or sailing related rules as prescribed.***
POWER/ELECTRICITY GENERATION			
13.	**Private Sector Electricity Generation Policy, 1996** *as revised in 2004* The policy deals with financing arrangements, security packages (viz. Implementation Agreements, Power Purchase Agreements ant Fuels Supply Agreement Agreements) requirements, power purchase tariff at bus bars, fiscal incentives, facilities and incentives for foreign investors etc.	MPEMR BPDB	***OPDL-2 has received Sovereign Guarantee in the form of repayment guarantee through the Implementation Agreement (IA) and BPDB has provided off-take guarantee through the Power Purchase Agreement (PPA).***
14.	**Power System Master Plan, 2010-2021** The plan envisages to achieve an installed electricity generation capacity of 24,000 MW by the year 2021 by adding 10500 MW to the existing capacity through: • Construction of imported coal power station • Introduction of LNG facilities • Construction of the oil fired power station • Import the electricity generated by hydro power from the	MPEMR BPDB	***The proposed project has been conceived under the Power System Master Plan. It is in line with the plan's target to generate maximum electricity from coal. Since the project is a ultra-supercritical thermal power plant, hence it also meets the high efficient power supply objective of the Plan.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	neighbouring countries or joint development • Introducing a high efficient power supply and low CO_2 emission technology • Improving 10 points thermal efficiency on average The plan aims to acquire the following fuel composition ratio for additional electricity generation: • Coal – 50% (30% domestic coal and 20% imported coal) • Natural Gas – 25% (including LNG) • Nuclear – 20% (including renewable and cross-border trade) • Liquid fuel – 5%		
OCCUPATIONAL HEALTH, SAFETY AND COMPENSATION			
15.	**The Dangerous Cargoes Act, 1953** This was promulgated to provide provisions related to the safety of ports with respect to the transit, working and storage of dangerous cargoes.	Deputy Conservator of the Port Board of Trade or the Ministry of Communication Chief of Naval Staff.	***OPDL-2 shall ensure that the provisions made under this Act are complied with during coal transportation to ensure safety of ports and vessels carrying the coal.***
16.	**Fire Prevention and Extinguishing Law, 2003** Under the provisions of this Law, the owner of a facility needs to obtain a licence from the FSCD prior to using a part/whole of it as a warehouse.	Bangladesh Fire Service and Civil Defence Department (BFSCDD)	As per Government order HSLG/SVII/1R-1/60/295 dated June 3, 1960 stocking of coal in excess of four tonnes shall be considered as a fire risk. ***Since the proposed project location will have a coal storage area whose capacity is in excess of four tonnes hence OPDL-2 shall obtain a*** **Warehouse Licence** ***from the BFSCDD for the same. It shall also ensure that the terms and conditions mentioned in the licence are complied with.***
17.	**Fatal Accidents Act, 1855** This Act was promulgated to provide compensation to families	MoLE	***OPDL-2 shall ensure compliance to the Rules***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	for loss occasioned by the death of a person caused by actionable wrong. The company will be liable to pay compensation in case of death of any worker/employee or damages in case death has not ensued but such circumstances could have resulted in death.		
18.	**Boilers Act, 1923** (as amended till 1990) and **Boiler Regulations, 1951** **Boiler Rules, 1961** • Section 7 of the Act mandates the ***registration of a boiler*** prior to its operation. The boiler can be operated only after it has been issued a certificate or a provisional order. • The registration certificate will have the maximum pressure mentioned at which the boiler can be operated. • The boiler shall be in charge of persons holding ***Certificates of Competency*** as prescribed by the Act or Rules made there under. • Section 8 deals with the provisions for renewal of certificate. • Section 18 prescribes the manner in which accidents shall be reported to the Inspector. • Section 22-25 enlists the penalties related to improper and illegal boiler operation	Office of Chief Inspectorate of Boilers	***During the project operation, OPDL-2 shall ensure the following:*** • ***Registration of boiler prior to operation.*** • ***The charge of boiler operation shall be given to persons in possession of valid Certificates of Competency.*** • ***Boiler operation shall adhere to the General Instruction for Boiler Operation as issued by the Office of the Chief Inspectorate of Boilers***.
19.	**Bangladesh Labour Act, 2006** *(as amended through July 22, 2013)* The provisions prescribed under chapters pertaining to occupational health and safety, and compensations due to accidents are entailed below. ***Chapter V: Health and Hygiene*** The chapter deals with provisions regarding cleanliness of the any facility, drinking water supply, ventilation, lighting, dust bean	Ministry of Labour and Employment	***OPDL-2 shall ensure that all conditions provided in chapters V, VI, VII and VIII of the Act, pertaining to Health, hygiene safety and welfare are met in accordance with the amended act.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	and spittoons etc. ***Chapter VI: Safety*** This chapter addresses the issues regarding safety of building and machinery, precautions in case of fire, fencing of machinery, work on or near machinery in motion, hoists and lifts protection of eyes, explosive or inflammable dust/gas, etc. ***Chapter VII: Special Provisions related to Health, Hygiene and Safety*** This chapter deals with provisions to be taken in case of hazardous operations, notice to be given in accidents, notice of certain dangerous occurrences and diseases etc. ***Chapter VIII: Welfare*** This chapter prescribes the provisions to be facilitated in the facility regarding first-aid appliances, safety record books, washing facilities, canteens, shelters, rooms for children etc.		
LABOUR BENEFITS AND ENTITLEMENTS			
20.	**Bangladesh Labour Act, 2006** *(as amended through July 22, 2013)* This Act consolidates and amends the laws relating to employment of labour, relations between workers and employers, determination of minimum wages, payment of wages and compensation for injuries to workers, formation of trade unions, raising and settlement of industrial disputes, health, safety, welfare and working conditions of workers, apprenticeship and matters connected therewith. The provisions prescribed under chapters pertaining to labour benefits and entitlements are as follows: • Conditions of Service and Employment	Ministry of Labour and Employment	***During the construction and operation phases of the proposed project, OPDL-2 shall ensure the facilitation of the following provisions:*** • Management of workers under service rules as approved by the Chief Inspector. • Provision of Letter of Appointment and ID card (with photograph) for each and every worker. • Maintenance of Service Book with the requisite details. • Retrenchment Policy and conditions of re-employment of retrenched workers, termination of employment etc. • Provisions regarding gratuity, provident fund and other payments at the time of retirement of workers. • Any adolescent employed in any dangerous operation shall be in possession of Certificate of Fitness issued by a registered medical

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	• Employment of Adolescent • Maternity Benefit • Working Hours and Leave • Wages and Payment • Workmen's Compensation for Injury by Accidents • Trade Unions and Industrial Relations • Regulation of Employment and Safety Of Dock Workers		practitioner. • Maternity benefits shall be paid as stipulated in the Act. • Cleanliness of the facility through washing, painting and varnishing etc. for ensuring hygiene. • Ventilation and removal dusts and fumes through adequate number of exhaust systems. • Adequate number of drinking water facilities equipped with cooling systems at convenient places in the unit. Al such places shall be legibly marked 'Drinking water' in Bangla. • Separate and adequate number of latrines and urinals for men and women. They shall be maintained in a clean and sanitary condition at all times with suitable detergents and disinfectants. • Safety provisions in accordance with the Act viz. protection of building, fire safety measures etc. All workers shall be provided with requisite Personal Protective Equipments (PPEs). • *Leave Policy* stating the working hours and the number of leaves the workers are entitled to under the provisions of the Act. • Compensation/wages shall be stated in the Letter of Appointment given to the workers/employees. • OPDL-2 shall ensure that there is no policy restricting the association of workers'/trade unions. • *Workmen's Compensation Policy* stating the compensation to be meted out in case of injury due to accidents. • Safety of dock workers engaged in loading and unloading of ships as per prescribed provisions.
CHILD PROTECTION AND UNDER AGE WORKERS			
21.	**National Child Labour Elimination Policy 2010** The National Child Labour Elimination Policy 2010 has been adopted to provide a framework towards eradicating all forms of	Ministry of Labour and Employment	***During all stages concerning employment of labour, OPDL-2 should take the policy as a guidance document for following ethical practices at workplace, in dealing with adolescent workers, if at all.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	child labour by 2015. The policy defines and lays guidelines for underage workers, regulation of their working hours, wages, nutrition needs, mental health, education and overall work environment. As per the policy, a child is a person under the age of 14. A person between the ages of 14 and 18 is an adolescent, and should be granted special amendments, if compelled to work due to poor economic status. The policy also entails that a child may not be employed as a regular employee, not be made to work in hazardous settings, provided breaks more frequent than those for regular employees and have enough time left for study.	Ministry of Women and Child Welfare	
22.	**Children's Act, 2013 (Act No. 24 of 2013).** The Act implements the Nation's ratification to the UN Convention on the Rights of the Child (CRC), and replaces The Children's Act of 1974. The main components of the act are as follows: • The Act changes the legal definition of a child from being a person under the age of 14 to one under the age of 18. • It enforces the national authorities to establish Child Welfare Boards in each district, besides one at the national level. • It criminalizes any kind of cruelty inflicted on children while they are working in both the formal and informal sectors. • The Act further prescribes stricter punishments for using or exploiting children in begging, in brothels, and in carrying drugs, arms, or other illegal commodities	Ministry of Social Welfare, Ministry of Law, Justice and Parliamentary Affairs. District commissioner's Office.	***OPDL-2 must ensure that at through all stages of construction and operation, no juvenile (children between ages 14 and 18) are engaged on site.***
LAND ACQUIZITION, RESETTLEMENT AND REHABILITATION			
23.	**The Acquisition And Requisition Of Immovable Property Ordinance, 1982** The ordinance consolidates and amends the laws relating to	Ministry of Land	***Land has already been acquired for the project on a willing buyer – willing seller basis by OPDL-2 for the site and therefore this ordinance is not applicable to the project.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	acquisition and requisition of immovable property by the government. It lays down the procedures and conditions for acquisition of land and other immovable properties such as common property resources (wells, places of worship, burial grounds etc).		
24.	**The Land Acquisition Act of 1894** The act provides procedures for acquisition of Land needed for public purposes and for companies, and for determining the amount of compensation to be made on account of the acquisition.	Ministry of Land District Collector	***Land for the project has been procured on a willing buyer – willing seller basis by OPDL-2 for the site and therefore this Act is not applicable to the project.***
COMMUNITY HEALTH AND SAFETY			
25.	**Prevention of Malaria (Special Provisions) Ordinance, 1978** Bangladesh is a Malaria endemic country and the ordinance makes provisions for the prevention and control of malaria, by the state authorities. ***Section 3*** highlights the following points, relevant to industries, factories and commercial establishments. • The government may prohibit or order closure of anything to do with engineering, agricultural and industrial projects which may increase the extent and spread of malaria. • In such a case, the government may order the spraying of insecticide and prohibit the management from washing, white-washing, plastering, painting or applying any other surface treatment during a period of 5 months from spraying, with respect to any building or other premises which has been sprayed. • The government may authorise a person on its behalf to conduct arbitrary inspections and subsequently take	Ministry of Health and Family Welfare Department of Public Health Engineering	***During construction and operations stages, OPDL-2 shall ensure sanitary living and working conditions of labourers are maintained. Food hygiene and sanitary conditions of toilets shall be provided special attention.***

S.N	Summary of Applicable Legislation/Policy	Agency Responsible	Applicable permits and Requirement
	measures to prevent or stop the spread of mosquito larvae. • Measures may include collection of water and blood samples, spraying of insecticide and compulsory testing of migrant labour (from malaria endemic areas) for malaria.		
MISCELLANEOUS			
26.	**Industrial Statistics Act, 1942 (No. 19 of 1942) and The Industrial Labour Statistics Rules, 1961** The Act directs statistics and information to be provided to relevant authorities, pertaining to any matter relating to factories and matters relating to welfare and conditions of labour.	Ministry of Law, Justice and Parliamentary Affairs.	OPDL-2 must maintain accurate and updated records pertaining to conditions entailed in section 3 of the law, and be able to furnish them upon the direction of the relevant Government Statistics Authority.

3.3 US EX-IM Bank's Environmental and Social Due Diligence Procedures and Guidelines

The Charter of the United States Export-Import Bank (Ex-Im Bank) requires the Bank to establish procedures to take into account the potential beneficial and adverse environmental effects of goods and services for which financial support is requested, consistent with the mandate to support U.S. jobs through exports. The Board of Directors are authorized by the Charter to grant or withhold financing support after taking into account the beneficial and adverse environmental effects of proposed transactions. In addition, the Charter directs the Bank to operate its financing programs in a manner that is competitive with support offered by principal countries whose exporters compete with U.S. exporters.

Ex-Im Bank formulated its Environmental Procedures and Guidelines on February 1, 1995 which underwent a series of subsequent revisions. It adopted the Organisation for Economic Cooperation and Development (OECD) '*Common Approaches for Officially Supported Export Credits and Environmental and Social Due Diligence*' in 2007 which was further revised in 2012 upon the recommendation of the Council on the Common Approaches. Adherence to the Common Approaches is intended to ensure consideration of the environmental effects of projects on a consistent basis among the major Export Credit Agencies (ECAs).

The Bank adopted the Equator Principles in March 2011 in its intent to further its objectives of coordinating and aligning with other lending institutions in reviewing the risks and impacts of projects for which financing is requested. As a member of the Equator Principles Association, the Bank has taken steps to align its environmental procedures with the Equator Principles as a complement to those prescribed by the Common Approaches.

US Ex-Im's Categorisation of Projects

The Ex-Im Bank for the purpose of reviewing the project financing applications on the basis of their potential environmental and social impacts has developed a system of categorization. This system is used for screening such applications and setting down information requirements from applicants pertaining to each category. The categorization used by the Bank along with the information requirement (besides the information furnished in the *Environmental Screening Document* submitted along with application) has been illustrated in *Table 3-3.*

Table 3-3: US Ex-IM Bank's categorization of Projects

Category	Description	Information Requirement
A	**Large Greenfield Projects or Projects located in, or impacting a Sensitive Site** 1. These include large green-field projects in sectors such as hydroelectric, mining, forestry, commercial oil & gas development, pipelines, transmission lines, chemical plants, refineries, thermal power plants greater than 140 MWe, pulp & paper, and industrial processing plants that have the potential to cause significant adverse	The project applicant shall submit along with the application : 1. **ESIA Report** consistent with information requirements as per the eight *IFC Performance Standards* on Environmental and Social Sustainability as revised in January 2012 describing the risks and impacts of the project as well as that of any associated operations or facilities that the Bank may identify as being within the

Category	Description	Information Requirement
	impacts. 2. Any project to be constructed in, or likely to have a perceptible impact on, environmentally sensitive locations (such as National Parks and other protected areas identified by national or international law) and other sensitive locations of international importance (e.g., Ramsar Convention sites, IUCN protected areas and UNESCO World Heritage Sites) or of national or regional importance, such as wetlands, forests with high biodiversity value, areas of archaeological or cultural significance, and areas of importance for indigenous peoples or other vulnerable groups.	scope of its environmental review. 2. **Environmental and Social Management Plan (ESMP)** and/or **Action Plans** demonstrating the project's level of compliance to all of the applicable host country legislations, IFC Performance Standards and World Bank Group EHS Guidelines.
B	**Expansions, Upgrades and Projects having Limited Environmental Impact** These projects have environmental and social impacts lesser as compared to those of *Category A* projects. The projects under this category generally include: • New thermal power plants with capacities less than 140 MWe; • Small to medium scale manufacturing and industrial facilities not impacting an environmentally sensitive location; • Nominal upgrades to existing projects that do not result in significant additional capacity or materially increase project risks and impacts; and • Existing projects that are not undergoing any material change in capacity or function, but which may have potentially adverse environmental or social impacts.	1. It does not require the preparation and submission of an ESIA. However, if an ESIA has been made earlier for the project, then it shall be made available to the Bank. 2. Environmental information shall be submitted in order to identify risks and impacts and proposed measures to reduce or mitigate identified impacts, consistent with the requirements of the applicable host country legislations, IFC Performance Standards and EHS Guidelines of the World Bank Group.
C	**Categorical Exclusions** Applications (greater than USD 10 million) which are not related to a physical project or if they relate to projects which do not require further environmental review because they are likely to have minimal or no adverse environmental or social risks or impacts. These generally include sale of aircraft, satellites, locomotives or railway signalling to existing railroads, equipment for existing telecommunication operations, radar and air traffic control systems not associated with new airports, electronic data processing equipment for existing facilities, hospital equipment not	No further information is required apart from that furnished in the Environmental Screening Document.

Category	Description	Information Requirement
	associated with new construction, and pre-project services such as environmental and feasibility studies.	

Source: US EXIM Bank Guidelines

Box 3-1 : Applicability of Categorization

Since the proposed project is a 635 MW capacity thermal power project, hence it's classified as a **Category A** project as per the Bank's categorization system. As per the information requirements, the applicant i.e., OPDL-2 is required to submit the following besides the Environmental Screening Document submitted along with the financing application:

- ESIA report consistent with the information requirements as per the IFC Performance Standards;
- ESMP and/or Action Plans demonstrating the project's level of compliance to all of the applicable host country legislations, IFC Performance Standards and World Bank Group EHS Guidelines; and
- Any other related documentation as may be intimated by the Bank.

3.4 Equator Principle Financial Institutions (EPFIs) Guidelines

In March 2011, US Ex-Im Bank adopted the Equator Principles. Equator Principles are a set of principles aiming towards promotion of responsible environmental stewardship and socially responsible development, including fulfilling responsibility to respect human rights by undertaking due diligence.

Principle 1: Review and Categorisation

Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the level of environmental and social risks and impacts. The categories are:

Category A – Projects with potential significant adverse environmental and social risks and/or impacts those are diverse, irreversible or unprecedented;

Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and

Category C – Projects with minimal or no adverse environmental and social risks and/or 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 impacts of the proposed Project. The Assessment Documentation should propose measures to minimise, 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. Bangladesh being a Non-Designated Country, the Assessment process evaluates compliance with the then applicable IFC Performance Standards on Environmental and Social Sustainability (Performance Standards) and the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines).

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.

Principle 5: Stakeholder Engagement

The EPFI will require the client to demonstrate effective Stakeholder Engagement as an on-going process in a structured and culturally appropriate manner for all Category A and Category B Projects. The client will conduct an Informed Consultation and Participation process. The consultation process will be tailored 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.

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.

Principle 6: 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.

Principle 7: 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.

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.

Principle 9: Independent Monitoring and Reporting

For Projects where an Independent Review is required under Principle 7, the EPFI will require the appointment of an Independent Environmental and Social Consultant after Financial Close, 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.
- The client will publicly report GHG emission levels during the operational phase for Projects emitting over 100,000 tonnes of CO_2 equivalent annually.

3.5 IFC's Performance Standards

The IFC Performance Standards stipulates that any proposed project shall meet the following requirements throughout the life of an investment by IFC or other relevant financial institution:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts;
- Performance Standard 2: Labour 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

These performance standards and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts.

3.5.1 Applicability

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

PS 1 establishes the importance of:

- Integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects;
- Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; and
- The project proponent's management of environmental and social performance throughout the life of the project.

Applicability

PS 1 is applicable to all projects and associated facilities having environmental and/or social risks and/or impacts. Some of the key environmental and social impacts that the proposed project can be associated with:

- Air pollution due to gaseous emissions of pollutants (SO_2, NO_X, Particulate matter etc.) during construction and operation phases
- Fly ash generation and disposal
- Dust generation during coal handling
- Vehicular emissions during transportation etc.
- Noise generation during construction and operation phase
- High temperature cooling water disposal into the river and possible impact on resident aquatic species
- Land acquisition and possible resettlement of local population
- Loss of livelihood of local population due to project operations etc.

PS 1 is applicable for the project and an Environmental and Social Impact Assessment (ESIA) study needs to be conducted prior to the commencement of the project. OPDL-2 also needs to develop and implement an Environmental and Social Management System (ESMS) to manage the identified risks associated with its operations.

Performance Standard 2: Labour and Working Conditions

PS 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers. The objectives of the PS 2 are:

- To promote the fair treatment, non-discrimination, and equal opportunity of workers;
- To establish, maintain, and improve the worker-management relationship;
- To promote compliance with national employment and labour laws;
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain;
- To promote safe and healthy working conditions, and the health of workers; and
- To avoid the use of forced labour.

Applicability

The applicability of PS 2 will be more important during the construction phase as operation phase will have lesser number of staff. It is estimated that approximately 3000 workers will be engaged during the peak construction phase and 275 during the operational phase. This PS covers not only the main plant employees, but all employees/workers, even those working through contractors. Migrant workers will be engaged for the project and they will be provided accommodation in labour camps. Hence, standards pertaining to campsites will be applicable.

PS 2 is applicable to the Project and OPDL-2 shall ensure provision of adequate facilities such as access to clean water, sanitary facilities and other necessary facilities at the construction sites. OPDL-2 shall ensure measures to prevent child labour, forced labour, and discrimination are strictly implemented. Freedom of association and collective bargaining shall be provided. Wages, work hours and other benefits shall be regulated as per the national labour and employment laws.

Performance Standard 3: Resource Efficiency and Pollution Prevention

The PS 3 outlines approach to pollution prevention and abatement in line with internationally disseminated technologies and practices with the following objectives:

- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from activities; and
- Promote the reduction of emissions that contribute to climate change.

Applicability

OPDL-2 shall assess the impacts and risks associated with the generation, use, storage, release, and/or disposal of pollutants during the ESIA, planned as part of the ESMS, and implement them as per the Action Plan(s). Also the pollution control measures shall be planned and implemented right from the project conception stage. Practices like minimal release of waste/emissions, safe disposal of waste, waste water management etc. shall be considered prior to each project phase. PS 3 is therefore applicable for the proposed project.

Performance Standard 4: Community Health, Safety and Security

PS 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. Its main stress is 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.

Applicability

The applicability of this PS shall be established during the ESIA process, resulting in preparation of an Action Plan to be disclosed to the local community. The Applicability will extend to construction as well as operational phases of the project. It will be associated with coal transportation, movement of vehicles, noise generation etc. Security staff will be engaged form local community whereas labour engaged will be both local as well as migrant.

The Action Plan and any other relevant project-related information is to enable the influenced communities and relevant government agencies to understand these risks and impacts, and will engage the influenced communities and agencies on an on -going basis consistent with the requirements of PS 1.

Performance Standard 5: Land Acquisition and Involuntary Resettlement

PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Its main aim is 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 providing compensation for loss of assets at replacement cost and ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of affected persons and community.

Applicability

The land required for the project has been purchased through negotiated settlements between landowners and OPDL-2's land acquisition representatives. The acquired lands were used for agricultural and grazing purposes which served as source of income for the landowners. Hence, the land acquisition has resulted in loss of livelihood of the landowners. However, there has been no physical displacement or resettlement as none of the acquired lands were inhabited. Thus PS 5 will be applicable for mitigating the impacts arising out of the land procurement process.

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. This standard is aimed to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

Applicability

The proposed project will involve discharge of high temperature of cooling water into the Meghna River during project operation phase. This poses risk to aquatic species (especially fishes) in the vicinity of the plant outfall. Since fishing is the primary source of income of the local population, it also poses a risk of affecting their livelihood.

OPDL-2 shall ensure that the temperature at which the cooling water is discharged is lesser than the limits as per the applicable national laws and international guidelines whichever of the two is more stringent. It shall ensure that indiscriminate fishing is prohibited in the project area as mandated by the national laws. PS 6 will be applicable in addressing the aforementioned issues and managing the risks posed by such project operations.

The details of this PS have been detailed out in the ESIA study,while implementation of the actions necessary to meet the requirements of this PS shall be managed through the suggested mitigation measures. The operation phase of the proposed project shall ensure protection of fauna and flora of the site and surroundings.

Performance Standard 7: Indigenous Peoples

PS 7 recognizes Indigenous Peoples as social groups with identities that are distinct from mainstream groups in national societies, and are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development.

Applicability

Census records and public consultations indicate that there are no Indigenous populations within a 5 km radius of the project site. Thus, PS 7 shall not be applicable to this project.

Performance Standard 8

PS 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention concerning the Protection of the World Cultural and Natural Heritage, this

Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

Applicability

This PS is applicable when tangible forms of cultural heritage, unique natural features or tangible objects that embody cultural values and certain instances of intangible forms of culture are impacted or are proposed to be used for commercial purposes. No such tangible forms of cultural heritage or objects were found in the project area. Hence this PS is not applicable to the proposed project.

IFC's Categorisation of Projects

As part of its review of a project's expected social and environmental impacts, IFC uses a system of social and environmental categorization. This categorization is used to reflect the size of impacts understood as a result of the client's social and environmental assessment and to specify IFC's institutional requirements. The following categories are used by the IFC:

- ***Category A Projects***: Projects with potential significant adverse social or environmental impacts that are diverse, irreversible or unprecedented;
- ***Category B Projects***: Projects with potential limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures;
- ***Category C Projects***: Projects with minimal or no adverse social or environmental impacts, including certain financial intermediary (FI) projects with minimal or no adverse risks;
- ***Category FI Projects***: All FI projects excluding those that are Category C projects.

IFC therefore categorizes projects primarily according to the significance and nature of impacts. IFC defines the project's area of influence as the primary project site(s) and related facilities that the client (including its contractors) develops or controls; associated facilities that are not funded as part of the project (funding may be provided separately by a client or a third party including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project; areas potentially impacted by cumulative impacts from further planned development of the project; and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that would occur without the project or independently of the project.

3.6 Environmental Review Requirements

Table 3-4 illustrates the information requirements from the applicant. It combines the information to be furnished by the applicant pertaining to the IFC Performance Standards and the Ex-Im Bank's Supplemental Guidelines for High Carbon Intensity Projects. The information will be used by the Bank in reviewing the environmental and social impacts of the project.

Table 3-4: Ex-Im Environmental Review Requirements

Environmental Review Requirements	Information to be furnished by the Client
Ex-Im Bank Environmental and Social Due Diligence Procedures and Guidelines	1. ESIA Study 2. ESMP

(incorporating IFC Performance Standards (PS) as per OECD Agreement and Equator Principles, as well as compliance with host country laws)	
CO_2 Calculation and Reporting	1. Estimate of total project CO_2 equivalent (CO_2e) emissions calculated as per GHG Protocol Standard Methodology for quantifying Scope1 emission 2. CO_2 intensity (energy efficiency)
General	Technical engineering assessment, including use of ultra-supercritical or subcritical technologies, coal quality, etc.
High Carbon Intensity Project Supplemental Guidelines	Use of best appropriate technology available. Alternatives Analysis demonstrating no other economically feasible alternative.

Source: UPDATE OF EX-IM ENVIRONMENTAL REVIEW REQUIREMENTS under Annex A-2: Supplemental Guidelines for High Carbon Intensity Projects on February 6, 2014

3.7 EHS Guidelines of IFC

The Equator Principle III requires follow up of the environmental, health and safety requirements as per the following guidelines released by IFC on 19th December, 2008. These guidelines ensure that the projects are developed in a manner that is socially responsible and reflects sound environmental management practices. EHS considerations into the site selection and plant design processes should be considered in order to maximize the range of options available to prevent and control potential negative impacts.

1. Environmental, Health, and Safety General Guidelines;
2. Environmental, Health, and Safety Guidelines for Thermal Power Plants;
3. Environmental, Health, and Safety Guidelines for Shipping.

The key requirements stated in the above mentioned EHS guidelines have been discussed in ***Table 3-5.***

Table 3-5: Key Requirements as per EHS Guidelines of IFC (General, Thermal Power Plants and Shipping)

S.N	Relevant Requirements as Stated in EHS Guidelines
1.	**Air Emissions**
i	*Choice of fuel*
a.	Preference to high-heat-content, low-ash, and low-sulfur coal
b.	Beneficiation to reduce ash content
c.	Selection of the best power generation technology
d.	Designing stack heights according to Good International Industry Practice (GIIP)
	Emissions should not contribute more than 25% of the applicable ambient air quality standards in the same airshed[2]
ii	*Pollutant-specific control recommendations*
a.	**Sulphur Dioxide**
	Use of lime (CaO) or limestone ($CaCO_3$) in coal-fired fluidized bed combustion boilers to have integrated desulfurization or Use of flue gas desulfurization (FGD)
b.	**Nitrogen Oxides**

[2] *An airshed should be considered as having poor air quality if nationally legislated air quality standards or WHO Air Quality Guidelines are exceeded significantly.*

S.N	Relevant Requirements as Stated in EHS Guidelines
	Use of low NOx burners with other combustion modifications, such as low excess air (LEA) firing
	Use of a selective catalytic reduction (SCR) system
	Use of water injection or SCR for combustion turbines and reciprocating engines burning liquid fuels;
c.	**Particulate Matter**
	Installation of dust controls capable of over 99% removal efficiency, such as Electrostatic Precipitators, Fabric Filters (bag houses) or Wet Scrubbers.
	Use of loading and unloading equipment that minimizes the height of fuel drop to the stockpile
	Use of water spray systems for solid fuel storage in arid environments;
	Use of enclosed conveyors with well designed, extraction and filtration equipment on conveyor transfer points to prevent the emission of dust;
	Design and operate transport systems to minimize the generation and transport of dust on site;
	Storage of lime or limestone in silos with well designed, extraction and filtration equipment;
	Use of wind fences in open storage of coal or use of enclosed storage structures
	Installation of special ventilation systems in enclosed storage to avoid dust explosions
2.	**Energy efficiency and Greenhouse Gas emissions**
a.	Consider efficiency-relevant trade-offs between capital and operating costs involved in the use of different technologies.
b.	Use of high performance monitoring and process control techniques,
c.	Good design and maintenance of the combustion system
d.	Reforestation, afforestation, or capture and storage of CO_2 or other currently experimental options
e.	Robust Quality assurance on input material and Scheduled maintenance programs
f.	Insulate all steam, condensate, hot water and thermal fluid distribution pipework, down to and including 1" (25 mm) diameter pipe, in addition to insulating all hot valves and flanges
g.	Ensure adequate insulation to reduce heat gains through cooling system structure and to below-ambient temperature refrigerant pipes and vessels.
3.	**Water consumption and aquatic habitat alteration**
	Use of dry scrubbers in situations where these controls are also required or recycling of wastewater in coal-fired plants for use as FGD makeup
	Reduction of maximum through-screen design intake velocity to 0.5 ft/s
	For freshwater rivers or streams intake flow should be sufficient to maintain resource use (i.e., irrigation and fisheries) as well as biodiversity during annual mean low flow conditions.
	Reduction of impingement and entrainment of fish and shellfish by the installation of technologies such as barrier nets (seasonal or year-round), fish handling and return systems, fine mesh screens, wedge wire screens, and aquatic filter barrier systems.
	Designing the location of the intake structure in a different direction or further out into the water body may also reduce impingement and entrainment
4.	**Effluents**
i.	*Thermal Discharges*
a.	integrity of the water body as a whole or endanger sensitive areas (such as recreational areas, breeding grounds, or areas with sensitive biota) to be maintained
b.	There should be no lethality or significant impact to breeding and feeding habits of organisms passing through the elevated temperature areas;
c.	No significant risk to human health or the environment due to the elevated temperature or residual levels of water treatment chemicals
d.	Adjustment of the discharge temperature, flow, outfall location, and outfall design to minimize impacts to acceptable level.
ii.	*Liquid Waste*
a.	Recycling of wastewater in coal-fired plants for use as FGD makeup.
b.	Collection of fly ash in dry form and bottom ash in drag chain conveyor systems
c.	Consider use of soot blowers or other dry methods to remove fireside wastes from heat transfer surfaces
d.	Use of infiltration and runoff control measures such as compacted soils, protective liners, and sedimentation controls for runoff from coal piles

S.N	Relevant Requirements as Stated in EHS Guidelines
e.	Spraying of coal piles with anionic detergents to inhibit bacterial growth and minimize acidity of leachate
f.	Treatment of low-volume wastewater streams that are typically collected in the boiler and turbine room sumps
g.	Pre-treatment of cooling tower makeup water
h.	installation of automated bleed/feed controllers in cooling towers
i.	use of inert construction materials to reduce chemical treatment requirements for cooling towers;
j.	Elimination of metals such as chromium and zinc from chemical additives used to control scaling and corrosion in cooling towers;
k.	Use the minimum required quantities of chlorinated biocides in place of brominated biocides.
l.	Process modification, including waste minimization, and reducing the use of hazardous materials.
m.	Assimilative capacity of the receiving water for the load of contaminant being discharged wastewater
n.	Temperature of wastewater prior to discharge does not result in an increase greater than 3°C of ambient temperature at the edge of a scientifically established mixing zone.
o.	Storm water should be separated from process and sanitary wastewater streams
p.	The parameters selected for monitoring should be indicative of the pollutants of concern from the process, and should include parameters that are regulated under compliance requirements;
q.	Limiting condenser or cooling tower blow down to the minimum required to prevent unacceptable accumulation of dissolved solids
iii.	*Sanitary Wastewater*
a.	Segregation of wastewater streams to ensure compatibility with selected treatment option.
b.	Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements
5.	**Solid wastes**
a.	Dry handling of the coal combustion wastes (CCWs), in particular fly ash.
b.	Recycling of CCWs in uses such as cement and other concrete products, construction fills (including structural fill, flowable fill, and road base), agricultural uses.
c.	Ensuring consistent quality of fuels and additives helps to ensure the CCWs can be recycled.
d.	Disposal of CCW in permitted landfills with environmental controls such as run-on/run-off controls, liners, leachate collection systems, ground-water monitoring and closure controls
e.	Management of ash disposal and reclamation so as to minimize environmental impacts.
f.	Reuse of sludge from treatment of waste waters from FGD plants.
6.	**Hazardous materials and oil**
i.	*Release Prevention and Control Planning*
a.	The use of double-walled, underground pressurized tanks for storage of pure liquefied ammonia (e.g., for use as reagent for SCR)
b.	Training of operators on release prevention, including drills specific to hazardous materials as part of emergency preparedness response training
c.	Implementation of inspection programs to maintain the mechanical integrity and operability of pressure vessels, tanks, piping systems, relief and vent valve systems, containment infrastructure, emergency shutdown systems, controls and pumps, and associated process equipment.
d.	Preparation of written Standard Operating Procedures (SOPs) for filling Underground Storage Tanks (USTs), Above Storage Tanks (ASTs) or other containers.
e.	SOPs for the management of secondary containment structures, specifically the removal of any accumulated fluid, such as rainfall.
f.	Identification of locations of hazardous materials and associated activities on an emergency plan site map
g.	Documentation of availability of specific personal protective equipment and training needed to respond to an emergency
h.	Description of response activities in the event of a spill, release, or other chemical emergency
i.	Written process safety parameters (i.e., hazards of the chemical substances, safety equipment specifications, safe operation ranges for temperature, pressure, and other applicable parameters, evaluation of the consequences of deviations, etc.)
ii	*Reaction, Fire, and Explosion Prevention*

S.N	Relevant Requirements as Stated in EHS Guidelines
a.	Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas
b.	Provision of material-specific storage for extremely hazardous or reactive materials
c.	Use of flame arresting devices on vents from flammable storage containers
d.	Provision of grounding and lightning protection for tank farms, transfer stations, and other equipment that handles flammable materials
e.	Selection of materials of construction compatible with products stored for all parts of storage and delivery systems, and avoiding reuse of tanks for different products without checking material compatibility
f.	Prohibition of all sources of ignition from areas near flammable storage tanks
g.	Appropriate secondary containment structures consist of berms, dikes, or walls capable of containing the larger of 110 % of the largest tank or 25% of the combined tank volumes.
h.	An Emergency Preparedness and Response Plan incorporated into and consistent with, the facility's overall management system should be prepared
i.	A system for community awareness, notification and involvement that should be commensurate with the potential risks identified for the project to be incorporated.
7.	**Noise**
a.	Siting new facilities with consideration of distances from the noise sources to the receptors (e.g., residential receptors, schools, hospitals, religious places) to the extent possible
b.	Use of noise control techniques such as: using acoustic machine enclosures; selecting structures according to their noise isolation effect to envelop the building; using mufflers or silencers in intake and exhaust channels; using sound-absorptive materials in walls and ceilings; using vibration isolators and flexible connections (e.g., helical steel springs and rubber elements);
c.	Applying a carefully detailed design to prevent possible noise leakage through openings or to minimize pressure variations in piping;
d.	Modification of the plant configuration or use of noise barriers such as berms and vegetation to limit ambient noise at plant property lines.
e.	Identify and mark high noise areas and require that personal noise protecting gear is used all the time when working in such high noise areas (typically areas with noise levels >85 dBA).
f.	Noise monitoring may be carried out for the purposes of establishing the existing ambient noise levels in the area of the proposed or existing facility, or for verifying operational phase noise levels.
8.	**Occupational Health and Safety**
i.	*Non-ionizing radiation*
a.	Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
b.	Training of workers in the identification of occupational EMF levels and hazards;
c.	Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure.
d.	Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.
ii.	*Heat*
a.	Regular inspection and maintenance of pressure vessels and piping;
b.	Provision of adequate ventilation in work areas to reduce heat and humidity;
c.	Reducing the time required for work in elevated temperature environments and ensuring access to drinking water;
d.	Provisions of shielding surfaces where workers come in close contact with hot equipment, including generating equipment, pipes etc;
e.	Use of warning signs near high temperature surfaces and personal protective equipment (PPE) as appropriate, including insulated gloves and shoes.
iii.	*Confined Spaces*
a.	Engineering measures should be implemented to eliminate, to the degree feasible, the existence and adverse character of confined spaces.

S.N	Relevant Requirements as Stated in EHS Guidelines
b.	Permit-required confined spaces should be provided with permanent safety measures for venting, monitoring, and rescue operations, to the extent possible.
c.	Access hatches should accommodate 90% of the worker population with adjustments for tools and protective clothing.
d.	Mechanical equipment in the space should be disconnected, de-energized, locked-out, and braced, as appropriate.
e.	Appropriate training in confined space hazard control, atmospheric testing, use of the necessary PPE, as well as the serviceability and integrity of the PPE should be verified.
iv.	*Electrical Hazards*
a.	Consider installation of hazard warning lights inside electrical equipment enclosures to warn of inadvertent energization;
b.	Use of voltage sensors prior to and during workers' entrance into enclosures containing electrical components
c.	Deactivation and proper grounding of live power equipment and distribution lines according to applicable legislation and guidelines whenever possible before work is performed on or proximal to them;
d.	Provision of specialized electrical safety training to those workers working with or around exposed components of electric circuits.
v.	*Fire and Explosion Hazards*
a.	Use of automated combustion and safety controls;
b.	Proper maintenance of boiler safety controls;
c.	Implementation of startup and shutdown procedures to minimize the risk of suspending hot coal particles (e.g., in the pulverizer, mill, and cyclone) during startup;
d.	Regular cleaning of the facility to prevent accumulation of coal dust (e.g., on floors, ledges, beams, and equipment);
e.	Removal of hot spots from the coal stockpile (caused by spontaneous combustion) and spread until cooled, never loading hot coal into the pulverized fuel system;
f.	Use of automated systems such as temperature gauges or carbon monoxide sensors to survey solid fuel storage areas to detect fires caused by self-ignition and to identify risk points.
g.	Equipping facilities with fire detectors, alarm systems, and fire-fighting equipment. The equipment should be maintained in good working order and be readily accessible.
h.	Provision of manual firefighting equipment that is easily accessible and simple to use. Fire and emergency alarm systems that are both audible and visible.
i.	Defining and labelling fire hazards areas to warn of special rules.
j.	Providing specific worker training in handling of flammable materials, and in fire prevention or suppression
k.	Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection systems.
vi.	*Chemical Hazards*
a.	Consider generation of ammonia on site from urea or use of aqueous ammonia in place of pure liquefied ammonia;
b.	Consider use of sodium hypochlorite in place of gaseous chlorine.
c.	Implementation of engineering and administrative control measures to avoid or minimize the release of hazardous substances into the work environment keeping the level of exposure below internationally established or recognized limits.
d.	Communicating chemical hazards to workers through labelling and marking according to national and internationally recognized requirements and standards.
e.	Training workers in the use of the available information (such as MSDSs), safe work practices, and appropriate use of PPE
vii.	*Dust Management*
a.	Use of dust controls (e.g., exhaust ventilation) to keep dust below applicable guidelines or wherever free silica levels in airborne dust exceed 1 percent;
b.	Regular inspection and maintenance of asbestos containing materials.
viii.	*Community Health and Safety*

S.N	Relevant Requirements as Stated in EHS Guidelines
a.	Reducing off-site impacts of releases through measures intended to contain explosions and fires, alert the public, provide for evacuation of surrounding areas, establish safety zones around a site, and ensure the provision of emergency medical services to the public
b.	Reducing the probability that releases will occur through improved site operations and control, and through improvements in maintenance and inspection
c.	Modifying process or storage conditions to reduce the potential consequences of an accidental off-site release
d.	Improving shut-down and secondary containment to reduce the amount of material escaping from containment and to reduce the release duration
ix.	*Traffic Safety*
a.	Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Source: IFC General EHS Guidelines and Thermal Power Plant Guidelines

3.8 Applicable Environmental Standards

3.8.1 Ambient Air quality standards

As per the provisions of Rules 12 and 13 of the ECR 1997, the MoEF is responsible for laying down environmental quality standards (pertaining to air, water, sound, odour and other components) and standards for discharge and emission of waste. Ambient air quality standards have been stipulated in *Schedule 2 (Standards for Air)* of the Rules. However, these standards were revised by MoEF in 2005. The revised standards have been illustrated in the following ***Table 3-6.***

Table 3-6: National Air quality Standards of Bangladesh (2005)

Pollutant	Averaging Time	Concentration
Carbon Monoxide (CO) (mg/m^3)	8 hours	10 (9 ppm)
	1 hour	40 (35 ppm)
Lead (Pb) ($\mu g/m^3$)	Annual	0.5
Oxides of Nitrogen (NO_x) ($\mu g/m^3$)	Annual	100 (0.053 ppm)
Sulphur dioxide (SO_2) ($\mu g/m^3$)	Annual	80 (0.03 ppm)
	24 hours	365 (0.14 ppm)
Suspended Particulate Matter (SPM) ($\mu g/m^3$)	8 hours	200
Coarse Particulates (PM_{10}) ($\mu g/m^3$)	Annual	50
	24 hours	150
Fine Particulates ($PM_{2.5}$) ($\mu g/m^3$)	Annual	15
	24 hours	65
Ozone (O_3) ($\mu g/m^3$)	8 hours	157 (0.08 ppm)