

## **Executive Summary Environmental Impact Assessment Report**

### **1.0 The Background**

The Tamil Nadu Electricity Board (TNEB) is a statutory body formed under the Electricity Supply Act as a successor to the erstwhile Electricity Department of the Government of Madras. The role of TNEB in improving the economy of the state of Tamil Nadu by extensive electrification of the villages, large scale energisation of agricultural pump sets and extension of electricity services. In order to meet the growing demand of the state, Government of Tamil Nadu has decided to develop a coal based power project through TNEB. Hence, TNEB is proposing 2X800 MW Supercritical Thermal Power Project near Udangudi of Thoothukudi District, Tamil Nadu. TNEB and Bharat Heavy Electricals Limited (BHEL) signed a memorandum of understanding (MOU) to form a Joint Venture Company (JVC) for setting up a this 1,600 MW (2x800 MW) coal based thermal power project.

TNEB has identified 939 acres of land for the proposed plant near udangudi village.

TNEB has retained Bhagavathi Ana Labs pvt Ltd (BALL) for carrying out Rapid Environmental Impact Assessment study required for obtaining “Environmental Clearance” from Ministry of Environment and Forest, Government of India. This document provides the summary of the findings of the REIA Studies.

## 2.0 The Project

The following are the highlights of the project.

Parameter	Description
Capacity of the Project	2X800 MW, Total 1600 MW
Source of fuel	It is proposed to use blended coal (70% Indian Washed Coal from Talcher Coal fields of Mahanadhi Coal fields Limited in Orissa state and 30% Imported Coal from Indonesia, South Africa, Australia, China, etc.)
Fuel requirement	6.74 million tones per annum at a plf of 85 %. 7385 TPA.
Calorific value	3800 Kcal/kg
Average ash content in coal (%-ARB)	30.9%
Maximum Sulphur content in coal	0.35 %
Water Requirement	The estimated consumptive water requirement is <b>245150</b> m <sup>3</sup> /hr(Including losses & recovery)
Source	Sea
Water transportation	Through Pipe Line
Raw water treatment	Water shall be treated in Clarifiers, filters and in DM plant.
Cooling water system	It is "Onec through system"
Raw Material	Secondary Fuel : 4500m <sup>3</sup> /annum

### 3.0 Salient Features of Site

The capital cost of Rupees **8694** Crores. The site is located on the Western side of Bay of Bengal. The nearest railway station is at Thiruchendur which is about 12 km from the site. The nearest airport is at Vaagaikulam, which is about 40 km from Udangudi site. The nearest sea port is Tuticorin port, which is about 45 km from the site. The salient features are described below:

Nature of the Project	Udangudi thermal power Project 2X800 MW Coal fired Power Plant
<b>Location of Project</b>	
Village	Udangudi
District & State	Thoothukudi
Latitude	8° 27' N
Longitude	78° 3' E
<b>General Climatic Conditions</b>	
Maximum Temperature	39°C
Minimum Temperature	22°C
Annual Rainfall	718.2 mm
Wind Pattern	From East and SE
Elevation Above Mean Sea Level	2 m above MSL
<b>Accessibility</b>	
Road Connectivity	East Cost Road-State Highway(176) pass near the project area.
Rail Connectivity	Site is at a distance of 12 KM from Thiruchendur Railway Station
Airport	Nearest Airports is vaagaikulam 40 Km from site
Sea Port	Thoothikudi, 45km from site
<b>Historical / Important Places</b>	
Archaeological/ Historically Important Site	None
Sanctuaries / National Parks	None
Nearest Industries	None

## 4.0 Basic Requirements

### 4.1 Land

TNEB has identified an area of 939 acres of land for the proposed project. Major portion of land, i.e. about 760 acres are Paramboke lands.

### 4.2 Fuel

Coal is considered to be the primary fuel for the proposed plant. The annual consumption of coal for the proposed power plant is estimated as 6.74 million tonnes (i.e. 18465 Tonne/day) duly considering average GCV of coal as 4800 Kcal/Kg with maximum sulfur content of 0.35% and ash content of 30.9%. It is proposed to use blended coal (30% from International market, country like Indonesia, South Africa, Australia, China and 70% Indian Washed Coal from Talcher Coal fields of Mahanadhi Coal fields Limited in Orissa state).

### 4.3 Water Requirement and Availability

The total water requirement for the proposed Plant would be around **245150** m<sup>3</sup>/hr. The water source would be seawater.

## 5.0 Baseline Environmental Status

Study zone of 10 km radius from the center of the proposed plant will form the baseline information.

### 5.1 Meteorology

On site monitoring was undertaken during summer season (February 2008 to April 2008), the predominant wind direction was observed to be from East and SE direction.

### 5.2 Existing Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) stations were set up at **8** locations in the study area. The observations are as follows

- The minimum level of SPM recorded in the study area was 101µg/m<sup>3</sup> at kollamozi and the maximum level recorded was 132 µg/m<sup>3</sup> at Manapadu.
- The minimum level of RSPM recorded in the study area was 22 µg/m<sup>3</sup> at Kulasekarapattinam and the maximum level recorded was 76.8 µg/m<sup>3</sup> at paramankurichchi.

- The minimum level of SO<sub>2</sub> recorded in the study area was 5.7 µg/m<sup>3</sup> at Kulasekarapattinam and the maximum level recorded was 12.6 µg/m<sup>3</sup> at plant site.
- The minimum level of NO<sub>x</sub> recorded in the study area was 7.6 µg/m<sup>3</sup> at Kulasekarapattinam and the maximum level recorded was 18.5 µg/m<sup>3</sup> at plant site.
- HC and CO values in the study area were found to be less <1-ppm at all locations.

All the above AAQ test results are well within the prescribed limits as per NAAQ Standard for residential area. The standard limits are as follows:

Air Pollutants	SPM	RPM	SO2	NOX
**NAAQ Standard for residential area Annual Average / 24 Hrs	140/200	60/100	60/80	60/80

### 5.3 Existing Noise Levels

The noise monitoring has been conducted at 8 locations in the study area during the study period. The Noise levels are

- The minimum noise level 37.5 dB (A) was recorded at Kulasekarappattinam while the maximum noise level 56.4 dB (A) was recorded at Manapadu.
- The day equivalent values were found to be ranging between 48.1 dB (A) to 50.3 dB (A).
- The night equivalent noise levels were found to be ranging between 41.1 dB (A) to 43.0 dB (A).

The standard limits for noise levels are as follows:

Standard limits of Noise Levels in day hours for Industrial Area	75
Standard limits of Noise Levels in night hours for Industrial Area	70
Standard limits of Noise Levels in day hours for Residential Area	55
Standard limits of Noise Levels in day hours for Residential Area	45

#### 5.4 Existing Water Quality

Nine ground water samples and four surface water samples were collected from the study area.

- pH was varying for ground waters from 7.47 to 8.48 and in surface water the pH is observed 6.76-8.48.
- Chloride levels in the ground water samples were ranging from 21 mg/l to 2662 mg/l, where as in surface waters levels are between 43 to 17395 mg/l.
- Hardness is varying from 85 mg/l to 1780 mg/l in ground water samples and in surface waters levels are between 125 to 1100 mg/l.
- In the ground water samples, fluoride value were in the range of 0.3 mg/l to 1.4 mg/l and in the surface waters, the fluoride levels are between 0.5 to 1.8 mg/l.

The test result of ground water samples are compared with permissible limits in the absence of alternative source as per IS:10500 (Drinking Water Standard). It is found that the ground water samples of coastal area are highly influenced by the sea water characteristics.

#### 5.5 Soil Quality

Soil samples were collected from 5 locations around proposed plant at various depths and analyzed for physico-chemical characteristics.

- pH values in the study area are varying from 7.28 to 7.52
- Electrical conductivity in the soil samples analyzed were in the range of 96 to 140 micro Siemens
- The nitrogen content in the soil samples analyzed was in the range of 20-50 kg/ha. The Phosphorous presence in the samples analyzed was found in the range of 11-16 kg/ha. The Potassium is varying between 130-190 kg/ha.

#### 5.6 Demography and Socio-Economics

The socio economic conditions of the study area are as follows.

- The Total Population density in the study area is 365583
- The literacy rate in the study area is 76 percentage.
- The major occupation in the study area is agriculture.

## 6.0 PREDICTION OF IMPACTS AND ENVIRONMENT MANAGEMENT PLAN

Prediction of impacts depends on the nature and size of activity being undertaken and also on the type of pollution control measures that are envisaged as part of the project proposal. However the following management practices would be followed to ensure the environmental quantities within the limits. The proposed plants may cause impact on the surrounding environment in two phases.

- During construction phase
- During Operation phase

### 6.1 Impact on Air Quality and Management

#### Construction Phase

Increase in SPM, RPM, SO<sub>2</sub>, NO<sub>x</sub>, HC & CO levels due to construction activities and movement of vehicles. The impact of these activities would be temporary and will be confined within the plant boundary.

#### Operational Phase

Air pollution generating sources at proposed plant will be due to operation of coal fired boilers. The important air pollutants generated from proposed plant are suspended particulate matter (SPM), Sulphur dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>x</sub>).

The maximum predicted increase in GLC's for, SPM, SO<sub>2</sub> and NO<sub>x</sub> is 4 µg/m<sup>3</sup>, 51.3 µg/m<sup>3</sup> and 16.9 µg/m<sup>3</sup> respectively. The maximum baseline values for SPM, SO<sub>2</sub> and NO<sub>x</sub> recorded during the study period in the study area is 132, 12.6 µg/m<sup>3</sup> and 18.5 µg/m<sup>3</sup> for SPM, SO<sub>2</sub> and NO<sub>x</sub> respectively. The future predicted maximum concentration can be estimated by superimposing the predicted GLC's over the baseline values. As seen from the above table the future maximum predicted GLC's of SPM, SO<sub>2</sub> and NO<sub>x</sub> are 136µg/m<sup>3</sup>, 63.9µg/m<sup>3</sup>, and 36.4µg/m<sup>3</sup> respectively which is very much well within the limits as per National Ambient Air Quality standards i.e. 200µg/m<sup>3</sup> for SPM, 80 µg/m<sup>3</sup> for both SO<sub>2</sub> and NO<sub>x</sub>.

Stack of 275 m shall be provided for coal fired boilers for better dispersion of pollutants. Electrostatic precipitators of 99.9% efficiency shall be provided for the coal fired boilers.

## 6.2 Impact on Water Quality & Management

### Construction Phase

The impact on water environment during construction phase is likely to be short term and insignificant.

### Operational Phase

Total **1661** m<sup>3</sup>/day of wastewater will be generated from the proposed power plant. The details are given below.

#### Wastewater Generation Details

S. No	Description	Wastewater Generation, m <sup>3</sup> /Hr
1	Desalination Plant/RO	1400
2	DM system	20
3	CHP Dust Suppression System(Coal Pile runoff)	125
4	Potable System	8
5	Service Water System	108
<b>Total</b>		<b>1661</b>

The sewage of **8** m<sup>3</sup> per hr generated from proposed power unit shall be treated through septic tanks followed by soak pits. Wastewater from Desalination plant shall be sent to sea. RO rejects shall be sent to CHP Dust suppression tank, then to coal settling tank and finally to central Monitoring basin. DM plant rejects shall be neutralized and then sent to outfall. Service water shall be treated in Tube settlers and sent to central monitoring basin and then some part reutilized. Coal handling system runoff shall be clarified in coal pile runoff pit and then reutilized.

## 6.3 Solid Waste Management

Major solid wastes from proposed thermal power plant are Bottom ash (**1475** TPD) and fly ash(**5900** TPD).Fly ash and bottom ash would be used in cement plant and for manufacturing other construction materials like paver blocks, hollow / solid blocks, mosaic tiles, bricks etc. The septic tank sludge generated is **7** kg/d shall be used as manure for greenbelt development. .

## 6.4 Impact on Noise Levels and Management

### **Construction Phase**

The impact of noise due to construction activities are insignificant, reversible and localized in nature and mainly confined to the day hours.

### **Operational Phase**

All rotating items shall be well lubricated and provided with enclosures as far as possible to reduce noise transmission. In general, noise generating items such as fans, blowers, compressors, pumps, motors etc. are so specified as to limit their speeds and reduce noise levels. Operators will be provided with necessary safety and protection equipment such as ear plugs, ear muffs etc.; Provision of green belt in and around the plant premises.

## **6.5 Social Aspects**

- During Construction, the project will provide employment to local personal.
- During the operational phase also, the project will generate employment opportunity.
- Increase in employment opportunities and reduction in migrants to outside for employment, Increase in literacy rate, Growth in service sectors
- Increase in land prices, house rent rates and labour wages, Improvement in socio cultural environment of the study area
- Improvement in transport, communication, health and educational services, Increase in employment due to increased business, trade commerce and service sector

## **6.6 Storm Water Management**

Based on the rainfall intensity of the proposed area, storm water drainage system is being designed and connected to final drains.

## **6.7 Rain Water Harvesting System**

Udangudi Thermal power station proposes to achieve proper utilization of rainwater by harvesting through appropriate water-harvesting mechanism in the study area.

## **7.0 COST PROVISION FOR ENVIRONMENTAL MITIGATION MEASURES**

About Rs.350 Crores will be incurred towards environmental mitigation measures.

## 8.0 Conclusion

UTPS shall provide most basic needs of people and the holds importance in the society; maintaining sustained growth for improving quality of life. The impact assessment studies carried out revealed that the proposed power plant will significantly improve the economic status of the region and also contribute significantly to the economic growth of the country.

TNEB strongly believes in the concept of eco-friendly industrialization. TNEB has adequate technical and managerial capability for successful implementation and safe operation of Thermal Power Plant.

Apart from eco-friendly operations, various socio-economic developmental activities will be undertaken by UTPS to bring about overall socio-economic development in the study area.

With the commitment and dedication, TNEB will commission and operate the proposed plants at Udangudi village. The proposed power plant is designed to meet the CPCB and MoEF standards for environmental protection. Hence, the implementation of plant will lead to overall sustainable development in the study area.

The Power Plant will increase employment opportunities, literacy rate, prices of indigenous produce, land prices, house rent rates, Labor prices, etc.

Due to operation of power plant following improvement can also be noticed in:

- socio cultural environment of the study area.
- Transport, communication, health and educational services.
- Employment due to increased business, trade commerce and service sector.

Since the project does not involve any land ouster or home oustees and resettlement or displacement of any community there will be no impact due to project on the social environment. Moreover, the project will lead to provision of more infrastructural facilities, educational facilities, and medical facilities.