

***Executive Summary for the proposed Ennore Thermal Power Station (ETPS) Replacement TPP (1X660 MW) at Ernavur Village, Tiruvottiyur Taluk, Thiruvallur District, Tamil Nadu by M/s. Tamil Nadu Generation and Distribution Corporation Ltd. (TANGEDCO).***

***(for Public Hearing as per MoEF&CC Notification S.O.1533 Dt. 14<sup>th</sup> Sept 2006)***



**Submitted By**

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**January 2017**

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**(QCI/NABET Approved – Certificate No. NABET/EIA/1316/SA 005)**

Towards sustainable growth



## ***Executive Summary***

### **1. Introduction**

In order to mitigate the power deficit in the state of Tamil Nadu, it is necessary to go for the capacity addition by installing new coal based thermal power projects. Further in order to establish the unit in the quickest possible time, it is better to replace the existing station with latest super critical unit for which the land is freely available and other important inputs like coal and water can be made available easily thereby the existing infrastructure can be best utilized when compared to a green field site where all the facilities have to be made available for establishing the project.

In view of acute shortage of power in the State and to bridge the demand-availability gap, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) a subsidiary of the Tamil Nadu Electricity Board (TNEB), Chennai -2, has proposed for a huge capacity addition of 3300 MW of coal based thermal power projects during the 12th plan in the State Sector.

Further another 2640 MW of capacity addition has been proposed for the 13th plan. The Government of Tamil Nadu in the budget speech for the year 2011-12 has announced that it is proposed to take up the replacement of Ennore Thermal Power station (ETPS) with a single unit of 600 MW and the Government has accorded approval for the same vide Lr. (Ms) No.1, dated 02.01.2012 of Energy (B2) Department. Subsequently considering the advantages in supercritical Technology and in order to have identical units at ETPS, the Govt. of Tamil Nadu in the Letter (Ms) No.45, Energy, dated 30.03.2012 has accorded approval for capacity enhancement of the ETPS Replacement Project from 1x600 MW to 1x660 MW.

The proposed developmental activity falls under the category A of Project Activity 1(D) under the schedule as per EIA notification issued on 14th September, 2006 and hence the project requires Environmental Clearance from MoEFCC, Govt. of India. The EIA report has been prepared as per the Terms of Reference (TOR) of MoEFCC, vide its letter no. J-13012/07/2014-IA.I (T), dated: 24.07.2014.

### **2. Details of Existing Units**

The existing ETPS was established during 1970-75 in an area of about 237 acres having an installed station capacity of 450 MW (3x110 MW + 2x60 MW). These units have served for more than 40 years and are in the last leg of their life span. As it has been ordered to shut down the plant by 31.03.2017 permanently, it is prudent to replace these aged units with higher capacity and efficient units adopting modern technology. TANGEDCO is already establishing ETPS Expansion Project with a single Supercritical unit of 660 MW in the available vacant land of about 120 acres within the existing ETPS complex.

### **3. Need of the project**

As per TNEB Ltd., it is to be noted that there is a deficit of 1449 MW arrived at inclusive of the projected availability of 561 MW from proposed ETPS Replacement Thermal



Power Project. As such without the proposed ETPS Replacement TPP, there will be a deficit of about 2010MW during 2018-19. Of the proposed projects in the 12<sup>th</sup> plan, the Supercritical ETPS Expansion project (1x 660 MW), Ennore SEZ TPP (2x660 MW), North Chennai TPP Stage – III (1x 800 MW), and Upper TPP (2x660 MW) are commenced and under execution. Udangudi supercritical TPP (2 x 660 MW) is in the advanced stage of ordering. Hence it is considered prudent to plan for another Thermal power project within the ETPS to tide over the power shortage in the state.

Hence setting up of coal based ETPS Replacement Supercritical Thermal Power Project (1X660 MW) is fully justified to partially off-set the demand supply gap in Tamil Nadu in the 13th Plan and beyond.

#### 4. Salient Features of Site and Project Components

**Table 1: Site Environs of the Study Area**

Particulars	Details
Location	Ennore Thermal Power Station (ETPS) Replacement Thermal Power Project (1x660 MW) at Ernavur Village, Tiruvottiyur Taluk, Thiruvallur Dist. (Within the existing ETPS premises)
Soil type	Sandy Loam
Ground elevation	The ground elevation of the site is 9 m above MSL.
Available Land	110 Acres
Topo sheet No.	66 C/8 (D4408)
Latitude & Longitude	13° 12' 8"N & 80°18'37" E
Nearest City	Chennai at 20 km (South)
Distance for CRZ	>500m (Away from CRZ Regulations 1991)
Seismicity Zone	Earth Quake Zone-III as defined in IS: 1893-2002
Nearest Villages	Ernavur- 1.2km(South)
Nearest Railway Station	Kathivakkam-2 Km(East)
Nearest Highway	Ennore Express Highway-600 m
Nearest Air Port	Chennai (Meenambakkam) at 35km South-West direction
Nearest Lake/River	Koratliyar River, West - 575 m
Nearest Sea	Bay of Bengal, East- 715 m, Ennore backwaters: 70 m
Nearest Sea Port	Ennore Port – 5 km
Project cost	4800 Crores



## 5. Land Requirement

The total land available inside the ETPS complex is about 237 acres out of which 120 Acres (southern side) is earmarked for the proposed ETPS Expansion Project(1x660 MW). The balance area of 117 acres (northern side) is available for this Replacement Plant. After the demarcation of project site under CRZ purview, around 110 acres of land is clearly available for setting up this power plant. The land required for putting up the proposed 1x660 MW Thermal Power Plant at Ennore Replacement TPS is summarized in **Table 2**.

**Table 2: Land Requirement Details**

Description	Area(Acres)
<b>(A) Inside power plant Boundary</b>	
Main Plant area including chimney	14
Water system area and CW system area including cooling tower area	8
Misc., buildings, coal conveyors & ware house area	8
Pre assembly / storage area	7
Vacant land for FGD and construction Access	8
Switchyard & Transformers yard	2
Roads and other access areas	8
Internal coal handling and & Ash handling facilities	5
<b>Sub Total</b>	<b>60</b>
External coal handling facilities and coal stock yard	To be used as common facility which is to be located in ETPS Expansion project area.
Sea water intake system	
Ash dump area	Existing ETPS dyke will be used
Staff colony	Existing ETPS colony area will be used.
Green Belt all along the project area	37
Miscellaneous	13
<b>Sub Total</b>	<b>110</b>
<b>(B) Facilities outside the plant boundary</b>	
Corridor for cooling Water Intake & outlet pipelines	To be used as common facility for ETPS Expansion project and ETPS Replacement project. No additional land is required.
<b>Grand Total</b>	<b>110</b>
<b>Note:</b> It is proposed to develop the green belt along the side of boundary wall; Area required outside the Power Plant boundary such as corridor for sea water piping is indicated in the plot plan.	

## 6. Water Requirement

The water is used in different process of the thermal power plant. The main water source from the sea, the total water requirement is 37,76,256 m<sup>3</sup>/day, daily makeup water requirement is 1,32,480 m<sup>3</sup>/day and fresh water requirement is 7,200 m<sup>3</sup>/day.



Water required for construction purposes (200 m<sup>3</sup>/day) will be obtained from CMWSSB and stored in an underground water tank. From underground tank water will be pumped into overhead tank for further distribution by gravity to various points.

## 7. Fuel Requirement

It is proposed to use 100% domestic coal for this project. Domestic coal will be sourced from the captive coal block to be allocated by the Ministry of coal. The average gross calorific value of the coal to be supplied from the coal block is considered as 3500 kcal/kg. Considering the plant load factor of 85 % for the proposed power plant which will be in operation for 310 days in a year the annual coal requirement will be about 3.0 MTPA. For 100% PLF the annual coal requirement will be about 3.50 MTPA.

As per the Central Electricity Authority (CEA) guidelines for coastal power plants minimum 30% imported coal is to be used. The plant will be designed for operation with 100% domestic coal with a provision to blend and use 30% imported coal. Different options are explored for meeting the coal requirements of the proposed project as detailed in **Table 3.**

**Table 3: Details of Coal Characteristics**

Details	Units	Description of Coal							
		Indian (100 %)	Indian/Foreign		Indian/Foreign		Indian/Foreign		Foreign (100 %)
			(70 %)	(30 %)	(50 %)	(50 %)	(30 %)	(70 %)	
Coal consumption	MTPA	3.0	2.1	0.52	1.5	0.875	0.9	1.225	1.75
	TPD	9677	6774	1663	4839	2822	2903	3951	5645
Ash Content (worst case)	%	34	34	12	34	12	34	12	12
Sulphur Content (worst case)	%	0.55	0.55	0.80	0.55	0.80	0.55	0.80	0.80
Particulate Matter	g/s	29.7	20.8	1.8	14.9	3.1	8.9	4.3	6.1
Total Particulate Matter	g/s		22.6		18.0		13.2		
Sulphur Dioxide	g/s	1232	862	308	616	523	370	732	1040
Total Sulphur Dioxide	g/s		1170		1139		1102		
Total Sulphur Dioxide with FGD	g/s	61.6	58.5		57.0		55.1		52.0
Oxides of Nitrogen (Outlet Concentration limit - 100 mg/Nm <sup>3</sup> )	g/s	62.6	62.6		62.6		62.6		62.6
Gross calorific value	Kcal/kg	3500	4460		4750		5340		6000
Ash in coal	TPD	3290	2503		1984		1461		677

- 100% Domestic coal- 3.00 MTPA Necessary allocation of Captive coal mine obtained from Ministry of Coal/GOI.



- However TANGEDCO will analyze the pollution level for 70(Domestic):30(imported) as the plant is a coastal plant.
- TANGEDCO will also analyze the other options of coal availability and its ratio like: 50% (Domestic): 50% (Imported), 30% (Domestic):70% (Imported) & 100% (Imported) as the plant is a coastal plant.

## 8. Baseline Environmental Status

### 8.1 Meteorology (Climate)

Weather data was collected for the period from July to September 2015 and analyzed. The predominant wind direction during the study period is from W to E respectively.

### 8.2 Ambient Air Quality

The ambient air quality was monitored at 9 locations within 10 km of the project site. The study area represents mostly rural environment. Air pollutants like Particulate Matter (SPM) ( $PM_{<2.5\mu}$ ,  $PM_{<10\mu}$ ), Sulfur dioxide ( $SO_2$ ), Oxides of Nitrogen ( $NO_x$ ), Ozone ( $O_3$ ) and Mercury (Hg) were monitored for representing the baseline status of the ambient air quality within the study area.

- The minimum and maximum Particulate Matter for  $PM_{10}$  is  $44.4\mu g/m^3$  and  $58.7\mu g/m^3$  respectively.
- The minimum and maximum Particulate Matter for  $PM_{2.5}$  is  $19.3\mu g/m^3$  and  $36.8\mu g/m^3$  respectively.
- The minimum and maximum values for Suspended Particulate Matter (SPM) are  $197\mu g/m^3$  and  $230\mu g/m^3$  respectively.
- The minimum and maximum values for  $SO_2$  are  $17.2\mu g/m^3$  and  $28.7\mu g/m^3$  respectively.
- The minimum and maximum values for  $NO_x$  are  $21.8\mu g/m^3$  and  $35.4\mu g/m^3$  respectively.
- The minimum and maximum values for  $O_3$  are  $14.7\mu g/m^3$  and  $27.9\mu g/m^3$  respectively.
- The minimum and maximum values for CO are  $609\mu g/m^3$  and  $935\mu g/m^3$  respectively.

The observed air pollutant parameters are within the applicable limits as per NAAQ standards.

### 8.3 Water Quality Status

Surface water (3 Nos.) and ground water samples (7 Nos.) were collected from different sources within the study area and some important physical and chemical parameters including



heavy metals were monitored for depicting the baseline status of the study area for both summer and pre monsoon seasons.

### **Ground Water Quality – Observations**

- ❖ The pH of water samples varied from 6.79 to 7.60 in pre monsoon season respectively, indicating that they are in acceptable limits.
- ❖ The Total Dissolved Solids for pre monsoon season are in the range of 752 mg/l to 3954 mg/l. All samples were above acceptable limit and four samples were above permissible limits of 2000 mg/l
- ❖ The Total Hardness is in the order of 165 mg/l to 1425 mg/l, Two samples are below acceptable limit, two samples are below permissible limit and three samples are above permissible limits
- ❖ The chloride values are in the ranges of 120 mg/l to 1018 mg/l. One sample is below acceptable limit all samples are within the permissible limit except one sample
- ❖ The fluoride values are in the rage of 0.7 mg/l to 1.5 mg/l.

### **Surface Water Quality – Observations**

When comparing with main parameters like TDS, Chlorides, Sulphates, Hardness and BOD samples are falling in Class 'D' to Class 'E' of **IS:2296** inland surface water standards.

## **8.4 Noise Quality**

Noise levels are monitored at 10 Locations in the study area. The day equivalents during the study period are ranging between 53.5 dB (A) to 61.6 dB (A). The maximum day equivalent value is under commercial area. Whereas, the night equivalents were in the range of 41.9 dB (A) to 44.8 dB (A) pre monsoon season. From the results, it can be seen that the Day equivalents and the night equivalents were within the Ambient Noise Standards of residential area and commercial area standards.

## **8.5 Soil Quality**

Soil Samples were collected from 7 locations from the study area.

- ❖ pH - value of soils is mostly from normal to saline class.
- ❖ The electrical conductivity in the study area is varying from 53 to 180 $\mu$ s/cm indicating that soils falling under normal category.
- ❖ The organic carbon in the study area is varying from 0.15 to 0.70 % which indicating that four samples are in low range and three samples are in medium range.
- ❖ In the study area Nitrogen as N is varying from 123 to 243 kg/ha which indicates that all samples are in low range.
- ❖ In the study area available Phosphorus is varying from 10 to 21 kg/ha, which indicates that all samples are in medium range.



- ❖ The available potassium in the study area is varying between 65 to 232 kg/ha which indicates that two samples are falling in low range and five samples are in medium range.
- ❖ The available potassium in the study area is varying between 65 to 232 kg/ha which indicates that two samples are falling in low range and five samples are in medium range.

## **9. Anticipated Environmental Impacts and Mitigation Measures**

The proposed power plant may cause impact on the environment in two phases.

- During Construction phase
- During Operation phase

### **• Impacts during construction phase:**

The possible construction activities that contribute to the environmental impacts are:

- Dust generation during leveling of earth
- Dust generation due to the movement of vehicles on unpaved roads
- Emission of pollutants from vehicular exhaust
- Unloading of raw materials and removal of unwanted waste material from site
- Accumulation of excavated earth material

The impact of the above activities would be temporary and will be confined within the project boundary

### **• Impacts during Operation Phase**

#### **9.1 Impact on Air Quality**

The proposed project is a coal based thermal power plant of capacity 660 MW and the major source of pollution would be the emissions from the stack. The important air pollutants generated from the thermal power plant are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and oxides of nitrogen (NO<sub>x</sub>). The expected stack dimensions and emissions rates are given below:

- The height and internal Dia. of the stack are 275m and 7m respectively. The Flue Gas temperature, velocity and flow rate are 130°C, 22 m/s and 847m<sup>3</sup>/s respectively.
- The fuel consumption is 403 TPH and ash content is 34%.
- TTP (Units) to be installed from January 2017 the emission of Particulate Matter (PM) is 30 mg /Nm<sup>3</sup>.
- The emission limits for SO<sub>2</sub> and NO<sub>x</sub> are 100 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> respectively.





## Predicted Air Impacts

While comparison of the results with different coal compositions/options it is observed that future predicted GLC's of the pollutants like PM, SO<sub>2</sub> & NO<sub>x</sub> are within the prescribed limits as per the NAAQ standards. **(applicable from January-2017)**

However, when compared with the Stack standard emissions:

- **Particulate matter (PM)** is exceeding at 2 combinations of coal i.e. :{ i). 100% Indian coal & ii):70:30(Indian: Imported)}. Electrostatic Precipitators (ESP's) with an efficiency of 99.95% will be installed to limit the PM below 30 mg/Nm<sup>3</sup> (meeting the standard).
- **SO<sub>2</sub>( Sulphur Dioxide)**: in coal various combinations the SO<sub>2</sub> emissions are exceeding the standards, FGD is proposed with an efficiency of over 95% to meet the revised emission norms of MoEFCC will be followed for Sulphur Dioxide (SO<sub>2</sub>) i.e., 100 mg/Nm<sup>3</sup>.
- **NO<sub>x</sub> (Oxides of Nitrogen)**: NO<sub>x</sub> emissions are well within the prescribed standards i.e.: 100 mg/Nm<sup>3</sup>. and to reduce the emissions steam generator with advanced NOX burner will be provided to meet the revised emission norms of MoEFCC.

The cumulative study of the stacks showing all the values of PM, NO<sub>x</sub> are within limit as per NAAQ Standards except SO<sub>2</sub> emission which exceeds the NAAQ standards in case FGD (Flue-gas desulfurization) is not in use. And it can be controlled by the effective utilization of FGD in respective TPPS's.

### 9.1.1 The Proposed Mitigation Measures

- Electrostatic precipitators (ESP) with 99.9% efficiency would be installed to control the emission of ash particles. The precipitators would be designed to limit the particulate emission to 30 mg/Nm<sup>3</sup> as per the Corporate Responsibility on Environmental Protection (CREP) recommendations of MoEFCC, Gol.
- Stack of 275 m height would be constructed as per MoEFCC, Gol guidelines for dispersion of pollutants, SO<sub>x</sub> and NO<sub>x</sub> emission will be restricted to 100 mg/NM<sup>3</sup>
- Flue-gas desulfurization (FGD) is a set of technologies used to remove sulfur dioxide (SO<sub>2</sub>) from exhaust flue gases of fossil-fuel power plants, and from the emissions of other sulfur oxide emitting processes.
- Advanced combustion technology with low NO<sub>x</sub> burners will be provided to limit NO<sub>x</sub> emissions to 200 g/GJ.
- For the control of fugitive coal dust emission within and around the coal handling plant, coal dust extraction and suppression systems would be provided.



- On-line stack and ambient air quality monitoring system would be provided and linked to TNPCB and MoEFCC website for regular monitoring as per guidelines.
- All the internal roads will be of concrete/asphalt to reduce the fugitive dust generated due to the vehicular movement.

## 9.2 Impact on Water Quality

The water required for the proposed project shall be met from the Bay of Bengal through the proposed intake pipe of ETPS (1x660 MW). Details of Water Requirement and Consolidated Waste Water Generation are given below in **Table 4** and **Table 5**.

**Table 4: Water Requirement**

S. No.	Description	Estimated Quantity	
		m <sup>3</sup> /h	m <sup>3</sup> /day
1	Condenser cooling water system	72,052	17,29,248
2	ACW cooling water system (Secondary)	3,840	92,160
3	Ash water system & Coal Handling system	1,800	43,200
4	Cooling water pumps	75,892	18,21,408
5	Cooling water system blow down	3,760	90,240
	<b>One Time Requirement – Total</b>	<b>1,57,344</b>	<b>37,76,256</b>
6	Cooling water make up requirement	4,896	1,17,504
7	Sea water requirement for Desalination plant	624	14,976
	<b>Daily Requirement - Total</b>	<b>5,520</b>	<b>1,32,480</b>
	<b>Concentration Ratio</b>	<b>1:3 COC</b>	

**Table 5: Consolidated Waste Water Generation (m<sup>3</sup>/d)**

Particulars	Raw Water	Waste Water	Loss	Discharge
<b>Sea Water</b>				
CW Make Up	1,17,504	90,478	27,026	Sea (COC 1.3)
Sea water for DS Plant	14,976	7,788	-	Sea
<b>Sub Total</b>	<b>1,32,480</b>	<b>98,266</b>		
<b>Sweet Water</b>				
To Cycle make up	1,920		1,920	-
DM Plant	1,344	134.4	1,210	CMB to Sea
CHP Dust Suppression	1,402		1,402	-
Plant Potable Water Requirement	134	120.6	13	STP to GB
Service Water System	2,400	444	1,956	CMB to GB
<b>Sub Total</b>	<b>7,200</b>	<b>699</b>	<b>6,501</b>	
<b>Total</b>		<b>7,200</b>		



The wastewater from plant will be collected and treated in conventional effluent treatment plant. The treated effluent will be reused and impact on natural sources would be negligible.

### **Cooling Tower Blow down and Rejects from Desalination plant:**

The cooling tower blow down from the proposed plant along with rejects from Desalination plant will be discharged in to sea through the proposed outlet pipes of ETPS Replacement TPP.

## **9.3 Impact on Noise Levels**

The different sources of noise pollution are mentioned below:

- Crusher unit
- Induced draft & Forced draft fans
- Boiler-feed pumps
- Turbines
- Generators
- Cooling Towers
- Frequent vehicular movement

### **9.3.1 The proposed mitigation measures are:**

- Properly designed plant and machinery (i.e. by providing inbuilt mechanisms like silencers, mufflers, and enclosures for noise generating parts) and shock absorbing pads at the foundation of vibrating equipment will be provided.
- In the high noise intensity working areas/zones ear muffs or ear plugs or any other suitable personal protective equipment would be provided to the workmen.
- Provision of isolation for major noise generating equipment's.
- Distribution of working hours among more personals working with major noise generating equipment's.
- Regular noise level monitoring would be carried out for taking corrective action, wherever required.
- Vehicular movement will be restricted and the drivers will be informed to blow horns only when required.
- The steam turbine generator would be housed in closed buildings, which would considerably reduce the transmission of noise from the generators to outside environment. The inlet air and exhaust gas streams would be provided with silencers for noise reduction.



Necessary plantation all along the boundary and with total area not less than 33% would be developed as the greenbelt, so that the noise emissions at the plant boundary to be within the stipulated standards of CPCB.

### 10. Fly ash utilization plan

By utilising 100% Indian coal, about 3290 TPD Ash is generated from the proposed plant (i.e: Fly ash (2566 TPD) & bottom ash (724 TPD)).

By utilising (70:30 Indian coal & imported coal) about 2503 TPD Ash is generated from the proposed plant (i.e: Fly ash (1952 TPD) & bottom ash (551 TPD)).

However TANGEDCO will also analyze the other options of coal availability and its ratio like: 50% (Domestic):50% (Imported), 30% (Domestic):70% (Imported) & 100% (Imported) as the plant is a coastal plant. The ash generation details are given in **Table 6** below:

**Table 6: Ash generation from the Proposed Plant**

S.No	Description	100% Indian coal		70% Indian: 30% Imported: coal		50% Indian: 50% Imported: coal		30% Indian: 70% Imported: coal		100% Imported: coal	
		TPD	TPH	TPD	TPH	TPD	TPH	TPD	TPH	TPD	TPH
1	Fly ash@ 78%	2,566	107	1,952	81	1,548	65	1,140	48	528	22
2	Bottom ash@22%	724	30	551	23	436	18	321	13	149	6
<b>Total ash</b>		<b>3,290</b>	<b>137</b>	<b>2,503</b>	<b>104</b>	<b>1,984</b>	<b>83</b>	<b>1,461</b>	<b>61</b>	<b>677</b>	<b>28</b>

#### Action plan for 100% ash utilization for proposed unit:

- 1) 100% dry fly ash extraction, storage and disposal facilities are proposed for the expansion unit
- 2) Bottom ash collection and storage facilities such as hydro bins are proposed to utilize bottom ash.
- 3) High volume fly ash concrete roads are being constructed in the project premises.
- 4) Pond ash/Fly ash is being used for formation of ash dykes, roads & embankments, filling low lying areas etc.

Fly ash and bottom ash would be collected and stored in the silos and given to end users for manufacturing cement and bricks. TANGEDCO would put maximum efforts and ensure bottom ash utilization. 100% ash utilization will be achieved as per MoEFCC new notification dated 03-11-2009 in the phased manner as follows and will be implemented.



Action Plan for 100% Ash Utilization for Proposed Unit is given below:

- At least 50% of fly ash generation utilization in one year from the date of commissioning.
- At least 70% of fly ash generation utilization in two years from the date of commissioning.
- 90% of fly ash generation utilization in three years from the date of commissioning.
- 100% of fly ash generation utilization in four years from the date of commissioning.

## 11. Environmental Monitoring Programmes

The detailed monitoring program for construction and operation phases is given in EIA report. The monitoring program for operation phase is scheduled below in **Table 7**.

**Table 7: Environmental Monitoring during Operational phase**

S. No	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
1.	Air Emissions	Stack emissions from Power Plants	Gaseous emissions (SPM, SO <sub>2</sub> & NO <sub>x</sub> )	Continuous monitoring using on-line equipment during operation phase
		AAQ within the project premises and nearby habitations to be monitored. All vehicles to be PUC certificate.	SPM, PM (<10 & <2.5), SO <sub>2</sub> & NO <sub>x</sub> Vehicle logs to be maintained	As per CPCB/ SPCB requirement
		Meteorological data	Wind speed, direction, temp., relative humidity and rainfall.	Continuous monitoring using automatic weather station
2.	Noise	Noise generated from operation of Compressor power plant, cooling towers to be monitored	Spot Noise Level recording;	Periodic during operation phase
3.	Wastewater Discharge	Compliance to wastewater discharge standards	pH, TSS, TDS, BOD, COD & Oil & grease	Periodic or As per CPCB/ SPCB requirement
4.	Solid waste/ Hazardous waste	Check compliance to HWM rules	Quality & quantity monitoring	Periodically
5.	Ground Water Quality and Water Levels	Monitoring ground water quality, around plant site and levels	Comprehensive monitoring as per IS 10500 Groundwater level BGL	Periodically



S. No	Potential Impact	Action to be Followed	Parameters for Monitoring	Frequency of Monitoring
6.	Flora and fauna	Vegetation, greenbelt/green cover development	No. of plants, species	Once a year
7.	Soil quality	Checking & Maintenance of good soil quality around	Physico-chemical parameters and metals.	Once a year
8.	Health	Employees and migrant labour health check ups	All relevant parameters including HIV	Regular checkups as per factories act.

## 12. Project Benefits

TANGEDCO will allocate sufficient Budget for meeting Corporate Social Responsibility (CSR) activities as per the existing guidelines of state & central Government. The detailed need based assessment study (socio Economic study) of the surrounding villages was carried out by the Madras school of social works, Chennai and based on the recommendation of the report the budgetary allocation will be done.

CSR activities such as Medical Assistance, Primary Education, Rural Water Supply, Vocational Training etc. are included in the action plan.

## 13. Environmental Management Plan

In order to comply with the environmental protection measures as suggested in the EIA, TANGEDCO has made budgetary provision for Environmental Protection and Safety measures to the tune of Rs.478 Crores towards capital cost and Rs.48 Crores for recurring expenditure apart from CSR provision.

### 13.1 Organizational Set Up For Environmental Management

Environment Division headed by an experienced Executive Engineer is responsible for Environmental Management of the existing station. The Executive Engineer reports to the Superintending Engineer (Environment) and Chief Engineer (O&M). The environment division has Environmental Engineering and Environmental Chemistry group. The existing Environmental management team of proposed power plant will discharge the responsibilities of the proposed unit.



## 14. Conclusions

- As the proposed power project (1 X 660 MW) is a supercritical power plant which replaces the existing 40 years old plant, the impact on the Environment of Ennore area will be improved.
- The EIA study revealed that the project can be established without serious environmental impacts as the existing baseline levels have sufficient buffer capacity.
- The mitigation measures will reduce the impacts to minimal levels.
- The project being supercritical unit will reduce the carbon footprint and pollution levels.
- The project will enhance the socio economic improvement by allocating the sufficient budget for various CSR activities and sufficient provision of budget for recurring expenses per annum apart from direct and indirect employment and project investment.
- The project contributes to availability of power to ensure growth in all sectors and overall development of the state and country.