TATA CONSULTING ENGINEERS LIMITED

Draft Environment Impact Assessment Report for The Proposed expansion of Existing plant by adding 2x830 MW super critical Units at Coastal Gujarat Power Limited, Mundra

Executive Summary

Project Proponent

Coastal Gujarat Power Limited (CGPL),
Kutch, Mundra, Gujarat

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EXECUTIVE SUMMARY

1.0 INTRODUCTION

Coastal Gujarat Power Limited has proposed expansion of its existing plant of 5x830 MW by adding 2x830 MW units at Kutch, Gujarat.

1.1 PROPOSED PROJECT DETAILS:

It is proposed to install two units of 830 MW each at the existing plant of CGPL. The salient features of this expansion project are given in Table 1 below.

Table 1: Salient Features of the Expansion Project

Sl. No.	Components	Details
1	Project Type	Expansion by adding 2x830 MW units.
1	Capacity	2x830 MW coal fired Super critical Units
2	Area	201 acres of existing land will be used.
3	Location	Tunda-Vandh village at Mundra Tehsil, Kutch district of Gujarat. The latitude 22°49'48"N and the longitude 69°30'58"E
4	Technology	Supercritical Technology
5	Requirements	Coal: 20112 tonnes/ day with GCV of 4200 kcal/ kg Water: 47390 m^3/hr (Sea water)
6	Project cost	Rs.7460 Crores

1.2 OBJECTIVE OF THE STUDY:

This Draft Environmental Impact Assessment (EIA) report is prepared for obtaining the Environmental Clearance (EC) from Ministry of Environment and Forests (MoEF), Government of India, New Delhi, for the proposed expansion of existing project by adding 2x830 MW units. The Draft EIA report has been prepared in accordance with the Terms of References (ToR) issued by MoEF vide letter no. No.J-13012/114/2011-IA.II (T) dated 28th December 2011. EIA for the proposed project has been carried out by TATA Consulting Engineers Ltd., which is accredited by NABET (National Accreditation Board for Education and Training), Quality Council of India (QCI).

1.3 ENVIRONMENTAL SETTINGS:

The Environmental settings of the proposed expansion project is given in **Table – 2**

Table –2: Environmental settings of the CGPL

Sr. No	Particulars	Details
1	Climatic conditions during summer season (as per IMD- Bhuj for 30 year's data 1951 to 1980)	Max Temp: 39.5 ^{0}C Min Temp: 13.6 ^{0}C Rainfall: 2.9 mm
2	Site specific climatological data (Summer season March to May 2012)	Maximum Temperature: 39.8 ^{0}C Minimum Temperature: 9 ^{0}C Rainfall: Nil
3	Nearest Highway	NH-8A (Ahmedabad-Mandvi), state highway SH-50 (via Anjar) & SH-6 (via Gandhidham)
4	Nearest Railway station	Adipur (85km)
5	Nearest Airport	Bhuj
6	Forest Area	No forest area is involved. Reserve Forest is at about 3 km away from project boundary.
7	Ecologically sensitive zones	No ecological sensitive zone like wild life sanctuary, biosphere, forest etc are within 10 km Radius
8	Water bodies (River/ Lake))	Nagmati, Bhukhi and Khari River. All are seasonal rivers.
9	Seismic Zone	V

1.4 JUSTIFICATION FOR THE PROPOSED PROJECT:

The western region faced the highest power shortfall of 13.7% in the year 2010, though the situation improved from the comparable metric of 16% in 2009. The proposed power project in Gujarat will be implemented under western power grid system of the country where the shortage in electricity available was seen at 13.9% for the year 2011–12 as per the report by India's Central Electricity Authority (CEA). As on February 2012, the western region of India is facing scarcity of power. Against a total peak demand of about 41,277 MW, actual generation was 35,535 MW with peak deficit of 5,742 MW. So there is a need for development of power projects on a large scale to meet the growing gap in demand and supply.

With ever rising power requirement in Gujarat state, Western and National scenario, any additional power generation project is viable. Any delay in the implementation of power projects, due to any reasons such as lack of clearances, financial constraints, etc., will result in much larger deficit than the present circumstances. Hence, the proposed 2x830MW expansion units could be operated at its maximum possible load factor which would justify the need to set up the proposed plant in Gujarat state.

The expansion project is planned within the existing boundary of 5x830MW power plant. The land is already in possession of CGPL and no additional land is required. Also, no additional infrastructure for water intake is required for the expansion project.

There are no eco-sensitive spots such as reserved forests or protected monuments in the site or in the vicinity of the proposed site meeting the requirements of MoEF guidelines. The site is plain/ barren & relatively flat land, free from settlements or habitation. The land is slightly undulated and therefore, not much of cutting and filling is envisaged.

2.0 DESCRIPTION OF PROJECT

A coal based thermal power plant converts the thermal energy of the coal into electrical energy. This is achieved by raising the steam to high temperature and pressure in the boilers, expanding it through the turbines and coupling the turbines to the generators which converts mechanical energy into electrical energy.

The proposed project is an expansion in power generation capacity by adding 2X830MW supercritical units within the existing plant boundary of 5x830MW plant, which is under different stages of execution. The land is in possession of Coastal Gujarat Power Ltd (CGPL), a wholly owned subsidiary of Tata Power Company Ltd.

This expansion project will have two numbers of coal fired supercritical thermal power units of 830 MW each. The supercritical steam generators of each units would be rated to generate about 2600t/ h (Approx.) of superheated steam at a pressure of 251bar(g) (257 kg/ cm (a)) and temperature of 569°C. The reheat steam temperature would be about 596°C. The steam turbine would be a four cylinder tandem-compound machine, driving a turbo-generator at 3000 rpm to produce the designed power.

Coal-fired supercritical power plants operate at very high temperature and pressure resulting in much higher heat efficiencies (exceeds 46%), as compare to sub-critical coal-fired plants.

The amount of coal required for the proposed expansion will be about 20,112 Tonnes per day considering GCV of 4200 kcal/ kg, annual plant load factor (PLF) of 85% and plant heat rate of 2117 kcal/ kWh. It is proposed to use existing ECHS for extended time at an average 3500 tph capacity to transport daily coal required for old as well as new units from port to plant. CGPL stockpile at port area is having about 400,000 tonnes of coal storage. Existing facilities will be used to the maximum extent with addition of new units. No new capacity for storage is envisaged.

There will not be any additional sea water withdrawal for this expansion project. The total sea water required for the expansion project will be about 47,390m^3/ hr. This will be taken from cooling water discharge of existing units from existing discharge channel, cooled, reused and discharged back again to the discharge channel..

The ash content in the coal will be maximum 10%. Total Ash generation after expansion will be 2011 MT/ day. Out of this, fly ash generation will be about 1608 MT/ day and bottom ash will be about 403 MT/day. The area identified for ash

disposal is about 500 acres, which is adequate to store ash generated from the existing 5x830 MW units as well as proposed expansion by 2x830 MW units. CGPL will utilize fly ash as per MoEF notification for ash utilization. Existing ash pond will be used for storing unutilized ash.

3.0 DESCRIPTION OF THE ENVIRONMENT

Primary baseline environmental monitoring studies were conducted during summer season (March 2012 to May 2012), summary of the same is as follows:

3.1 Meteorological Data Generated at Site:

The meteorological parameters like wind speed, wind direction, temperature, relative humidity, atmospheric pressure, rainfall and cloud cover were recorded on hourly basis during the study period near proposed plant site

The summary of meteorological data generated at site enlisted in below table

Table – 3: Meteorological Detail of the project site

March 2012 to May 2012

Sl. No.	Parameter	Max. Value	Avg. Value	Min. Value
1	Wind speed, m/s	10.4	3.1	0.1
2	Temperature, °C	39.8	27.5	9
3	Humidity , %	96.8	64.2	17

3.2 Air Quality:

The study area mostly covers villages of Mundra and Mandvi Taluka, major road, railways and river passing through the study area. Seven ambient air quality monitoring stations were selected in and around project site within 10 km radius of the study area. The parameters like Suspended Particulate Matter (SPM), Particulate Matter<10µ (PM_{10}), Particulate Matter<2.5µ $PM_{2.5}$, Sulphur dioxide (SO_2), Nitrogen Oxide (NO_x), Ozone (O_3) and Mercury (Hg) were monitored during Summer season of 2012. Ambient air quality at these locations was compared with National Ambient Air Quality Standards. Summary of results is given below.

- SPM

  Out of the seven sampling locations the minimum concentration of SPM was observed as 161 µg/m^3 recorded at Moti Khakar Village and the maximum concentration observed as 478 µg/m^3 recorded at Moti Khakar village during the study period. The NAAQ standards of 2009 does not specify any standard for SPM.

- PM_{10}

  Out of the seven sampling locations the minimum concentration for PM_{10} was observed as 102 µg/m^3 recorded at Nani Khakar and maximum concentration observed as 170 µg/m^3 recorded at CGPL site location during study period. Observed values are beyond the NAAQ standards of 100 µg/m^3 for Industrial/

Residential/ Rural areas for most of the locations due to high wind speed, unpaved roads and loose soil and non agriculture land.

- $PM_{2.5}$

  Out of the seven sampling locations the minimum concentration of $PM_{2.5}$ was observed as 21 µg/m^3 recorded at Moti Khakar Village and the maximum concentration observed as68.8µg/m^3 recorded at Moti Khakar during the study period. Observed values are well within the NAAQ specified standards of 60 µg/m^3 for Industrial/ Residential/ Rural areas for most of the locations except Mota Bhadiya.

- SO_2

  Out of the seven sampling locations the minimum concentration for Sulphur dioxide (SO_2) was observed as 4 µg/m^3 recorded at Mota Bhadiya Village and the maximum concentration observed as 9.4 µg/m^3 recorded at Navinal during the study period. Observed values are well within the NAAQ standards of 80 µg/m^3 for Industrial/ Residential/ Rural areas.

- NO_x

  Out of the seven air quality locations the minimum concentration observed as 4.2 µg/m^3 recorded at Mota Bhadiya Village and the maximum concentration for Oxides of Nitrogen (NO_x) was observed as 13.3 µg/m^3 recorded at Moti Khakar during the study period. Observed values are well within the NAAQ specified standards of 80 µg/m^3 Industrial/ Residential/ Rural areas.

- Ozone

  Out of the seven sampling locations the minimum observed concentration of ozone was less than 19.6 µg/m^3 recorded at all the locations and the maximum concentration for Ozone (O_3) was observed as 29.8 µg/m^3 recorded at Navinal during the study period. The O_3 concentrations in the region are observed to be well under the limits of 100 µg/m^3 as specified by NAAQ standards.

- Hg

  Heavy metal mercury was not detected during the entire study period in the study area at all the locations.

3.3 Water Quality:

Water samples were collected from six locations (02 Surface Water and 04 Ground water). These samples were taken as grab samples and analyzed for various parameters to compare with the standards. Summary of the results is given below:

- pH: The pH level of samples are within the stipulated range as per drinking water standards IS 10500.
- Inorganic parameters: The inorganic parameters such as concentration of Sodium, Chlorides, and fluorides are as per stipulated range as per drinking water standards IS 10500.
- Hardness: Hardness in all the water samples varied between 90 mg/lit to 227

mg/lit. This is slightly higher than the normal range; however, it is within the permissible limit.

- Toxic chemicals: Result shows that there is no toxic chemicals/ heavy metals in the water samples which indicate that there is no contamination
- Microbial parameters: The microbial populations in the surface water (pond) sample are higher than the drinking water standards, however, these sources are not being used for the drinking purpose. Ground water is used for the drinking purpose in this area.

3.4 Soil Environment:

The project site and its vicinity is Barren land and agriculture land. The detailed soil analysis was carried out for study area. Soil samples were collected from four locations once in a season during the complete study period. Physico-chemical analysis of soil samples was carried out to assess the quality of soil. It shows that the soil is alkaline in nature because of coastal region.

3.5 Noise Level Survey:

The noise monitoring has been conducted for determination of noise levels at four locations in the study area. Noise monitoring results reveal that the ambient noise levels at all locations are well within the limits as per Ambient Noise standards.

3.6 Ecology of study area:

Vegetation of the study area falls under “VI – B Northern Tropical Forest “ – sub – type C-I Desert Thorn Forest - (VI – Kachchh, Saurashtra, Gujarat). A costal area of the study area has small patches of mangrove forest also in its coastal belt. Typical open scrub forest mainly constitutes thorny, stout species of *Prosopis juliflora*, *Acacia spp*., *Euphorbia spp, Acacia auriculiformis* (mostly new plantation) etc.

There happens to be a significant diversity of crops in the study area. Among cereals, Bajra (*Pennisetum typhoides*) and Jowar (*Sorghum bicolor*) are mainly cultivated in this region. Proportionately Wheat (*Triticum vulgare*) is cultivated in lesser quantity. In pulses Mung and Mungphali (*Arachis hypogaea*) are cultivated. Kharik Palm (*Pheonix dactylifera*), Chiku (*Achrus sapota*), Coconut (*Cocus nucifera*) Mango (*Mangifera indica var. Kesar*) were the main fruit tress grown by locals. Detail flora and fauna study has been carried out and incorporated in EIA report.

3.7 Socioeconomic Status:

A reconnaissance survey of the study area was conducted during the study period. Socio-economic assessment was carried out by the survey team. Visits were made to Taluka office and district head offices for collection of data on population and land use pattern. Census data for the year 2011 is still not available in detail; however, census data for 2001 was collected in CD from Directorate of Census Operations.

The demography details for the study area are presented in Table – 4. The salient features of the study area are as follows.

Total population of the study area is 53452.

Schedule caste population is 13.6% while Schedule Tribe population in the study area is 3.7%

Sex Ratio (No. of females per 1000 males) is 987.

Overall literacy rate is 54.02%

Above findings are based on the Census study conducted in 2001. However, the demographic pattern has changed in last 10 years.

Table 4: Demographic Structure of the Study Area - 2001 Data

Population in Study Area		
Total	Total	53452
	Male	26897
	Female	26555
Total Workers	Total	20938
	Male	14232
	Female	6706
Literates	Total	28946
	Male	16873
	Female	12073

* Source; Census CD 2001,

4.0 ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.1 IMPACT DURING CONSTRUCTION PHASE:

4.1.1 Impact on Air Quality

Particulate matter is the predominant pollutant affecting the air quality during the construction phase, especially during dry condition. Major construction activities responsible for dust and gaseous emissions are as mentioned below:

- Excavation and earth work for foundations
- Civil work at site
- Vehicles transportation for sourcing of building material to site.

Following mitigation measures are suggested:

Dust suppression by spraying of water will reduce the impacts considerably.

The impact due to additional vehicles plying during the construction period is of temporary nature and their impact on air quality will not be significant.

4.1.2 Impact of Noise Level

The major noise generating source during the construction phase is vehicular traffic, construction equipments like dozer, scrapers, concrete mixer, crane, generators pumps, and compressor, rock drills, pneumatic tools, vibrators, etc. During construction, these equipments will generate noise ranging between 75-85 dB (A). This can be mitigated by providing proper Personal Protective Equipment (PPE's) to the labors working at site.

4.1.3 Impact on Water Quality

It is expected that domestic water use by the construction workers can be the most likely impact on the water quality. Since CGPL has already existing facilities for construction workers for supply of water as well as treatment of waste water no adverse impact on water quality is envisaged. Existing sanitation facility will be provided for the workers working during the construction phase. So the overall impact on water environment due to construction of proposed project is likely to be temporary, short term and insignificant.

4.1.4 Impact on Soil Quality

This is an expansion project and all the construction activities will be limited for the plant area only. Therefore, no additional impact on the soil quality is expected due to construction activities within the plant and surrounding area.

4.1.5 Impact of Solid Waste Generation

Solid waste during the construction phase will consist primarily of scrap building materials, excess concrete and cement, rejected components and materials, packing and shipping materials (pallets, crates, Styrofoam, plastics etc.) and human waste. It is expected that there will be generation of sizeable amount of garbage, which will be taken care by the existing solid waste management practices of CGPL. Hazardous waste will be stored separately and disposed off appropriately using the facilities already existing for the plant.

4.1.6 Impact On Land Use

As the proposed project is an expansion project, most of the facilities are already existing which shall be used. Site is already having industrial land-use; hence no change in land-use is envisaged due to the proposed expansion.

4.1.7 Impact on Ecology

CGPL has already built up areas including operational areas, plants, stores, offices, etc. Removal of vegetation is not expected and all the construction work will be carried out in the premises of the existing plant. The green belt will also be strengthened to contain the dust and noise due to various activities. Hence no significant impact on ecology is expected during construction phase.

4.1.8 Impact on Socio-Economics

In addition to the opportunity of getting employment as construction labourers, the local population would also have employment opportunities in related service activities like commercial establishments, small contracts/ subcontracts and supply of construction materials for buildings and ancillary infrastructures etc. There will be positive impact for the local workforce during construction phase of the project.

4.2 IMPACT DURING OPERATION PHASE:

4.2.1 Impact on Air Quality:

Prediction of impacts on air environment has been carried out using Industrial Source Complex (ISCST3) to find out Maximum Ground Level Construction of PM, SO_2 and

NO_x. The worst case maximum GLC of all pollutants were observed at about 4.5 to 6 Km in the east (E) direction from the project site.

The results of Industrial Source Complex Short Term (ISCST 3) model are tabulated below:

Table –5: Summary of Results of Air Quality Impact Assessment – Worst case scenario (Cumulative)
CGPL Modelling results 5x830+ Expansion 2x 830 + Adani Phase III 3 x 660MW
Using meteorological data March 2012 to May 2012

24 Hourly Concentrations	SO_2	NO_X	PM_{10}
Baseline Maximum Monitored Concentration ($\mu g/m^3$)	9.4	13.3	170
Predicted Total Maximum Incremental GLC ($\mu g/m^3$), CGPL Existing Plant (4 units out of 5), expansion units (2 x 830MW) and Adani Phase III (3 x 660)	51.8	26	3.9
Overall GLCs during Worst Case Scenario ($\mu g/m^3$)	61.2	39.3	173.9
NAAQS Limit (Rural & Residential) ($\mu g/m^3$)	80	80	100

After the proposed expansion project, there will be increase in level of PM_{10}, SO_2 and NO_x. However, by implementation of appropriate pollution control measures and equipments, the levels will be maintained well within the prescribed standards, except PM_{10}. The baseline data of particulate matter is already exceeding the NAAQ limit in the area. The incremental value for particulate (cumulative) is only 3.9 $\mu g/m^3$. Therefore, the proposed expansion project is not likely to have significant adverse impact on the ambient air quality of the surrounding area.

- Fugitive Emission**:**

The proposed expansion will increase the coal consumption at CGPL, thus increasing the coal handling. It is proposed to operate existing ECHS conveyors for additional hours for transportation of additional coal from port to plant. Fugitive emission control systems are already provided e. g. covering all the conveyor belts carrying coal, setting up of dust suppression system, strengthening green belt around coal yard etc. As the same facility is proposed to be used, there is no significant adverse impact envisaged due to fugitive emissions.

4.2.2 Waste water treatment and disposal**:**

The total sea water required for the proposed expansion will be about 47,390m^3/ hr. This will be taken from discharge channel of existing channel; hence there will not be any additional water drawl from sea for this expansion project.

Sea water will be pre-treated using clarifier before utilizing as feed for RO plant. An open cycle sea water recirculation system with Induced Draft Cooling Tower (IDCT) will be provided for condenser cooling water system and other auxiliaries.

Effluent on zero discharge philosophy will be adopted for the proposed plant except for SWRO reject. CW blow down will be utilized for ash handling system. SWRO reject would be disposed to the existing outfall channel at a location upstream of the intake sump. Huge amount of turbulent flow available in the existing outfall channel and its lengthy approach (about 1.5km) to sea would ensure sufficient mixing and dilution of the reject before reaching sea.

Other liquid effluents will be treated/re-used in the plant. A guard pond will be provided to facilitate collection and treatment of waste water generated in the proposed plant. Fuel oil handling area waste and oil water mixture emerging from service water system will be handled using oil-water separators with skimmers. Clear water will be led to guard pond and separated oil would be collected separately in the oil collection tank. The treated water from guard pond will be utilized for gardening, coal dust suppression, plant wash etc.

4.2.3 Impact on Noise Level:

Noise level within the plant boundary of CGPL is found to be within the prescribed ambient standard. Adequate protective measures during operation phase will be provided in the form of earmuffs/ ear-plugs to the workers working in high noise areas. All the necessary noise protective equipment will be supplied to workmen operating near high noise generating sources. In addition, lower exposure can be achieved by carrying out remote operation where ever possible.

4.2.4 Impact on Ecology:

The impacts of pollutants on environment were identified. Air dispersion modelling is carried out to delineate its concentrations at different locations. The modelling results reveal that; the resultant concentrations for study period are within the limits as per National Ambient Air Quality Standards. Hence impact on ecology is not expected.

5.0 ENVIRONMENTAL MONITORING PROGRAM:

CGPL is regularly carrying out environmental monitoring for various environmental components like air, water, meteorology etc. as per the Consent to Operate granted by Gujarat Pollution Control Board (GPCB). Same will be followed during construction and operation phase of the project.

6.0 ADDITIONAL STUDIES:

Being an operational unit, CGPL has well set risk assessment and disaster management plan in place. Risk associated with the expansion project has been evaluated and the mitigation measures were suggested. These will be implemented during the project execution. Same is being followed on regular basis.

Public Consultation Report will be incorporated in EIA after completion of public hearing.

7.0 ENVIRONMENT MANAGEMENT PLAN:

Environment Management Plan has been prepared during construction and operation phase to mitigate the impact arising from the project site. Same is summarized below:

7.1 DURING CONSTRUCTION PHASE:

Table No- 6: EMP during Construction Phase

Sr. No	Components	Probable Source of Impact	Mitigation Measures
1.	Occupational Health and Safety	➢ Construction activities	➢ Necessary approved Personal Protective Equipment (PPE) like helmet, eye protection, safety belt should be provided to the employees and arrange training & awareness program for the effective use of PPE. ➢ Accessibility of site should be safely and properly marked for any danger point like slippage, deep hole, and mud should be identified and barricade. ➢ All material stores in tiers stacked, racked, blocked, interlocked or otherwise secured to prevent from sliding, falling or collapse. ➢ Aisles and passageways kept clear and in good condition. ➢ Live part of all electric equipment should be guarded against accidental Contact. ➢ Ground Fault interrupters should be used to protect the user. ➢ Ensure that effective and appropriate use of eye and face protection equipments are placed during cutting & welding. Proper mechanical ventilation system should be in place, which helps to exhaust the toxic gases.
2.	Air	➢ Excavation and earth work for site preparation; ➢ Civil work at site; ➢ Vehicles transportation for sourcing of building material to site.	➢ More emphasis should be given on deployment of vehicles with Pollution Under Control (PUC) certificates even for contractor vehicles/transporters. ➢ Workers shall be provided with protection masks. ➢ Dust covers will be provided on trucks that would be used for transportation of materials prone to fugitive dust emissions. ➢ Water sprinkling shall be done at the location where ever dust generation is anticipated.
3.	Noise & Vibrations	➢ Operation of machinery like compressors, compactors, concrete plant, cranes etc. as	➢ Noise protection equipments such as noise shields for high noise producing equipments and ear muffs/plugs to workers shall be provided during construction activities.

Sr. No	Components	Probable Source of Impact	Mitigation Measures
		well as transportation of vehicles. ➢ Vibrations are caused due to heavy dumpers, and construction machineries	➢ Maximum efforts shall be made to restrict use of noisy construction equipment during night hours. ➢ Vibration control damped tools shall be used and the number of hours that a worker used them will be limited.
4.	Water	➢ Site excavations ➢ Accidental spills of paints, oils, grease or other materials	➢ Minimum water to be used during construction. ➢ Leak proof containers will be used for storage and transportation of oil and greases. ➢ Segregating all waste oils and lubricants from maintenance of construction equipment and disposing of them properly through approved agency/ disposal areas. ➢ Construction workers will be trained for proper handling, storage and disposal of hazardous or toxic materials.
5	Land	➢ Dumping of construction spoils (plastics, glass, fibre insulation, roofing, steel piping)	➢ Existing solid waste management plan will take care of this construction waste.
6	Socio economic	➢ Creation of employment opportunity in the region.	➢ Local people will be employed during the construction process; ➢ Proper facilities, including drinking water, sanitation, transport within plant premises and other essential community services will be made available to the construction workers.

7.1 DURING OPERATION PHASE:

Table No- 7: EMP during Operation Phase

Sr. No	Components	Mitigation Measures
1.	Air Quality Management	➢ Electrostatic Precipitator (ESP) of adequate efficiency shall be provided to limit the particulate matter emission below 50 mg/Nm3 ➢ Low NOx coal burners shall be installed. ➢ Process interlocking system will be provided to trip off the complete process in case of failure of ESP. ➢ Low Ash Low Sulphur coal shall be utilised
2.	Fugitive Emission Control measures in the plant	➢ All the coal conveyor belts shall be fully covered ➢ Adequate capacity air pollution control equipments shall be installed at all the transfer points to control the fugitive emissions during the coal conveying; ➢ An effective dust suppression system shall be installed at coal handling system; ➢ All the workers and officers working inside the plant are to be provided with PPEs; ➢ Adequate greenbelt shall be planned around the coal yard to arrest the fugitive emissions; ➢ Water sprinkling shall be carried out on the coal stock pile to avoid fugitive emission; ➢ Adequate wind barriers will be provided to avoid dust going in the ambient air from coal storage area
3.	Noise Level Management	➢ All the machines will be well lubricated to reduce noise transmission ➢ Acoustic Enclosures shall be provided at high noise generating sources ➢ Workers at high noise generating sources shall be provided with PPEs
4.	Water Pollution Management	➢ Process effluent water will be re-circulated within the process where possible. Where this cannot be re-circulated it will be treated to a suitable level and will be discharged to the sea; ➢ Online temperature measurement shall be installed in the discharge channel

Sr. No	Components	Mitigation Measures
		➢ A programme of ongoing monitoring shall be implemented to ensure that any discharge of process effluent water continues to meet required standards; ➢ No wastewater or waste materials will be discharged to ground; ➢ Regular dredging shall be carried out in the discharge channel so that the discharge channel would give the adequate cooling effect ➢ STP treated water shall be used for gardening and for coal dust suppression ➢ Rainwater harvesting shall be carried out as per plan.
5	Solid Waste Management	➢ Fly ash shall be utilised as per Fly ash notification using the best practices. ➢ Low ash coal shall be used to control the fly ash generation from the unit ➢ Existing solid waste management facilities shall be extended to utilize the solid waste generated from the proposed expansion ➢ Hazardous waste generated from the proposed expansion shall be disposed of as per the Hazardous Waste (Management, Handling & Transboundary Movement) Rule, 2009
6	Conservation of Ecology in and around CGPL	➢ To protect the coastal area from erosion and protection from natural calamities, CGPL is developing mangroves on 1000 hectare land in consultation with Gujarat Ecology Commission (GEC). ➢ The project will benefit a wide range, from the local communities of the village who are directly and indirectly dependent on mangroves and its resources and the State in general which will benefit in terms of enhanced capacities in decentralised mangrove management, sustainable coastal resource management and better integration of environmental concerns in developmental planning for the coastal zone.
7	Green Belt Area Development	➢ Additional green belt to be developed around the coal yard ➢ Grassing of the open area shall be carried out within the plant premises.

8.0 PROJECT BENEFITS:

The proposed project is expansion by addition of 2 coal based supercritical units (830 MW each) in the existing project at CGPL. Some of the benefits of Supercritical technology are as follows:

- Reduced power costs due to improved plant efficiency;
- Reduced emission of CO_2, NOx, SO_2 and particulate due to burning less coal per megawatt-hour electricity produced as compared to sub- critical technology.
- Supercritical units can achieve thermal efficiency of more than 45 percent, compared with a typical sub-critical plant's 30-38 percent.

Following are some of the benefits of proposed expansion:

- This expansion project will definitely help in meeting the power demand of western region.
- Expansion project will be within existing premises of CGPL and land is already in possession. Hence there will not be additional land acquisition for the proposed expansion.
- No additional withdrawal of water from sea since the water required will be taken from discharge channel of existing channel.
- Infrastructure already developed. Existing infrastructure will be utilized to the extent possible. For eg: Sea water intake and outfall, Sea water intake and outfall, Operational port for import of coal, Maintenance Workshop, Laboratory, Access roads and drains, Labour colony, Canteen, Admin Building, stores etc.

8.1 CSR ACTIVITIES:

CGPL is wholly owned subsidiary of Tata Power. Tata Power had undertaken the Corporate Social Responsibility (CSR) activities for decades, reflecting the company's commitment towards sustainable energy generation without undue compromise to human and environmental issues. The organization is totally committed to the welfare of the community and believes that sustained business growth can be achieved only through carrying out people centric program. CGPL believes in integrating its business values and operations to meet the expectations of all its stakeholders.

The CSR activities for the proposed expansion units of 2x830MW capacity coal fired supercritical thermal power at Mundra shall be ensuing existing plant of 5 x 830 MW. In addition, CGPL shall continue to serve its communities by:

- Adhering to the principles of community engagement.
- Ensuring the benefit from the company's presence by proactively responding to their needs.
- Providing all assistance during times of disasters.
- Building and strengthening community institutions, including Panchayat, which will enable them to realize their rights and entitlements.
- Working in partnership with NGOs, State and Central bodies to widen the reach and leverage each partner's individual experience and expertise.
- Encouraging its employees to volunteer their time