

Pre-feasibility Report

For

MAHAGENCO

MAHARASHTRA STATE POWER GENERATION COMPANY LIMITED
2 x 660 MW Coal based Supercritical Thermal Power Plant at Koradi,
Tahsil - Kamptee, District - Nagpur



EIA Consultant:
Pollution and Ecology Control Services, Nagpur
NABET No.: 119

Contents

1. Executive Summary.....	4
2. Introduction of the project/Background information.....	8
2.1 Identification of project and project proponent	10
2.2 Brief description of nature of the project.....	10
2.3 Need of the project its importance to the country and or region.....	10
2.4 Employment Generation (Direct and Indirect) due to project.....	12
3.0 Project Description	13
3.1 Type of project.....	13
3.2 General Location	13
3.3 Details of alternate sites considered.....	16
3.4 Size or magnitude of operation.....	16
3.5 Manufacturing Process.....	16
3.5.1 Selection of Technology.....	16
3.5.2 Process Details	17
3.6 Raw Material requirement.....	18
3.6.1 Coal Requirement and Source	18
3.6.2 Water Requirement and Source.....	19
3.6.3 Fuel Oil Requirement.....	19
3.6.4 Power Evacuation	19
3.7 Generation and disposal of waste.....	19
4.0 Site Analysis.....	21
4.1 Connectivity	21
4.2 Land Form	21
4.3 Land use of the project.....	22
4.4 Environmental Setting of the project.....	22
4.5 Soil Classification	22
4.6 Climatic data from secondary sources	22
5.0 Planning brief	23
5.1 Planning Concept	23
5.2 Population Projection	23

5.3	Amenities/Facilities	23
5.3.1	Residential Township.....	24
5.4	Green Belt	24
5.5	Social Infrastructure.....	24
5.6	Drinking Water Management	24
6.0	Rehabilitation and Resettlement Scheme:	24
7.0	Project Schedule & Cost estimates	25
7.1	Likely date of start of construction.....	25
7.2	Estimated Project Cost.....	25
8.0	Analysis of proposal.....	25
8.1	Financial and social benefit.....	25
8.2	Socio-Economic Development Activity	25

Table

Table 1	Details of Retiring units of Mahagenco	11
Table 2	Mahagenco's earlier replacement units plan.....	11
Table 3	Environmental Setting of Study Area	15

Figure

Figure 1	General Location of Project Site	14
Figure 2	Study area of project site in within 10Km.....	14
Figure 3	Location on Google Earth.....	14
Figure 4	Power Generation Process	18

Annexure:

Annexure:1	Thermodynamic Cycle
Annexure:2	Steam and Water
Annexure:3	Plant Water System
Annexure:4	Water Balance
Annexure:5	DM Water Plant
Annexure:6	Single Line Diagram for Coal Handling
Annexure:7	Single Line Diagram for Ash Handling
Annexure:8	Single Line Diagram for Fuel Oil Handling
Annexure:9	Single Line Diagram for Waste Water Generation and Utilization
Annexure:10	Floor Plan
Annexure:11	C&I Cable Block Diagram
Annexure:12	Cross Section of Plant

1. Executive Summary

The basic objective of the planned development in power sector in the country is to outpace the rapid rise in power demand with reasonable level of reliability to ensure faster economic growth. The most important primary resources for electric power generation are fossil fuels, water and nuclear energy. Rapid industrialisation induced by the on-going liberalisation of the country's economic policy, continued stress on rural electrification with larger use of electric pumps for irrigation purposes and increase in electricity utilisation for transportation and household purposes have all contributed to rise in the growth rate for demand of power.

65% of total power generated in the State of Maharashtra is fossil fuel based thermal power. The state has several plans for power generation through the state owned **Maharashtra State Power Generation Company Limited (MAHAGENCO)** and is also encouraging Independent Power Producers (IPP) to establish power generating stations after the opening up of this sector to private entrepreneurs supported by Electricity Supply Act 2003.

Although several new power projects have been identified with a view to bridge the gap between the demand and supply, only a few could be taken up so far due to financial and other constraints. The present demand for electrical power continues to grow and will continue to outstrip the available and planned generation capacity leading to shortage of power and energy in the foreseeable future. Hence, several new power projects have been identified with a view to bridge the gap between the demand and supply.

In order to reduce the duration for setting-up a new power station, it is proposed to install 2x660 MW units in the existing premises of TPS where land and other infrastructure are available. Accordingly, MAHAGENCO has proposed to install the units at Koradi Thermal Power Station which is about 11km from Nagpur.

MAHAGENCO operates two (2) units of 210MW each commissioned in 1982-83 and three (3) supercritical units of 660MW commissioned in the year 2016-2017.

With the advancement in technology and increasing confidence in super-critical, MAHAGENCO has now proposed two (2) units of 660 MW units deploying supercritical steam parameters.

Vacant land is available within the boundary wall of the existing TPS which is adequate to accommodate the proposed units along with all its auxiliary systems. MAHAGENCO intend to establish a modern plant incorporating the state-of-the-art technological features on standalone basis. In view of the age of the existing installation, all the utilities and offsite systems shall be new with minimum dependence on the existing plant and its facilities.

However, in view of the higher size of the proposed units there will be additional requirements for the inputs like coal and water. Coal requirement for this project is @ 7.18 MMTPA with consideration of worst coal of GCV 3200 Kcal/kg at BMCR at 85% PLF. It is proposed to utilize existing coal linkages to the tune of 3.165 MMTPA of those units which are either closed or going to close up to FY 2023-24. The details of coal linkages of these units are tabularized as below.

For balance coal requirement of @ 4.015 MMTPA, it is proposed to use the coal from M/s WCL's Umred and its nearby coal mines; for which necessary Fuel supply agreement shall be made.

Table No.: Details of coal linkages:

Sr. no.	Closed unit	Decommissioning date	Capacity (MW)	Total (MMTPA)			
				WCL	SECL	MCL	
1	Koradi U-5	02.03.2017	200	0.161	0.597	0.355	1.113
2	Nashik U-4	09.07.2020	210	0.785	0.241	0	1.026
3	Nashik U-5	29.01.2021	210	0.785	0.241	0	1.026
							3.165

Increased water availability from Pench Dam, the present water source for Koradi TPS, is not considered possible. Instead, MAHAGENCO has decided to source water from Nagpur City sewage treatment plant.

Sewage waste water of Nagpur City shall be suitably treated and then utilised for cooling water circuit of the extension station. This treated water is being made available across the fencing of the proposed project. However, Power Cycle Make-up and Potable water requirements shall be met from the existing arrangements for water from Pench Dam and treated sewage water.

Maharashtra State Power Generation Company Limited (MAHAGENCO) have initiated action for setting up a 2 x 660 MW coal based supercritical thermal power plant taking advantages of the inherent features and infrastructures of existing Koradi TPS. Koradi Thermal Power Plant is in operation. The power plant received Environmental Clearance vide letter no. 13012/87/2007IA.II(T) Dated 4th January 2010, validity extended vide letter no. J-13012/87/2007 dated 23rd March 2017. Total generation capacity of new Koradi thermal power plant is 3 x 660 MW + 2 x 210 MW = 2400 MW

In existing plant operation coal is being transported by trucks from WCL mines and rail wagon from SECL. The work of construction of Pipe conveyor is under progress for transportation of coal from Singhori, Bhanegaon, Gondegaon, Inder and Kamthi. The coal from Umrer area of WCL will be transported by Rail.

Under the present study the feasibility of setting up the station is assessed from the viewpoint of

- *Land availability,*
- *Fuel availability and transportation logistics,*
- *Water availability and transportation to site,*
- *Power evacuation from the station,*
- *Infrastructural availability and requirement of augmentation.*

For the main power block a set size of 660 MW is favoured in view of:

- *Superior thermal efficiency*
- *Less specific initial investment requirement*
- *With less emission, the technology is environment-friendly.*

MAHAGENCO operates two (2) units of 210MW each commissioned in 1982-83 and three (3) supercritical units of 660MW commissioned in the year 2016-2017. With the advancement in technology and increasing confidence in super-critical, MAHAGENCO has now proposed two (2) units of 660 MW units deploying supercritical steam parameters.

The Power block for proposed 2 x 660 MW units would require of 417 mt x 350 mt and can be established on land of closed 4x120MW and 200MW unit and associated structure at existing Korardi TPS. Total 275.39 ha land is identified for proposed

project. Other utilities can be accommodated within the available space of MAHAGENCO's existing power plant after demolishing the existing structures as required. For the proposed 2x660MW Power plant 36 MM³/year of raw/sewage water and 7.18 million ton of coal (worst) (Annual Coal Req.) for operation of the station at a planned plant load factor of 85% are required.

A total manpower requirement of 534 persons has been envisaged for the propose station. Based on available quotes and in-house data, the project cost estimate has been worked out.

A total capital outlay of **Rs.9882** Crores, including interest during construction and other financial charges, would be involved.

The basic requirements for setting up and operating a coal based supercritical power plant of 2x660 MW capacity are -

- Availability of adequate land suitable for setting up the station by utilising the existing infrastructure to the extent feasible.
- Assured availability of sufficient water of appropriate quality on year-round basis.
- Confirmed supply of adequate fuel with effective transportation system to ensure the least delivered cost of fuel at the plant end.
- Power evacuation possibility to the grid at appropriate voltage level(s).
- Availability of construction water and power, availability of construction manpower.
- Road and rail access, connectivity from airport, seaport, etc.
Availability of other infrastructural requirements

2. Introduction of the project/Background information

Project at a Glance

Sr. No.	Particular	Details
1	Project Authority	Maharashtra State Power Generation Company Limited (MAHAGENCO).
2	Location	Koradi of Nagpur District in Maharashtra Latitude 21° 14' 53.19" N Longitude 79° 05' 53.24" E
3	Nearest Major Towns	Nagpur : 4 km (S)
4	Seismic Zone	Zone-II as per IS 1893-1984.
5	Access by Rail	The coal rakes shall be moved upto Nagpur on the Kolkata-Mumbai main line and then to Kalamna on the Nagpur-Ramtek (BG) section.
6	Main Fuel	7.18MMTPA Coal linkage from retired/to be retired units.
7	Fuel Transportation	By rail in rake loads of BOX-N wagons and pipe conveyor.
8	Water	a) Total water requirement for proposed thermal power plant is 36 MM ³ /year. 1) Tertiary treated sewage water from Nagpur Municipal corporation for cooling circuit. 25.2MM ³ /annum 2) Pench dam water 10.8MM ³ /annum for other non-critical uses. Specific water consumption shall not exceed 3.0 cubic meter /MWh as per Notification dated 28 th June 2018.
9	Land for proposed plant	Proposed coal based thermal power plant will be established on land of closed 4x120MW and 200MW unit and associated structure at existing Koradi TPS. Total 275.39 ha land is identified for proposed project. A National level Tender is floated for experienced contractor for entire demolition work. The responsibility of demolishing, cleaning, disposal of debris, metal, equipment's etc. in specific manner and levelling of land will be in scope of contractor. This work will be carried out under supervision of Mahagenco.

10	Land Development	The land required for additional 2x660MW thermal power plant will be levelled and developed as per project requirement.
11	Power Generating Unit	2x 660MW Supercritical Thermal Power Unit.
12	Cooling System	Semi-open recirculating condenser cooling system with wet-type natural draft cooling tower.
13	Coal Handling System	Coal handling facility, which comprises unloading by Wagon Tipplers with on-line crushing and stacking by stacker-cum-reclaimer in the coal yard and finally feeding the bunker level conveyors. The system capacity considered is 2000 TPH
14	Ash Disposal System	Dry extraction and disposal with provision for high concentration slurry disposal for fly ash and wet disposal for bottom ash is considered.
15	Power Evacuation	At 400 kV level.
16	Environmental Aspects	Two Separate Wet stacks have been considered as per MoEF&CC guidelines with internal diameter of the chimney estimated @ 6.5 m, flue gas velocity of 19.8m/sec and a temperature of 90°C at stack exit after installation of FGD. Adequately designed electrostatic precipitators with more than 99.89% efficiency are envisaged. The amount of SOx emissions shall be less than 100mg/Nm ³ after installation of FGD (Flue Gas Desulfurizer) system for each unit by combining common utilities and the installation of chimney as per MOEF guidelines. The amount of NOx emissions shall be less than 100mg/Nm ³ after installation of SCR for each unit after economizer outlet when the units are operating at MCR. Waste water quality to be maintained as per MoEF&CC notification. Most of the waste water and ash water would be recycled back to the system after treatment for use in less priority areas.
17	Project Time Frame	Fifty-one (51) months for 1 st Unit & fifty seven (57) months for 2 nd Unit from zero date i.e. the date of 'Letter of Award' to the EPC contractors for BTG package to commercial operation.
18	Project Cost	Present day cost including interest during construction, financing charges Rs.9882 Crores.

2.1 Identification of project and project proponent

It has been observed from the Mahagenco's statistics and the 19th Electric Power Survey (EPS), published by the Ministry of Power, Government of India, that the energy demand/supply position for Maharashtra at the end of the 12th Plan require substantial capacity addition particularly in thermal sector. The above scenario highlights the need for measures to bridge the gap between the demand and supply. In order to induct more base-load thermal power stations for stability of the state grid, a station with 1320MW nominal capacity has been proposed for implementation during the National Institution for Transforming India.

2.2 Brief description of nature of the project

Maharashtra State Power Generation Company Limited (MAHAGENCO) have initiated action for setting up a 1320MW extension station taking advantages of the inherent features and infrastructures of existing Koradi TPS. Land for 2x660 MW project can be made available by demolishing existing structures/buildings of closed 4x120 MW units at Koradi TPS. Further 200MW unit and adjacent available land can also be utilized. Hence no any Govt./Private Land acquisition is required.

Mahagenco is already having five (5) thermal power units totalling 2400 MW capacity at Koradi TPS. Infrastructural support from these units is an added advantage, if units are installed within the boundary walls of the existing TPS.

2.3 Need of the project its importance to the country and or region

The power demand in our country is increasing rapidly due to rapid industrial and infrastructure developments. Lack of availability of sufficient electric power has always been one of the greatest deterrents to the growth of industry in the state. Government of India is planning to build last mile connectivity to the rural landscape of the country which will enhance the power demand.

Government of India is planning to replace old underperforming units with modernised high efficiency thermal plants. In accordance to retiring of old units and cancelled / on-hold projects, if new units are not installed as replacement of MWs, Mahagenco's installed capacity will get reduced considerably in future in turn increasing Gap(Deficit) of Power Demand and Supply.

To meet the increasing power demand and to generate power at cost lower than the average cost of power generation, Maharashtra State Power Generation Co. Ltd. (MAHAGENCO) is planning to set up thermal power project at Koradi Thermal Power Plant Premises. The proposed plant capacity will be 2 x 660 MW with Supercritical Technology.

Table 1 Details of Retiring units of Mahagenco

Sr. no.	Name of unit	Unit capacity in MW	Retiring in
A. Units retiring up to Dec. 2027			
1	Nasik Unit-3	210	April 2019
2	Nasik Unit-4	210	July 2020
3	Nasik Unit-5	210	January 2021
4	Bhusawal unit-3	210	May 2022
5	Parli Unit-4	210	March 2025
6	Chandrapur Unit-3	210	May 2025
7	Chandrapur Unit-4	210	Mar 2026
8	Parli Unit-5	210	December 2027
Sub-Total (A)		1680	
B. Units retiring after Dec. 2027			
1	Khaperkheda unit-1	210	March 2029
2	Khaperkheda unit-2	210	January 2030
Sub Total (B)		420	
Total (A+B)		2100	

Table 2 Mahagenco's earlier replacement units plan

Sr. No.	Proposed replacement units	Retiring units & status of the same, date for completion of 40 years of service	PPA status
1	Bhusawal Unit # 6 (660 MW)	Bhusawal # 2 (210 MW): Not in service, August 2019 Bhusawal # 3 (210 MW) : In service, May 2022.	PPA approved by

		Nashik # 3 (210 MW) : In service , April 2019 (Retiring capacity 630 MW)	MERC
2	Umred/Koradi (2 X 800MW) (Ultra supercritical technology) Proposed as replacement project of ultra-super critical technology with new units near the coal mines to avail the benefits of lower VC due to low SHR and low coal cost. <i>The project is dropped due to non viability land development cost and time required.</i>	Nashik # 4 (210 MW): In service, July 2020 Nashik # 5 (210 MW): In service, Jan 2021 Koradi # 5 (200 MW): Not in service. July 2018 Koradi # 7 (210 MW) : In service , Jan 2023 Parli # 4 (210 MW): Not in service, March 2025 Parli # 5 (210 MW): Not in service, Dec 2027 Chandrapur # 3 (210 MW) : In service ,,May 2025 Chandrapur # 4 (210 MW): In service ,Mar 2026 (Retiring capacity 1670 MW)	PPA will be amended and will approach Hon'ble Commission for approval.
3	Dherand (1 X 800MW) Proposed as replacement project of ultra-super critical technology	Chandrapur # 1 & 2 (2 X 210 MW): Already closed Parli # 3 (210 MW) : Already closed Khaperkheda # 1 (210 MW): In service, Mar 2029 Khaperkheda # 2 (210 MW): In service, Jan 2030 (Retiring capacity 1050 MW)	PPA will be amended and will approach Hon'ble Commission for approval

2.4 Employment Generation (Direct and Indirect) due to project

The total manpower requirement is estimated at 534 of which nearly 145 will be deployed for plant operation in keeping with the design and operating philosophy proposed for the station.

Approximately 300 persons would be deployed in maintenance of the plant and machineries. The periodic capital maintenance is considered to be done through contract labour in line with general practice being followed elsewhere. Besides, nearly 90 persons along with a Superintendent Engineer would look after the fuel supply, transportation and handling section

3.0 Project Description

3.1 Type of project

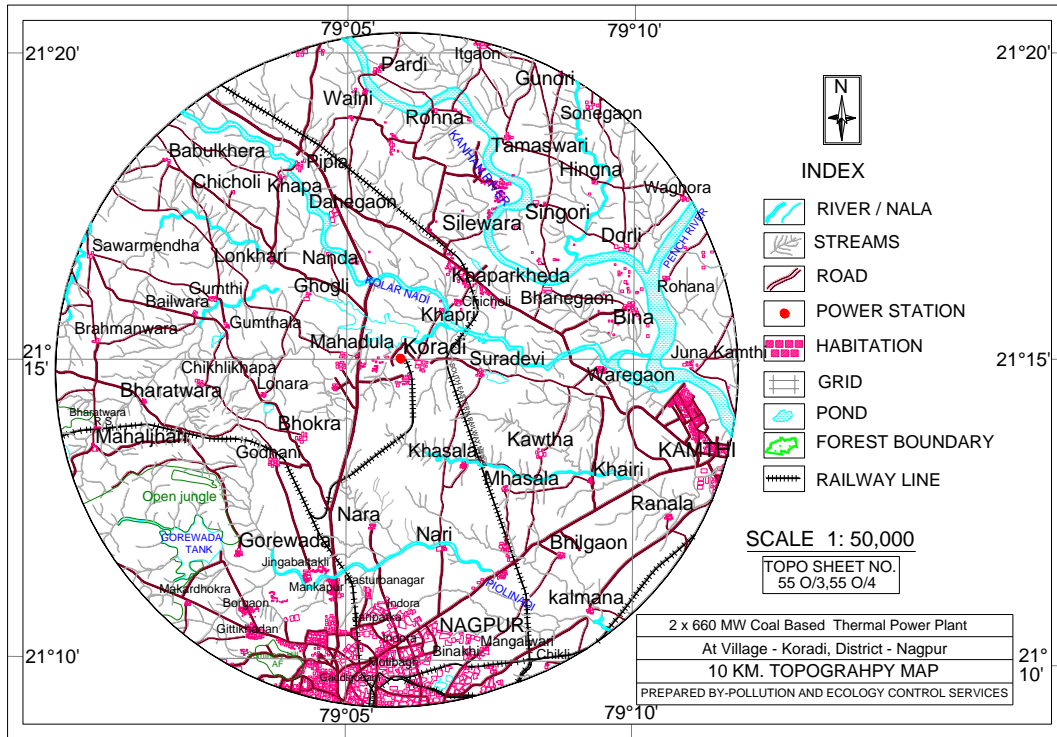
The proposed project is 2 x 600MW Coal based supercritical thermal power plant at Koradi taking advantages of the inherent features and infrastructures of existing Koradi TPS. For the main power block a set size of 2 x 660 MW is favoured in view of:

- Superior thermal efficiency
- Less specific initial investment requirement
- With less emission, the technology is environment-friendly.

3.2 General Location



Figure 1 General Location of Project Site



Source (Toposheet)

Figure 2 Study area of project site in within 10Km

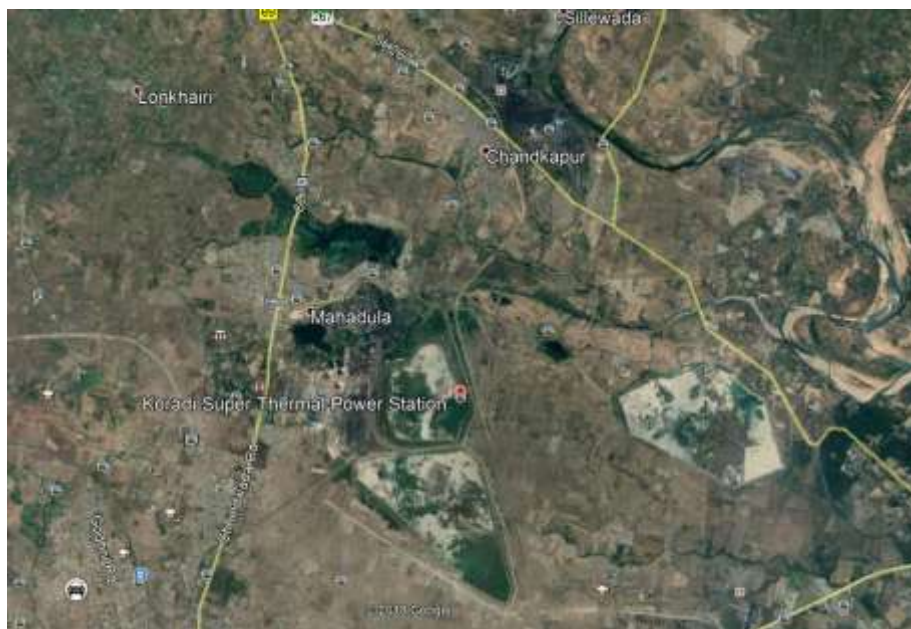


Figure 3 Location on Google Earth

Table 3 Environmental Setting of Study Area

Area	Name	Aerial distance
Nearest Habitation		
Road	NH-69 Nagpur -Bhopal NH	0.5 Km West
Railway Station	Godhani Railway Station: 5.0 km (SW)	5.0 km (SW)
Town	Nagpur	4 Km (S)
Airport	Nagpur	18Km (S)
Nearest Water Body	River: Kanhana River Pench river : Kolar river : Pioli Nadi : Lake: Gorewada lake: Koradi Lake : Futala Lake: Shukrawari Lake: Ambazari Lake :	4.5 Km (NE) 7.5 Km (E) 2.0 Km (N) 5.5 Km (SE) 6.0 Km (SW) 1.0 Km (NW) 10.0 Km(S) 10.0 Km (S) 12.5 Km (S)
Areas used by protected, important or sensitive species of flora or fauna for breeding, nesting, foraging, resting, over wintering, migration	Gorewada Zoo and Wildlife Rescue Centre	6.5. Km (SW) Mansinghdeo Wildlife Sanctuary Existing Boundary:23.5Km Proposed Boundary:25.5Km
National Park/Sanctuary	No National Park is situated within the 10 Km radial distance	
Biosphere Reserve	None	
Forest(RF/PF)	None	
Archaeological Site	None	
Defense Installation	Yes	Kamptee cantonment : 7.0 Km (E) Ambazari Ordnance Factory : 16.0 Km. (SW) Air Force Maintenance Command : 10 Km. (SW)
Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	Yes	Mahalaxmi Temple Koradi : 0.5 Km. (N) Dragon Palace : 12.0 Km. (SE) Waki Tajuddin Darbar : 14.5 Km. (NW) There are number of colleges and hospitals in Nagpur city and Kamptee Town.

3.3 Details of alternate sites considered

The identified site for proposed 2x660MW coal based supercritical thermal power plant located in existing Koradi thermal power plant taking advantages of the inherent features and infrastructures of existing Koradi TPS.

- There are no National Park/Sanctuaries within 10Km radius
- There are no historical places/places of tourist importance within 10km radius.
- Nearest village Mahadula is situated at a distance 1.0 km from proposed site.
- No forest land is involved in the site
- No R & R is involved for proposed installation.

3.4 Size or Magnitude of Operation

It is coal based power extension project with two (2) units of 660 MW units deploying supercritical steam parameters.

3.5 Manufacturing Process.

3.5.1 Selection of Technology

For the proposed station a two (2) unit configuration has been planned with overall capacity of 1320 MW with supercritical steam parameters by the project proponent. The choice of supercritical steam parameters in once-through boiler is prima facie guided by the improvement in combustion efficiency as listed above. The choice is, however, beset with use of higher alloy steels in the heat transfer surfaces.

For the present study, the details of power cycle equipment for 660 MW supercritical units are given below:

Equipment	Details
Boiler	Once-Through
Turbine	1HP+1 IP+2LP
Generator (MVA)	780
LP Heaters	Three(3) to Four(4) Nos.
HP Heaters	Two(2) to Three(3) Nos.

Equipment	Details
Deaerator	One(1) No.
Condensate Extraction Pumps	3 x 50%
Boiler Feed Pump	2x50% of BMCR TD + 2x30% of BMCR MD
Vacuum Pumps	2 x 100%
Condensate Polishing Units	3 x 50%/4 x 33.3%
HP Bypass Valves	Two(2) Nos.
LP Bypass Valves	Two(2) to Four(4) Nos.
Recirculation Pumps	Two(2) Nos.

The steam parameters and basic inputs are given hereunder:-

- 660 MW Supercritical:-

M. S.	:	255 atm (a), 568 °C, 2100 TPH
Feed Water Temperature	:	190.0 °C (BFP Outlet)
Condensate Flow	:	1320 TPH
Coal Requirement	:	7.18 MMT @ 85% PLF

3.5.2 Process Details

In thermal power generation, chemical energy of coal is first converted into thermal energy (during combustion), which is then converted into mechanical energy (through a turbine) and finally into electrical energy (through a generator).

The power generating units will consist of boilers, turbo-generators with accessories, transformer and other complementary parts. Coal from the coal handling plant will be transported to the boiler bunkers through Conveyor belts. Thereon, the pulverized coal will be fed to the boiler furnace with the help of heated air driven by primary air (PA) fans. Forced draught (FD) fans will provide additional controllable air to the burners to assist desirable combustion. The heat released by the burning coal is absorbed by the demineralised boiler feed water passing through the boiler wall tubing to produce high-pressure steam. The steam will then be discharged onto the turbine blades, which will make the turbine to rotate. The generators coupled to the turbines will also rotate and produce electricity. The electricity will pass to the transformer, which will increase the voltage to the desired level of the transmission grid system.

This combustion will produce ash, out of which the bottom ash will fall to the bottom of the boiler. The fly ash carried in the flue gases will travel through the electrostatic precipitators (ESP) where it will be precipitated on the high voltage electrodes. The relatively clear flue gas will pass through the stacks with the help of induced draught (ID) fans. Bottom ash will be collected in dry form and disposed in ash disposal area. The dry fly ash, stored in the silos will be transported through covered/closed trucks. Bottom ash slurry from bottom ash hopper will be conveyed to ash slurry sump by the jet pumps below the bottom ash hopper. Fly ash from the intermediate fly ash surge hopper/ buffer hopper will also be conveyed in slurry form to the ash slurry sump.

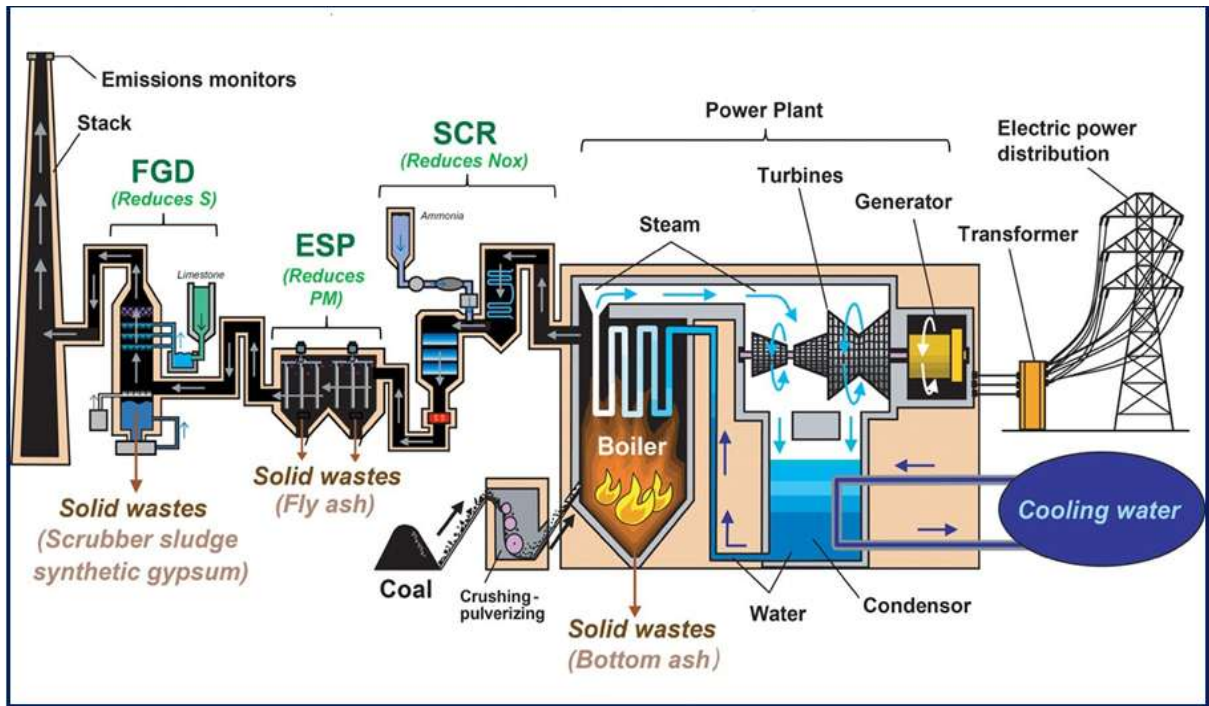


Figure 4 Power Generation Process

3.6 Raw Material Requirement

3.6.1 Coal Requirement and Source

Coal requirement for this project is @ 7.18 MMTPA with consideration of worst coal of GCV3200 Kcal/kg at BMCR and 85% PLF. It is proposed to utilize existing coal linkages to the tune of 3.165 MMTPA of those units which are either closed or going to close up to FY 2023-24.

For balance coal requirement of @ 4.015 MMTPA, it is proposed to use the coal from M/s WCL's Umred and its nearby coal mines; for which necessary Fuel supply agreement shall be made.

3.6.2 Water Requirement and Source

For the proposed power plant two types of water are proposed to be used namely Tertiary treated waste water and Pench Dam water. Tertiary treated sewage water from Nagpur Municipal Corporation for cooling circuit and other non-critical uses. Water would be conveyed through cross country pipeline at a distance of 11km. Pench dam water for process use. Raw water for existing TPS is met from Pench dam at a distance of around 40Km.

The cooling and consumptive water requirement for the proposed 2x660 MW station is 1500 m³/hr (10.8 MM³/annum) of river water and 3500 m³/hr (25.2 MM³/annum) of tertiary treated sewage water respectively. Tertiary treated sewage water will be received from the proposed Sewage Treatment Plant under NMC. Total water requirement for proposed thermal power project is 36 MM³per annum.

3.6.3 Fuel Oil Requirement

LDO and HFO would be required for cold start-up and flame stabilization at lower load. The requirement of fuel oil has been estimated to be about 29,490 KL per annum. LDO 9830KL/annum and HFO 19660KL/annum. Fuel will be transported by rail route to the plant site from the nearest depot.

3.6.4 Power Evacuation

The power evacuation from new 2x660 MW units will be evacuated through a dedicated 400 kV switchyard of MAHATRANSCO.

3.7 Generation and Disposal of Waste

Ash

The station will generate approx. 2.48 MMT of ash per annum, of which about 80%(1.98MMT) is fly ash and 20%(0.5MMT) Bottom ash. Fly ash has good pozzolonic

property, good flow ability and low permeability, which facilitate myriad utilisation of fly ash. Ash generated from the station would have sizeable quantum of inert oxides and carbonates of silica, alumina, magnesium, etc. Some of the commercially viable uses of such fly ash are as follows :-

- i) As fill materials in cement
- ii) Backfilling of open cast mine
- iii) Building blocks
- iv) Light-weight aggregates
- v) Partial cement replacement
- vi) Road sub-base
- vii) Grouting material
- viii) Filler in asphalt mix for roads
- ix) Partial replacement of lime aggregate in concrete work
- x) Road embankment
- xi) Land filling material
- xii) Recovery of minerals namely Aluminium & Iron.

A fly ash cluster is under development in Koradi for utilization of fly ash. It is expected that this cluster will be operational by 2021. 100 % ash will be utilized as per MoEF notification.

Gypsum from FGD

FGD is designed for 100% BMCR(Boiler Maximum Continues Rating) condition with sulphur contents 0.8% in coal and desulfurization efficiency $\geq 95\%$.

Quantity of gypsum generation is about 600 TPD from both the unit.

- ❖ The gypsum shall be stored in ground floor of gypsum dewatering building and it shall be adequately sized for 3 day.
- ❖ FGD gypsum can be used as a substitute for mined gypsum in many uses.
- ❖ Gypsum has many beneficial uses, including agricultural applications, wallboard products for residential and commercial buildings, as an ingredient in portland cement manufacturing and as filler ingredient .
- ❖ Gypsum can be used as nutrient for crops, as conditioner to improve soil physical properties and water infiltration and storage.

Liquid Effluent from Water Treatment & Other Areas

The waste water treatment and management plan is developed with Minimum (Zero) Discharge Concept. Maximum heat cycle make-up water requirement for the power station would be of the order of 200 m³/hr of demineralized water. The demineralizing process would generate alternately acidic and alkaline effluents after regeneration of such type of exchangers. These effluents would be neutralized in a neutralizing basin where proper neutralizing arrangements for the effluent fluids would be provided and the neutralized effluent water would be discharged into an equalization basin termed Guard Pond. The waste water from the gypsum dewatering system, belt filter wash water rejects etc. shall be treated in clarifier. The sludge from the clarifier shall be dewatered and disposed off through trucks. The treated water shall be pumped to ash slurry sump. Details are provided in **Annexure 4**

Waste material from demolition work

Closed 4x120MW unit and 200MW will be demolished. National tender will be float for demolition and land clearance work. Waste disposal will be including in tender and contractor will disposed waste material through concerned departmental vendors. Other material will be used for making working area, fencing etc.

4.0 Site Analysis

The project site is located within the existing premises of Koradi TPS.

4.1 Connectivity

The proposed site is well connected with road network. Nearest railway station is Godhni Railway Station: 5.0 km. The site is connected to NH69 Nagpur Bhopal National highway at 1.0 Km. Outskirt of Nagpur city is 4.0 Km.

4.2 Land Form

Land is flat and does not require much levelling .

4.3 Land use of the project

Present land is Industrial land. Proposed coal based thermal power plant will be on land of closed 4x120MW and 200MW unit and associated structure at existing Korardi TPS. Total 275.39 ha land is identified for proposed project.

4.4 Environmental Setting of the project

The details is provided in table no.3

4.5 Soil Classification

A detailed soil investigation will be carried out before finalization for design and drawings.

4.6 Climatic data from secondary sources

The nearest meteorological station of Indian Meteorological Department is at Nagpur. It may be seen that this area does not have any strong prevalent wind direction.

The annual rainfall of the area is about 112 cm with 80% of precipitation being in the months of June to September. Other meteorological features which will form the design basis for the units are given here under :-

- Maximum Temperature : 47.0 °C
- Minimum Temperature : 4.0 °C
- Average Annual Rainfall : 1000-1100 mm
- Maximum Rainfall in 24 hours : 315 mm
- Seismic Zone : Zone-II as per IS 1893
- Maximum Wind Velocity : 44 m/sec.

5.0 Planning Brief

5.1 Planning Concept

In order to induct more base-load thermal power stations for stability of the state grid, a station with 1320MW nominal capacity has been proposed for implementation during the National Institution for Transforming India. The proposed 2x660MW thermal power unit will be installed using Superior thermal efficiency, Less specific initial investment requirement and with less emission, the technology is environment-friendly.

5.2 Population Projection

There are no major human settlement in the close vicinity of project site. The manpower requirement during construction phase will be sourced from the local area to the extent possible, hence not much of settlement of outside people in the area. However population concentration may increase around the project site due to increase in ancillary activity.

5.3 Amenities/Facilities

Apart from the main power house building housing the new power generating equipment and other buildings required for their running and maintenance, the following facilities are required to be provided inside the extension station premises for the operation, maintenance and administration staff.

- I. Administrative Office
- II. Service building including technical offices
- III. Canteen
- IV. First-Aid Centre
- V. Car Parks and Motor Cycle Sheds
- VI. Gate House Complex including Safety and fire station.
- VII. Toilets, washrooms, change rooms, drinking water etc. provided in main buildings and yard to meet requirements of the Factories Act.

5.3.1 Residential Township

It is estimated that a total of about 534 employees would be working for operation, maintenance and administration of the proposed 1320 MW station. Additional quarters will be constructed in existing colony to accommodate the employees.

5.4 Green Belt

Green belt will be developed as 33% of total plant area is @90.88Ha. out of 90.88 Ha 34.14 Ha land is developed as green belt. Plantation near coal stacks and ash bund to arrest fugitive dust is also proposed. These green belts, apart from arresting air-borne dust particles and acting as noise-barrier, would help in improvement of ecology and aesthetics of the area.

5.5 Social Infrastructure

The existing facility available for the Koradi township will be suitably augmented to meet the additional requirement of the new residents in the township. New school, playground etc. shall, however, be required and capacity of the Hospital/ Health Centre will have to be increased.

5.6 Drinking Water Management

It is estimated that approx. 28KL/day of water will be required for plant worker and officer during operation of proposed thermal power plant. The water will be source from Pench Dam.

6.0 Rehabilitation and Resettlement Scheme:

No rehabilitation and resettlement is required.

7.0 Project Schedule & Cost estimates

7.1 Likely Date of Start of Construction

Construction activity pertaining to installation of proposed 2x660MW coal based thermal power plant will be started within 1 month from the date of Environmental Clearance and permission to establish from Maharashtra Pollution Control Board.

Commercial operation of all two (2) units from zero date i.e. the date for placement of order for main equipment would be 45 months for 1st unit and 51 months for 2nd unit.

7.2 Estimated Project Cost

Present day cost including interest during construction, financing charges Rs.9882 Crores.

8.0 Analysis of Proposal

8.1 Financial and Social Benefit

As Maharashtra State is one of the most preferred states for industrialization, the industrial demand for power will be ever increasing. Added to the industrial demand, the agriculture need as well as domestic consumption coupled with the improved standard of living of the population will be on the rise.

8.2 Socio-Economic Development Activity

The management is committed to uplift the standards of living of the villagers by undertaking following activities/responsibilities as the part of Corporate Social Responsibility.

- Health & Sanitation
- Drinking water
- Education for poor
- Village road
- Lighting

Health & Hygiene

- Personal and domestic hygiene
- Maintaining clean neighbourhood,
- Ambulance services
- Education and drug de-addiction, aids.

Supporting Education

- Providing books to all poor children
- Conducting annual sports festival in the village schools,
- Providing amenities like fan, lavatories
- Maintain play ground etc.