AURO MIRA BIO POWER INDIA PRIVATE LIMITED(AMBPIPL)

S.F.Nos.162/3A,5,6,9, 168/11, 169/1,2,3A,3B,
170/1,4A,4B,4C,4D,5,6, 178/1A,4A,1B, 181/5, 183/8C,1B,1C,6,7,
184/1H,4A,4B,4C,
Melmaruthappapuram village,
Alagulam Block,
Veerakeralam Pudur Taluk,
Tirunelveli District
Tamil Nadu.

The Proposed Biomass Power Plant

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1.0 INTRODUCTION

M/S. Auro Mira Bio Power India Private Limited is proposed to set up a 18 MW Biomass based power plant to generate power utilizing woody biomass and agro residuals. The plant will be located at S.F.Nos.162/3A,5,6,9, 168/11, 169/1,2,3A,3B, 170/1,4A,4B,4C,4D,5,6, 178/1A,4A,1B, 181/5, 183/8C,1B,1C,6,7, 184/1H,4A,4B,4C,
Melmaruthappapuram village, Alagulam Block, Veerakeralam Pudur Taluk, Tirunelveli District, Tamil Nadu., which is located 40 km away from Tirunelveli.

Power is the lifetime of the major economic activities of any developing country. Large-scale modernization and increased economic activities require extensive use of electricity. The installed capacity of power in A India has increased from 2300 MW in 1950 to over 1, 21,000 MW in 2005. However, with the accelerating pace of India's urbanization and industrialization and growing rural electrification, the country's power requirements is growing substantially year after year.

India today faces a peak shortage of about 11-18 per cent and an energy shortage of 9-11 per cent. We May need to grow generation capacity by 10,000 MW to 14,000 MW per Year. Our actual capacity addition has been significantly lower than that. In the period March 2000 to March 2004, the rate of annual capacity addition ranged from 2,700 MW to 4,000 MW. In 2004-2005, the capacity addition has been 6000 MW (Source: Power Line Nov'05). This rate of capacity addition is still below the desired levels even if we are able to maintain it. The latest assessment by the central Electricity Authority is that around 32,000 MW can be added during the Tenth plan (Source: Power Line Dec, 05).

2.0 PROJECT DESCRIPTION

2.1 Products and Production Capacity

The Production Capacity of power Plant will be as follows.

1. Power - 18 MW

2.2 Raw Materials

S.No.	Raw Material	Quantity
1.	Agricultural Residues	540 T/day
2.	Agro Industry Residues	
3.	Fuel from waste land	

2.3 Manufacturing Process

Description

The proposed biomass based power plant will consist of one number of biomass stoker/fired bi-drum, natural circulation boiler of 70 tph, 86 Ksca, 525° C and 1 No. condensing steam turbine of nominal capacity 18 MW. The steam pressure at the inlet of the turbine will be 86 Ksca at 525° C.

Apart from the above, the biomass based power plant will consist of fuel handling & feeding, firing system, Ash handling ESP (Pollution control system), Air cooled condensers, electrical system, power evacuation system and control system.

Boiler system

Boiler

The boiler designed for firing biomass fuel with oil used for start up purposes.

The boiler sub systems will be pressure parts, super heater, economizer, de super heater, fuel feeding, firing system and ash handling electrostatic precipitators and chimney for the steam generation of 70 tph at 86 Ksca and 525°C.

Pressure Parts

The boiler pressure part consists of water cooled furnace, boiler bank, steam and water drums, risers and down comers. The boiler furnace is of membrane wall construction made of tubes with fins welded between tubes to ensure leak tightness.

The steam generated in the furnace sidewalls is taken to the steam drum through a series of riser tubes. The front/roof tubes and rear wall tubes are directly connected to the steam drum. The bottom headers receiver the water from the water drum through a set of down comers. The furnace is adequately protected for over pressure by a set of buck stays. Which strengthen the furnace walls and transfer the load due to furnace puff, to the structures.

The super heater heats the saturated steam from the steam drum by absorbing the convection heat from the flue gas to the required temperature of 525°C. The super heater is a radiant super heater. The attemperator / desuper heater sprays water on to the steam, to maintain the outlet temperature to the required level.

The convection bank is sized to absorb the convection heat from the flue gas. Some of the tubes in the convection bank act as down comers to the water drum.

The economizer is a steel tube economizer. In the economizer, the feed water is heated to a temperature close to the saturation temperature, by the outgoing flue gas.

The steam drum is sized to have adequate steam space and water space. The steam drum is equipped with internals, which remove the water particles from the saturated steam, before it enters into the super heater.

The boiler is equipped with wall deslagers, long retractable soot blowers and rotary soot blowers for removal of ash deposited on to the heating surfaces.

The last stage of the heat recovery system is the tubular air heater. In the air heater, the fresh air is heated to a temperature of around 180° C, by the out going flue gas.

Fuel Handling and Feeding System

The design of fuel handling system, involving biomass fuels is based on the estimated quantities of annual fuel requirements.

Fuels will be received at site by road. Adequate road facilities will be provided to handle the road – bound vehicles on a daily peak basis.

The fuels arriving at site by different types of vehicles such as trucks, tractor trailers etc. will be weighed on a pitiless type electronic road weighbridge provided in the plant premises.

The fuels will be unloaded manually/hydraulically. Separate open storage areas will be identified for different fuels for maintaining necessary plant stock of two (2) months. The fuels will be stock piled to a height of about 4 meters.

One (1) separate storage shed of mild steel structural construction of adequate size for the biomass fuel is envisaged near the feeding zone to accommodate two (2) days' storage of fuels.

Fuel handling system will be provided by means of two (2) independent conveying systems.

Julia flora, waste wood from waste land and biomass fuels will be processed off-line and cut into required size using adequate numbers of wood chipper (Gr.H-1) fitted with rod gate. The biomass fuel from the grizzly hopper shall be discharged on to Belt Conveyor BC-1 through rod gate. The belt conveyor BC-1 conveys the fuel through the two way chute & BC – 2 to boiler bunker.

The slat chain conveyor SACC-1 is also used to convey wood chips to the boiler bunker house without intermediate storage, for discharging into the fuel feeding equipment.

Firing system

The firing system consists of a traveling grate, air plenum, regulating dampers and ash discharges values. The traveling grate is driven by a hydraulic arrangement. The bars of the traveling grates are made of cast iron, to withstand the heat from the burning. The combustion air to the grate is supplied from the bottom plenum poppers. The air is controlled by the air dampers. The discharges end of the grate discharges the ash into a water impounded hopper. The shifting are collected in the plenum hopper and discharges by an air lock value.

Draft system

The boiler will be equipped with one (1) number of forced draft (FD) fan, secondary air (SA) fan and induced draft (ID) fan. The FD & SA fans will supply the required combustion air to the boiler. The flue gases generated in the boiler will be evacuated by the ID fan. The capacity and head of FD fan will be selected considering maximum air that would be required for an of the fuel firing modes. In the same way, ID fanwill also be selected based on the maximum flue gas generated in any of the fuel firing modes under consideration.

Electro-static precipitator

The boiler is equipped with a electro-static precipitation, which will remove the dust and ash participles from the flue gas, before the ID fan could handle it. The efficiency of the precipitator will be 99% and the dust concentration at the outlet of the ESP will be less than 50 mg/$Nm^{3.}$

Turbo-Generator system

Steam Turbine

The proposed biomass based power plant, will one no. 18 MW turbo generator. The turbine will be a reaction type, extraction cum condensing type and running at a high speed. Hence, will be coupled with the generator through a reduction gear unit.

Steam is admitted into the turbine through an emergency stop value actuated by hydraulic cylinders. The turbine speed uncontrolled by an electronic covering system. The extraction pressures are arrived at based on the process requirements. The turbine exhaust pressure will be 0.18 Ksca.

The turbine shaft will be given fool sealing with steam. The steam coming out of the staff sealing system will be condensed in the gland steam condenser.

The lubrication system for the turbo generator will consist of main oil pump, auxiliary oil pump and emergency oil pump. The pumps will be equipped with suction and discharges filters, oil coolers etc. An oil tank of adequate capacity will be provided.

The turbine will be provided with devices to safeguard to turbine against, over speed, low stem inlet pressure, high axial movement of the shaft, low lube oil pressure, high condenser vacuum, excessive vibration etc.

Air Cooled Condenser

The turbine exhausts the steam into an air cooled condenser. The pressure of the turbine exhaust will be 0.18 Ksca. The corresponding temperature will be around 55°C. The condenser system will consist of an air cooled condenser with necessary radiator panels cooled by forced draft fans.

The condenser heat load will be designed for the maximum continuous rating operating. When the steam condensed will bethel maximum. The steam will be condensed by the air cooled condenser.

The evacuation system consists of starting ejector and holding ejector. The ejector creates the required vacuum in the condensing system using the steam as the motive fluid. The air sucked along with the steam will be condensed in the ejector condenser by the incoming feed water. The condenser will be provided with a storage tank, where the condensate will be collected. The above storage tank will be equipped with control devices, to ensure positive flow to the condensate extraction pump (2x100%)

2.4 Power and Fuels

The power generation will be 18 MW during the operation. The Auxiliary power (Home load) demand will be 1.8 MW. The balance power 16.2 MW will be exported to TNEB grid.

2.5 Raw Water

The total requirement of raw water for this unit will be 316 KLD. The entire raw water requirement for the unit will be met from dug well inside the factory premises.

2.6 Land

The total area allotted for this factory is 22.98 acres.

2.7 Manpower

The total workforce including staff and workers will be 44.

3.0 PRESENT ENVIRONMENT SCENARIO

3.1 Climate

The climate is generally arid with temperatures varying from37.4°C to 21.8°C. The rainfall is maximum in the SW monsoon period and minimum in NE monsoon period.

3.2 Ecology

The industrial area is mainly of shrubs land with thorny shrubs such as Euphorbia and Avarai (Cassia auriculata) and scattered trees such as Karuvel (Accacia nilotica). Neem (Azadirachta indica) etc. There is no endangered species of flora and fauna noticed in this area. The area does not shelter any specific wildlife.

3.3 Hydrological Conditions

3.3.1 Surface Water

The run-off during monsoon period contributes to the surface water. These villages get water due to rain in rainy season.

3.3.2 Ground water

The ground water table varies from 70 m to 100 m. It is therefore a low to medium potential zone for ground water.

3.4 Water Quality

Water samples were collected from different locations, which include open wells and bore wells. The water is slightly hard with total hardness varying from 49 to 274 mg/l at some places. However there is no indication of contamination except for traces of oil and grease in open wells.

3.5 Ambient Air Quality and Noise Levels

The ambient air quality was studied for four locations. It is found that the PM_{10} is found to vary from 36 □g/m^3 to a maximum of 65 □g/m^3. The concentration of NOx and SO_2 are found to be very low. The noise levels recorded at various locations indicate that it is mostly less than 49 dB(A) which is less than the permissible limit for Industrial areas.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Air Emissions

S.No.	Description	Air Pollution Control Measures
1.	Boiler (70 TPH)	55 m height and 1.8 m dia of stack with Electro Static Precipitator will be provided.
2.	DG set (500KVA) – 1 no	10 m height and 0.3 m dia of stack with acoustic measures will be provided.

4.2 Wastewater Generation

S.No.	Particulars	Water requirement m^3/day	Method of Treatment
1.	Sewage	9.6	Septic tank with Dispersion trench
2.	M.B & Softener regeneration	14	Neutralization tank
3.	Filter back wash/U.F & R.O reject	40	Waste Water Storage Tank
4.	Boiler blow down	30.5	
5.	Cooling tower bleed off	72	

4.3 Solid Waste

The solid waste will be generated from this unit is as follows.

S. No.	Solid Wastes	Quantity (T/DAY)	Method of Disposal
1.	Fly ash	13.5	Sold out to brick manufacturing industry.
2.	Bottom ash	4.5	

4.4 Land Degradation

Since, the small quantity of wastewater will be generated from domestic usages, the chances of contamination of soil will be nil. The vacant area in the industry will be used for tree plantation to improve the surrounding environment of the industry.

4.5 Noise

The noise level in the inside & outside the factory is maintained at low level.

4.6 Socio-Economic Considerations

This project does not involve any displacement of local people. Employment opportunities will be improved in the nearby villages because of this proposed unit and this will provide direct employment opportunity for 44 persons.

5.0 ENVIRONMENTS, SAFETY AND HEALTH MANAGEMENT

5.1 Organization Structure

The General Manager is responsible for the factory operations. There are several executives for various sections such as Production, Human Resource, Purchase, Store, Accounts, Environmental & Safety, Maintenance, and Quality Control etc.

Budgetary Allocation for Environmental Management

Category	**Capital Investment**	***Annual Operating Costs***
	(Rupees in Lakhs)	

Air Pollution Management	150	1
Water and Wastewater Management	100	2
Solid Waste Management	50	5
Greenbelt	5.0	1
Environmental Monitoring and Training	5.0	1
Total	**310**	**10**

5.2 Air Quality Management

Proper control measures will be provided in all process area in order to control all emissions if any to maintain a safe and healthy work place environment. The vent air will be passed through pollution control equipments before it is released into the atmosphere.

5.3 Wastewater Management

The sewage will be treated by the Septic tank with dispersion trench. D.M regeneration will be treated by collection cum neutralization tank and it will be sent to waste water storage tank, finally it will be used for greenbelt development, dust suppression and ash handling system. Hence there will be no impact on waste water.

5.4 Greenbelt Plan

Greenbelt is developed inside the factory premises covering a total area of about 7.5 acres. The unit will also develop the nearby area around the industry for greenbelt. The inter-spaces are laid with shrubs. The inter-space between trees planted is about 5m. It is proposed to double the tree density in future.

5.5 Environment, Safety and Health Monitoring

The environment, safety and health-monitoring programme in the factory are as follows:

- Monthly monitoring of stack emissions
- Daily monitoring of water and wastewater
- Quality monitoring of ambient air, noise and work place air
- Monitoring of occupational safety
- Yearly monitoring of occupational health.

Once again the unit assures that, there will be no adverse impact due to proposed activities.

For Auro Mira Bio Power India Private Limited

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