

Executive summary

Of Draft EIA report

Proposed Sugar Plant of 6500 TCD with 29.5 MW Co-Generation, 400 KLPD Cane Syrup/ Molasses and 100 KLPD Grain Based Distillery Plant

Mahalgoan, Tal. Vaijapur, Dist. Aurangabad, Maharashtra

By

**M/s. Panchaganga Sugar &
Power Private Limited.**

Environmental Consultant and Laboratory



MITCON Consultancy & Engineering Services Ltd.

Environment Management and Engineering Division
Behind DIC Office, Agri College Campus, Shivajinagar,
Pune 411 005, Maharashtra (INDIA),

Tel.: +91- 020-66289400

QCI-NABET, Lab NABL, MOEF & CC, OHSAS 18001:2007 approved

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Executive Summary

1 Introduction

Panchaganga Sugar & Power Private Limited (PSPPL) has proposed installation of Sugar Plant of 6500 TCD with 29.5 MW Co-generation, 400 KLPD Cane Syrup/ Molasses and 100 KLPD Grain Based Distillery Plant. The products manufactured will be Sugar, Rectified spirit/ Extra Neutral Alcohol/Absolute Alcohol/ Ethanol for which industry shall be utilizing Sugarcane, Molasses/ Cane Syrup and Grains as a raw material. The high-pressure steam generated in the boiler will run a Turbine to generate power thus saving in purchase cost of power. The spent wash generated from molasses/cane syrup based distillery will be concentrated in MEE to produce conc. spent wash which will be used as a fuel in incineration boiler and raw stillage generated from grain based distillery will be treated in decanter followed by MEE followed by dryer to produce DDGS powder which will be sold to cattle feed. The industry will run on ZLD concept.

2 Project Location

The proposed project will be located at Gut No 154,155, 156, 157, Mahalgoan, Tal. Vaijapur, Dist. Aurangabad, Maharashtra. Unit is geographically located at Latitude 19°49'13.70"N & Longitude 74°51'10.12"E situated around 534m above MSL.

3 Salient features of integrated project

Table 1 Brief information of the project and environmental settings

Particulars	Details
Project	Sugar Plant of 6500 TCD with 29.5 MW Co-generation, 400 KLPD Cane Syrup/ Molasses and 100 KLPD Grain Based Distillery Plant
Location	Gut No 154,155, 156, 157, Mahalgoan, Tal. Vaijapur, Dist. Aurangabad, Maharashtra.
Screening category (as per SO 1533 as timely amended)	5 (g) – “Distilleries” Category: “A” (>100 KLPD molasses based distillery) 5 (j) – Sugar 1 (d) –Thermal Power Plant
Land Type	Private land
Product	Sugarcane Crushing: 6500 TCD RS/ENA/AA/ Ethanol: 400 KLPD (Cane Sugar/ Molasses Based) RS/ENA/AA/ Ethanol: 100 KLPD (Grain Based)
By-product	CO ₂ : 454 TPD (<i>For industrial beverage grade/ dry ice</i>) B-Molasses: 422.5 TPD (<i>Used as raw material in own distillery</i>) C- Molasses: 292.5 TPD (<i>Used as raw material in own distillery</i>) Bagasse: 75.83 TPD (<i>Used as fuel in in-house boilers</i>) DDGS: 56 TPD (<i>Sold to Poultry feed</i>)
Basic Raw Material	Sugarcane Own sugarcane syrup B-Heavy Molasses C-Molasses Grains
Operation days	Sugar: 190 days Cane Syrup Based Distillery: 190 days Molasses Based Distillery: 110 days Grain Based Distillery: 300 days
Total Plot Area	24.39 Ha.
Green belt Area	8.1 Ha. (33% of total plot area)
Water requirement	Fresh Water Consumption Sugar Unit: 368 CMD Distillery Unit: 2083 CMD (Cane Sugar/ Molasses/ Grain based distillery)
Source of water	Source of water: Surface and Ground
Boiler	Sugar: 160 TPH Distillery: 30 TPH
T.G Set	Sugar: 29.5 MW Distillery: 3.2 MW
APCD	ESP with 99.9% efficiency for both boiler stacks
Steam requirement	Sugar: 151.73 TPH Distillery: 23 TPH
DG Set	1250 kVA *2
Fuel for Boiler	Sugar:

	Bagasse: 48.64 TPH Distillery: Bagasse:9.12 TPH Conc. Spent wash: 10.26 TPH		
Power requirement	Sugar: 9.87 MW Distillery: 2 MW		
Man-power requirement	Construction Phase: 150-200 Operation Phase: 400-500		
Total project cost	578.99 Crore		
EMP capital cost	46.32 Crore (8% of total project cost)		
CER Cost	5.8 Crore (1% of total project cost-greenfield project)		
Total effluent generation	Sugar effluent: 946 CMD (<i>1000 CMD ETP</i>) Distillery effluent: 2832 KLD (<i>3000 CMD CPU</i>) Domestic: 28.05 KLD (<i>30 CMD STP</i>)		
ETP Capacity	1000 CMD		
CPU capacity	3000 CMD		
STP capacity	30 CMD		
Solid & Hazardous Waste Generation	Solid/Hz. Waste	TPD	Treatment & Disposal
	Bagasse Ash	27.72	Used as manure
	Conc. Spent Wash Ash	32.01	Sold to brick manufacturer
	DDGS	56	Sold to poultry/ cattle feed
	ETP Sludge	18.92	Used as manure
	CPU Sludge	15.6	Used as manure
	Yeast Sludge	9.9	Used as manure
	Press Mud	260	Used as manure
	STP Sludge	2.81	Used as manure
	Spent oil	0.008	Sent to authorized recycler

4 Process description

Distillery Process based on Molasses/ Cane Syrup

- Molasses preparation
- Yeast propagation
- Fermentation
- Distillation

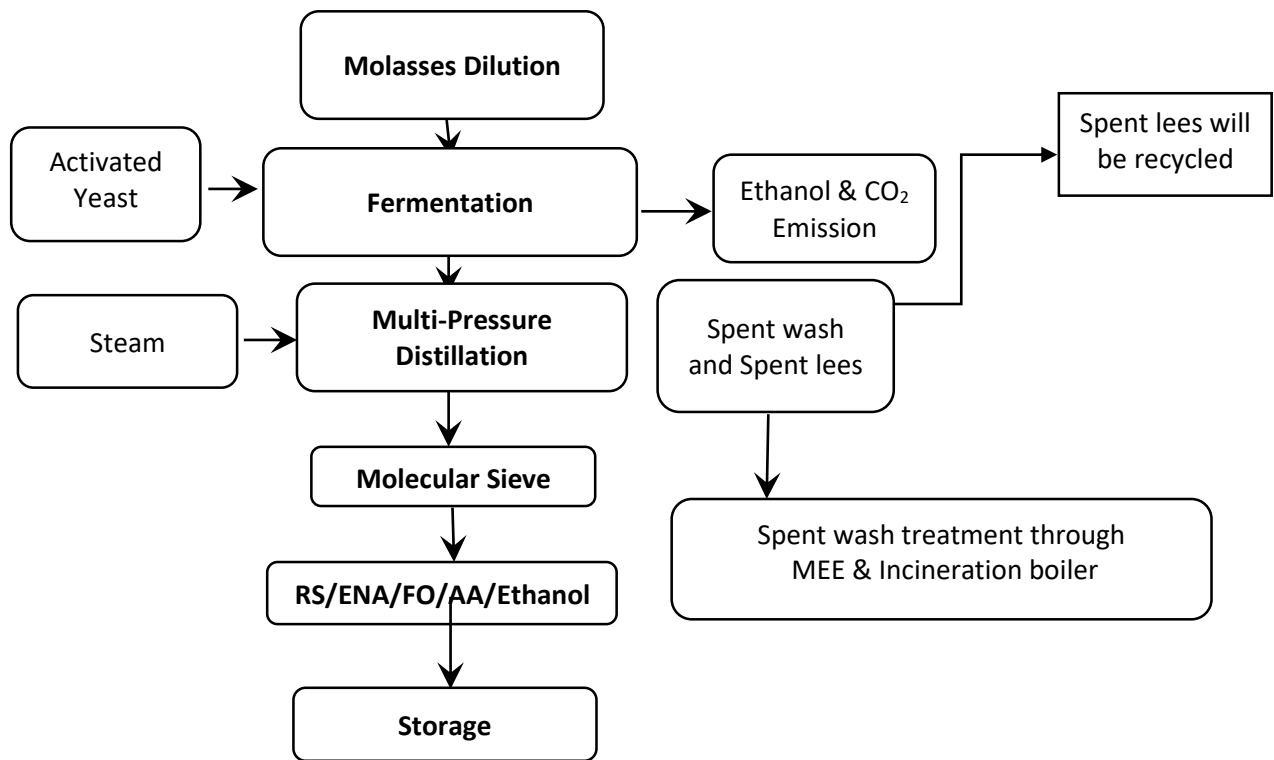


Figure 1 Distillery process flow chart (Molasses based)

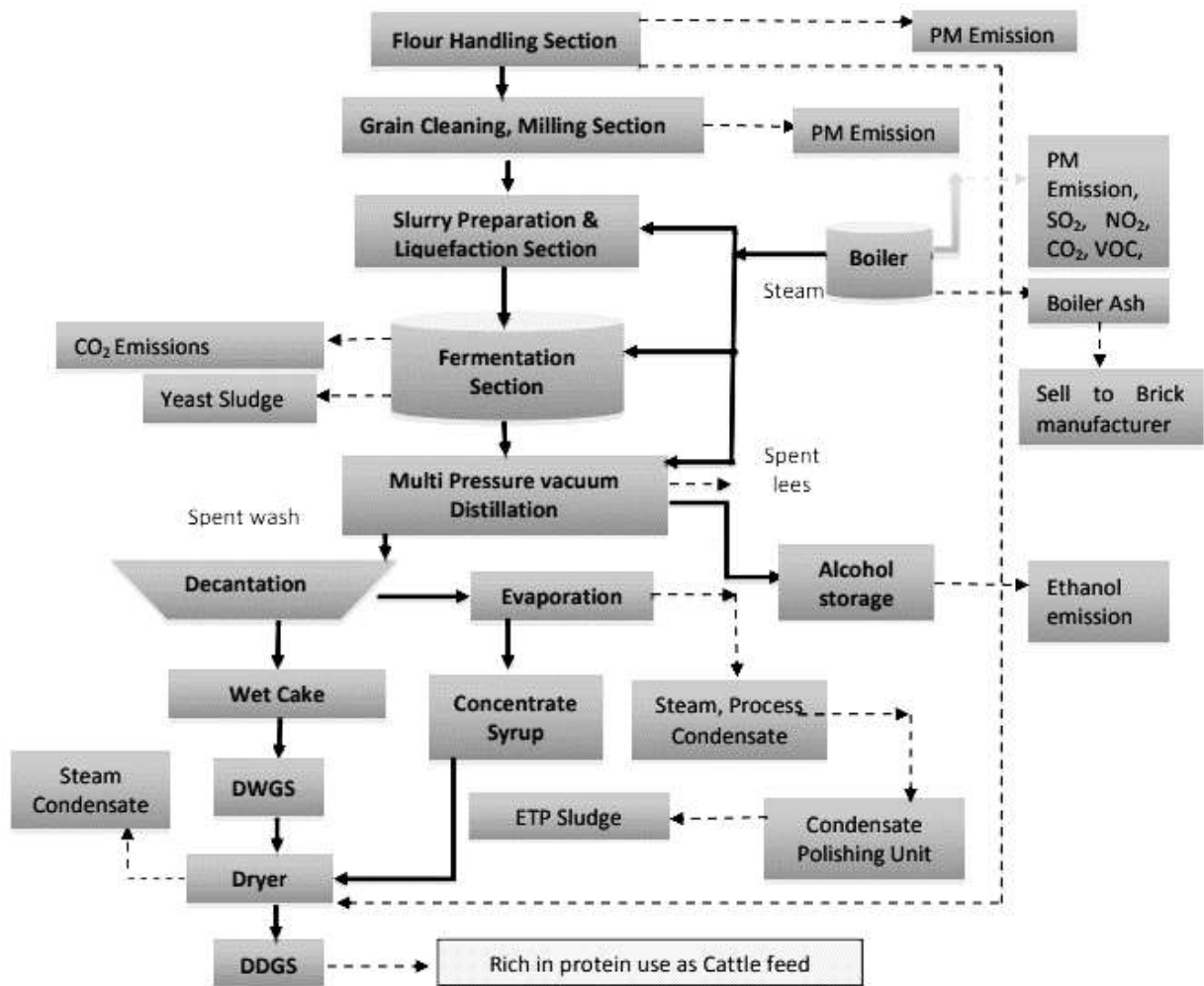


Figure 2 Distillery process flow chart (Grain based)

Sugar manufacturing process description

Technology- Most of the sugar factories in India follow Double Sulphitation Process and produce plantation white sugar.

The major unit operations are given below. These are

1. Extraction of Juice
2. Clarification
3. Evaporation
4. Crystallization
5. Centrifugation

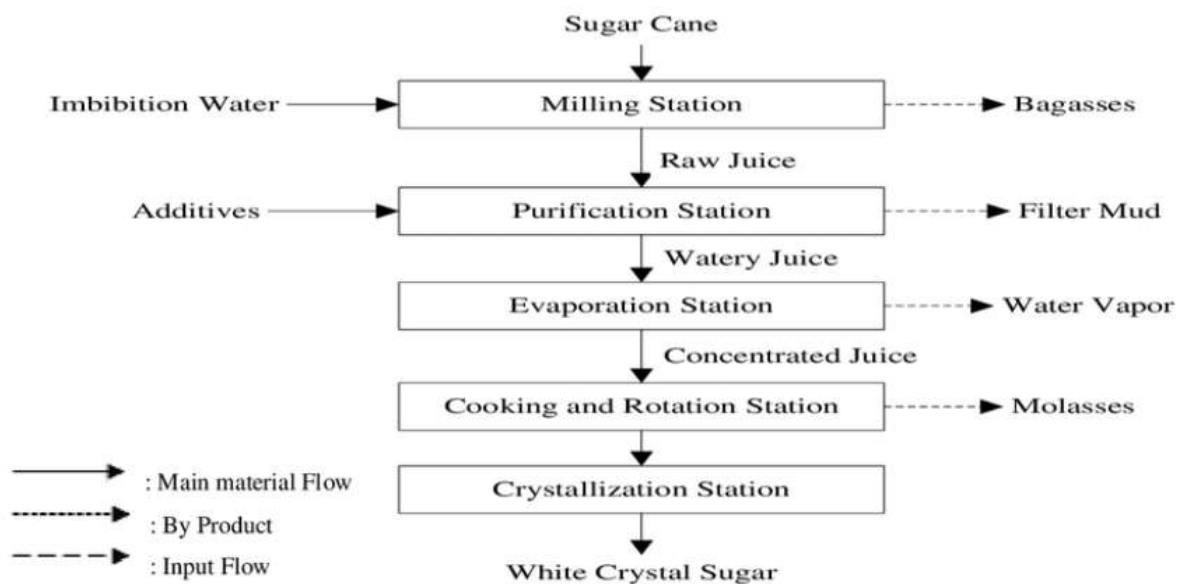


Figure 3 Sugar process flow chart

5 Description of the Environment

Standard ToR was approved by MOEF&CC, New Delhi on 26.12.2022 vide letter no. IA-J-11011/533/2022-IA-II(I). The study period conducted was from March 2022 to May 2022. The guiding factors for the present baseline study are the requirements prescribed by the guidelines given in the EIA Manual of the MoEF&CC and methodologies mentioned in Technical EIA Guidelines Manual for Distilleries by IL&FS Ecosmart Ltd., approved by MoEF&CC.

Table 2 Observation of Environmental monitoring

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results
Meteorology	Microprocessor based Weather Monitoring Station Continuous hourly recording	Wind direction	West followed by West North West
		Max. Temp.	42.2 °C
		Mini. Temp.	6.5 °C
		Relative Humidity	45-64 %
		Precipitation	Annual avg. 789.7 mm
Ambient Air Quality	10 Locations 24 hourly samples Twice a week for 3 months (in µg/m ³)	PM ₁₀	All parameters are within limit of NAAQ 2009
		PM _{2.5}	
		SO ₂	
		NO _x	
Water Quality (Ground & Surface*)	Once in season at 8 locations for GW (Physical, chemical and biological parameters) <i>*Surface water was not observed during monitoring</i>	Parameter	Maximum the constituents are within the permissible limits prescribed standards promulgated by Indian Standards
		pH	
		TDS	
		COD	
Soil Quality	Once in season at 8 locations	Soil type and texture, Physico-chemical properties, NPK	Red sandy soil. Soil is medium in fertility, good water holding capacity, heavy metal contamination signs not seen.
Noise Level	Once in season at 9 Locations (Noise levels in dB(A))	Day	43.6-55.0
		Night	40.5-49.6
Land use Pattern	One time visit of the study area	Identification & classification of land use	Most of the land is Agricultural land followed by Barren land
Geology and hydrogeology	Based on secondary data	Geology and hydrogeology of the study area	Basaltic lava flows, the ground water in Deccan trap basalt occurs mostly in the upper weathered and fractured parts

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results
			down to 20-25 m depth, alluvium occurs in small areas.
Ecology	General in 10 km radial study area and data collected around the project site through field visits	Flora	The most abundant species in the study areas are, <i>Abrus precatorius</i> L., <i>Abutilon indicum</i> (L.) Sweet, <i>Acacia concinna</i> (Willd.) DC., etc.
Socioeconomic Data	General in 10 km radial study area and data collected around the project site through field visits	Socio-economic characteristics of the affected area	Sanitation facilities are satisfactory, Power supply facility is available in almost villages and town, Drinking water sources is mostly from ground water. Medical facilities in terms of primary health centre and primary health sub centres in the rural areas are good.

6 Anticipated Environmental Impacts

Table 3 Anticipated Impacts

Environmental Facets	Anticipated Impacts
Air Environment	Probable increase in concentration of air pollutants due to process, fugitive and utility emissions.
Water Environment	Generation of industrial & domestic wastewater.
Land Environment	Impacts on land due to improper disposal of hazardous/ solid waste.
Ecological Environment	Positive as greenbelt of appropriate width will be developed and maintained by the company in the area. No impacts are envisaged on aquatic flora & fauna as there will be zero effluent discharge outside the plant premises.
Social Environment	Overall development of the area in respect of the infrastructure development, educational growth, health facilities etc.
Economic Environment	Positive impacts on economy of the region and the country as the Alcohol will be exported and revenue generation.
Noise Environment	Minor increase in noise level within the project area.
Occupational Health & Safety	Major health hazards are identified in worst case scenario.

7 Environmental Monitoring Program

Table 4 Environmental monitoring schedule

Particulate	Parameters	Number of location	Frequency
Ambient air quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x etc.	Ambient air quality at minimum 3 locations. Two samples downwind direction at 500 m and 1000 m respectively. One sample upwind direction at 500m.	Monthly
Stack emission	PM, SO ₂ and NO _x	All stacks	Monthly
		Online stack monitoring will be installed	-
Work place	PM _{2.5} , SO ₂ , NO _x , CO, O ₃	Process emission in workplace area/plants (for each area/plant minimum 2 locations and 1 location outside plant area near vent)	Monthly
Waste water	pH, EC, SS, TDS, O&G, Ammonical Nitrogen, COD, BOD, Chloride, Sulphides etc.	Wastewater from all sources. Inlet & outlet of ETP, spent wash, Condensate treatment plant	Monthly
		Online Monitoring machine is already installed at existing ETP. Camera at spent wash tank will be installed.	
Surface water and ground water	pH, Salinity, Conductivity, TDS, Turbidity, DO, BOD, Phosphate, Nitrates, Sulphates, Chlorides, Total Coliforms (TC) & <i>E.Coli</i>	3-5 location Within 1 km radius from spent wash tank and compost yard. 2 locations downward 1 location upward additional three locations within 10 km radius from the site.	Half yearly
Solid waste	Ash	<ul style="list-style-type: none"> Process dust generated sludge and ash. Before used as manure if used manure 	Monthly
Soil Organic and Inorganic matter	N, P, K, moisture, EC, heavy metals etc.	At lands utilizing compost manure and treated effluent, 3 locations	Pre monsoon – Post monsoon
Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as	5 location At all source and outside the Plant area.	Monthly

Particulate	Parameters	Number of location	Frequency
	sensitive receptors in the vicinity		
Green belt	Number of plantation (units), number of survived plants/ trees, number of poor plant/ trees.	In and around the plant site	Monthly
Soil	Texture, pH, electrical conductivity, cation exchange capacity, alkali metals, Sodium Absorption Ratio (SAR), permeability, porosity.	2-3 near Solid/ hazardous waste storage. At least five locations from Greenbelt and area where manure of biological waste is applied. Near spent wash storage lagoon	Quarterly
Occupational health	Health and fitness check-up of employees getting exposed to various hazards and all other staff	All worker	Yearly/ twice a year
Emergency preparedness, such as fire fighting	Fire protection and safety measures to take care of fire and explosion hazards, to be assessed and steps taken for their prevention.	Mock drill records, on site emergency plan, evacuation plan	Monthly during operation phase

8 Additional Studies

The following additional such as risk assessment for storage and handling of alcohol and mitigation measure due to fire and explosion and handling area has been carried out.

9 Environmental Management Plan

Following mitigation measures shall be adopted by factory to minimize the impact of project on the surrounding environment.

Table 5: EMP for various environmental attributes

Environmental Attributes	Mitigation Measures
Air Quality Management	<p>Process Emission</p> <ul style="list-style-type: none"> • ESPs shall be provided for PM emissions. • The whole process will be carried out in closed condition so as to avoid any chances of VOC emissions. <p>Utility Emission</p> <ul style="list-style-type: none"> • All the D.G. sets shall be standby arrangement and will only be used during power failure. • Adequate stack height shall be provided to Boiler and D.G. sets. • Electrostatic Precipitator shall be provided as an air pollution control device to the boiler with approximately 99.99 % efficiency to capture maximum boiler fly ash. <p>Fugitive Emission</p> <ul style="list-style-type: none"> • The main raw material and product shall be brought in and dispatched by road in covered enclosures. • Dust suppression on haul roads shall be done at regular intervals.
Water & Wastewater Management	<ul style="list-style-type: none"> • The distillery would be based on 'Zero Liquid Discharge' technology. • Raw spent wash will be concentrated in MEE to form conc. Spent wash which will be used as a fuel in incineration boiler. • Raw stillage will be treated through Decanter followed by Multi effect evaporator (MEE) followed Dryer to produce DDGS. • The Process condensate, spent lees will be cooled and will be treated in Condensate Polishing Unit, after treatment of which it will be recycled back to the process again. • Effluent from sugar unit will be treated in 1000 CMD ETP. ETP Treated effluent from sugar will be reused in greenbelt development and cooling tower. • The treated water will be used for gardening. • Proper storm water drainage will be provided during rainy season to avoid mixing of storm water with effluent.
Noise Management	<ul style="list-style-type: none"> • Closed room shall be provided for all the utilities so as to attenuate the noise pollution. • Acoustic enclosure shall be provided to D.G sets. • Free flow of traffic movement shall be maintained. Earmuffs shall be used while running equipment's of the plant. • Proper maintenance, oiling and greasing of machines at regular intervals shall be done to reduce generation of noise. • Greenbelt shall be developed around the periphery of the plant to reduce noise levels.

Odour Management	<ul style="list-style-type: none"> • Odour shall be primarily controlled at source by good operational practices, including physical and management control measures. • Better housekeeping will maintain good hygiene condition by regular steaming of all fermentation equipment. • Use of efficient biocides to control bacterial contamination. • Control of temperature during fermentation to avoid in-activation/ killing of yeast. • Avoid staling of fermented wash.
Solid & Hazardous Waste Management	<ul style="list-style-type: none"> • The hazardous waste i.e. spent oil generated shall be very minor and shall be burnt in boiler along with fuel. • Boiler coal ash shall be sold to brick manufacturer. • spent wash ash will be used as • ETP & yeast sludge can be used in greenbelt development
Traffic Management	<ul style="list-style-type: none"> • Culverts shall be maintained. • The trucks carrying raw material & fuel shall be covered to reduce any fugitive dust generation. • Good traffic management system shall be developed and implemented for the incoming and outgoing vehicles so as to avoid congestion on the public road.
Green Belt Development / Plantation	<ul style="list-style-type: none"> • Plantation shall be done as per Central Pollution Control Board (CPCB) Norms. • The plantation in and around the plant site helps/will help to attenuate the pollution level. • Native species shall be given priority for Avenue plantation.
Corporate Social Responsibility	<ul style="list-style-type: none"> • An amount of INR 5.8 Cr. (As CER OM dated 1.05.2018 Greenfield project 1% of total project cost) will be allocated for CSR activities in the coming 2 years which will be utilized on the basis of requirement for weaker sections of the society for next 2 years.
Occupational Health & Safety	<ul style="list-style-type: none"> • Factory shall monitor the health of its worker before placement and periodically examine during the employment • Health effects of various activities and health hazard if any observed shall be recorded and discussed with the health experts for corrective and preventive actions need to be taken by the industry • All safety gear shall be provided to workers and care shall be taken by EMC that these are used properly by them. All safety norms shall be followed

10 Environment Management Cost

Table 6 Environment Management Cost

Sr. No	Construction phase (with Break-up)	Capital Cost	O & M (Annual)
		(Amount in lakhs)	(Amount in lakhs)

1.	Environmental monitoring	0	1.5
2.	During site preparation	2	1
3.	Noise and solid waste management	2	1.5
4.	Water and waste water	10	3
5.	Occupational health	4	1
6.	Greenbelt development	7	5
	Total	25	13
Sr. No	Operation Phase (with Break-up)	Capital Cost	O & M (Annual)
		(Amount in lakhs)	(Amount in lakhs)
1.	Air, OCMS and Noise pollution	2300	30
2.	CPU, ETP and STP	1500	40
3.	Environmental Monitoring (Air, water, waste water, Soil, Solid waste, Noise)	0	15
4.	Occupation health	72	30
5.	Green belt	80	25
6.	Solid waste	50	10
7.	Rain water harvesting	50	10
8.	CER Cost	580	0
	Total	4632	160

11 Project Benefits

1. Provides an initiative to sugar mill to concentrate more on conservation of energy & reduction of operating cost, thereby improving their profitability of operation.
2. Saves the expenditure on safe storage and disposal of bagasse.
3. Benefits of quick return on biomass power capital investment and generation of additional revenue.
4. The economic benefits available to the sugar factories from sale of exportable surplus and improvement in the operations
5. Entire integrated project is proposed to be set up based on the stand-alone commercial viability of each component of the project.

12 Conclusion

- Zero liquid discharged is proposed with efficient mitigation measures implemented.
- Air emissions through stack will be controlled by ESP.
- Loss of vegetation and habitat will not be attributed.
- Personal protective equipment's, safety precautions, emergency plan & disaster management plan shall be in place to avoid the environment hazards.