Executive summary
of Draft EIA report

Expansion of existing sugar plant from 6000 TCD to 12000 TCD, co-generation power plant from 30 MW to 37 MW & proposed 400 KLPD molasses/Sugarcane Syrup-based distillery

At Village Lohara Khurd & Khed, Taluka Lohara, District Osmanabad.

Lokmangal Mauli Industries Limited

PreparedEnvironmental 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

Lokmangal Mauli Industries Limited ('LMIL') is a company registered in the state of Maharashtra, under the Companies Act 1956 bearing certificate of incorporation number U15421PN2007PLC130585 dated August 20th, 2007. It has targeted the objective of engaging in the business of manufacturing proposed ethanol alongside the existing operations of manufacturing sugar and power. LMIL proposes expansion of Sugar Plant from 6000 to 12000 TCD; Co-generation plant expansion from 30 MW to 37 MW along with new Distillery plant of 400 KLPD.

Industry has obtained Environment clearance for existing 6000 TCD sugar from SEIAA, Maharashtra vide letter no. SEAC-2013/C.R.538/TC-II dated 11.06.2014 & 30 MW Bagasse & Biomass based power plant from MOEF, New Delhi vide file no. F. No. J-13012/02/2012-IA. II(T) dated 25.02.2014. The industry is operational by obtaining consent to operate for 6000 TCD sugar & 30 MW cogeneration unit.

2 Project Location

The proposed project will be located at Gut No 67,68,69,70,80,83,84 and 85 (67/1, 67/2/3, 68/1, 68/2/1, 68/2/2, 68/3, 68/4, 69/1, 69/2, 69/3, 69/4, 69/5, 69/6, 70/2, 80/4, 83/91/1, 84/92/2, 84/92/3, 85/93/1 and 85/93/2) at Village Lohara Khurd & Khed, Taluka Lohara, District Osmanabad. Unit is geographically located at Latitude 17°59'8.42"N &
Longitude 76°21'53.09"E situated around 649 m above MSL.

3 Salient features of integrated project

Table 1 Brief information of the project and environmental settings

Particulars	**Details**			
Project	Expansion of existing sugar plant 6000 to 12000 TCD, Cogeneration Power Plant from 30 to 37 MW along with proposed new 400 KLPD molasses/syrup based distillery plant			
Location	Gut No 67,68, 69, 70, 80, 83, 84 and 85 (67/1, 67/2/3, 68/1, 68/2/1, 68/2/2, 68/3, 68/4, 69/1, 69/2, 69/3, 69/4, 69/5, 69/6, 70/2, 80/4, 83/91/1, 84/92/2, 84/92/3, 85/93/1 and 85/93/2) at Village Lohara Khurd & Khed, Taluka Lohara, District Osmanabad			
Screening category *(as per SO 1533 timely amended)*	5 (g)Distilleries , 5 (j) Sugar, & 1 (d) Thermal - Cat A.			
Product		**Existing**	**Proposed**	**Total**

	Sugar (TCD)	6000	6000	12000
	Cogeneration (MW)	30	7	37
	Distillery (KLPD) RS/ ENA/ AA/ Ethanol	-	400	400
Operation days	Sugar: 140 days; Distillery: 330 days			
Total plot area	54.44 Ha.			
Green belt area	Existing – 17.97 Ha. Proposed – 0.77 Ha.			
Water requirement	Total proposed Fresh water req. - 985 CMD **Sugar** Existing – 1300 CMD (Industrial + Domestic) Proposed – 185 CMD Proposed Domestic – 46 CMD **Distillery** Proposed 800 CMD			
Source of water	Makhani dam			
Boiler	**Existing**: Sugar: 135 TPH **Proposed:** Sugar: 150 TPH *(Existing 135 TH boiler upgraded to 150 TPH)* Distillery: 70 TPH *(New slop fired incineration boiler)*			
T.G set	**Existing:** Sugar: 30 MW *(Condensing mode)* **Proposed:** Sugar: 30 MW *(Back pressure mode)* Distillery: 7 MW *(Back pressure mode)*			
Stack details	**Sugar**: Electrostatic precipitator with Stack height of 85m for upgraded 150 TPH sugar boiler **Distillery**: Utilization of the Common stack of 85 from sugar with ESP of 99.99% efficiency for 70 TPH proposed boiler.			
Steam requirement	**Proposed:** Sugar: 142.83 TPH Distillery: 69.65 TPH			
Fuel for Boiler	**Existing:** Bagasse: 1472 MTD; HSD: 500 kg/Hr. **Proposed:** Sugar: Bagasse: 54.87 TPH Distillery: Bagasse: 12.5 TPH; Conc. Spent wash: 15.96 TPH			
Power requirement	**Existing:** Sugar: 5.94 MW **Proposed**: Sugar: 15.43 MW; Distillery: 5.0 MW			
Man-power requirement	**Total manpower requirement: 700** • Construction phase: 200 Skilled: 50 Unskilled: 150 • Operational phase: 500			

	Skilled: 100 Unskilled: 400
Total project cost	419.05 Cr.
EMP capital cost	Capital Cost: Rs. 53.09 Crore Operational Cost: 93.5 Lakh/Annum
CER Cost	3.14 Crore *(Green field project: 0.75% of the total project cost)*
Total effluent generation	**Existing:** Sugar Trade effluent: 660 CMD Domestic: 25 CMD **Proposed:** Sugar: 1398 CMD Domestic: 39.1 CMD Distillery: 2740 CMD
CPU capacity	**Proposed:** Sugar: 4000 CMD Distillery: 2800 CMD
ETP capacity	Existing: 1000 CMD Proposed: 1400 CMD *(1000 CMD upgraded to 1400 CMD)*
STP capacity	45 CMD STP
Solid & Hazardous Waste Generation	Press mud: 480 TPD CPU sludge: 14.64 TPD Bagasse Ash: 32.4 TPD Spent wash ash: 57.4 TPD STP Sludge: 0.4 TPD ETP Sludge: 27.96 TPD Yeast Sludge: 78 TPD Spent oil: 0.0368 TPD

4 Process description

4.1 Sugar Manufacturing Process

(i) Extraction of juice (ii) Clarification (iii) Evaporation (iv) Crystallization (v) Centrifugation

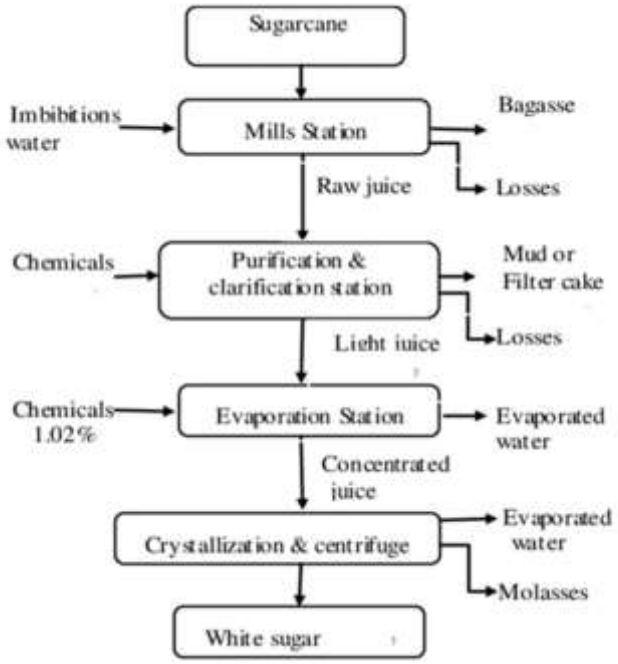
Extraction of Juice: The sugarcane is passed through devices like knives for cutting the stalks in to chips before being subjected to crushing in a milling tandem comprising 4 to 6 three roller mills. Fine preparation with its impact on final extraction is receiving special attention and shredders, particularly the fibroses gaining popularity. The mills are of modern design, being equipped with turbine drive, special feeding devices, efficient compound imbibitions system etc. In the best milling practice, more than 95% of the sugar in the cane goes into the juice, this percentage being called the sucrose extraction or more simply the extraction. A fibrous residue called bagasse; with a low sucrose content is produced about 25 to 30% of cane, which contains 45 to 55% moisture.

Clarification: The dark-green juice from the mills is acidic (pH 4.5) and turbid, called raw juice or mixed juice. The mixed juice after being heated to 65 to 75 0C is treated with phosphoric acid, sulphur dioxide and milk of lime for removal of impurities in suspension in a continuously working apparatus. The treated juice on boiling fed to continuous clarifier from which the clear juice is decanted while the settled impurities known as press mud is sent to the field as fertilizer. The clear juice goes to the evaporators without further treatment.

Evaporation: The clarified juice contains about 85 % water. About 75% of this water is evaporated in vacuum multiple effects consisting of a succeeding (generally four) of vacuum boiling cells arranged in series so that each succeeding body has higher vacuum. The vapours from the final body go to condenser. The syrup leaves the last body continuously with about 60% solids and 40% water.

Crystallization: The syrup is again treated with sulphur dioxide before being sent to the pan station for crystallization of sugar. Crystallization takes place in single-effect vacuum pans, where the syrup is evaporated until saturated with sugar. AT this point “seed grain” is added to serve as a nucleus for the sugar crystals and more syrup is added as water evaporates. The growth of the crystals continues until the pan is full. Given a skilled sugar boiler (or adequate instrumentation) the original crystals can be grown without the formation of additional crystals, so that when the pan is just full, the crystals are all of desired size and the crystal and syrup form a dense mass known as “massecuite”. The “strike” is then discharged through a foot valve into a crystallizer.

Process Flow Diagram & Mass Balance of the sugar manufacturing is given below



4.1.1 Cogeneration Manufacturing process

In the mid-eighties it was realized that by making maximum use of potential for co generating steam and electricity from bagasse, generation of electricity could be increased not only to fully meet the captive requirements but also to have exportable surplus. Thermodynamically, energy recovery is more dependent on the steam inlet temperature than the pressure and the higher the inlet steam temperature, higher the cycle efficiency. However, because of the nature of the working medium, which is steam, the pressure also plays a major role in ensuring the optimum extraction of the useful energy from the working medium and hence, the increase in the steam temperature should be accompanied by the matching increase in the pressure. In order to integrate the sugar plant expansion with power production, industry proposes to implement an additional high-pressure cogeneration power project. The cogeneration project envisages installation of a suitable capacity, high pressure boiler, matching with 30 MW Turbogenerator, auxiliary equipment and all required grid paralleling / interfacing equipment. The cogeneration project with energy efficient sugar plant will make optimum use of available bagasse during the season operation. The new additional high-pressure Cogeneration plant will operate using the bagasse generated in the sugar mill during the cane crushing season and with saved bagasse and coal as fuels for off-season operation.

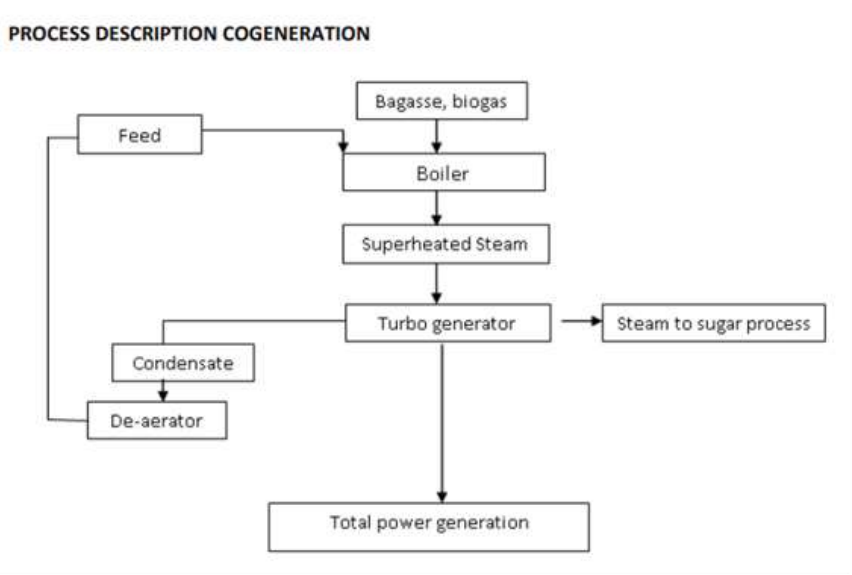


Figure 4-1 Flow Diagram of Co-generation process

4.1.2 Molasses Based Distillery

Yeast Culture and Propagation:

The strains of yeast species *saccharomyces cerevasae* generally used for alcoholic fermentation. Strains of ***schizosacchromyces pombe*** is used in continuous fermentation Process. The first stage propagation is done in lab where a very small mass of yeast is aseptically transferred into test tubes containing a small amount of sterilized liquid culture media prepared carefully maintaining proper amount of sugar either made from Gur or good quality clarified molasses solution with addition of added nutrients for fast and healthy growth.

Fermentation

The yeast culture developed is used for fermentation where dilute molasses solution is inoculated with the culture is addition of some nutrient like urea. Fermentation can be either batch or continuous mode.

Distillation

Distillation is an extremely energy intensive unit operation in a separation process. Extractive distillation is adopted to recover or remove the components from extreme dilute solutions. In the case of alcohol purification, the impurities, which are present in extremely low quantities, are removed using water as the extracting agent. The various Impurities which form low boiling mixtures with water and come off at the top of the distillation column while pure but dilute alcohol comes off as bottom product which is then further rectified to azeotrope strength, by normal distillation to produce Extra Neutral Alcohol.

Molecular Sieves

Molecular sieves are zeolites (structural crystals of Alumino silicates) with micro pores specific to a particular chemical constituent which is adsorbed onto the sieve while the other constituent chemical molecules would be let off. Thus, takes place the separation of adsorbate from the constituents of anazeotrope which otherwise cannot be separated by distillation method.

Sugarcane Ethanol

Sugarcane ethanol is an alcohol-based fuel produced by the fermentation of sugarcane juice/syrup and molasses. Because it is a clean, affordable and low-carbon biofuel, sugarcane ethanol has emerged as a leading renewable fuel for the transportation sector.

5 Description of the Environment

The guiding factors for the present baseline study are as per the requirements prescribed by the guidelines given in the EIA Manual of the MoEF&CC and ToR approved by Expert Appraisal committee Ind- I, MOEFCC, New Delhi.

Baseline study and all analytical work is carried out from a recognized lab, i.e. MITCON Consultancy & Engineering Services Ltd., which is a NABL & MoEF&CC recognized laboratory under the EPAct -1986. Toposheet of project site showing project location with various geographical features within 10km radius of the project site and satellite image are presented in below respectively.

Environmental Settings within the Study Area

Table 2 Environmental Settings

#	Particulars	Description
1.	Project Location - Geographical Coordinates	Latitude 17°59'8.42"N
		Longitude 76°21'53.09"E
2.	Toposheet number	56 B /8, 56 C / 5
3.	Impact Habitation	Lohara kh. @ 1.47 km towards W direction
		Khed village @ 3.45km towards NNE direction
4.	Nearest town	Lohara @ 4.16 km towards WNW direction
		Kanegaon @ 8.11 km towards NW direction
5.	Nearest Railway Station/ Junction	No any railway station in 10 km radius of the project site
6.	Nearest Airport	No any airport in 10 km radius of the project site
7.	Nearest IMD station	Osmanabad MET station: 39.33 km towards NW
8.	Nearest Water body	Makani Dam: 6.32 km towards NE
		Lohara kh. Lake @ 1.47 km towards W direction
		Lohara Bk. Lake @ 3.58 km towards WSW direction
9.	Nearest Road	Lohara - Makni Rd. @ 0.17 km in SSW direction
10.	Nearest Highway	Not any within 10 km radius of the project

11.	Any Historical Place	
12.	Any Archaeological monuments	
13.	Ecological sensitive area / Reserve Biosphere within 10 km / RF	
14.	Seismic Zone	II
15.	Temp.	Min 8.0^{0}C
		Max 45.1^{0}C
16.	Average Annual rainfall	829.2 mm

Table 3 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.	45.1 ^{0}C
		Mini. Temp.	8.0 ^{0}C
		Relative Humidity	54-68 %
		Precipitation	Annual avg. 829.2 mm
Ambient Air Quality	10 Locations 24 hourly samples Twice a week for 3 months (in µg/m$^{3)}$	PM_{10}	**PM_{10}:** 63.37 to 71.84 µg/m3 **$PM_{2.5}$**: 24.46 to 29.60 µg/m3 **NO_x**: 11.93 to 17.87 µg/m3 **SO_2:** 7.50 to 13.17 µg/m3
		$PM_{2.5}$	
		SO_2	
		NO_x	
Water Quality (Ground & Surface)	9 no. of locations – Ground water 4 no. of locations – Surface water (Physical, chemical and biological parameters)	**Parameter**	pH: 7.23 to 7.89 TDS:342 mg/lit - 650 mg/lit Total Hardness ranges from 127.35 mg/lit to 256.32 mg/lit. Chlorides 21.08 mg/lit - 34.28 mg/lit. Copper, Manganese, Zinc, Nickel and Hexavalent Chromium was below detectable limit at all the locations.
		pH	
		TDS	
		COD	
Soil Quality	Once in season at 10 locations	Soil type and texture, Physio-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 10 Locations (Noise levels in dB(A)	Day	41.8 – 65.6
		Night	39.9 – 62.1
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

Environmental Attributes	Frequency of monitoring	Parameters	Observed Results
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 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	There are no National Parks, Wildlife Sanctuaries, or Protected Forests, emphasizing the significance of conserving biodiversity within the study area itself. Furthermore, the landscape composition, with 95.25% comprising agriculture and scrub land, and only 2.15% as water bodies, suggests that the observed species primarily inhabit agricultural landscapes. This highlights the interdependence between faunal biodiversity and human-modified habitats, necessitating sustainable land management practices to ensure the coexistence of wildlife and agricultural activities.
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, NOx 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 NOx	All stacks	Monthly
		Online stack monitoring will be installed	-
Work place	$PM_{2.5}$, SO_2, NOx, 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) & *E.Coli*	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

Particulate	Parameters	Number of location	Frequency
Solid waste	Ash	• 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 and Post monsoon
Noise	Equivalent noise level - dB (A) at min. Noise Levels measurement at high noise generating places as well as sensitive receptors in the vicinity	5 location At all source and outside the Plant area.	Monthly
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	**Sugar**: Electrostatic precipitator with Stack height of 85m for upgraded 150 TPH sugar boiler **Distillery**: Common stack of existing sugar of 85 m along with ESP of 99.99% efficiency for 70 TPH proposed boiler. CO2 will be scrubbed & bottled/dry ice and sold. All raw materials, chemicals will be stored in designated storage area in closed containers.
Water & Wastewater Management	• Existing ETP: 1000 CMD • Excess condensate will be treated in 4000 CMD CPU. • CPU treated water will be recycled for distillery and equipment cleaning. • Cooling tower, boiler blow down and Miscellaneous effluent will be treated in upgraded 1400 CMD ETP for sugar. • Domestic effluent will be treated in 45 CMD STP • Conc. Spent wash will be used as a fuel in incineration boiler. • Process condensate and spent lees along with blow down will be treated in 2800 CMD CPU for proposed distillery
Noise Management	• 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	• 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	• The hazardous waste i.e. spent oil generated shall be very minor and shall be burnt in boiler along with fuel. • Bagasse ash will be mixed with press mud and utilized as a manure or sold directly to farmers. • Spent wash ash will be given to farmers • ETP, CPU & STP sludge can be used in greenbelt development
Traffic Management	• 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	• 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	• An amount of ₹ 3.14 Cr. *(Green field project: 0.75% of the 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	• 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

S. No	Construction phase (with Break-up)	Capital Cost	O & M
		(Amount in lakhs)	
1.	Environmental monitoring	_	3
2.	During site preparation	3	0
3.	Noise and solid waste management	2	0
4.	Water and waste water	5	0
5.	Occupational health	5	2
6.	Greenbelt development	5	5
	Total (A)	**20**	**10**
Sr. No	**Operation Phase (with Break-up)**	**Capital Cost**	**O & M**
		(Amount in lakhs)	
1	**Air pollution**		
	Boiler upgradation	1500	20
	Incineration Boiler	2000	40
	ESP	800	15
	ID fan and other auxiliaries	50	0.5
2	**Online Continuous Emission Monitoring System (OCEMS)**	**25**	**2**
3	**Water pollution**		
	Water pollution- CPU (1 Nos), STP, (ETP upgradation)	450	7
4	Environmental Monitoring (Air, water, waste water, Soil, Solid waste, Noise)	25	4
5	Occupation health	50	5
6	Green belt	45	5
7	Solid waste	5	2
8	Rain water harvesting	25	3
9	CER cost	314	-
	Total (B)	**5289**	**83.5**
	Total A+B	**5309**	**93.5**

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.