



MADRAS SUGARS LIMITED

(An Unit of Bannari Amman Group)

PROPOSED TO INSTALL

CO-GEN PLANT (25 MW / Hr)

&

DISTILLERY UNIT

[Alcohol - 64 KL / Day (Molasses / Grain Base)
Malt Spirit 3.7 KL / Day & Grape Spirit 3.7 KL / Day]

At

**Vengur Village, Tirukkoyilur Taluk,
Villupuram District, Tamil Nadu – India**

[S.F.Nos.: 271, 272, 276, 277, 279, 280, 281, 284, 285, 294,
295, 298, 268, 267, 283, 270, 269 & 282]

EXECUTIVE SUMMARY

1.0 PROPOSED PROJECT – COGEN PLANT & DISTILLERY UNIT

1.1 Introduction

Bannari Amman Group is one of the largest Industrial Conglomerates in South India with wide spectrum of manufacturing, trading, distribution and financing activities. Manufacturing and trading includes Sugar, Alcohol, Cogen, Granite, Textile, etc. The service sector has Wind power energy, Education, Health care, etc. The group is already operating four Sugar Mills, three Cogen plants and two Distilleries in Tamil Nadu and Karnataka State. The group is having more than 30 years experience in Sugar, Alcohol and Cogen fields.

The Group has proposed to set up a Cogen plant and a Distillery Unit in the new Sugar Mill with 3600 TCD under establishment at Vengur Village, Thirukoyilur Taluk, Villupuram District, Tamilnadu state in the name of **“MADRAS SUGARS LIMITED”**.

1.2 Plant Location

The Madras Sugars Limited is proposed to set up the Cogen Plant & Distillery Unit in the Sugar Complex in S.F.No.271, 272, 276, 277, 279, 280, 281, 294, 295, 298, 284, 285, 268, 267, 269, 270, 283, & 282 at Vengur village, Thirukoyilur Taluk, Villupuram District, which is located 8.2 KM away from Thirukoyilur.

1.3 Products Manufactured

a) The Production Capacity of the proposed Cogen Plant will be as follows.

Sl.	Product details	Quantity
1.	Power	25 MW/Hr. (Boiler 130 TPH, 125 ATA)

b) The Production Capacity of Distillery Unit will be as follows.

Sl.	Product details	Quantity
1.	Alcohol (Molasses / Grain base)	64 KL/Day (RS/ENA)
2.	Malt spirit (Malt base)	3.7 KL/Day
3.	Grape spirit (Grape base)	3.7 KL/Day

1.4 Raw Materials

(A) Cogen plant – 25 MW/Hr :

S. No.	Raw Material (Fuels)	Quantity in MT/ Month	
		Sugarcane Crushing Season	Sugarcane Crushing Off-season
1.	Bagasse	33000 MT	As per the availability
2.	Coal	To achieve the designed capacity of 25 MW/Hr, along with available bagasse, use coal as additional fuel if needed	500 MT/day (15000 MT/Month)
3.	BioMass (Cane trash, rice husk, wood chips, etc)	As per the availability	As per the availability

During sugarcane crushing season, Bagasse will be the prime fuel along with Cane trash and Biomass. The Coal will be used in case of necessity to achieve the designed capacity.

During Sugarcane Crushing Off-season, Coal will be the fuel along with the saved bagasse and Biomass.

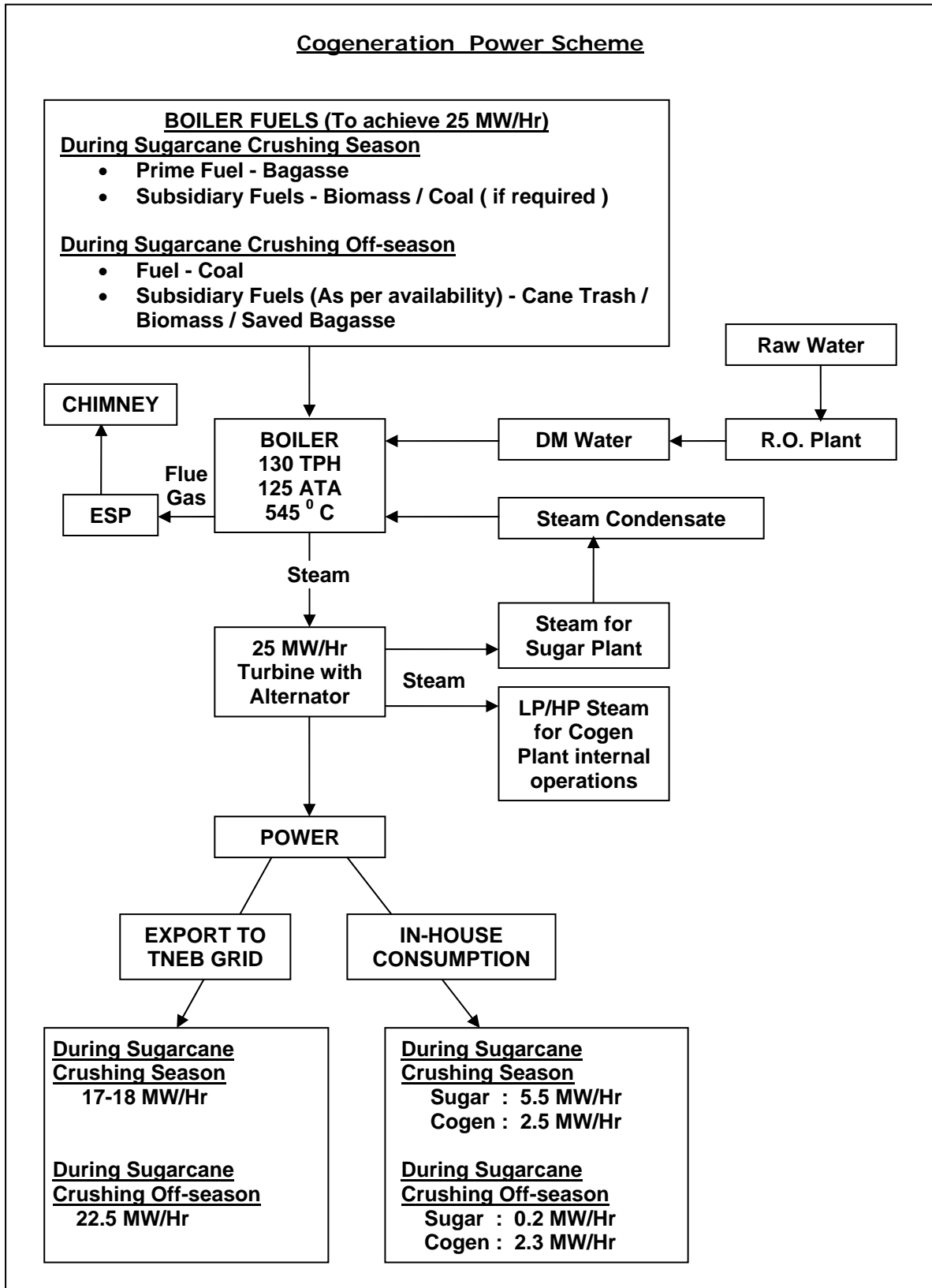
(B) Distillery Unit (ALCOHOL PRODUCTION) :

Capacity of the Distillery Unit and Raw materials for various kinds of Alcohol:

S. No.	Details of Product	Proposed Production Capacity	Raw material Requirement Quantity
1.	Alcohol - Molasses / Grain base (Molasses / Grain – Any one raw material at a time)	64 KL / Day	Molasses 285 MT / day OR Grain 165 MT /day
2.	Malt spirit	3.7 KL / Day	Malt 7 MT /day
3.	Grape spirit	3.7 KL / Day	Grape 27 MT / day

1.5 Manufacturing Process :

(A) Cogen plant - 25 MW/Hr :



Process Description for Cogen Plant :

Cogeneration is broadly defined as the coincidental generation of useful thermal energy and Electrical power from the same input fuel. Thus, Cogeneration system renders the unit to meet out the in-house steam and power requirement and export the surplus power generated.

The high pressure Cogeneration Power Plant envisages the installation of one 130 Tons Per Hour (130 TPH) capacity Boiler with the super heater outlet steam parameters of 125 ata and 545°C and One Extraction cum Condensing Turbo Generator (TG) of 25 MW/Hr capacity.

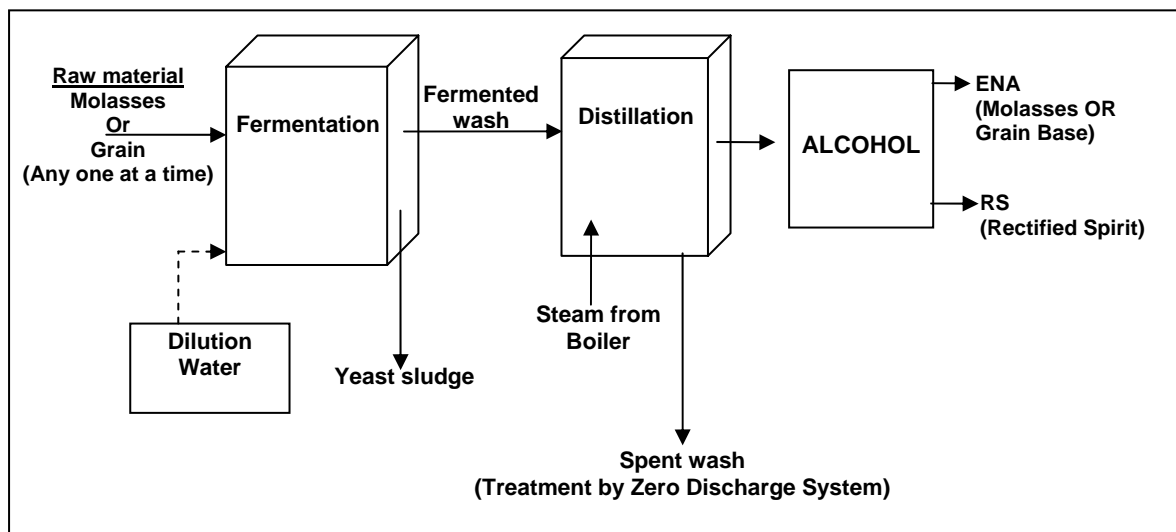
The proposed new installation of Cogen Boiler and TG aims at significantly improving the energy position of the Sugar Factory, enabling the plant to generate steam and surplus power from its cane crushing operations. This surplus power will be exported to the State Electricity Grid. Self sufficiency in steam and power along with export of power to the grid is made possible by the employment of high pressure and high temperature steam cycles.

During the Sugarcane crushing season, the fuel requirement of Cogen will be met out by Bagasse. In case of fuel deficiency to achieve 25 MW/Hr cane trash, available biomass and coal will be used as additional fuel.

During Sugarcane Crushing Off-season, the bagasse will be in shortage and to operate the Cogen plant, Coal will be used as fuel along with available biomass.

(B) Distillery Unit :

ALCOHOL MANUFACTURING PROCESS AT DISTILLERY UNIT ALCOHOL – 64 KL / DAY



1) Process Description for Alcohol Production :

Alcohol is manufactured using the Molasses or Grain as raw material, using any one of it at a time depending on the market requirement.

i) Alcohol Production through Molasses – 64 KL / Day :

Molasses is diluted with water, inoculated with yeast and allowed for fermentation. Fermentation takes about 24 to 30 hours. Alcohol formed in the fermented wash is distilled in multiple distillation columns to separate the Alcohol.

Spentwash generation will be about 7 - 8 litres per litre of alcohol and will be treated and utilized by Zero Discharge system methodology.

ii) Alcohol Production through Grain :

Corn, jowar and other millets will be used as raw material. Grains stored in the silos will be transferred to process section and grinded, steam cooked, liquefied using enzymes and fermented with yeast. Fermentation takes about 40 hours. The Alcohol formed is distilled in multiple distillation columns.

2) Malt Spirit Production (3.7 KL / Day):



Barley malt is milled, steam cooked, liquefied by enzymes and fermented by yeast. The fermented liquid is distilled in pot still to obtain malt spirit which finds use in Liquor manufacturing.

3) Grape Spirit Production (3.7 KL / Day):



Grape is crushed and juice is extracted. It is fermented and distilled out in pot stills to produce Grape Spirit, which finds use in liquor manufacturing.

1.6 FUELS AND POWER

(A) COGEN PLANT - Boiler Fuel

(i) During Sugarcane Crushing Season

During the Sugarcane Crushing Season, Bagasse will be used as fuel in the Cogen. Coal along with available biomass like cane trash, wood chips will be subsidiary fuels.

(ii) During Sugarcane Crushing Off-Season

During sugarcane crushing off-season, Coal will be the fuel along with saved bagasse and other available Biomass.

Cogen Plant Power Production & Distribution

(i) During Sugarcane Crushing Season

The power generation will be 25 MW/Hr during the season. In-house power consumption will be about 7.6 MW/Hr and the balance surplus power of 17.4 MW will be exported to TNEB grid.

(ii) During Sugarcane Crushing Off-season

The power generation will be 25 MW during the off-season. The in-house power consumption will be about 2.5 MW/Hr, and the balance 22.5 MW/hr power will be exported to TNEB grid.

(B) DISTILLERY UNIT

Distillery Boiler (Spentwash Fired with Coal/Biomass as support fuel)

A 30 Tons Per Hour Boiler at Distillery Section will run with Concentrated SpentWash fuel with Coal/Biomass as support fuels.

Power requirement

The total Power requirement of the distillery unit for Alcohol production and environment management will be around 2.5 MW/Hr and will be met by the Back Pressure type Turbo Generator (3.0 MW/Hr) attached to the spentwash fired boiler of 30 Tons/Hour capacity. The outlet low pressure steam from the turbine will be used for Alcohol processing and spentwash evaporators.

1.7 Raw Water Requirement for Cogen Plant and Distillery Unit

The total requirement of raw water for the Cogen plant will be 900 Kilo Litres per Day (900 KLD) and for the Distillery unit will be 1200 KLD. The entire raw water requirement for the unit will be met from Dugwells already existing inside the factory premises and from the river Pennaiyar at 7 KM distance from the plant.

1.8 Land

The total area allotted for the **Cogen Plant** is 11 Acres.

Plant Area - 7 Acres.

Green Belt - 4 Acres

The total area allotted for the **Distillery Unit** is 42 Acres.

Plant Area - 29 Acres.

Green Belt - 13 Acres

1.9 Manpower

The total employees for the **Cogen plant** will be about 30.

The total employees for the **Distillery unit** will be about 60.

1.10 Organization Structure

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

2.0 DESCRIPTION OF THE ENVIRONMENT

2.1 Climate

The climate is generally arid with temperatures varying from 20 to 38.3°C. The rainfall is maximum in the NE monsoon period and minimum in SW monsoon period.

2.2 Ecology

There is no endangered species of flora and fauna noticed in this area. The area does not shelter any specific wildlife.

2.3 Hydrological Conditions

2.3.1 Surface Water

The run-off during monsoon period contributes to the surface water.

2.3.2 Ground water

The ground water table varies from 15 m to 45 m.

2.4 Water Quality

Ground Water samples were collected at various places around 10 Km radius from the factory and analysed. Water quality parameters are normal and within the limits.

2.5 Ambient Air Quality and Noise Levels

The ambient air quality and noise levels were studied for 8 locations around 10 Km radius. The particulate matter (PM₁₀) is found to vary from 30 µg/m³ to 56 µg/m³. The concentration of SO₂ and NO₂ are found to be very low. The noise levels recorded at various locations indicates that, it is mostly less than 68 dB(A) and is less than the permissible limit for Industrial areas.

2.6 Land Use Pattern

This proposed unit is using the dry vacant land area, and the climatic conditions are favourable for developing industries.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

3.1 Air Emissions and Control Measures

(A) Cogen plant :

S. No.	Description	Air Pollution Control Measures
1.	Boiler (130 TPH)	79 m height stack with three field high efficiency Electro Static Precipitator will be provided.
2.	DG Set (1010 KVA – 2 Nos)	15 m height stack will be provided.

(B) Distillery Unit :

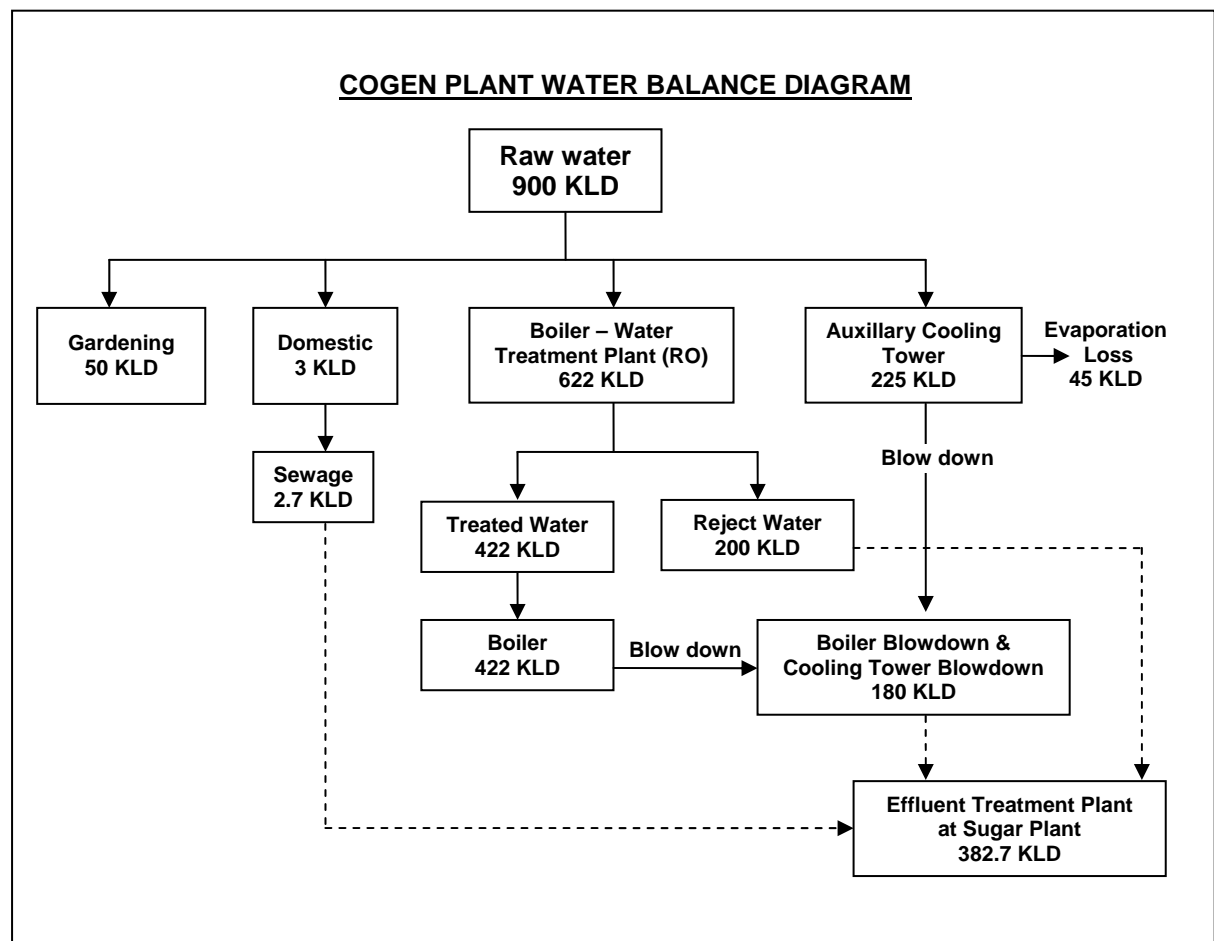
The evolved CO₂ from the fermenter will be scrubbed with water and the scrubbed water will be recycled back in the process.

Exclusive Distillery Boiler – 30 TPH (Ton per hour) using concentrated spentwash as prime fuel with supportive coal / biomass fuel will be provided with Bag filter and 54 metre height stack to control stack emissions.

3.2 Wastewater Generation and Method of Treatment

(A) Cogen plant :

S. No.	Particulars	Water quantity m ³ /day	Method of Treatment
1.	Boiler Blow Down & Cooling Tower Bleed off	180	Neutralized, settled and utilised in cane farm through Sugar ETP
2.	R.O. rejection	200	



(B) Distillery Unit :

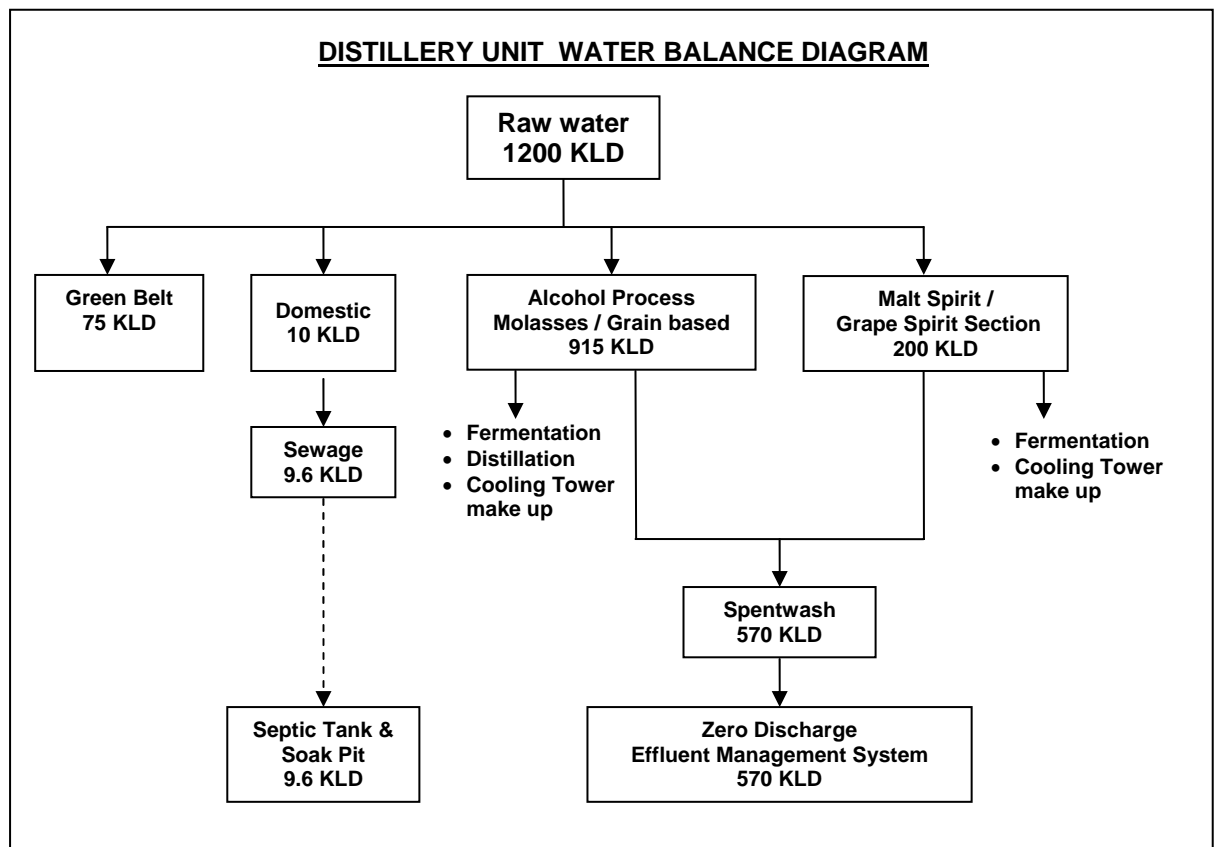
i) Alcohol (Molasses / Grain based) :

During the production of a alcohol, spentwash of about 570 KLD (from Alcohol, Malt Spirit and Grape Spirit) will be generated everyday from the process.

It is proposed to concentrate the spentwash in specially designed multiple effect evaporators and burn the concentrated spentwash as liquid fuel in the exclusively designed boiler with Coal / Biomass as support fuels.

The steam generated will be used for power generation (3 MW/Hr) and the exhaust steam will be used for Spent wash Evaporator section and Alcohol processing.

Whenever the Alcohol plant is operated with grain as raw material, the Spentwash Management will be, concentration of spentwash in multiple effect evaporators and make it as DWGS (Distillers Wet Grain Soluble) / DDGS (Distillers Dry Grain Soluble) for animal feed. In case of less demand for the animal feed, it is proposed to utilise it in composting/burn in the boiler.



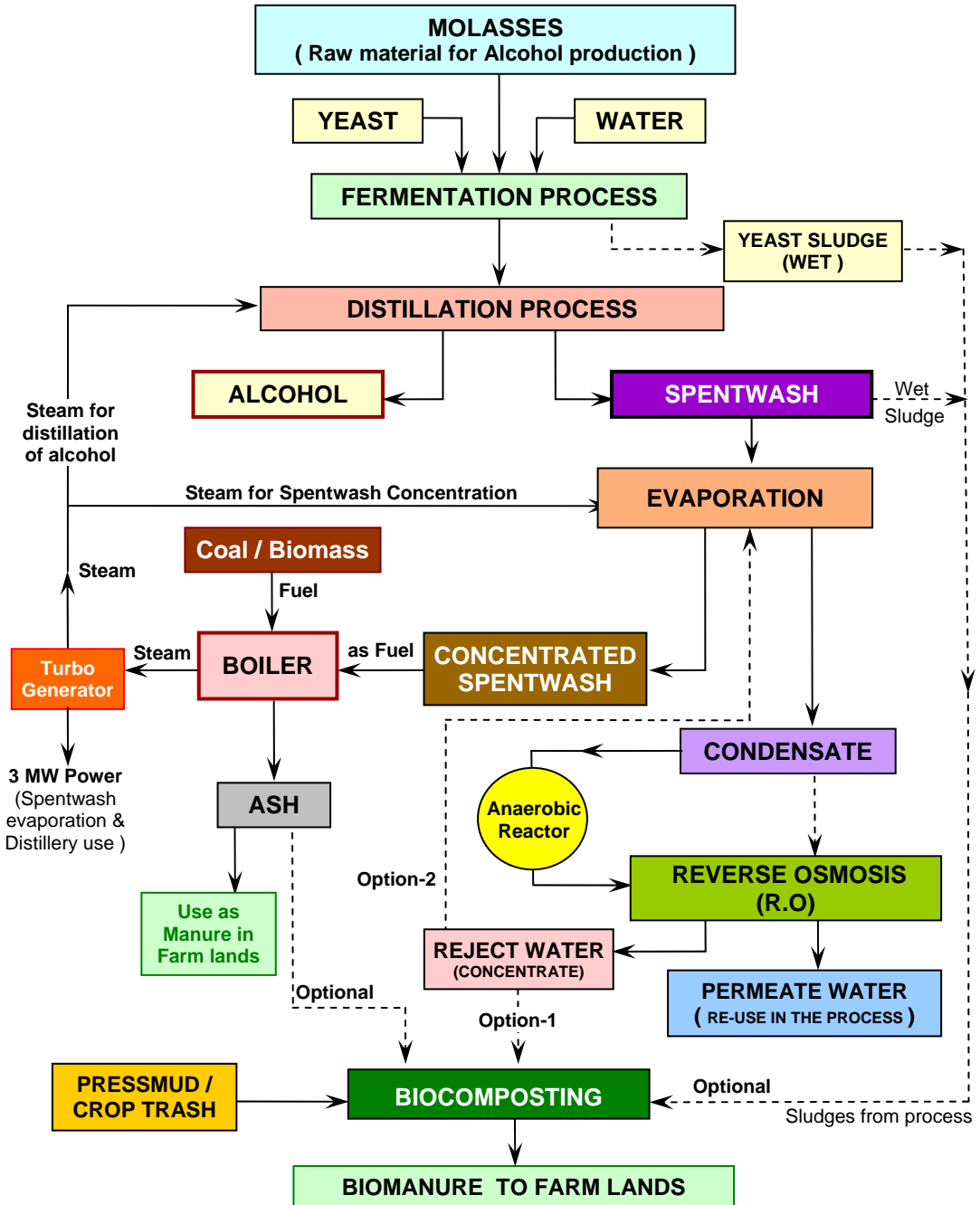


MADRAS SUGARS LIMITED
VENGUR VILLAGE, THIRUKOYILUR TALUK, VILLUPURAM DISTRICT

PROPOSED DISTILLERY UNIT

ECO MANAGEMENT - FLOW CHART No. 1

(ALCOHOL PROCESSING - MOLASSES BASED OPERATION MODE)



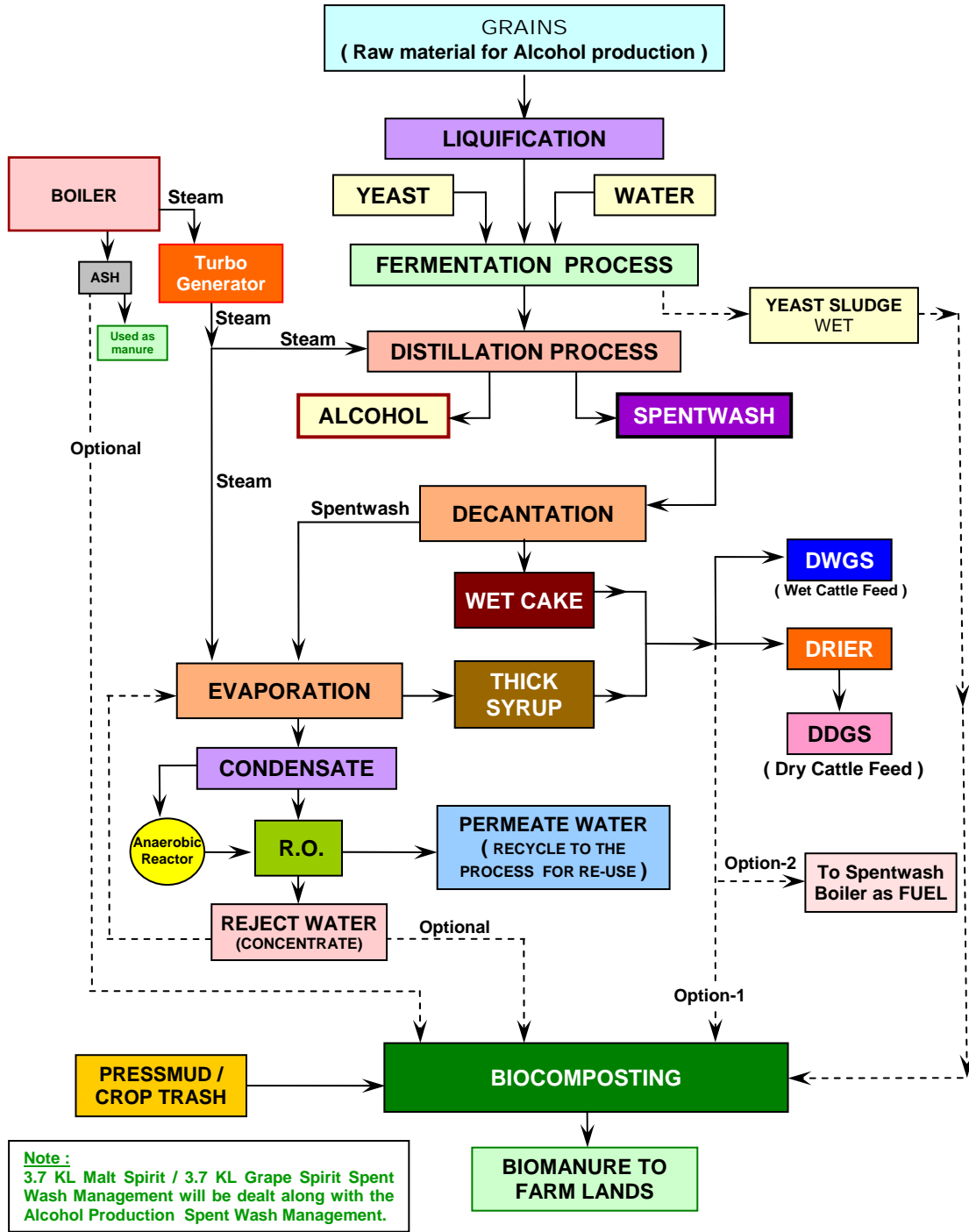


MADRAS SUGARS LIMITED
VENGUR VILLAGE, THIRUKOYILUR TALUK, VILLUPURAM DISTRICT

PROPOSED DISTILLERY UNIT

ECO MANAGEMENT - FLOW CHART No. 2

(ALCOHOL PROCESSING - GRAIN BASED OPERATION MODE)



ii) Malt Spirit /Grape Spirit :

With regard to the Malt Spirit and Grape Spirit plants, the spentwash generated will be dealt along with spentwash generated from alcohol production (Molasses/Grain base).

The condensate water generated from the spentwash evaporators and spentlees from distillation section will be treated by anaerobic and aerobic methods and passed through ultra filtration and R.O system. The purified permeate water separated will be used at distillery process section and the reject will be recycled back to the evaporation / Proposed for utilisation in composting with pressmud / crop trash.

3.3 Solid Waste generation and method of disposal

(A) Cogen plant – Solid waste (ASH) :

S. No.	Solid Wastes	Quantity per month		Disposal Method of ASH	
		Sugarcane Crushing Season	Sugarcane Crushing Off-season	Sugarcane Crushing Season	Sugarcane Crushing Off-season
1.	Ash	30 T/Day	30 T/Day	To use as manure	To Supply to Brick manufacturers & Cement Industries

(B) Distillery Unit - Solid Waste :

The solid waste generated from the unit is Settled Yeast sludge (wet) (5 Ton/day) and is proposed to be utilised as Animal Feed / use in composting. ETP sludge (wet) (5 Ton/day) is proposed to be utilised in Composting.

Distillers Wet Grain Solids (DWGS) and Distillers Dry Grain Solids (DDGS) produced from grain alcohol spentwash management programme will be supplied for cattle feed. In case of no off take, proposed to use it in Composting / in the Boiler as fuel.

The Boiler ash rich in potash generated during molasses based spentwash burning will be used as land manure / To enrich the compost manure.

3.4 Hazardous Waste

There will be no hazardous waste generation from this proposed Cogen Plant and Distillery Unit.

3.5 Noise Level

The noise level at inside and outside of the factory will be maintained at a low level as per norms by using acoustic measures and tree plantation around the zone.

3.6 Odour Control System

The odour from the process and waste water treatment systems will be minimized to the lowest possible by adopting good environmental practices.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

4.1 Environment, Safety and Health Monitoring :

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

Sl. No.	Particulars	Parameters	Frequency of monitoring
1.	Stack Emissions	SPM, SO ₂ , NO ₂	Online & Monthly
2.	Ambient Air Quality	SPM, PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂	Monthly
3.	Waste water	pH, BOD, COD, SS, TDS, Cl ₂ , SO ₄ , Oil & Grease Etc.	Daily
4.	Noise monitoring	Noise Levels	Monthly
5.	Safety and Health aspects	General	Yearly

4.2 Budgetary Allocation for Environmental Management Programme

(A) Cogen plant :

<i>Category</i>	Capital Investment	Annual Operating Costs
	(Rupees in Lakhs)	
Air Pollution Control Measures	300	36
Water and Wastewater Management	100	25
Solid Waste Management	10	2
Greenbelt	10	1
Environmental Monitoring and Training	10	2
Total	430	66

(B) Distillery Unit :

<i>Category</i>	Capital Investment	Annual Operating Costs
	(Rupees in Lakhs)	
Air Pollution Control Measures	360	60
Environmental Management Section (Spentwash Storage - Concentration & Burn as fuel in Boiler - Anaerobic, Aerobic and RO system for evaporator condensate & spentlees polishing, Dryer for DWGS)	3000	480
Solid Waste & Reject water Management	500	10
Greenbelt	10	1
Environmental Monitoring and Training	10	3
Total	3880	554

5.0 ADDITIONAL STUDIES

5.1 Socio-economic Conditions

There is no habitation or settlement in the industrial site. The nearest village is Vengur at 2 KM distance and has a population of 3899 as per 2001 census data. The major source of income for this local population is from farming.

6.0 PROJECT BENEFITS

6.1 Socio-economic benefit

This project does not involve any displacement of local people. Employment opportunities will improve in the nearby villages because of this proposed unit and will provide direct employment opportunity for 90 persons. The unit as a responsible corporate citizen will contribute towards social causes like health, education, and amenities for the surrounding areas.

7.0 ENVIRONMENTAL MANAGEMENT PLAN

7.1 Air Pollution Management

(A) Cogen plant :

For the emission from 130 TPH Boiler, 79 m height stack will be provided with an Electro Static Precipitator to minimize particulate emissions. For DG sets (1010 KVA - 2 Nos) - 15 m height stack will be provided.

(B) Distillery Unit :

In the Fermentor, the evolved CO₂ will be scrubbed with water and the scrubbed water will be recycled in the process. Spentwash fired Boiler of 30 TPH will be provided with Bag filter and 54 metre high Chimney to control stack emission.

7.2 Waste water management

(A) Cogen plant :

The R.O. Reject (200 KLD), Boiler Blow Down and Cooling tower bleed off (180 KLD) will be neutralized, settled and utilised in the cane farming through sugar ETP. Sewage (2.7KLD) will be sent to the septic tanks with dispersion trench. Hence the waste impact is controlled.

(B) Distillery Unit :

During the production of alcohol from molasses, spentwash will be generated. About 570 KLD of spentwash (from Alcohol, Malt spirit, Grape spirit) will be generated every day from the process. The unit proposed to achieve the **Zero Discharge** by adopting Concentration of spentwash by Evaporation and burn the concentrate as liquid fuel in specially designed boiler.

The Grain based spentwash will be decanted and concentrated to turn it in to DWGS (wet cattle feed) and DDGS (dry cattle feed). In case of no market for cattle feed, the material is proposed to be utilised in Biocomposting OR will be considered for burning it as fuel in the boiler.

The condensate water generated from spentwash evaporation has to be polished for reuse. Treatment in Anaerobic, Aerobic and RO filtration will yield the permeate water for use in the process section and the RO reject will be recycled back to evaporators / Proposed to utilize in Composting.

All the above schemes leads to **Zero Discharge** System. The wastewater from the Toilets will be dealt through septic tank and dispersion trench.

7.3 Solid Waste Management

(A) Cogen plant :

S. No.	Solid Wastes	Quantity per month		Method of Disposal	
		Sugarcane Crushing Season	Sugarcane Crushing Off-season	Sugarcane Crushing Season	Sugarcane Crushing Off-season
1.	Ash	30 T/Day	30 T/Day	To use as manure	To supply for Brick manufacturers & Cement Industries

The ash from boiler with Bagasse as fuel will be used as manure in the cane field. The ash generated during Sugar off season with Coal as fuel in the Cogen boiler will be supplied to brick manufactures and cement industries.

(B) Distillery Unit :

The solid waste will generate daily from the fermentation section as yeast sludge (wet) - 5 Ton/Day & ETP sludge (wet) - 5 Ton/Day. Proposed to utilise the yeast sludge for cattle feed / utilise in Composting.

ETP sludge is proposed to use in Composting.

Solids generated from grain based spentwash decantation and evaporation (DWGS & DDGS) will be utilised as Cattle feed / proposed for use in Composting (in case of non-demand for cattle feed).

About 20 MT of Ash rich in Potash (8 – 10%) will result from spentwash fired boiler and will be utilised as farm land manure / Blend with compost manure.

7.4 Noise Level

As per the observations, the noise level in the buffer zone is found to be very low. Necessary acoustic measures will be incorporated to maintain the noise level to the lowest level.

7.5 Land Degradation

Since, the wastewater generated from the process are treated thoroughly under Zero Discharge System, the chances of contamination of soil will be nil.

7.6 Greenbelt Development

Greenbelt is developed in the premises of Cogen plant and Distillery unit in an area of 17 Acres.

7.7 Environment, Safety and Health Monitoring

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

1. Monthly monitoring of stack emissions
2. Daily monitoring of waste water and treated water
3. Quality of Water, Air and Noise measurement in the Environment
4. Monitoring of safety and health aspects
5. Massive tree planting will be an ongoing programme

Madras Sugars Limited, an unit of Bannari Amman Group, depends on agro based raw materials for its operation, it enhances the job opportunities and economic conditions of farming communities of this zone. The organisation's social activities in Education, Health and related areas would benefit the people around.

For MADRAS SUGARS LIMITED

CHAIRMAN