PRE-FESIBILITY REPORT

FOR

EXPANSION PROJECT OF

EXISTING SUGAR MILL (FROM 7,000 TCD TO 15,000 TCD) & POWER CO-GENERATION PROJECT (FROM 18 MW TO 88 MW)

AND

ADDITION OF NEW 200 KLPD DISTILLERY PLANT (MOLASSES / CANE JUICE / SYRUP BASED)

OF

Tirupati Sugars Limited
Narainapur, Bagha
District West Champaran,
Bihar – 845 105

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1. Executive Summary :

Tirupati Sugars Limited, the origin of the Company dates back to setting up of a sugar factory at the present location under the name and style of M/s. Ganga Devi Sugar Mills by Khaitan Group of Padrauna in 1936. The mill was taken over by Shri Tulsidas Kanoria in 1950, who changed the name to M/s. North Bihar Sugar Mills Ltd. Subsequently, Bagaha Chini Mills Ltd. was incorporated on 29th July 1979. The assets and liabilities of the company M/s North Bihar Sugar Mills Limited were taken over by M/s Bagaha Chini Mills Limited under the Scheme of Arrangement, and under the order of Hon'ble High Court of Kolkata, in the year 1980. The company was taken over by HMP group in 1987 from Kanorias. The name was subsequently changed to HMP Sugars Ltd. on 22nd February 1990. The name was further changed to Tirupati Sugars Limited w.e.f. 18th June 2002. This company was taken over by Mr. Deepak Yadav in September 2008 as sick unit under BIFR. The company was turned around by him and started earning profit from the 1st year of takeover itself. Under this new ownership the crushing capacity of the sugar plant was enhanced from 2500 TCD to 3500 TCD during the season 2009-2010 and was further enhanced to 5000 TCD plus in the year 2011-12. The crushing capacity was enhanced further to 7000TCD in 2017. The Company has always followed the philosophy of ploughing back the profits, by continuously re-investing in the sugar factory and undertaking modernization and expansion projects which is evident from the above mentioned expansions.

Now, to meet the increasing demand of local farmers and surplus availability of Sugarcane in the area, the management of TSL has embarked upon expansion of existing sugar mill project from existing 7000 TCD upto 15000 TCD and also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL. This will give boost to the local rural economy and also give its contribution to the State by augmenting renewable power supply, which is the need of the time. Also, the Project proponent proposes to establish new proposed Distillery plant of 200 KLPD Ethanol production.

The Company owns a total land of 50.58 Ha. (125 Acres) for Sugar Mill as well as co-generation plant. Ample space is available to enhance the capacity of production within the existing premises. All necessary infrastructures are available in the existing plant premises.

For establishment of new 200 KLPD Distillery plant, the total land is required 8 hectares. About 33 % of the land (2.6 ha.) will be developed as Green Belt as per CPCB & MoEFCC guidelines.

2.0 Introduction of the Project / Background Information

Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude **27°07'39.61"N & 27°07'55.31"N** & Longitude **84°04'02.12"E & 84°04'44.33"E** at 310 m. above MSL. It is about 65 kms from district head quarter Bettiah and 1 Km from sub-divisional town Bagha is well connected by NH – 28-B and rail with rest of the country. TSL is about 500m. (W) from Bagha Railway Station.

SI. No	Parameters	Description
1	Identification of project	Project falls under (**Distilleries & Sugar Industry**) Item **5(g) & 5(j)** of the schedule of EIA notification of Sept 14, 2006 issued by MOEF & CC and amendments thereof.
2	Project Proponent	M/s **Tirupati Sugars Limited**.
3	Brief description of nature of the project	Our consolidated proposal includes A) Expansion of existing Sugar Mill from **7000 TCD** to 15,000 TCD, B) Expansion of existing Co-generation Power Plant from 18 MW to 88 MW C) Establishment of new Molasses / Cane Juice / Cane Syrup based Distillery plant of 200 KLPD Ethanol. The detailed production capacity is given in Project Description Para 3.0.
4	**Salient Features of the Project**	
4.1	Proposed plant capacity	Our consolidated proposal includes A) Expansion of existing Sugar Mill from **7000 TCD** to 15,000 TCD, B) Expansion of existing Co-generation Power Plant from 18 MW to 88 MW Establishment of new Molasses / Cane Juice / Cane Syrup based Distillery plant of 200 KLPD Ethanol.

4.2	Total Land Area	Total Land Area of Tirupati Sugar Mill is =50.058 Ha. (125 Acres) **Plot Area allocated for Distillery Plant = 8 ha (20 Acres)**
4.3	Location	Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL.
4.4	Water requirement	Approximately 25-50 KLD Water for construction and domestic purpose will be drawn from existing Borewells.
4.5	Source of water	Expected source of water: Borewell
4.6	Water requirement for plant operation	The make up water requirement for the plant will be met from the tube-wells and the plant complex area. There is no water scarcity in the area as such, so there is no difficulty in getting ground water. Total Fresh Gorund Water requirement for proposed Distillery Plant = 1800 KLD. Total Fresh Ground Water requirement of Tirupati Sugar Mills after proposed expansion will be for expansion of Sugar Mill and Co-generation Plant = 3340 KLD
4.7	Man Power	100 nos.
4.8	Electricity/ Power requirement	Additional 70 MW through co-generation from Steam by Incineration Boiler. Total Captive Power generation will be 88 MW including existing 18 MW.
4.9	Alternative site	No Alternative site has been considered, as the existing available land of 50.58 Ha. is adequate for proposed expansion of sugar mill and cogeneration plant and establishment of new 200 KLD Ethanol distillery project.
4.10	Land form, Land use and land ownership	The Company owns a total land of 50.58 Ha. (125 Aces) for Sugar Mill and co-generation plant under leasehold basis. The total land for Distillery plant is 8 hectare, out of which 33% land will be done for green belt development. Site Layout Plan enclosed.
5.0	Cost of the project	The estimated cost of the Project for Sugar Mill

		is approximately Rs. **17500.00** Lakhs. Cost of additional **70 MW** Co-Gen Power Plant Rs. **14750.00** Lakhs and cost of the new proposed 200 KLPD Distillery plant = **16000.00 Lakhs**

2.1 Identification of Project and Project Proponent

The present proposal is an expansion project to expand Sugar Mill from existing 7000 TCD to 15000 TCD, expansion of existing Power Co-generation from 18 MW to 88 MW (additional 70 MW) ; as well as establishment of a new Molasses / Cane Juice / Cane Syrup based Distillery plant of 200 KLPD.

Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL. It is about 65 kms from district head quarter Bettiah and 1 Km from sub-divisional town Bagaha is well connected by NH – 28-B and rail with rest of the country. TSL is about 500m. (W) from Bagha Railway Station.

The proposed expansion programme of our co-generation unit is in accordance to the National Policy and State Government Policy of promoting bagasse based co-generation units which would insure further generation of Renewable Energy through non-conventional sources.

Our Managing Director Mr. Deepak Yadav is an active Member in the Executive Committee of Indian Sugar Mills Association, New Delhi and Bihar Sugar Mills Association, Patna.

The Directors of Tirupati Sugars Limited are

- *Shri. DEEPAK YADAV*
- *Chairman & Managing Director*
- *Smt. BHAVNA YADAV*
- *Whole Time Director*
- *Shri. SOMNATH*
- *Director*
- *Shri. MITESH MAJITHIA*
- *Director*

- *Shri. C.P. UPADHYAY*
- *Director*

5 KM. RADIUS LOCATION MAP

Geo Coordinates	
Latitude	**27°07'39.61"N & 27°07'55.31"N**
Longitude	**84°04'02.12"E & 84°04'44.33"E**

2.2 Brief description of nature of project :

Tirupati Sugars Limited, (TSL) have been a pioneer in Sugar manufacturing and one of the best Units in the state of Bihar. The unit has been constantly achieving laurels in the field of Efficient Production, Quality and Environmental Management. The unit has the licensed capacity of **7,000 TCD and wish to expand to 15,000 TCD** and also decided to go for the expansion and modernization of its bagasse based co-generation unit from 18MW at present to 88MW by adding 70 MW of co-generation capacity from which steam and power requirement of sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL. The unit is facing serious hardship for storage of Bagasse and Molasses in their premises. In view of above, the management of TSL desires to use it's own molasses and Bagasse for manufacturing of downstream products which is mainly **Fuel Ethanol.**

TSL wishes to establish new Molasses/ Cane Juice / Cane Syrup based Distillery Plant of 200 KLPD Fuel Ethanol / Rectified Spirit/ Pharma grade Ethanol and Extra Neutral Alcohol (ENA) for export to other states.

The Distillery will be operated for minimum **340 days** on Molasses / Cane Juice / Cane Syrup produced at ***Tirupati Sugars Ltd***. Now, to meet the increasing national demand of Fuel Grade Ethanol (Absolute Alcohol) and availability of Molasses from own as well as nearby Sugar Mills, the management of TSL has embarked upon to establish new Distillery plant alongwith expansion of captive Power generation plant of upto **88 MW by adding another 70 MW**.

All the generated Solid Waste and Liquid Effluent will be managed as per guidelines of E(P) Act.'1986. Spent Wash will be concentrated in Multi-Effect Evaporators followed by using as fuel in incineration Boiler and suitable Condensate Polishing Unit to enable entire recycle of treated Process Condensate as per latest CPCB requirements. Waste Water Recycle and Reuse & employ Spent Wash Concentration followed by Incineration as their comprehensive Effluent Treatment in order to achieve Zero Liquid Discharge.

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

With a view to give boost to agriculture sector and reduce environmental pollution, the Government of India have been examining for quite some time supply of ethanol-doped-petrol in the country. In order to ascertain financial and operational aspects of blending 10% ethanol with Petrol as allowed in the specifications of Bureau of Indian Standards for petrol. Government had launched three pilot projects; two in Maharashtra and one in Uttar Pradesh during April and June 2001 and these pilot projects have been supplying 10% ethanol-doped petrol only to the retail outlets under their respective supply areas since than. Apart from the aforesaid field through pilot projects, R & D studies also were undertaken simultaneously. Both pilot projects and R & D studies have been successful and established blending of ethanol up to 10% with petrol and usage of ethanol-doped-petrol in vehicles.

Discussions were held with concerned agencies including the Governments of major sugar producing States. While the Society for Indian Automobile Manufacturers (SIAM) has confirmed the acceptance for use of 10% ethanol doped-petrol in vehicles. State Governments of major sugar producing States and the representatives of sugar/distillery industries have confirmed availability / capacity to produce ethanol.

In its bid to increase use of ethanol and other alternate fuel for transportation, government will come out with a new ethanol policy focusing on producing more ethanol. Against the present annual demand of about 460 crore litres annually for different purposes, only 250 crore litres is available in the country.

In 2007, the domestic sugar consumption is estimated to be 19.5 million MT. It is expected that the drivers for consumption i.e. the GDP growth and population growth would continue to grow at current rates. Based on the past ten years' growth in consumption and estimates from various independent sources, it is expected that in 2017, the domestic sugar consumption would be approximately 28.5 million MT. Given the high cost of imports and the strategic importance of food security, India would need to target its production in excess of domestic consumption. Given the past trend in production cyclicality, sugar equivalent to 1.5 months of consumption i.e. an additional 3.5 million MT of sugar would need to be produced by 2017.

Now, to meet the increasing demand of local farmers and surplus availability of Sugarcane in the area, the management of TSL has embarked upon expansion of existing sugar mill project from existing 7000 TCD upto 15000 TCD and also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL.

Bagasse is known to be an important energy source for developing countries like India. Its importance is now being reaffirmed even by developed countries in view of its renewable and environment friendly character. In our country also, optimum utilization of bagasse resources could not only lead to savings in conventional resources of energy but also result in many indirect benefits. In view of this, the Ministry of New and Renewable Energy, Govt. of India, has been promoting electricity generation from bagasse as a means of full exploitation of its inherent energy value. Among the technologies being promoted for this purpose are the megawatt scale power generations through combustion using boiler and turbine. The Ministry initiated the program for promotion of bagasse utilization almost a decade back and significant achievements have been made in this period towards their commercialization and establishment as a viable and environment friendly electricity generation option.

In recent years the sugar industries have been facing huge losses resulting in economic instability due to the mismatch between the yearly increasing cane prices and declining prices of sugar. The sugar units having co-generation units have been able to survive with the value addition and profitability provided by their co-generation unit.

Energy is an important input for economic development. Since exhaustible energy sources in the country are limited, there is an urgent need to focus attention on development of renewable energy sources and use of energy efficient technologies. The exploitation and development of various forms of energy and making energy available at affordable rates is one of our major thrust areas. With the emergence of new technologies for manufacture of sugar, generation of power and energy systems, bagasse based electricity generation has assumed new and significant relevance. It is an important source of energy which needs to be fully utilized in the national interest especially in the context of ever increasing demand for energy in the state of Bihar.

The proposed expansion programme of our co-generation unit is in accordance to the National Policy and State Government Policy of promoting bagasse based co-generation units which would insure further generation of energy through non-conventional sources. The state would be getting additional energy for the people and through value addition it would be helpful to our sugar industry to achieve economic stability and this would enable the NBPDCL and SBPDCL to achieve the renewable purchase obligation (RPO), so the BSPHCL/ NBPDCL/ SBPDCL accept the project report and arrange for evacuation of power from the proposed co- generation plant.

In view of the above scenario, proposed expansion project of **Tirupati Sugars Limited** (TSL) is justified and it will help in bridging the demand supply gap of ethanol.

2.4 Demand Supply Gap:

In view of rapid increase in the demand of Sugar from year to year and availability of own main Raw Materials i.e. Sugarcane in project influence area, the project proponent has decided to expand its existing cane crushing and production capacity.

Against the present annual demand of about 460 crore litres of Ethanol annually for different purposes, only 250 crore litres is available in the country. Hence, the projected demand of Fuel Ethanol is huge and encourages such proposed capacity expansion.

With the emergence of new technologies for manufacture of sugar, generation of power and energy systems, bagasse based electricity generation has assumed new and significant relevance. It is an important source of energy which needs to be fully utilized in the national interest especially in the context of ever increasing demand for energy in the state of Bihar.

2.5 **Imports vs. Indigenous Production :**

After the liquor ban in the state of Bihar, the State is a net producer of **Fuel Ethanol**. However, Indian market has so far, not been able to meet the country's overall Ethanol requirement of 330 Crore Liters. Further, as Molasses based Distilleries are more in number in Uttar Pradesh & Bihar, the entire Ethanol demand of Northern India is targeted to be met from these two states. With surplus Sugarcane production in last few years, there is a glut of Molasses in the state. Moreover, there are large stocks of Sugar lying with Sugar Mills. It is seen to be more viable to produce & supply Fuel Ethanol towards the recently announced National Biofuels Policy and contribute to Indian Agro Economy & help in reducing the Foreign Exchange Bill towards Crude Oil Imports.

Tirupati Sugars Limited envisages to contribute 68000 KL Per Annum of Fuel Ethanol / Alcohol / Pharma Grade Ethanol / ENA (in future) with the addition of 200 KLPD Distillery based on their own Molasses / Sugar Cane Juice / Sugarcane Syrup / and Molasses available from nearby Sugar Mills.

2.6 **Export Possibility:**

There is no export possibility at present of Fuel Ethanol produced by TSL, as the indigenous demand is itself very high.

2.7 **Domestic/Export Market:**

Domestic/Export market depends on policy of government

2.8 **Employment Generation (Direct & Indirect)**

The proposed expansion of project will generate employment opportunities both in direct and indirect manner. In director mode people will get additional jobs in proposed expansion project and in indirect mode people will be appointed as company authorized dealers & sellers.

3.0 Project Description:

(i) Type of project including interlinked and inter dependent project:

Under this new ownership, ***Tirupati Sugars Limited., (TSL)*** the crushing capacity of the Sugar plant was enhanced from 2500 TCD to 3500 TCD during the season 2009-2010 and was further enhanced to 5000 TCD plus in the year 2011-12. The Sugarcane

Crushing Capacity was enhanced further to **7000 TCD in 2017**. Now, to meet the increasing demand from local farmers and surplus availability of Sugarcane in the area, the TSL management has embarked upon expansion of existing sugar mill project from existing 7000 TCD upto 15000 TCD.

TSL has also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL. This will give boost to the local rural economy and also give its contribution to the State by augmenting renewable power supply, which is the need of the time.

TSL also wish to establish new Distillery plant of 200 KLPD based on Molasses / Sugar Cane Juice / Sugar Cane Syrup for production of different products as per market demand viz. Rectified Spirit (RS) , Absolute Alcohol (AA), Fuel Ethanol, Pharma Grade Ethanol and / Or Extra Neutral Alcohol (ENA).

(ii) Location :

Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL. It is about 65 kms from district head quarter Bettiah and 1 Km from sub-divisional town Bagha is well connected by NH – 28-B and rail with rest of the country. TSL is about 500m. (W) from Bagha Railway Station.

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(iii) <u>Details of alternate sites Considered and the basis of selecting the proposed site, particularly the environment consideration gone into should be highlighted.</u>

For Sugar Mill and co-generation power plant, no alternate sites have been considered for the proposed expansion project as all the expansion activities will be carried out within existing premises and no additional land will be required for the proposed expansion project.

Now for establishment of new Distillery plant, an additional land of 8 hectares (~ 20 Acres) has been allocated.

(iv) Size or magnitude of operation:

The unit has the licensed capacity of 7,000 TCD and wish to expand 15,000 TCD and also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL.

TSL also wishes to establish a new Distillery Plant of 200 KLPD based on C-Molasses, B-Heavy Molasses and Cane Juice/Syrup directly for production of Fuel Ethanol, Rectified Spirit, Absolute Alcohol and Extra Neutral Alcohol (ENA).

Production and Manufacturing Details are as under;

Manufacturing Facilities	Product	Existing	Proposed Addition	Total Final Capacity
Sugar Mill	Sugar	7000 TCD	8000 TCD	15000 TCD

Manufacturing Facilities	Product	Existing	Proposed Addition	Total
Distillery	Ethanol/RS/ ENA	-	200 KLPD	200 KLPD
Captive Power generation	Power	18 MW	70MW	88MW

(v) Project description with process details: (a schematic diagram/flowchart layout, components of the project)

The unit has the licensed capacity of 7,000 TCD and wish to expand 15,000 TCD and also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18MW at present to 88MW by adding 70MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL. The unit is facing serious hardship for storage of Bagasse and Molasses in their premises. In view of above, the management of TSL desires to use own molasses and Bagasse of Sugar Mill for manufacturing of downstream products which is mainly Fuel Ethanol.

TSL also wish to establish new Distillery plant of 200 KLPD based on Molasses / Sugar Cane Juice / Sugar Cane Syrup for production of different products as per market demand viz. Rectified Spirit (RS) , Absolute Alcohol (AA), Fuel Ethanol, Pharma Grade Ethanol and / Or Extra Neutral Alcohol (ENA).

All the generated Solid Waste and Liquid Effluent is being treated and managed as per guidelines of E(P) Act.'1986. Spent Wash concentration in Multi-Effect Evaporators followed by Incineration Boiler and suitable Condensate Polishing Unit to enable entire recycle of treated Process Condensate as per latest CPCB requirements. Waste Water Recycle and Reuse & employ Spent Wash Concentration followed by Incineration as their comprehensive Effluent Treatment in order to achieve Zero Liquid Discharge.

Manufacturing Process Details

Process Description : 200 KLPD MOLASSES TO ETHANOL

A. **HIFERM : FERMENTATION**

Yeast Propagation :

Molasses is received into the yeast vessel and sterilized by steam. Yeast seed material is prepared and added to the yeast vessels by inoculating molasses with yeast. The contents of the yeast vessel are then transferred to the Yeast activation vessel. The purpose of aeration in the yeast activation is to allow time for the yeast cell multiplication.

Fermentation :

The purpose of fermentation is to convert the fermentable sugars into alcohol. During fermentation, sugars are broken down into alcohol and carbon - di - oxide. Significant heat release takes place during fermentation. However the fermentation temperature is maintained at 32 - 35 ^{0}C by use of forced recirculation plate type heat exchangers.

The yeast growth critically required for the fermentation process is maintained with utilisation of Yeast Activation vessels which are maintained under aerobic condition and the aerated cell mass is transferred to the fermenters.

At the end of fermentation cycle, Wash is fed to the Wash Holding Tank / Beer Well and is pumped fed further to the distillation section.

ECOFINE – MPR DISTILLATION

DISTILLATION : WASH TO AA MODE

Pre-heated fermented wash will be fed to Evaporative Distillation. Fermented wash is stripped off alcohol by ascending vapors in Analyzer column. Vapors of Evaporative column & Analyzer vapors are condensed and taken to Purifier Column.

Water is added for dilution in Purifier. Low boiling impurities are concentrated in the Purifier column. A top draw is taken out as technical alcohol from the top of the Purifier column. Purifier bottom liquid is preheated with spent lees and fed to Rectifier cum Exhaust column.

Rectified Spirit containing at least 94-95% v/v Alcohol is pumped from Rectifier column to dehydration section (MSDH Section).

DISTILLATION - WASH TO RS MODE

Pre-heated fermented wash will be fed to Evaporative Distillation. Fermented wash is stripped off alcohol by ascending vapors in Analyzer column. Vapors of Evaporative column & Analyzer vapors are condensed and taken to Purifier Column.

Water is added for dilution in Purifier. Low boiling impurities are concentrated in the Purifier column. A top draw is taken out as

Technical alcohol from the top of the Purifier column. Purifier bottom liquid is preheated with spent lees and fed to Rectifier cum Exhaust column.

Rectifier cum Exhaust column operates under pressure and provides heat to the Analyser column through Re-boiler. Alcohol is enriched towards the top and is drawn out as Rectified Spirit. Fusel oil build up is avoided in the Rectifier cum Exhaust column by withdrawing side streams.

MULTI-EFFECT EVAPORATION :

The latest Multi-Effect Evaporation Technology is a combination of advanced Falling Film Evaporation and Forced Circulation Technology.

The evaporation system is Low fouling, low scaling Shell & tube type Evaporators design with highly efficient liquid distributor working on the principle of falling film evaporation. The operation of the plant is under vacuum.

The proposed standalone evaporation system consists of Four Effect Falling Film Evaporators (3+1) & 3 Forced circulation evaporator (2+1). In second effect falling film jacket side First effect vapor & finisher vapor will be condensing on the tube side raw spent wash will be concentrated & vapors generated from 2nd effect VLS are used as heat source for 3rd effect.

Vapors generated from last effect are condensed on shell side of Surface Condenser. In first effect & finisher jacket side condensing steam will be condensing on tube side. The product (final concentration of Spent Wash) at the 58%-60 % w/w is obtained after the final Finisher Effect. Such concentration of Raw Spent Wash is ideal for burning alongwith supplementary fuel in **80 TPH (40 TPH x 2 Nos.) Incineration Boiler**.

Process Condensate Treatment Plant (Condensate Polishing Unit)

1. Equalization Tank:

Equalization tank of adequate retention time will be provided for flow and characteristics equalization. The equalization tanks will be provided for balancing the hydraulic and organic load fluctuations and to neutralize the incoming condensate effluent with help of Alkali dosing system. The Alkali solution will be added in order to maintain ideal pH requirement for biological process treatment & then the equalized effluent will be pumped to buffer tank for further treatment.

2. Buffer Tank:

The equalized effluent from equalization tank will be pumped to the buffer tank of adequate retention time is provided before the AF reactor. The buffer tank serve as acid

phase reactor provided to carry out the first phase of anaerobic treatment like Hydrolysis & Acidogenesis takes place in this reactor where in complex organic matter are hydrolyzed to sugars, alcohols, volatile acids, hydrogen & carbon dioxide by facultative anaerobic bacteria. The part of the overflow from the AF is recycled back to the buffer tank which helps in preconditioning the effluent before entering to the AF reactor.

3. Anaerobic Filter:

Anaerobic up flow Filter is an anaerobic digester in RCC, filled with plastic media. The MOC of filter media will be PVC. The effluent from the buffer tank will be distributed on the media in the filter. The effluent will be treated anaerobically & the clear effluent will be taken to extended aeration tank downstream and the generated biogas will be vented manually through the well-designed pipe network to the flare unit located outside the plant suitably.

The buffering capacity of the anaerobic up flow Filter will be increased by recirculating the reactor overflow to the buffer tank to enhance the hydrolysis & liquefaction which is first stage of anaerobic digestion.

The bacteria responsible for the treatment grow and reside on the plastic media. The bacteria consume organic content of waste water and metabolize it to produce bio gas and biomass.

Anaerobic Filter operates in the mesophillic range of temperature, i.e. 28 o - 40 ^{o}C. The pH inside the filter unit is usually kept around 7.2 while proper ratio of volatile acid and alkalinity is maintained. The bio gas will be collected at the reactor top & send to the flare stack with a provision of a tapping for use as fuel in canteen or burns in open atmosphere.

The excess sludge from the bottom of the reactor is periodically taken out and sent to the sludge handling facility.

4. Extended aeration Tank:

Aeration serves the dual purposes of providing dissolved oxygen and mixing of the mixed liquor suspended solids in the aeration tank. Waste stabilization cannot occur unless the microorganisms are brought into contact with food. Oxygen usually supplied from air, is needed by the living organisms for oxidation of wastes to obtain energy for growth. If DO is too high, pinpoint flocs will be developed and will not be removed in the secondary settling tank. Therefore proper DO levels must be maintained so solids will settle property. The oxygen is supplied with the help of twin lobe air blowers for satisfying the

air requirements of the Aeration Tank. Air sparging arrangement will be provided to mix the contents of Aeration Tank and transfer atmospheric oxygen into the system. The dissolved organic matter is subject to biological degradation by bacterial action in presence of oxygen & nutrients. This will convert dissolved organic matter into stable settable matter.

Environment:

The microorganisms, which cause the final conversion of waste water into stable water, are sensitive to conditions in the reactor. Their activity slows down unless optimum conditions are maintained as shown in below Table

Optimum Conditions for Aerobic Treatment:

Dissolved Oxygen	1-2 mg/L
Temperature	Less than 40°C
pH	6.5 to 7.5
Toxic Material	Nil

5. Secondary Clarifier :

The biological sludge developed in extended aeration Tank will overflow to the secondary clarifier and allowed to settle in a hopper bottom secondary clarifier. The sludge accumulating in the sludge hopper bottom will be returned to extended aeration tank to maintain required active biomass in the aeration tank. The process of returning the sludge back into extended aeration Tank will be operated continuously. The excess biomass/sludge generated will sent to Sludge Sump by means of sludge recirculation pumps. The clarified effluent from secondary clarifier will overflow into the intermediate tank by gravity.

6. Clarified Effluent Tank :

The clarified effluent from the secondary clarifier will allowed to flow by gravity into the clarified effluent tank which having adequate retention time to maintain the flow fluctuation and constant feed to the downstream process.

7. Pressure Sand Filter:

The biological treated effluent from the clarified effluent tank will be pumped to the pressure sand filter in order to remove the suspended solid load from the incoming effluent. The Filter will be filled with graded quartz sand bed. Pressure sand filter is a

depth filter that makes use of coarse and fine media placed together in a fixed proportion. This arrangement produces a filter bed with adequate pores dimensions, which reduces turbidity, suspended matter from the incoming effluent. The Filter will have a backwash arrangement and will be provided with frontal piping and manual operated valves

The pressure sand filter will be back-washed with the help of backwash pump to separate out the attached dirt particle from the bed course when the pressure difference across the PSF increased to the design level. PSF will be designed for once a day backwash or when the pressure drop across PSF reaches more than 0.8 bar (g). Operation of multi grade filter will be manual with butterfly valves.

8. Ultra Filtration System :

The filtered effluents from the PSF will be taken to the UF membranes through basket strainer with the PSF feed pump. Each UF membrane module consists of thousands of hollow fiber membranes that are capable of removing virtually all suspended solids, colloids, bacteria and viruses bigger than 0.03 micron from the feed stream. The filtered water from PSF will be further filtered through ultra-filtration membrane system in order to achieve better RO feed quality. The ultra-filtration system will operated on 90-95% recovery. The backwash of the system will be done at predefined interval and will be recycled back to inlet of pre-treatment. Chemical cleaning facility will also provide to avoid membrane damage due to fouling. The ultra-filtered water will be stored in RO feed Tank. UF is a skid mounted membrane system, which comprises mainly of the hollow fiber UF membrane modules, re-circulation and pneumatically actuated valves. All these are neatly interconnected into a compact and modular train, which comes complete with a self-control semi-automatic system.

9. UF Back Wash system :

In the UF filtration process, the rejected suspended solids form a layer on the surface of the membrane which reduces the UF membrane permeation rate. This layer is to be dislodged to maintain the membrane permeation rate. This can be achieved through a method called backwash with reverse flow. Service & backwash interval is set in such way that the backwash will automatically initiate when the pressure across the membrane exceed the permissible limit.

The backwash water volume from the UF system and PSF will be conveyed to the UF backwash collection tank by gravity.

10. RO feed

The RO feed tank of adequate retention time will be provided for flow fluctuation and maintain the constant feed flow to the downstream RO system. The UF system and MGF will be backwashed with UF permeate water with the help of UF backwash water.

RO SYSTEM :

A BRIEF ON REVERSE OSMOSIS PLANT SYSTEM

11. Reverse osmosis system:

The pressurized flow enters the RO system. Due to high pressure, a portion of the feed water permeates through the semi-permeable RO membranes as pure water while the balance of the flow exits the system as reject. The two RO systems will proposed with two stages.

RO plant is designed with two stage RO plant to achieve the overall recovery about 80%.

The conductivity indicating transmitter will be provided on the RO permeate line monitors the product water quality.

12. Cartridge Filter:

The UF permeate water is chemically conditioned with Antiscalant, SMBS, HCl doing is then feed to micron cartridge filter having cartridges of 5 micron nominal rating. Purpose of this cartridge filter is to basically remove very fine particles.

The water from cartridge filter will then be passed to 1st RO unit by means of high-pressure pump to get the RO product water.

13. RO Membrane Skid:

Membrane skid consists of membranes housed in membrane housings. The feeding logistics to the various membrane housings depends on the scheme configuration. The offered plant is provided in two RO plants where 1st RO plant will recover the permeate through ultra-filtered effluent and reject from the 1st stage will be fed to the second RO system with the help of booster pump in line with the 1st RO plant. Since the reject of 1st plant is high on silica and calcium and magnesium contents it need to go through treatment in order to achieve better recovery with minimized risk of salt precipitation.

14. RO Cleaning system:

A cleaning system is provided for the RO chemical cleaning. A system cleaning is required when the normalized permeate flow is reduced by 10-15%, or the differential pressure (DP) increases by 15 percent from the reference conditions

The operation of cleaning has to be done manually. The cleaning solution preparation operation is manual.

The 5 -micron cartridge type guard filter is provided after the cleaning pump to prevent passage of suspended solids removed during the CIP cycle back onto the RO membranes.

The RO Cleaning Pump will flow cleaning solution through each stage of an RO train. The overall rate is based on the number of RO vessels in a train and the step of the cleaning process and is controlled manually at pump delivery. Permeate of RO system will be stored in RO permeate water tank.

15. RO CIP System:

A Clean in Place System is provided to clean both the RO systems at regular intervals. It consists of CIP tank & CIP pumps.

16. RO Permeate Tank:

RO treated water will be free from most of dissolved solids and recycled back as process water requirement. The permeate water is stored in to RO permeate water storage tank and utilize as cooling tower make up water.

17. RO Reject Tank:

Reject water from RO system will be stored in to reject water storage tank. The reject water contain high amount of dissolved solids need to evaporate as the dry matter.

The RO reject water tank with suitable capacity will be proposed to safeguard the continuous operation while cleaning of Evaporation plant..

II. EQUIPMENT INSTALLED FOR ACHIEVING ZERO SPENT WASH DISCHARGE :

The plant produces spent wash at an average of approx. 9 KL/KL of alcohol produced with solid contents of 16–17%. Spent wash generated. There are three stages of treatment for the Spent Wash to achieve Zero Liquid Discharge. Detailed ETP process:

Adoption of Effluent Treatment involving Raw Spent Wash (RSW) Evaporation (MEE) followed by complete Incineration. Concentrating RSW from 15-18% to upto 55-60% w/w solids with implementation of Multi-Effect Evaporator and complete Incineration of the same in a specially designed Incineration Boiler and hence achievement of Zero Liquid Spent Wash Discharge. The evaporation condensate water will be partly recycled & reused in Fermenters after condensate polishing & treatment, thereby implementing effective Recycling of treated waste water streams. Also, odour is controlled with adequate green belt all around the Plant's periphery.

For in details referred to Manufacturing Process Details in above para.

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II. CAPTIVE POWER GENERATION:

During proposed expansion and modernization of the sugar mill to 15,000 TCD and for that high pressure boiler and turbine would be required. The proposed expansion of co-generation plant from 18 MW at present to 88 MW by adding 70 MW co-generation capacity with Two new 2 x175 TPH high pressure boilers with Two new 2 x 35 MW extraction- cum- condensing turbo generators. The new setup would take care of the energy and steam requirement of our sugar mill’s expansion programme as well as

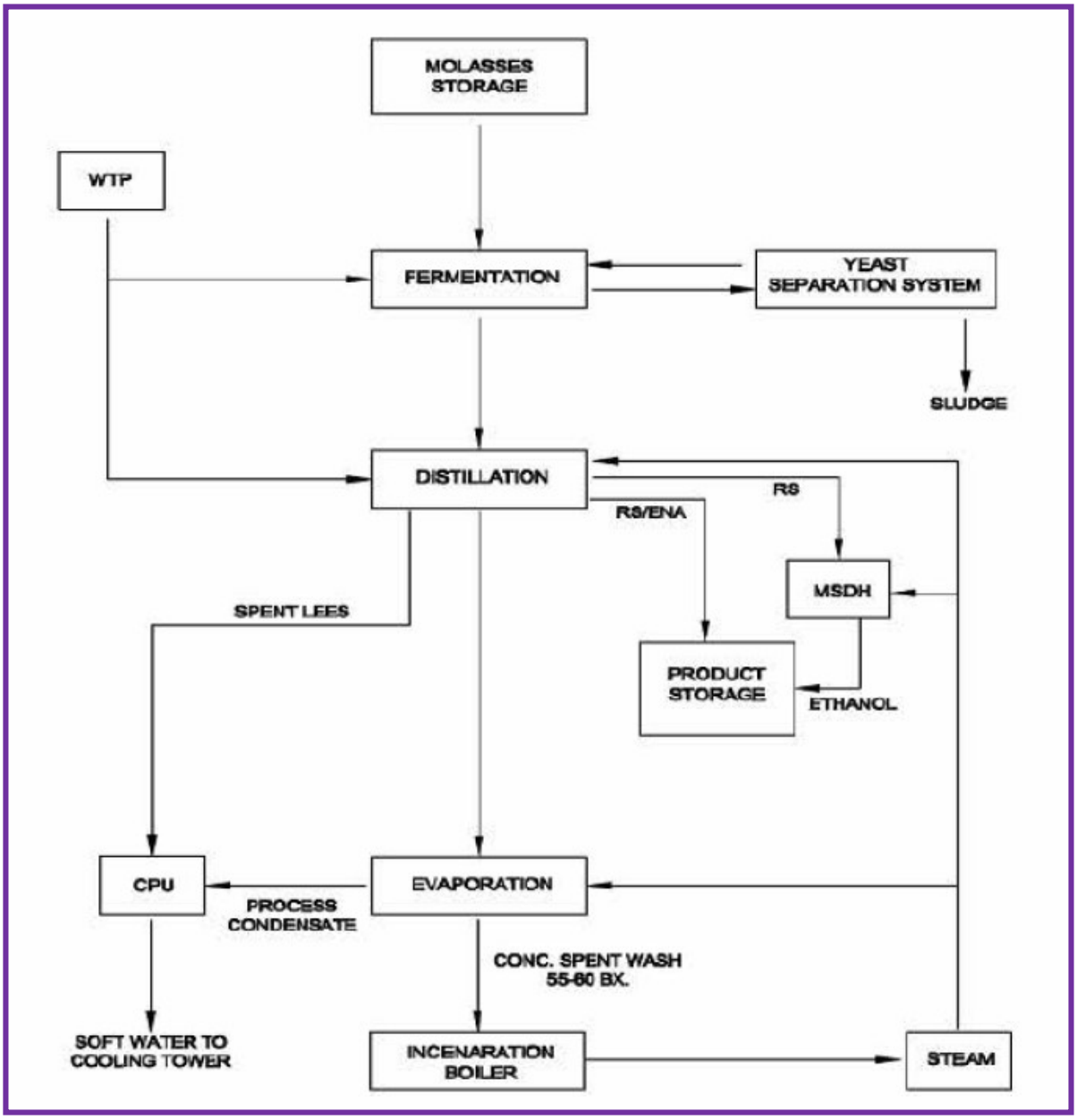
generate a further 70 MW surplus electricity to be exported to the power grid of the State (NBPDCL/ BSPHCL).

Fuel in the steam boiler will be burnt with the help of air in the boiler furnace. Water will be circulated in the boiler drum and tubes thus getting heated by the flame burning in the boiler furnace. Water comes out of the boiler drum located at the top of the boiler as steam. Flue gases rise in the boiler furnace and come in contact with the steam coming out of boiler drum.

Steam after coming in contact with flue gases gets heated up further thus getting superheated. Super-heated steam leaves the boiler in a pipe. Flue gases after super heating the steam pass through economizer where they pre-heat the boiler feed water before it enters the boiler drum. After economizer, flue gases pass through air pre-heaters where they heat the air which is fed to the boiler furnace for burning the fuel.

After air pre heaters flue gases will pass through Wet Scrubbers where the dust particles are collected. The dust is collected from here. High pressure superheated steam from boiler is passed through a steam turbine, which is used for in distillery process operations. While passing through the turbine, the high pressure and temperature steam rotates the turbine rotor and by the alternator. This electric power generated is consumed in house i.e. electric alternator mounted on the same shaft. Electric power is generated for running the distillery and utilities like boilers and auxiliaries etc.

DISTILLERY PROJECT PROCESS FLOW DIAGRAM



B. PROCESS OF SUGAR MANUFACTURING

Extraction of Juice

The sugarcane is passed through preparatory devices like knives for cutting the Stalks into fine chips before being subjected to crushing in a milling tandem.

Clarification

The treated juice on boiling fed to continuous clarifier from which the clear juice is decanted while the settled impurities known as mud is sent to rotary drum vacuum filter for removal of unwanted stuff called filter cake is discarded or returned to the field as fertilizer.

Evaporation

The syrup is again treated with sulphur dioxide before being sent to the pan station for crystalization of sugar. Crystalization 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.

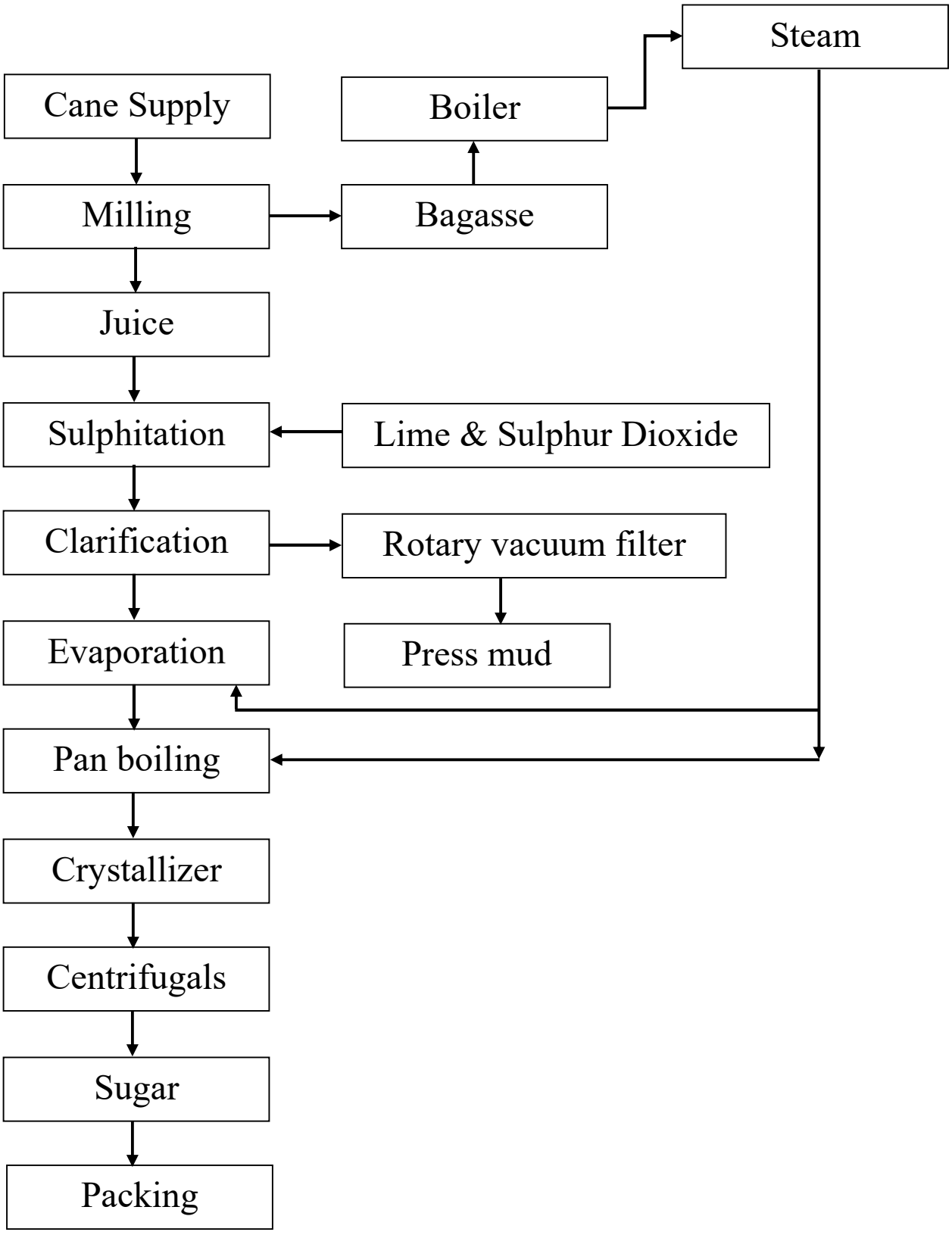
Centrifugation

The massecuite from crystallizer is drawn into revolving machines called centrifuges. The perforated lining retains the sugar crystals, which may be washed with water, if desired. The mother liquor "molasses" passes through the lining because of the centrifugal force exerted and after the sugar is "purged" it is cut down leaving the centrifuge ready for another charge of massecuite

Gradation & Packing

The final product in the form of sugar crystal is dropped through pan section and this sugar is graded and picked in 50 kg bags. The grade of the sugar depends on the size of the crystal viz. Small (S) and Medium (M).

FLOW DIAGRAM SHOWS SUGAR MANUFACTURING



(vi) Raw Material required along with estimated Quantity, likely source, marketing area of final products, mode of Transport of raw material & finished product.

Item	Raw Material Requirement	
	Existing	**After Proposed Expansion**
Sugar Cane	7000 TCD	15000 TCD
No. Of Days Operation / Annum	**150 – 180 Days**	**150 – 180 Days**

Item	**Raw Material Requirement**
Molasses	900 MT/Day
No. Of Days Operation / Annum	340 Days

Item	**Raw Material Requirement**
Bagasse	1500 MT/DAY
UREA ACID , NUTRIENTS	300 KG / Day

(vii) Resources optimization/recycling and reuse envisaged in the project, if any, should be briefly outlined.

Water as a resource is recycled at each possible step of the process and latest technology and methodology will be adopted to conserve and reuse the resources. Adoption of Effluent Treatment involving Raw Spent Wash (RSW) Evaporation (MEE) followed by complete Incineration. Concentrating RSW from 15-17% to upto 55-60% w/w solids with implementation of Multi-Effect Evaporator and complete Incineration of the same in a specially designed Incineration Boiler and hence achievement of Zero Liquid Spent Wash Discharge. The evaporation condensate water will be partly recycled & reused in Fermenters after condensate polishing & treatment, thereby implementing effective Recycling of treated waste water streams. Also, odour is controlled with adequate green belt all around the Plant's periphery.

(viii) <u>Availability of Water its source, Energy/Power requirement and source should be given</u>

a. Estimated Water Requirement for Proposed "Distillery" Capacity 200 KLD

After establishment of Distillery plant, water requirement is fulfilled through borewells inside premises. Water requirement details for post establishment of the project are as under;

Components	Total Water before recycle (KLD)	Total water recycle (KLD)	Net. Fresh Water (KLD)
Process Water	2000	**1700**	300
Soft Water	1600	**400**	1200
DM Water	1600	**1300**	300
TOTAL	**5200**	**3400**	**1800**
KL/KL	**26**	**17**	**9**

Total fresh water requirement for ethanol production alone is 9 kl/kl; additional water consumption in Captive Power Cogeneration plant is estimated to be about 400 kl /day owing to part condensation.

b. **Water Requirement for Proposed "expanded Sugar Mill" Capacity from 7000 TCD to 15000 TCD and co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity**

At present and after expansion in future also, water requirement is fulfilled through borewells inside premises. Water requirement details for post expansion project are as under;

Components	Existing	Proposed	Total
Sugar Mill Water Requirement	700 KLD	800 KLD	1500 KLD

(b) Power Requirement and Source after proposed expansion:

During proposed expansion and modernization of the sugar mill to 15,000 TCD for that high pressure boiler and turbine would be required. The proposed expansion of co-gen unit by 70 MW would consist of a new 175 THP high pressure boiler with a new 70 MW extraction- cum- condensing turbo generator. The new setup would take care of the energy and steam requirement of our sugar mill's expansion programme as well as

generate further 70 MW surplus electricity to be exported to the power grid of the State (NBPDCL/ BSPHCL).

(c) Steam Requirement after proposed expansion:

Under the present setup of the sugar plant at 7000+ TCD, one High Pressure Boiler, having steam generating capacity of 80 Tonnes per hour, besides 2 Nos. existing Boilers having steam generating capacity of 40 Tonnes per hour each with all its auxiliaries, D.M. Plant etc. At present two nos. of 3 MW turbine (one on fibrizor) and two nos. of 6 M.W turbine with alternator. The Power generated out of one 6 MW Power Turbine is solely exported at Power Grid to NBPDCL, Bagaha-1 sub-station.

For expansion and modernization of the sugar mill to 15,000 TCD and for that high pressure boiler and turbine would be required. The proposed expansion of co-gen unit by 70 MW would consist of two new 2 x 175 THP high pressure boilers with two new 2x35 MW extraction- cum- condensing turbo generators.

(d) Power Cogeneration Boiler Details (Sugar Side) :

Two number 2x175 TPH MCR capacity of 109 KG/cm² (G) working pressure, 540± 5º C steam temperature at super heater outlet, radiant type natural circulation, balanced draft, continuous ash discharge travelling Grate, water tube bagasse/biomass fired Boiler with Wet Scrubber and other auxiliary equipments suitable for outdoor installation and R.C.C.Chimney of 76 mtrs. Height and the Boiler, manufactured strictly as per Indian Boiler Regulations Act.

(ix) Quantity of waste to be generated (Liquid and solid) and scheme for their management.

All the generated Solid Waste and Liquid Effluent is being treated and managed as per guidelines of E(P) Act.'1986. The major sources of pollution in Molasses Distillery project are treated by Spent Wash concentration in Multi-Effect Evaporators followed by Incineration Boiler and suitable Condensate Polishing Unit, to enable entire recycle of treated Process Condensate as per latest CPCB requirements. Waste Water is Recycled and Reused & employed in Spent Wash Concentration followed by Incineration as their comprehensive Effluent Treatment in order to achieve Zero Liquid Discharge**.**

Waste Water Generation & Treatment ;

In the proposed project operations, the entire Spent Wash followed by volume reduction through a Multiple-Effect Evaporator, followed by Incineration Boiler and suitable Condensate Polishing Unit to enable entire recycle of treated Process Condensate as per latest CPCB requirements. The Process condensate from MEE will also be treated through Stripper and condensate Water is recycled back in the Fermentation process & makeup for cooling water.

Distillery waste water will be implemented to achieve Zero Liquid Discharge norms.

After expansion of sugar mill project approx. 1200 KLD of waste water will be generated which will be treated in ETP inside premises based on Activted Sludge Process followed by tertiary treatment through PCF and ACF. Entire treated water will be recycle and reused in boiler make-up, cooling tower make-up, farmers irrigation and for dust suppression activities within premises.

Air Pollution:

For expansion and modernization of the sugar mill to 15,000 TCD and for that high pressure boiler and turbine would be required. The proposed expansion of co-gen unit by 70 MW, would consist of two new 2x175 THP high pressure boiler and two new 2x35 MW extraction- cum- condensing turbo generator.

To minimize air pollution load from new boiler, wet scrubbers will be installed followed by a new ~ 76 m height stack for wider dispersion of pollutants.

Solid Waste Management:

In the existing & proposed sugar mill project, Molasses (958 T/Day), Bagasse (1500 T/Day), Press Mud (785 T/Day), Boiler ash (33 T/Day) and ETP sludge (13 T/Day) are generated as Solid Waste. The molasses will be utilized as raw material in our own proposed distillery project, Bagasse is being used as fuel in sugar mill boilers and Press Mud and Boiler Ash is being utilized in Bio-composting process as per present practice and CPCB guidelines.

In the proposed distillery project following solid wastes will be generated ;

Solid Wastes	Generation	Management
Boiler Ash	11 TPD	Sold to brick manufacturers
Decanter-Sludge	28 TPD	Recycle and Reused in process

4.0 **Site Analysis:**

(i) **Connectivity:**

Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL. It is about 65 kms from district head quarter Bettiah and 1 Km from sub-divisional town Bagha is well connected by NH – 28-B and rail with rest of the country. TSL is about 500m. (W) from Bagha Railway Station. .

ii) **Land Form, Land use & Land ownership:**

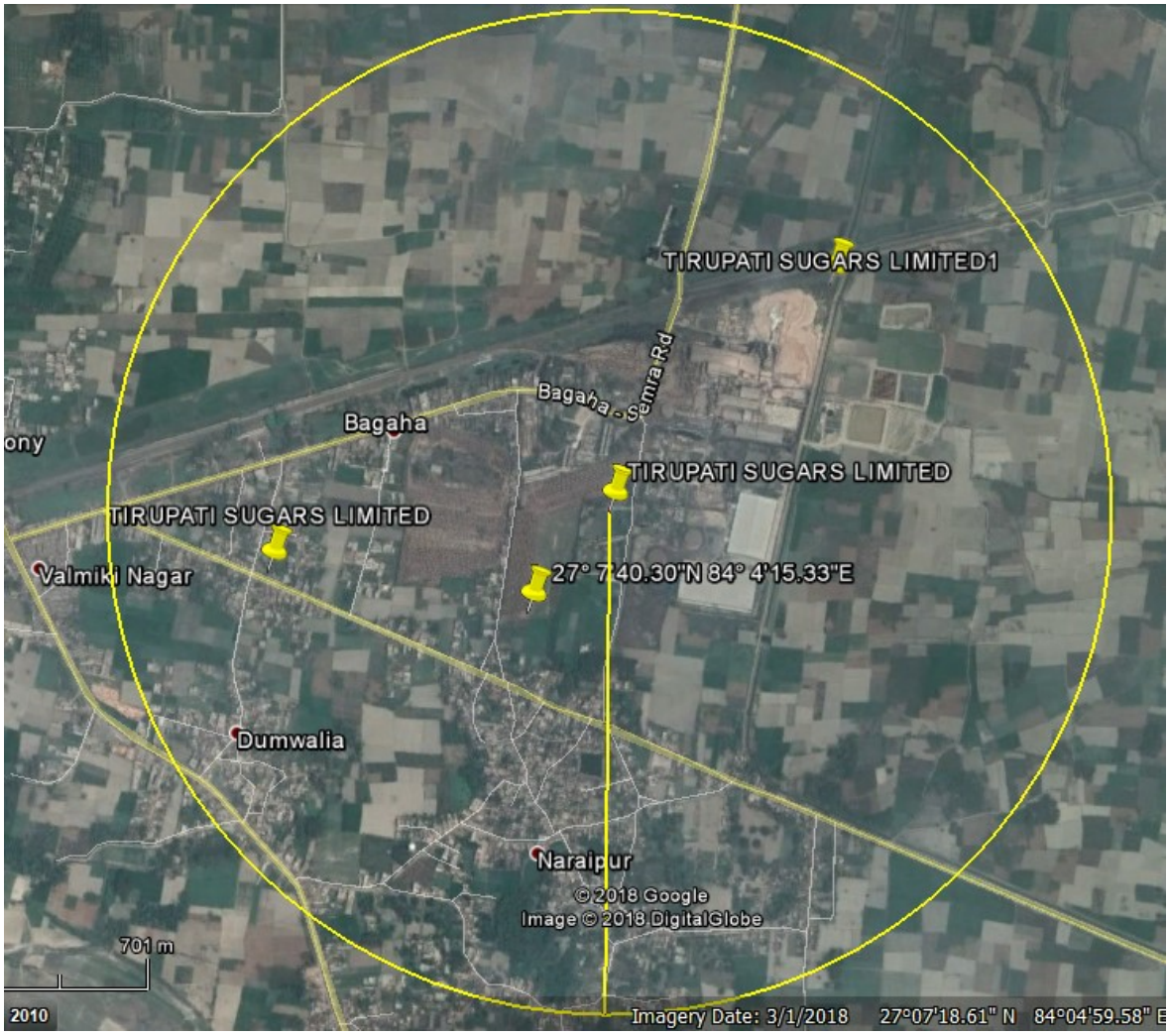
Within 10 Km. Area	Sensitive targets are safe away
• There is no forest area • There is no biosphere reserve • There is no national park • There is no wildlife sanctuary	• NH – 28B approx. 0.75Km. away • River Gandak at a distance of 1.75 km • Nearest Railway Station Bagaha at 500m. distance • Village Naraipur at 500m

The expansion project is proposed within existing premises and for proposed Distillery plant, the land is proposed (8 ha.) for industrial purpose. It is owned by the TSL under ownership. The terrain is almost flat and entire area is mixed area. Project site is already under ownership of TSL.

iii) **Topography (along with map):**

The terrain is almost flat, no hills in the surroundings. The geographical coordinates are Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL.

1000 M. RADIUS LOCATION MAP



iv) **Existing land use pattern (Agriculture, non agriculture, water bodies including CRZ), shortest distance from the periphery of the project forest, national park, wild life sanctuary, eco- sensitivity area, water bodies Distance from HFL line, CRZ notification for notified industrial area.**

At present existing land use of the project area in which proposed expansion project and installation of new distillery project will be done is ***industrial*** in nature.

v) **Existing Infrastructure ;**

Land for the proposed expansion is vacant within the existing premises. All necessary infrastructure is available within premises.

vi) **Soil Classification:**

The soil of the district are old alluvium grey to greyish yellow, fine textured cracking soils, The soils are characterized by greyish yellow to grey colour, medium fine to fine textured, neutral to slightly alkaline reaction having weakly developed profiles. These soils on drying develops cracks. The cracks are 5 to 8 cm wide and 60-120 cm deep. The transported old alluvium catenary soils are generally of alluvial origin. Alluvial soils cover the entire land mass of the north of the Ganges.

vii) **Climatic Data;**

The temperature variations in different three seasons are given in table below:

Period	Min$^{m.}$ Temperature	Max$^{m.}$ Temperature
Mar. – June	18 ^{0}C – 22 ^{0}C	32 ^{0}C – 44 ^{0}C
Jul. – Oct.	16 ^{0}C – 18 ^{0}C	30 ^{0}C – 37 ^{0}C
Nov.- Feb.	5 ^{0}C – 11 ^{0}C	15 ^{0}C – 24 ^{0}C

Rainfall in Study Area :

Period	**Rainfall in mm. (Source : IMD Report)**
2013	1375.7
2014	1404.7
2015	1068.4
2016	1412.9
2017	2054.9

Wind Direction and Velocity :

Season	**Direction**	**Maximum Velocity**
Mar. – June	SE to SW	5 – 30 km/hr
Jul. – Oct.	NE to SW	2 – 25 km/hr
Nov.- Feb.	NW to SE	1 – 22 km/hr

viii) **Social Infrastructure available ;**

- Schools (Primary as well as secondary)
- Colleges (Science, commerce, Arts, engineering, medical, pharmacy, education)
- Health centers, dispensaries, hospitals
- Electricity
- Drinking water supply
- Banks (Cooperative as well as nationalized) and credit societies

5.0 Planning Brief:

i) **Planning concept (type of Industries, facilities, transportation etc) Town and country planning/Development authority classification.**

Type of Industry :

Tirupati Sugars Limited, the origin of the Company dates back to setting up of a sugar factory at the present location under the name and style of M/s. Ganga Devi Sugar Mills by Khaitan Group of Padrauna in 1936. The mill was taken over by Shri Tulsidas Kanoria in 1950, who changed the name to M/s. North Bihar Sugar Mills Ltd. Subsequently, Bagaha Chini Mills Ltd. was incorporated on 29th July 1979. The assets and liabilities of the company M/s North Bihar Sugar Mills Limited were taken over by M/s Bagaha Chini Mills Limited under the Scheme of Arrangement, and under the order of Hon'ble High Court of Kolkata, in the year 1980. The company was taken over by HMP group in 1987 from Kanorias. The name was subsequently changed to HMP Sugars Ltd. on 22nd February 1990. The name was further changed to Tirupati Sugars Limited w.e.f. 18th June 2002. This company was taken over by Mr. Deepak Yadav in September 2008 as sick unit under BIFR. The company was turned around by him and started earning profit from the 1st year of takeover itself. Under this new ownership the crushing capacity of the sugar plant was enhanced from 2500 TCD to 3500 TCD during the season 2009-2010 and was further enhanced to 5000 TCD plus in the year 2011-12. The crushing capacity was enhanced further to 7000TCD in 2017. The Company has always followed the philosophy of ploughing back the profits, by continuously re-investing in the sugar factory and undertaking modernization and expansion projects which is evident from the above mentioned expansions.

Now, to meet the increasing demand of local farmers and surplus availability of Sugarcane in the area, the management of TSL has embarked upon expansion of existing sugar mill project from existing 7000 TCD upto 15000 TCD and also decided to go for the expansion and modernization of Sugar Mill its bagasse based co-generation unit from 18 MW at present to 88 MW by adding 70 MW co-generation capacity from which steam and power requirement in sugar manufacturing shall be met and surplus power shall be exported to the nearby grid at Bagaha-1 of NBPDCL. This will give boost to the local rural economy and also give its contribution to the State by augmenting renewable power supply, which is the need of the time.

TSL also wish to establish new Distillery plant of 200 KLPD based on Molasses / Sugar Cane Juice / Sugar Cane Syrup for production of different products as per market demand viz. Rectified Spirit (RS) , Absolute Alcohol (AA), Fuel Ethanol, Pharma Grade Ethanol and / Or Extra Neutral Alcohol (ENA).

Facilities:

Production and Manufacturing Details are as under;

Manufacturing Facilities	Product	Existing	Proposed Addition	Total Final Capacity
Sugar Mill	Sugar	7000 TCD	8000 TCD	15000 TCD

Manufacturing Facilities	Product	Existing	Proposed	Total
Distillery	Ethanol / RS/ENA	-	200KLD	200KLD
Captive Power generation	Power	18 MW	70 MW	88MW

Transportation:

Mode of transport of raw materials & finished products will be via road through trucks.

Town/Country Planning/Development authority Classification:

The proposed project is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL. Tirupati Sugars Limited, the origin of the Company dates back to setting up of a sugar factory at the present location under the name and style of M/s. Ganga Devi Sugar Mills by Khaitan Group of Padrauna in 1936. The mill was taken over by Shri Tulsidas Kanoria in 1950, who changed the name to M/s. North Bihar Sugar Mills Ltd. Subsequently, Bagaha Chini Mills Ltd. was incorporated on 29th July 1979. The assets and liabilities of the company M/s North Bihar Sugar Mills Limited were taken over by M/s Bagaha Chini Mills Limited under the Scheme of Arrangement, and under the order of Hon'ble High Court of Kolkata, in the year 1980. The company was taken over by HMP group in 1987 from Kanorias. The name was subsequently changed to HMP Sugars Ltd. on 22nd February 1990. The name was further changed to Tirupati Sugars Limited w.e.f. 18th June 2002 & since, then the land is being used for industrial purpose and will be used for the same purpose only.

ii) **Population Projection:**

No major population influx is anticipated due to the proposed expansion project.

iii) **Land Use Planning**

Site Layout Plan enclosed.

iv) **Assessment of Infrastructure demand (physical & social) :**

The basic infrastructure such as roads, electricity, transportation, drinking water supply, health centers and hospitals, school, colleges, sanitation facilities are available in the vicinity. The proposed project is not going to exert any unbearable load on any of these resources. In fact, the proposed expansion project could reduce the electricity load of the local area by exporting 70MW of power to State Grid.

v) **Amenities/Facilities:**

Canteen, Laboratory, rest room, medical facilities, drinking water, etc. are available within existing project premises.

6.0 **Proposed Infrastructure:**

No new infrastructure is planned for the proposed expansion project. For Distillery plant some infrastructure will be developed

i) **Residential Area (Non-Processing Area):**

No residential area is envisaged in the proposed project.

ii) **Green Belt Area :**

15.78 Ha. land is being utilized for green belt development within existing premises.

For new Distillery Plant, an additional 2.6 ha (33% of proposed Distillery Land) land will be developed as Green belt development of total land of 8 ha.

iii) **Social Infrastructure:**

All infrastructure facilities are existing in the vicinity of the TSL.

iv) **Connectivity**

Tirupati Sugars Limited., (TSL), is situated at village, Narainapur, Bagha District West Champaran (District HQ- Bettiah), Bihar having Latitude 27°07'39.61"N & 27°07'55.31"N & Longitude 84°04'02.12"E & 84°04'44.33"E at 310 m. above MSL. It is about 65 kms from district head quarter Bettiah and 1 Km from sub-divisional town Bagha is well connected by NH – 28-B and rail with rest of the country. TSL is about 500m. (W) from Bagha Railway Station.

v) **Drinking Water Management :**

After proposed expansion existing borewells will be used as drinking water source.

vi) **Sewerage System:**

All the domestic waste water will be disposed of through septic tank followed by soak pit inside premises.

vii) **Industrial Waste Management:**

Waste Water Generation & Treatment ;

In the proposed project, All the generated Solid Waste and Liquid Effluent is being treated and managed as per guidelines of E(P) Act.'1986. Spent Wash concentration in Multi-Effect Evaporators followed by Incineration Boiler and suitable Condensate Polishing Unit to enable entire recycle of treated Process Condensate as per latest CPCB requirements. Waste Water Recycle and Reuse & employ Spent Wash Concentration followed by Incineration as their comprehensive Effluent Treatment in order to achieve Zero Liquid Discharge.

Air Pollution:

For expansion and modernization of the sugar mill to 15,000 TCD and for that high pressure boiler and turbine would be required. The proposed expansion of co-gen unit by 70 MW would consist of two new 2x175 THP high pressure boiler with two new 2x35 MW extraction- cum- condensing turbo generator.

To minimize air pollution load from new boiler, wet scrubbers will be installed followed by a new ~ 76 m height stack chimney for wider dispersion of pollutants.

viii) **Solid Waste Management:**

In the proposed Distillery project, All the generated Solid Waste and Liquid Effluent is being treated and managed as per guidelines of E(P) Act.'1986. Spent Wash concentration in Multi-Effect Evaporators followed by Incineration Boiler and suitable Condensate Polishing Unit to enable entire recycle of treated Process Condensate as per latest CPCB requirements. Waste Water Recycle and Reuse & employ Spent Wash Concentration followed by Incineration as their comprehensive Effluent Treatment in order to achieve Zero Liquid Discharge as per CPCB guidelines.

ix) **Power Requirement & Supply/Source:**

During proposed expansion and modernization of the sugar mill to 15,000 TCD and for that high pressure boiler and turbine would be required. The proposed expansion of co-gen unit by 70 MW would consist of Two new 175 THP high pressure boilers with Two new 35 MW extraction- cum- condensing turbo generator. The new setup would take care of the energy and steam requirement of our sugar mill's expansion programme as well as generate further 70 MW surplus electricity to be exported to the power grid of the State (NBPDCL/ BSPHCL). Distillery has separate Incineration Boiler & its own Co-Gen Turbine

7) **Rehabilitation & Resettlement (R & R) Plan:**

As there is no requirement of additional land for the proposed expansion project for sugar Mill and co-generation plant.

Land is only required for set up of new proposed Distillery plant project which is under/acquired by TSL, so there is no need of any new Rehabilitation and Resettlement (R&R) Plan.

8) Project Schedule & Cost Estimates:

i) Likely date of start of construction & likely date of completion.

Expansion activities will be started immediately after obtaining Environmental Clearance from MOEF&CC, New Delhi. Expansion activities will be completed within 12 months time after start.

ii) Estimated Project cost along with analysis in terms of economic validity:

Project Cost Details for expanding the Co-Generation capacity only are as under ;

S.NO.	DESCRIPTION	Rs. In LAKHS
A.	**CIVIL WORKS**	**2650.00**
B.	**MECHANICAL WORKS**	
1	**Boiler**	**4850.00**
2	**Turbo-generator**	**2800.00**
3	**Fuel handling system**	**800.00**
4	**Cooling Tower**	**220.00**
5	**Water Treatment Plant**	**330.00**
6	**Balance of Plant (other than specified above, like EOT Crane, Air compressor, Ventilation & AC, Piping, Pumps, Fire fighting, Ash handling, etc.,)**	**1500.00**
	TOTAL FOR MECHANICAL WORKS	**10500.00**
C.	**INSTRUMENTATION WORKS**	
1	**Distributed Control Systems including UPS & Balance of plant Instrumentation**	**340.00**
D.	**ELECTRICAL WORKS**	
1	**Generator Transformer**	**220.00**
2	**Switchyard**	**200.00**
3	**Dist. Transformers / Conv Transformers**	**90.00**
4	**LT Package**	**140.00**
5	**VFD Package**	**170.00**

6	**Electrical contracts package**	**290.00**
7	**Cables**	**150.00**
	TOTAL FOR ELECTRICAL WORKS	**1260.00**
	TOTAL WORKS COST	**14750.00**
Notes:		
1	**The above cost includes design, manufacturing, supply, transportation to site and erection & commissioning and are exclusive of all taxes & duties**	

For set up of New Distillery Plant, total cost of the project is Rs. 160 crore in which 40 crore will be utilized for Environmental Management Plan/ Pollution control system.

9) **Analysis of Proposal (Final Recommendation):**

(Financial & Social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area.)

To meet the increasing demand of **Fuel Grade Ethanol** and surplus availability of Molasses from nearby sugar mills, management of TSL has embarked upon set up of new Distillery Project along with expansion of Captive Power Generation Plant and Sugar Mill.

No power will be outsourced from outside agencies. Power requirement will be met by own captive power generation plant.

New employment opportunities may be generated due to proposed expansion activities.

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