
بسم الله الرحمن الرحيم

SHAKARGANJ LIMITED (BHONE)

Improvement of Profitability in Sugar Industry By Adding Co-products

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Plant Introduction

Shakarganj Limited, (Bhone) was established in 2005-6 have:

- Sugar plant with capacity of 8,000 TCD.
- 03 Bio fuel plants of capacity 200,000 liters/day.
- Anhydrous plant of capacity 100,000 liters/day.
- 04 Digesters to produce 60,000 m3/day bio gas.
- Tiger Composting Plant with capacity of 700 bags per day.
- Steel mill, Crescent Hadeed limited (CHL) with two induction melting furnace (IMF) of capacity 12 Ton per heat cycle each.

Paper Introduction

This paper will be helpful to the people related to sugar industries who are planning to go one step further by value adding the by-products of sugar.

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- Paper describes about the by products of sugar plant like Bagasse, Molasses and Mud and how Shakarganj limited converts them into final products.
- Paper also describes about the by-products of Bio Fuel plant like Spent Wash, Biogas and CO2.
- Paper also describes about the Shakarganj tiger compost & Shakarganj Tiger (Aab-e-Zarkhaiz)

Vision and Mission Statement

Initially, Shakarganj Limited started with conventional sugar plant. But Vision was to convert the by products to final products instead to sale them as raw material like most sugar plants does, by value adding the by products and to support the sugar industry, growers, country economy and create employment by using following steps:

- Exporting the Ethanol (To generate the foreign exchange)
- Reduce the CO2 import (To save the foreign exchange)
- Reduce the import of fuel by anhydrous blending (To save the foreign exchange)
- Provide the inexpensive fertilizer Shakarganj Tiger Compost to growers (To enhance Farmers profitability)
- Provide free of cost Shakarganj Tiger (Aab-e-Zarkhaiz) to farmers.

Sugar Plant Products and By Products

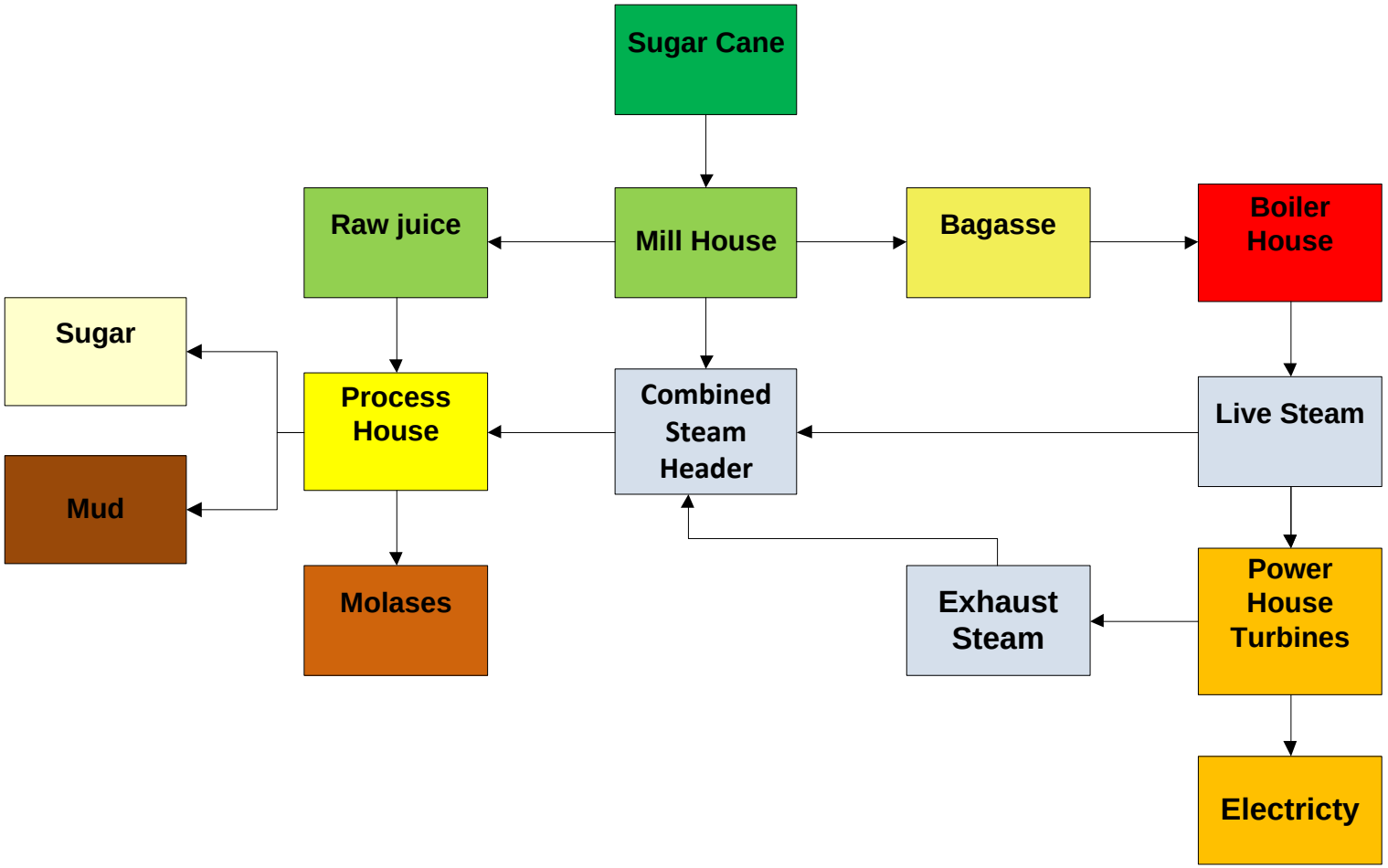
Sugarcane procured for sugar making process almost gave the sugar recovery of 9.5% to 10.5% in Shakarganj Limited area and remaining by products.

Molasses

Mud

Bagasse

Sugar Process Flow Diagram

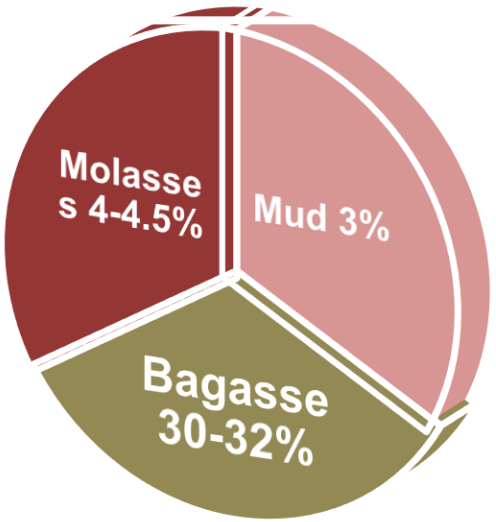


Detail of Sugar Plant By Product

Sugar plant produce the Bagasse, Mud and Molasses as by-products during sugar making process but conventional sugar plant did not value added these by- products and sale them in market.

By Products Ratio:

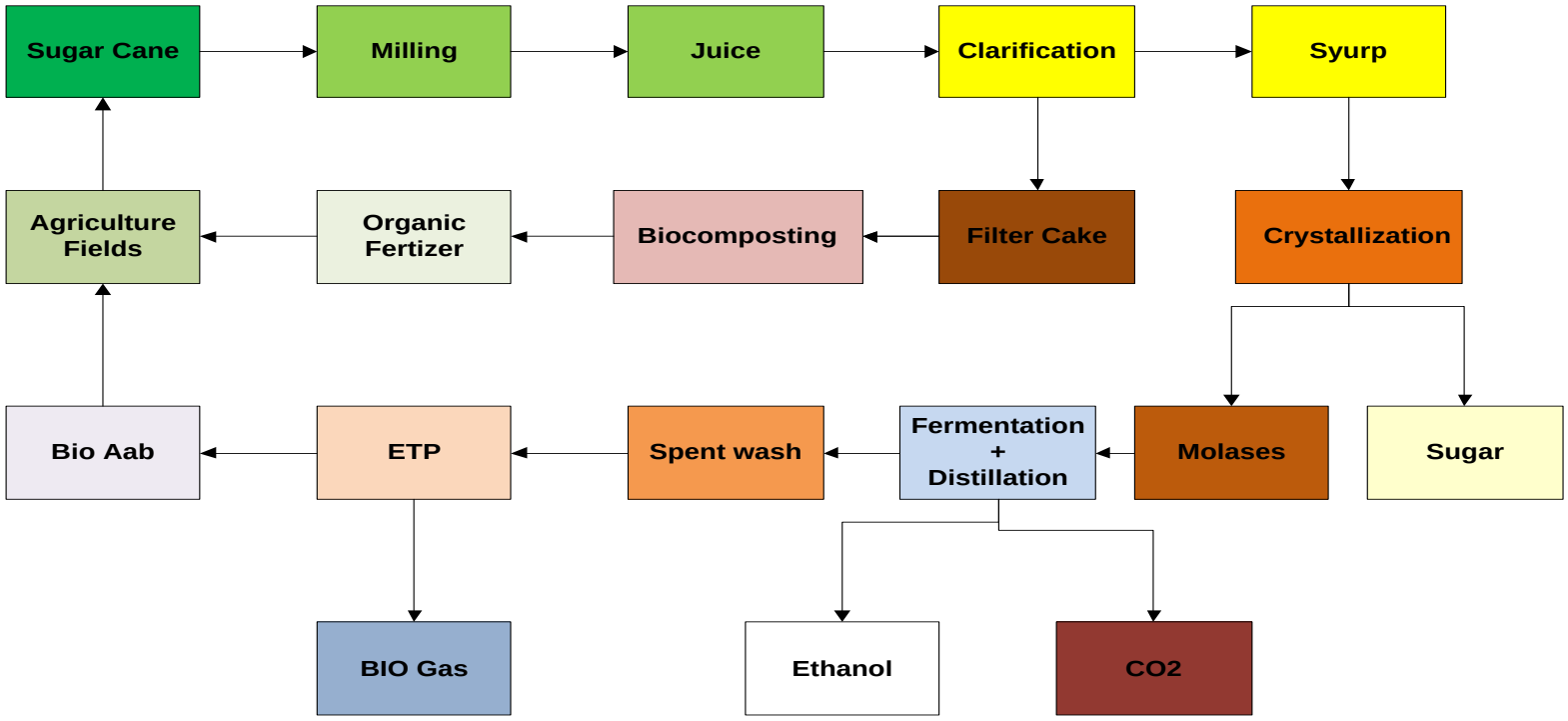
- Bagasse 30-32 %
- Molasses 4-4.5 %
- Mud 3 %



These by Products are being used to produce different products in Shakarganj Limited and would be discussed in details in next slides.

Sugar Plant Products by Processing the by products Nature to Nature

Shakarganj Limited value added the byproducts to generate additional revenue and to support growers and country economy.

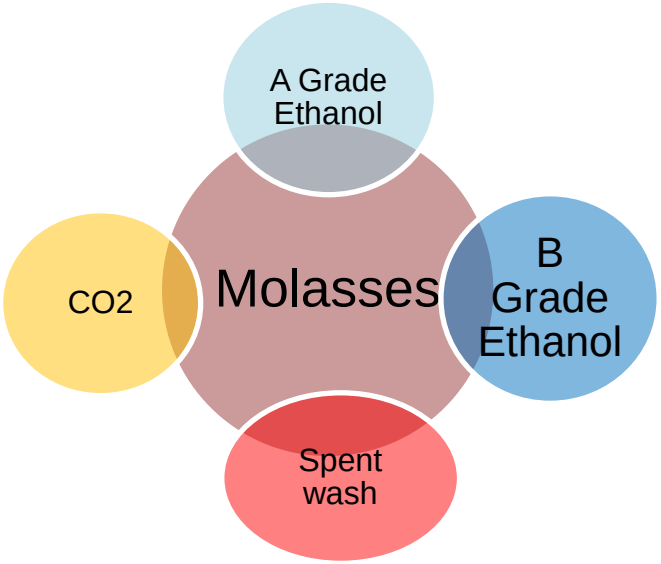


Molasses

Molasses is a by product obtained during sugar making process. In conventional sugar plants raw molasses is sold out and it did not add additional benefit in company profit and country's economy.

In Shakarganj Limited, molasses is used as raw material for Bio fuel Plant to produce following products & by products.

- A Grade Ethanol 96.4%
- B-Grade Ethanol 93%
- CO2
- Spent Wash



Detail of Bio Fuel Product & By-products

Shakarganj Limited value added the following by-products to generate additional revenue and to support growers and country economy.

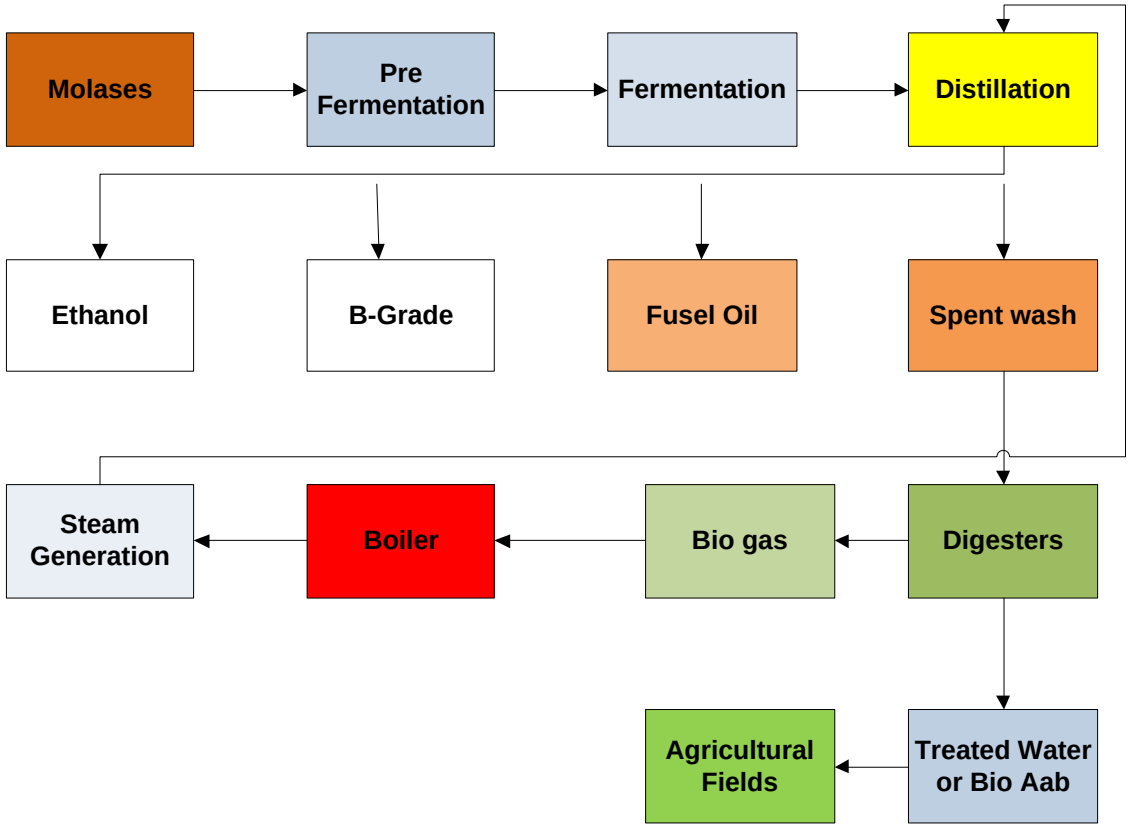
Molasses:

- A -Grade Ethanol 94%
- B-Grade Ethanol 5.8%
- CO2

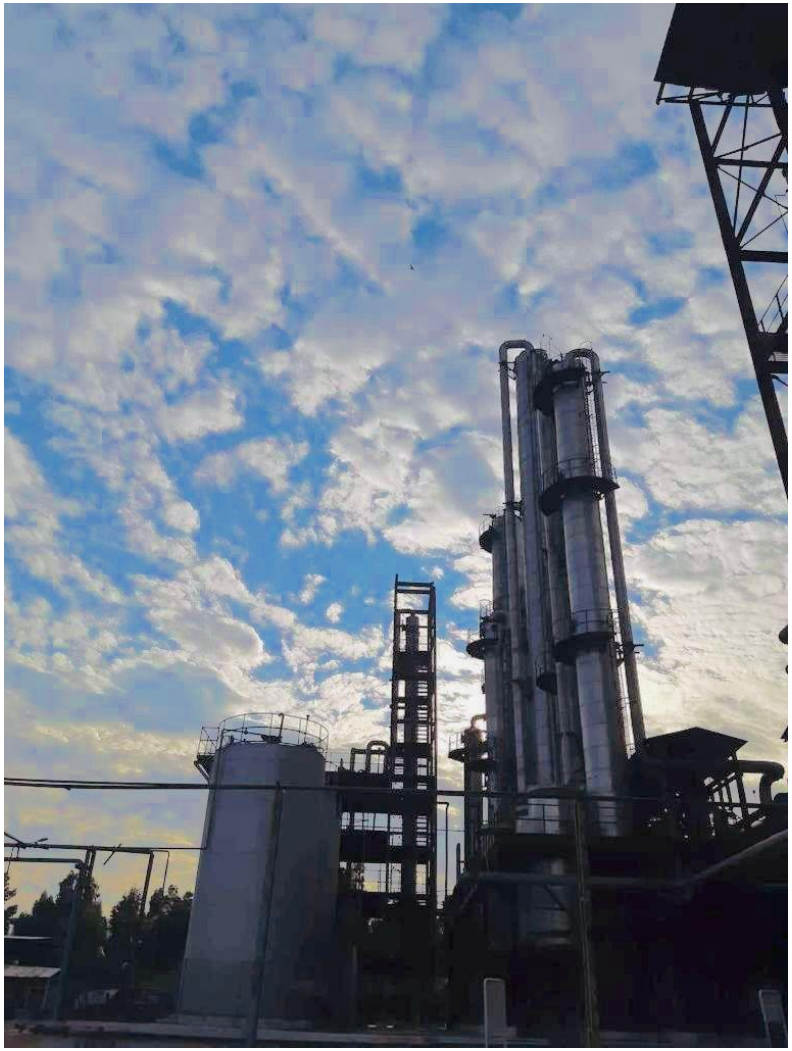
Spent Wash:

- Bio Gas
- Shakarganj Tiger
- Aab-e-Zarkhaiz

Bio Fuel & ETP Process Flow Diagram

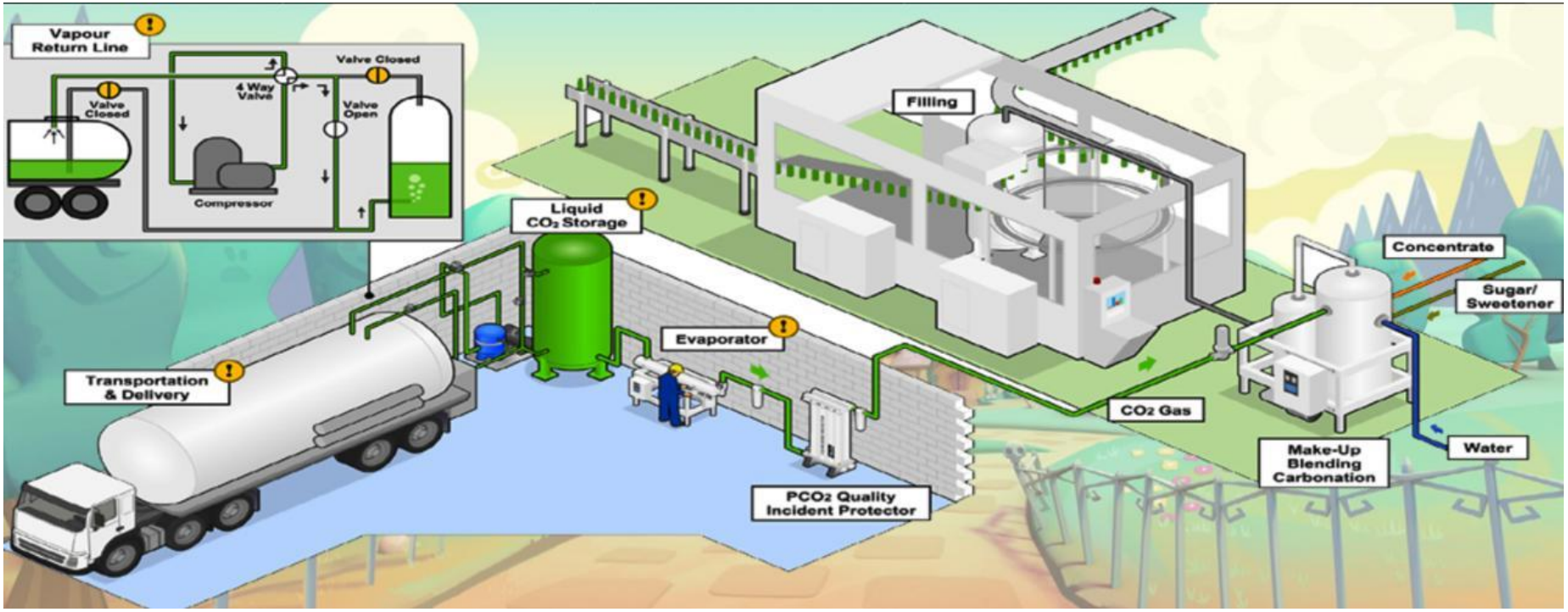


Bio Fuel Division



CO2 Plant

CO2 is a by-product of ethanol production which is produced during molasses fermentation. Shakarganj Limited (Jhang) also have the CO2 plant with the production capacity of 48 MT/Day with 12 fermenters to convert raw CO2 gas into liquid CO2 for beverage. Which helps to generate additional revenue and also save the country's foreign exchange which is being used on import of CO2.



One Month Comparison of Bio Fuel Production Cost and Revenue

Description	Per Day (MT)	Price/MT (Rs.)	Total Price Per Day (Rs.)	Price Per Month (Rs.)	Million (Rs.)
Molasses	425	25,000	10,625,000	318,750,000	319
Bio Fuel Processing Cost			2,052,940	61,588,200	62
Total Cost			12,677,940	380,338,200	380
Ethanol Production	80	175,750	14,060,000	421,800,000	422
B-Grade	4.77	100,000	477,000	14,310,000	14
CO2	40	18,000	720,000	21,600,000	22
Revenue Generated			15,257,000	457,710,000	458
Extra Profit Generated			2,579,060	77,371,800	77.37

Anhydrous Plant

- Shakarganj Limited (Bhone) have the ability to convert the 100,000 Liters of ethanol/day into anhydrous which can be blended with fuel to reduce the pressure on foreign exchange by importing fuel.

- Many countries are using the anhydrous as a fuel by its blending and we should also convert on this to save our foreign reserves.

- I would request to Psst Officials to negotiate with government officials to allow the blending of Anhydrous Ethanol with fuel to reduce the energy crisis.

Spent Wash

Shakarganj Limited (Bhone) have the ability to convert the spent wash into Biogas by using biological process.

There are four digesters installed with production capacity of 60,000 m3 Biogas per day by using spent wash. This gas is being used at boiler as a fuel equivalent to bagasse.

It saves the 70-80 % of bagasse per day which saves the fuel cost of Bio fuel.

Effluent Treatment Plant

Shakarganj Tiger(Aab-e-Zarkhaiz)

Shakarganj Limited value added the spent wash and after treatment this water is providing to farmers free of cost

Nutrients of Tiger Aab-e-Zarkhaiz

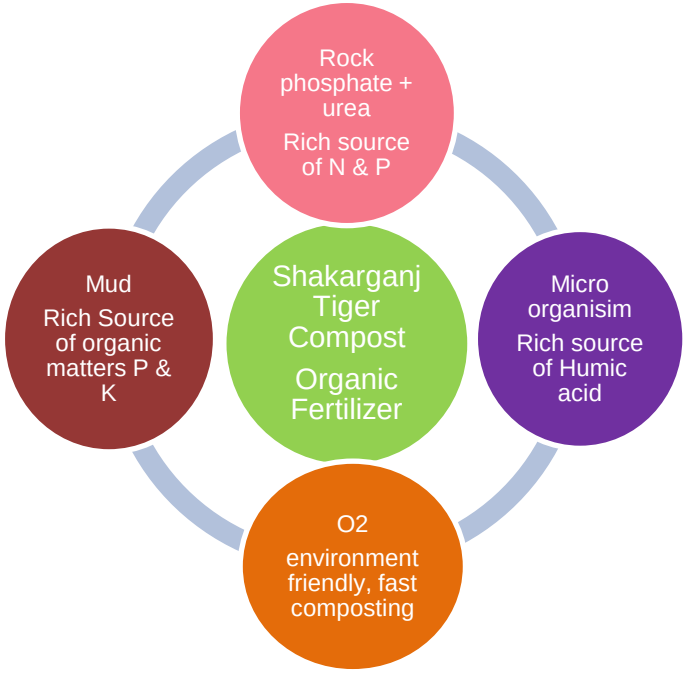
Consists of macro nutrients i.e. N, P, K

Micro nutrients i.e. Mn, B, Cu, Fe, Zn and Humic acid

Suitable for maira, heavy and sandy soils

Shakarganj Tiger Compost
(Organic Fertilizer)

Mud is a by product of every sugar industry and its sold out in very cheap price. In Shakarganj Limited, Mud is value added to making inexpensive fertilizer for farmers with the name of Shakarganj TIGER Compost. Shakarganj Tiger compost (fertilizer) which is a value added nutritional material, rich source of organic matter and essential macro & micro nutrients. It is helpful for economically successful raising of vigorous sugarcane crop. Shakarganj Tiger compost is provided to growers.



One Month Cost and Revenue Comparison of Tiger Compost

Description	Ingredients / Bag (kg)	Unit Price (Rs.)	Total Amount Per Bag (Rs.)	Production Per Day	Production Per Month	Total Amount Per Month	Million (Rs.)
Filter Cake	18	3.57	64	0	0	-	-
DAP	2	218	436	-	-	-	-
Urea	4	48	192	-	-	-	-
Gypsum	2	5	10	-	-	-	-
Sludge	2	0	0	-	-	-	-
Fine Ash	2	0	0	-	-	-	-
Packing Material	-	64	64	-	-	-	-
Labour Wages	-		20	-	-	-	-
Electricity cost	-	20	20	14,400	-	432,000	0.43
Total Cost	-	-	806	720	21,600	17,415,216	17.4
Revenue Generated	-	-	1,200	720	21,600	25,920,000	25.9
Extra Revenue Generated	-	-	-	-	-	8,072,784	8.07

Bagasse

Bagasse is main source of power/steam generation for sugar making process in sugar industry. In conventional sugar industry surplus bagasse after steam and power generation is sold out in open market. In Shakarganj Limited surplus bagasse is being used for power/steam generation for Steel Mill, Bio fuel plants and also used by Particle Board Plant to make particle boards.

Power Export

- In 2014, to meet the challenges of modern age Shakarganj Limited (Bhone) decided to develop a margin of electricity to Export.

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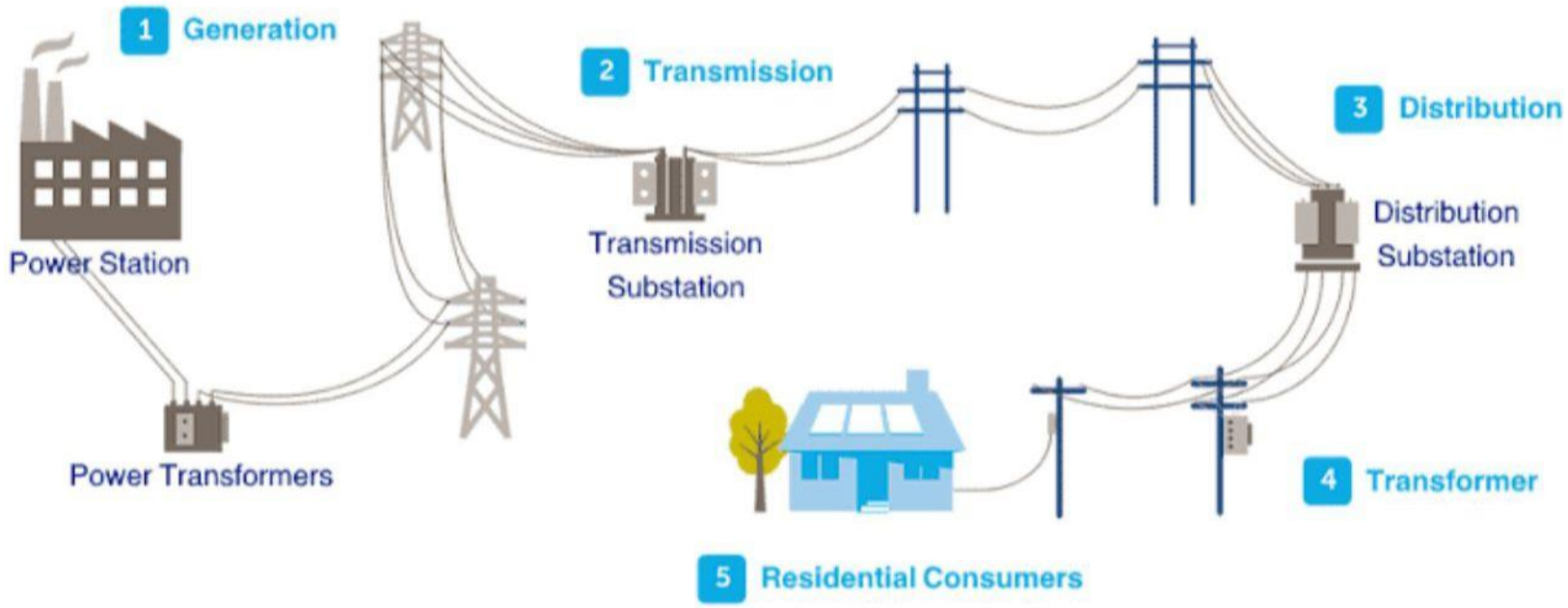


Power Export

- Initially, Shakarganj Limited partially shifted to high pressure (65 Bar) system and replaced two MP (25 bar) boilers of capacity 80 TPH and 6 MW TG-Set MP (25 bar) with high pressure boiler (65 bar) of capacity 100 TPH, and 15 MW (65 Bar) back pressure TG-Set.
- Shakarganj Limited started to export the power to FESCO after signing a contract for 4-6 MW power export.

Issues Faced During Electricity Export

- Export feeder tripping due to voltage & frequency variation
- Process steam deficiency
- Turbine steam consumption
- Turbine speed variation

- Keeping in view, the issues with export system, Shakarganj management decided to setup a steel mill (Crescent Hadeed Limited) with initially 01 induction melting furnace of 12 Ton capacity per heat cycle which came in operation at start of crushing season 2015-16.

Detail of TG-Sets at SML Bhone

TG-Set	Power Rating	Voltage Rating	Turbine Type	Steam Pressure
TG-Set 1	16.5 MW	11 KV	Condensing /Extraction	65 Bar
TG-Set 2	15 MW	11 KV	Back pressure	65 Bar
TG-Set 3	3 MW	11 KV	Back pressure	65 Bar

Detail of Boilers at SML Bhone

Boiler Name	Capacity	Steam Pressure
Boiler no. 1	100 TPH	65 Bar
Boiler no. 2	80 TPH	25 Bar
Boiler no. 3	35 TPH	65 Bar

Steel Mills

- Steel Mill is also installed at Shakarganj Limited (Bhone) that uses electricity against make up steam in crushing season.
- There are two Induction Melting Furnaces are installed for making billets.
- Capacity of IMF is 12 MT each per heat cycle.

One Month Comparison of Power Export Revenue against Surplus Power

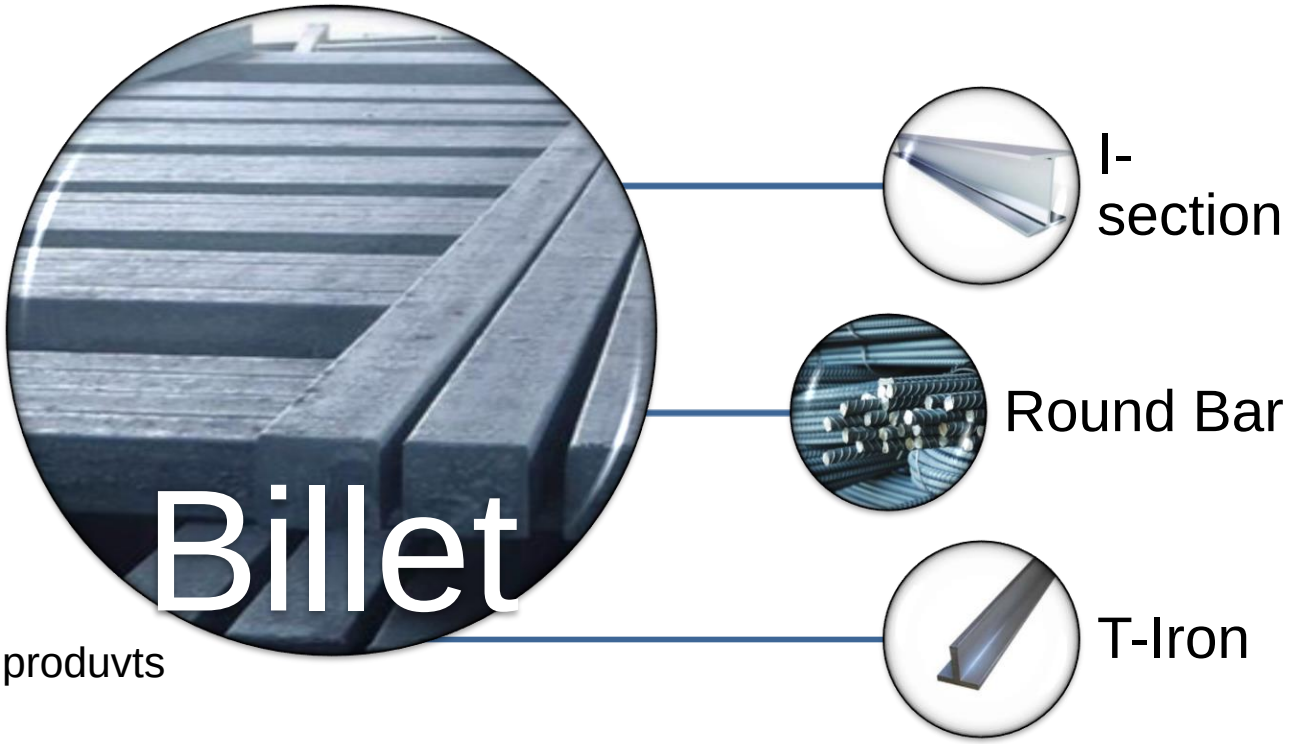
Power Export against Make Up Steam Requirement					
Description	**Power Exported per Day (kWh)**	**Unit Price (Rs.)**	**Amount Per Day (Rs.)**	**Amount Per Month (Rs.)**	**Million (Rs.)**
CHL 01 (IMF)	**100000**	**20**	**2,000,000**	**60,000,000**	**60**
CHL 02 (IMF)	**200000**	**20**	**4,000,000**	**120,000,000**	**120**

Product of Steel Mill

Steel Mill of Shakarganj Limited (Bhone) produce Billets of C.C Type.

Further products can be produced from billets:

- I-Section
- T Iron (TR)
- Round Bar
- Angle Iron
- Deform Bar
- Spring Steel
- Many other small steel produvts



One Month Comparison of Steel Mill Production Cost and Revenue

Description	Per Day (MT)	Price/MT (Rs.)	Total Price Per Day (Rs.)	Price Per Month (Rs.)	Million (Rs.)
Scrap	300	121,000	36,300,000	1,089,000,000	1089
Billet Production	280	175,000	49,000,000	1,470,000,000	1470
Processing Cost		29,000	8,700,000	261,000,000	261
Total Cost	300	150,000	45,000,000	1,350,000,000	1350
Revenue Generated			49,000,000	1,470,000,000	1470
Extra Revenue Generated			4,000,000	120,000,000	120

Specialty Sugar Division

- Sugar Packing 1 - 5 kg pouches
- Brown Sugar Packing 0.5 kg Packing
- Sugar Cube White 0.5 kg Packing
- Sugar Sachets Stick / Square 5 g & 8 g
- Brown Sugar Sachets 5 g & 8 g

Specialty Sugar Division

Specialty Sugar Division Products

Sugar Sachets

Conclusion

- Sugar plant operation by value adding the by-products is the solution to overcome the crisis of industry and support the country's economy.
- Ethanol Production could increase the additional revenue and help the country's economy by saving foreign exchange.
- CO2 also generate additional revenue and also help the country by reducing the import.
- Spent Wash generates Bio Gas which could be used at boilers to save the bagasse.
- Shakarganj Tiger (Aab-e-Zarkhaiz) as by product of ETP used by farmers to increase land fertility.
- Pressed mud could be used to generate inexpensive fertilizer to increase revenue and to support the farmers.
- Anhydrous Ethanol could be used as fuel by its blending with fuel which could help to reduce energy crisis and could save foreign exchange.
- Steel Mill also generate the additional revenue.

Questions Please!

Thank you!