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<b>Sector</b>	Agro and Food Processing
<b>Sub - sector</b>	Food Processing
<b>Project No.</b>	AF-12
<b>Project Title</b>	Refined Sugar Plant

## Project Description

The proposed project envisages setting up of a refined sugar manufacturing unit. At present, considerable quantity of refined sugar is imported in India to meet the requirements of food processing and pharmaceutical industry. This project offers excellent opportunity to the existing sugar mills in Gujarat for value added processing through modern technology.

## Product Applications

Refined Sugar is a value added product made from raw sugar. The concept of Sugar refining has developed in the last two decades, with growing awareness about superior quality of food ingredients being used by Food processing industries.

White refined sugar is generally sold as granulated sugar, which comes in various grain sizes, depending upon the application – either household or industrial:

Applications:

- Packing it for retail marketing under brand name for domestic and export markets.
- Preparation of Dairy products like Ice cream, Yogurt, Shrikhand and Sweet milk, Sweet / Flavoured Lassi etc;
- Preparation of high quality Indian sweets like Rasgulla, Gulab Jamun, Chamcham, Khoya and Paneer base sweets, etc;. for domestic and export purpose.
- In manufacture of instant mixes and processed foods items.
- Commonly used in baking, decoration of cookies and other desserts.
- Preparation of high quality chocolates, toffees, Candies and other confectionary products.
- Base syrups for beverages, Fruit drinks and soft drinks.
- Pharmaceutical industries – for preparation of syrup bases for Pharmaceutical formulations and also for preparing coating material for sugarcoated tablets.

## Market and Growth Drivers

During 2005-06, the global sugar production has been estimated at around 145 million tones, with an increase of about 4 per cent from 2004-05 and about 3 million tons short of the projected world sugar demand of around 148 million tons. The global sugar production is forecast to reach around 150 million tons by the year 2006-07, led by a record harvest in Brazil, and India.

Brazil dominates the world in sugar production, producing around 30 million tons in the year 2005. Sugar output is expected to rise in Mexico and is expected to reach about 6 million tons in the year 2006-2007. Output in China for the year 2006-2007 is expected to increase by 6 per cent to

10.7 million tons. But in Thailand, sugar output is projected at 4.6 million tones, a decrease of about 15 per cent due to drought.

India is the second largest producer of sugar with production of about 18 million tons per annum, in the world, while it leads the world in sugar consumption. The Indian sugar industry is the second largest agro-industry in the world, which has a turnover of INR 500 billion per annum. It is estimated that in the year 2006-07, sugar production in India will increase further to a record level of 22.5 million tons.

The domestic sugar consumption is dominated by unorganized bulk consumers (eg. Sweet shops), contributing to 55%, followed by big industrial consumers such as soft drink companies, chocolate and confectionary makers, biscuit manufacturers, etc contributing 20%.

There is also opportunity in terms of value added processing by setting up of a stand alone sugar refining unit. This is evident from the fact that in the year 2004, when there was no shortage of sugar, the Government allowed import of 2.074 million tons of raw sugar, under advance license scheme, against zero duty and with an obligation to export the same quantity of refined sugar. However, due to lack of appropriate processing facilities in India, so far only 48,000 tons of refined sugar has been exported. Thus, it clearly indicates gap of refining facilities in India in general and Gujarat in particular.

There are 4 to 5 Refined Sugar manufacturers in India at present. E.I.D Perry from southern India has recently started Refined Sugar production to market it in retail market under Branded product. Dhampur Sugar, Balarampur Chini and Darula Sugar are other major players in refined sugar manufacturing in India. As per industry sources total refined sugar manufacturing capacity in India is in the range of 50,000 to 70,000 MT per annum as against Indian food processing, branded sugar retail market and pharmaceutical industry demand of approx. 150,000 to 200,000 MT per annum.

### **Growth Drivers**

- India has imported around 5069.65 MT of refined sugar during the year (2005-06). The import quantity rose tremendously as compared to the year 2004-05 which was having import of only 181 MT.
- India is one of the leading exporters of sugar in the international markets, in countries like Pakistan, Iran, Gulf Countries and in Nepal. Global preference is growing for Refined Sugar and it gives higher value addition and high returns, even if import of raw sugar is done. This is the main growth driver for increase in Refined Sugar capacity in India in recent years.
- Food processing industries, which forms part of the FMCG sector, is estimated to grow at a rate of 12 to 15% per annum. This will drive the growth of sugar industry in general and refined sugar demand in particular, in the coming years.
- The Pharmaceutical formulation industry is also poised to grow at a rate of 8 to 10% in India which will boost the demand of refined sugar consumption.

## Why Gujarat?

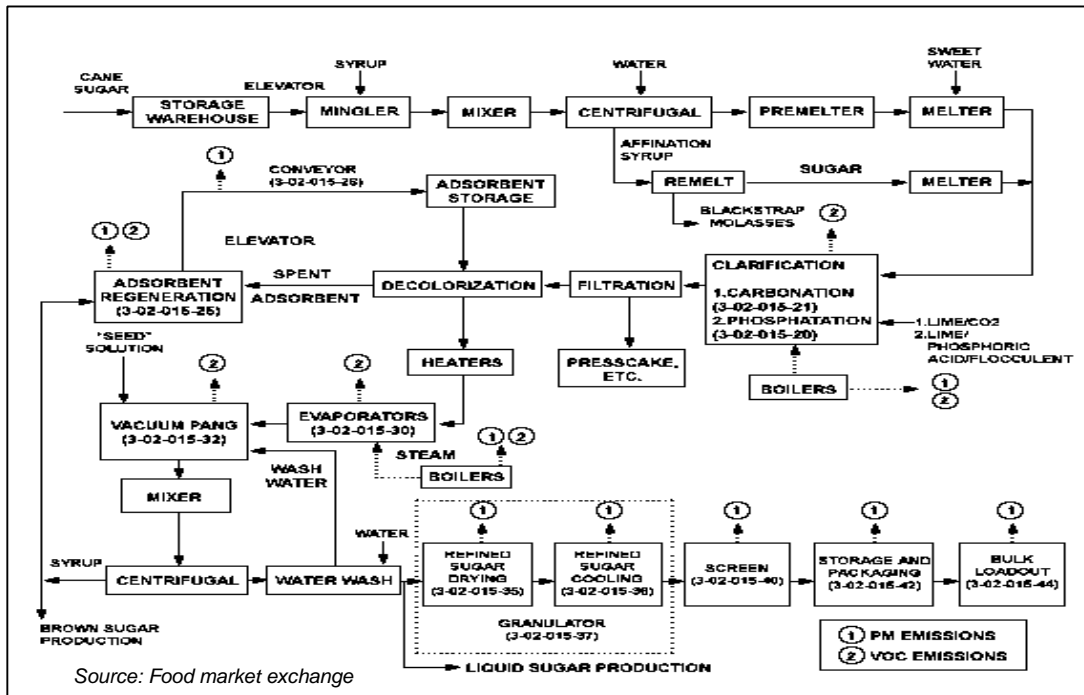
- With increase in Sardar Sarovar Dam height and completion of Narmada main canal as well as its distributary canals net work in South, Central and North Gujarat areas will ensure increased availability of irrigation facilities in Gujarat. This will boost up sugarcane cultivation in increased areas with high level of production. This in turn will increase sugar production in the coming years in new areas of South and Central Gujarat.
- Raw material availability - there are about 20 operating sugar mills in Gujarat with a combined installed capacity of about 12.5 Lakh tons of sugar production per annum.
- Increased availability of Sugarcane and attractive price of Sugar in the last few years provides opportunity for value added processing in the form of Sugar Refining in Gujarat. With improved cash flows of the sugar manufacturing cooperatives, after spiralling sugar prices in India and world over in the last 18 months, now manufacturers can take up this opportunity to set up value added processing units in the form of Sugar Refinery.
- Gujarat is home to one of the largest dairy industries in Asia, which is a major consumer of refined sugar.
- With a well established pharmaceutical industry based in Gujarat, the linkages intensity with such units appears to be high.

## Manufacturing Process

Most of the sugar in India is manufactured and sold as “Plantation White Sugar” which is produced by Double Sulphitation Process, while in developed nations refined sugar is produced by the Phospho floatation Process.

Refined sugar involves manufacturing process like dissolving raw sugar and purifying it with a phosphoric acid method similar to that used for blanco directo, a carbonation process involving calcium hydroxide and carbon dioxide, or by various filtration strategies. It is then further decolorized by filtration through a bed of activated carbon or bone charcoal depending on where the processing takes place. In India, activated carbon from natural sources like coconut shell and pinewood are available as a substitute of bone charcoal.

Refined sugar – Process flow sheet



**Technology sources**

Refined Sugar Technology is indigenously available from Sugar machinery and technology suppliers like M/s. Walchand Nagar Industries Limited - Mumbai, Hi Tech Engineering Company - Pune, Visjun Engineers - Ahmednagar, Yashwant Iron and Steel Works Limited - Kolhapur, Praj Industries – Pune, Vasantdada Sugar Institute - Pune etc;. However, to have international quality product, modern equipments for Ion-exchange process for Sugar syrup clarification will require necessary equipments and technology to be imported from overseas.

Moreover, the technology suppliers for production of superior quality sugar (blanco directo process) are as follows:

1. M/s. ISGEC – Noida.
2. M/s. Triveni Engineering & Industries Ltd. – Noida.
3. M/s. Walchand Nagar Industries Ltd. – Mumbai
4. M/s. Cimmmco International Ltd. - Vietnam
5. M/s. Mitsui Babcock Energy (I) Ltd. – UK.

**International Technology sources:**

TSK – Tsukishima Kikai Co. Ltd – Japan

**Raw materials**

Raw sugar required – 1.075 MT per MT of refined sugar.

The proposed project is suggested with 12500 MT p.a. capacity, therefore raw sugar required is 13450 MT pa.

Phosphoric acid – About 37.5 MT per annum

**Raw material availability:**

**Raw sugar:**

Gujarat has a well established base of sugar mills with 20 of them operating at present, with a combined installed capacity of 67500 TCD/annum. The production trend of sugar in Gujarat over the years is as follows:

**Last 3 Year - Raw Sugar Production in Gujarat**

Sr. No.	Particulars	Production (MT)
1	Net sugar production	
	2002-03	1251522.2
	2003-04	1066377.4
	2004-05	796830.1

*Source: Gujarat State Co-operative Sugar Industries Federation*

This raw material can be procured from sugar mills like:

1. Shree Khedut Sahakari Khand Udyog Mandli Ltd.
2. Shree Madhi Vibhag Khand Udyog Sahakari Mandli Ltd.
3. Shree Valsad Sahakari Khand Udyog Mandli Ltd.

**Phosphoric acid:**

Phosphoric acid can be sourced from numerous manufacturing units like Gujarat Alkalies and Chemicals Limited (installed capacity – 80 TPD), IFFCO - Kandla unit etc.

**Suggested Plant Capacity and Project Cost**

The suggested plant capacity for the proposed project is 10,000 MT Refined sugar per annum. The indicative project cost for the proposed unit is around INR 100 million (US\$ 2.25 million).

Sr. No	Cost of project	INR in million
1	Land and Land development	3.00
2	Building & Civil works	8.75
3	Plant & Machinery	52.5
4	Misc. Fixed Assets	9.25
5	Preliminary & Pre-operative	6.00
6	Provision for contingencies	7.40
	<b>Total Fixed Assets</b>	<b>86.90</b>
7	Margin Money for working capital	13.10
	<b>Total</b>	<b>100.00</b>
	<b>Means of Finance</b>	
8	Promoters contribution	33.30
9	Term loan	66.70
	<b>Total</b>	<b>100.00</b>

As indicated above, the proposed project will require approx 10000 sq. mt of land with proposed built up area of 2500 sq. mt. Considering 250 working days in a year the unit is proposed to have an

installed capacity of 12500 TPA or say 50 MT per day. The total fixed cost of the project is estimated at INR 89.50 million and INR 10.50 million is the working capital margin which adds up to block capital cost of INR 100 million. The unit being proposed to cater to domestic as well as to International demand, hence it is suggested to have a Debt equity ratio of 2:1. Thus, the estimated term loan amounts to INR 66.70 million and Equity contribution will be at INR 33.30 million.

## Plant and Machinery

Major plant and machinery required for the proposed project are as follows:

### List of Plant and Machinery

Sr. No.	Particulars	Quantity	Suppliers
1	Raw and Refined Sugar handling Conveyors	2 set	Raj Works and Industries, Indore
2	Raw Sugar Melter	1	Triveni Engineering & Industries, NOIDA, UP
3	Buffer tank	2	Shiva Engineers, Pune
4	Reaction tank	2	Neela India Pvt. Ltd, Mumbai
5	Heater	2	Jayesh Enterprises, Indore
6	Condensate tank	2	Shiva Engineers, Pune
7	Stirring unit	2	Shiva Engineers, Pune
8	Micronizer	1	Shiva Engineers, Pune
9	Flocculator	1	Triveni Engineering Ltd, Noida
10	Froth clarifier with scrapper and accessories	2	Triveni Engineering Ltd, Noida
11	Clear Melt receiving tank	1	Shiva Engineers, Pune
12	Dosing pumps	Lot	Shiva Engineers, Pune
13	Dosing tanks	Lot	Shiva Engineers, Pune
14	Automated melt clarification system	2	Triveni Engineering Ltd, Noida
15	Melt Filtration	1	Parksan Filters Pvt. Ltd., Mumbai
16	Deep Bed filter comprising pumps and tanks	1	Parksan Filters Pvt. Ltd., Mumbai
17	Polishing filter comprising pumps and tanks	1	Parksan Filters Pvt. Ltd., Mumbai
18	Acrylic resin columns	2	Pasteur Engineering Pvt. Ltd. Kolkata
19	Styrene resin columns	2	Pasteur Engineering Pvt. Ltd. Kolkata
20	Brine Filtration unit	2	Pasteur Engineering Pvt. Ltd. Kolkata
21	Boiler for Boiling house section	1	Cethar Vessels Pvt.Ltd
22	Refinery pan	3	Triveni Engineering Ltd, Noida
23	Decolorized liquor tank	2	Shiva Engineers, Pune
24	Pans for Boiling and seedler	2	Triveni Engineering Ltd, Noida
25	Pan condensers	2	Triveni Engineering Ltd

Sr. No.	Particulars	Quantity	Suppliers
26	Receivers	2	Triveni Engineering Ltd
27	Crystallizers	2	Triveni Engineering Ltd
28	Raw sugar pug mill	1	Triveni Engineering Ltd
29	Magma mixer	1	Mix Sep, Mumbai
30	Refined molasses tanks	1	Shiva Engineers, Pune

### Utilities

The proposed unit would necessitate 300 KL water/ ton and energy requirement of 250 MJ /ton.

### Project Time Line

The proposed project will have project time line period of 5 to 6 months and project implementation period of 10 to 12 months.

### Suggested Location

The suggested locations for the proposed project could be at Vadodara, Surat, Bharuch, Narmada and Valsad districts.

### Financial Indicators

Based on the profitability projections worked out for the proposed project, key financial indicators are as summarized in the following table:

**Key financial indicators**

Sr. No	Financial Ratios	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
A	Break-Even Point in % capacity	39.94	36.99	34.14
B	Debt-service Coverage Ratio	1.73	2.10	2.55
C	<b>Average DSCR</b>	<b>2.12</b>		
D	Return on Investment (ROI)	22.72	26.66	30.64
E	<b>IRR for 10 years project period</b>	<b>43%</b>		

The proposed project will have an indicative IRR of approx 43% considering initial 10 years operation. Proposed Debt equity ratio is 2:1.

### Clearances Required

The proposed unit will have to register itself with Secretariat of Industrial Approvals (SIA), Ministry of Industries and Government of India, by filing Industrial Entrepreneur's Memorandum (IEM), as it will have plant and machinery investment of more than INR 10 million.

The proposed project is targeting refined sugar consumer market in India, viz, food processing industries and pharmaceutical industry. The unit will be required to get registered its product with Indian and state food administration authorities for supply to process food industries. The unit will also have to meet IP standards for making supplies to pharmaceutical industry.

The unit will get EOU registration from RBI, DGFT and with APEDA as registered manufacturer exporter to avail export incentives for the refined sugar export in global markets.

BIS has laid the quality norms for refined sugar under their standard IS 1151:2003 (refined sugar – Specifications (second revision) and it is obligatory on the part of manufacturer to meet provisions under the PFA act for all ingredients and quality aspects for marketing product in Indian market.

### **Agencies to be Contacted**

Industrial Extension Bureau

Mott MacDonald India

Gujarat Agro Industries Corporation Ltd