



**GANGAKHED SUGAR  
& ENERGY LIMITED**

The power of  
sweetness





# Powerful Possibilities

A Rs. 450 Crore Integrated Cane Processing Plant spread over 200 Acre of land with close proximity to road & water.

Gangakhed Sugar & Energy Limited (Gangakhed) is an Integrated Cane Processing Plant (ICPP) located in the cane surplus district of Parbhani, Maharashtra. The Company has adopted an approach that will insulate it from sugar downturns by way of producing co-gen power and ethanol and thus develop a steady revenue stream.

The Company's ICPP boasts of a cane crushing capacity of 6000 TCD with two roller mill technology which enables it to produce 30 MW of co-generation power plant as against an industry average of 24 MW. Its 30 MW co-generation plant with 110 ata Pressure boiler also utilizes surplus bagasse from nearby sugar mills, biomass and agro waste and has planned to run for 330 days in a year. The 60 KLPD Multi Product Distillery Plant with incineration fired boiler (Zero discharge of distillery effluent), further adds to the Company's topline as it will use the **molasses** and **sugarcane juice** to produce ethanol.

Sugar  
6,000 TCD

Co-gen power  
(Green Power)

30 MW

Distillery  
60 KLPD  
with  
1.8 MW  
Co-gen

# Vision

To become leader in producing sustainable green co-gen power and bio fuels like ethanol.

# Mission

Running the plants with BAST (best available systems and technology) efficiently and produce world class quality products, setting up benchmarks and delivering excellence on a continuous basis.



# From Strength to Strength

Gangakhed enjoys a package of abilities that makes it a force to reckon with, Customer relationships, strong infrastructure, two roller mill technology, a variety of products, all come together to enable the Company to advance in the industry.



Masoli dam with Jackwell



Dam side Location

## Integration

Enhanced product value and insulated from overdependence on the sugar cycle through forward integration from sugar manufacture into manufacture of spirit, ethanol and co-generation.

## Capacities

Possesses a co-generation power capacity of 30 MW, sugarcane crushing capacity of 6000TCD and multiproduct distillery of a capacity of 60 KLPD with 1.8 MW co-generation power plant.

## Efficient cane development programs

Special sampling plantation, drip irrigation program, satellite mapping software and other measures are undertaken to increase cane yield acreage and recoveries.

## Technology

Adopted energy optimizing devices to maximize surplus energy from bagasse. The by-products of the process, namely molasses and bagasse would be used in distillery to manufacture Ethanol and as fuel for the boilers of co-generation plant respectively. Ethanol Plant is a zero discharge plant having its own 1.8 MW co-generation plant.

Investments have also been made in upgrading existing technology to avail of benefits like lower steam consumption, reduced moisture content and improved quality.

## Strong farmer relations

Does not discount the importance of a strong relationship with its farmers. Efforts are made towards providing them with financial assistance, technological support, seeds, fertilizer and educating them about good breed of cane. This has resulted in acquiring more than 25000 hectare of lands owned by the farmers, thus developing a trustworthy association with them.

## Recovery

Enjoys an average recovery of 11-12 %, resulting in higher production.

## Location

Enjoys all logistical benefits of a good location.

**Nearest City:** Gangakhed-7Kms, Parbhani-45kms,

**Nearest Railway Station:** Gangakhed, 7km

**Nearest Airport:** Nanded, 80 Kms, Aurangabad 250 Kms,

**Nearest Coal siding:** Parli,

**Land:** 200 Acres,

**Water Resources':** Masoli Dam-2 Km.

## Strong credibility

Group Company of Sunil Hitech Engineers Ltd, not only gives it access to strong infrastructure and capital support, but also awards it greater credibility in the market.

## Diesel pump

Possesses self own diesel pump within the factory.





# Chairman's statement



Gangakhed Sugar & Energy has a co-generation power plant capacity of 30 MW, Sugar processing capacity of 6000tcd, and distillery capacity of 60 KLPD with 1.8 MW co-generation power plant

Dear friends,

The Integrated Cane Processing Plant at Gangakhed is 'a sweet deal' for all parties involved. The Company benefits from the synergies of being in a cane surplus region and addressing the entire sugar value chain. The farmers and skilled workers in the region gain an alternative source of income and overall growth of the region in terms of revenue generation, taxes, logistics etc.

Gangakhed has a co-generation power plant capacity of 30 MW, sugar processing capacity of 6,000 TCD, and Distillery capacity of 60 KLPD with slop fired 1.8 MW co-generation power plant. Thus besides the primary produce, sugar, electricity and ethanol from molasses/ sugar cane juice. Surplus water available from the sugarcane is also recovered and used. Additionally, the crushing and off-season coincides with the period of peak demand for power which enables the Company to earn higher revenue from the sale of excess co-gen power. Since all the processes are integrated under one roof, the ICPP enjoys the flexibility to alter production according to market dynamics.

The Company is proactive in investing in the local farming community. A drip irrigation programme and an innovative satellite mapping system have been put in place to improve quality of the crop productivity.

The Company has also made efforts to include the farmers as stakeholders of the Company; currently 10,000 farmers are stakeholders. Gangakhed's efforts to continually strengthen its relationship with the farmers ensure an uninterrupted supply of raw material.

As an integrated plant Gangakhed stands to get several other advantages. Firstly, it is eligible to earn carbon credits which will create an entirely new revenue stream and carry tax benefits which will improve the Company's bottom-line. Secondly, the Company's eligibility for Mega Project status will entitle it to further benefits, the company is also eligible for REC which would add to its revenue.

Sugar is a capital intensive industry as compared to other industries. It involves huge capital expenditure and continuous procurement of environmental clearances. In order to combat these vagaries and generate stable cash flows, the company takeover sick units and make them viable. We are planning to enhance our sugar producing capacity to 16,000 TCD, distillery capacity to 180 KLPD and co-generation capacity to 150 MW. Gangakhed plans to effectively deploy technical knowhow to de-risk itself from the dependence on the sugar cycle and to chart its progress in the industry.

Regards,

Ratnakar M. Gutte  
**Chairman**

### Expansion proposal of sugar complex

Continuous up gradation of sugar cane cultivation area, it is expected to get more than 16.00 lac tonnes sugar cane yield with in two to three years. Hence Company has a proposal to expand the capacity to crush the available cane. The existing sugar complex layout having the provision for additional cane milling tandem 6000 TCD capacity, another 30 MW co-generation plant and another 60 KLPD ethanol plant with 1.8 MW co-gen power plant.



# Upgrades in Technology

Gangakhed has invested in latest technology to make the plant fully automated. Increased automation has also resulted in minimum human intervention and quality output. The Company is enjoying benefits from this upgraded technology:





Control room

## Steam consumption (per tonne of cane)

The Company's steam consumption per tonne of cane is around 39 % as against an industrial average of 45 %. Efforts are on to reduce it to 36 % and increase power savings. Every 1 % saved results in savings leaves higher surplus for the Company to export.

## Moisture content

At Gangakhed, the moisture content of the cane at the time of crushing is 48 % as compared to the industry average of 50-53 %. Measures are being taken to further reduce the moisture content and thus improve the efficiency of the boilers.

## Quality rating

The Gangakhed sugar plant has the capability to manufacture sugar up to 50 ICCUMSA Colour value.

## Captive consumption of power below 9 %

The Company is adopting a latest technology for crushing cane instead of a conventional technology. This reduces the cost of operations as well as improves recovery of sugar and reduces moisture content in bagasse.

## Co-generation

Reduced consumption of captive power implies that the Company has more co-gen power for export.

## Variable frequency drives

The Company provided conducting variable frequency drive motors depending on the requirements to reduce power consumption. 100 % VRT in all plants.



Fermentation Section of Distillery Plant

## Planetary gears

The speed reduction gearboxes in the plant are high efficient planetary gears.

Companying both VFD and planetary gears sugar plant power consumption is reduced to 22 kW/ton of cane as an average consumption of 26 kW and above in other plants.

## Decanter System

First time in our country, Company installed decanter system for muddy juice separation. Because of this bagacillo requirement of sugar process is completely eliminated, thus 0.8 % bagasse saved and effectively utilised in co-generation plant for additional revenue. And also the system provides 500 % lesser pol loss in press mud. Conventional vacuum filter pol loss is 0.06-0.08 % on cane but using this latest decanter system pol loss in press mud is reduced to 0.012 % on cane as well as press mud quantity is reduced from 3.5 % on cane to 0.92 % on cane.

## Sugar Effluent Treatment Plant (ETP)

well equipped ETP is provided which treats sugar effluent effectively and outlet water of ETP having less than 30 BOD and 100 COD.



# Product Range

Gangakhed is an integrated plant with a range of products. Thus, it insulates the company from the cyclical nature of the industry, and also ensures consistent returns for sugarcane to farmers in the region.



Co-generation plant

## Co-gen power (Green Power)

Co-gen Power is most important revenue generating item at Gangakhed. It has a co-generation power plant capacity of 30 MW, Sugar processing capacity of 6000 TCD, and distillery capacity of 60 KLPD with 1.8 MW co-generation power plant.

The co-generation power plant boiler and the turbine combine a 110 kg per sq cm pressure and a temperature of 535° Celsius to optimize co-gen power generation from renewable fuel sources. Energy optimising devices have also been installed to maximize co-generation from bagasse.

Gangakhed has also entered into PPA (power purchase agreement) to diversify its source of revenue as stabilised way of revenue generation.

The plant requires bagasse and coal to fuel the boiler of the co-gen power plant. The quantity of bagasse is 30 % of the total sugar production. Thus, in producing 6,000 TCD plant produces 1,800 tonnes of bagasse per day. To run a 30 MW co-generation power plant, it requires approximately 1,300-1,400 tonnes per day. The bagasse is sourced in-house as well as through nearby sugar plants. The bagasse generated in-house suffices for co-gen power production for 8 months (including sugar season & off season). Additionally, bagasse is purchased from nearby sugar co-operative mills. The Company also procures the bottom part of the cane and the trashes, for the use as fuel. The combination of the two fulfils the fuel requirement for another 2 months. For the remaining 2 months, generally August and September, coal is outsourced.

The co-generation plant is equipped with ESP (Electro Static Precipitate) equipment and collect all ashes from the co-generation boiler flue gas emitting only 100 mg/Cum to atmosphere. Collected ash from the ESP is used to make bricks as building construction material.

Waste generated from the distillery is also channelled to produce co-gen power and steam for the distillery itself. This 1.8 MW co-generation power plant is one of the latest technology co-gen plant in the industry.

### CDM benefits

Projects that reduce GHG (Green House Gases) can claim for benefits under UN legislation – Kyoto Protocol. For a project to qualify for CDM (Clean development mechanism) benefits it must generate renewable energy and the electricity supplied must displace the existing grid based power. The benefits endowed are the reduction in carbon emission resulting into quantum of electricity supplied to the grid.

Since, Gangakhed produces biomass based co-gen power, it is a clean technology plant and is eligible to earn carbon credits. The bagasse-based co-gen power plant and the distillery incineration plant will undergo the validation process for registration under Clean Development Mechanism (CDM). After the validation, the Company is projected to earn additional revenue year on year.





*Distillery plant*

## Distillery

Molasses, a by-product of sugar production, is distilled to produce rectified spirit, extra neutral alcohol, denatured spirit, and ethanol which find applications in the alcohol, pharmaceuticals and chemicals industries. Ethanol is also a valuable alternative fuel.

Ethanol can be manufactured directly from sugarcane juice. Sugarcane contains about 45 % sucrose. One kg of sucrose can theoretically yield 0.644 litres of ethanol and after accounting for 88 % fermentation efficiency and 98 % distillation, it yields 0.555 litres of alcohol. If a sugar mill crushes 100 tonnes of sugarcane, on an average, it would obtain 11.5 tonnes of sugar and 4.50 tonnes of molasses; 1,200 litres of alcohol can be produced from this quantity of molasses. But, if the juice from cane is used to directly produce alcohol, then around 6,300 liters of alcohol can be generated.

Gangakhed uses an independent slop (concentrated spend wash) incinerator fired boiler system (zero discharge) instead of composting for continuous running of distillery beyond 270 days. Further, a multi-functional micro processor based monitoring and control system has been installed to achieve reliability and optimization.

Normal distillery spend wash effluent pollutes the ground water very badly. Since its BOD (Biological Oxygen Demand) & COD (Chemical Oxygen Demand) is very high even after conventional Biomethenisation process. Hence Company adapted latest technology by concentrating the entire spend wash (distillery effluent) as slop and fired in the boiler. This method is giving Zero discharge both for effluent form and distillery and also generate 1.8 MW additional co-gen power in addition to meeting the process steam requirement of distillery.







*Sugar mill carrier- internal view*

## Sugar

Sugar is one of the primary product of the Gangakhed. The company has taken several initiatives to maximize sugar recovery, minimize wastage and transport losses and maintain harmonious relations with the farming community. The farmers have been trained for the adoption of advanced methods of cane development. This has helped extend the crushing season beyond the present average of 160 days without any loss in sugar recovery. Village centres have been developed to encourage farmers to adopt more scientific methods of cultivation and thus, ensure a stable supply of cane.

Our various cane development initiatives include:

### Drip irrigation program

The State Government's plan for subsidised irrigation on 1000 acres of land has been implemented.

### Special sampling plantation

The Company has demarcated an area near the plant where a sample plantation program is undertaken to improve the quality of the sugarcane cultivated

### Financial support

The Company has providing many financial freedom and benifits to its buyers, which creates a strong bond between both the parties. UCO bank provides the financial assistance to farmers by lending them for fertilizers, advances for cane cultivation, irrigation and cutting facilities.

### Satellite mapping

Satellite mapping implemented in the gangakhed region, covers a radius of 100 km and tracks the quantity of crops cultivated in the entire area, and new land available for cane cultivation. The process has been implemented since last 2 years. The cultivation area has been increased by 20 % every year which ensures abundance availability of cane during the full operation phase of the plant


### Farmer assistance

Apart from the financial support to farmers , the company also provides technological assistance to them for good quality of seeds, fertilizers, new cultivation methods and trains them to ensure good quality of crop.

### Dedicated software

Specialised software has been developed to streamline all activities, starting from farmer registration to the delivery of cane to the sugar plant. Each cane grower is given an unique id which helps keep track of the crop he cultivates, date of cultivation, land details, crushing patterns etc. Based on this data, the Company obtains the age of the cane and the date of harvesting, which results in better quality control.

# Industrial Scenario



Currently, India is positioned as the second largest producer of sugar in the world and the Indian sugar industry continues to grow at a steady pace. 45 million sugar cane growers spread across the nation cater to a consumer base of over a billion. Maharashtra, Uttar Pradesh, Bihar, Gujarat, Tamil Nadu, Karnataka and Andhra Pradesh are the main sugarcane cultivating regions. There are over 450 sugar mills in India of which 250 are co-operative sector mills, 130 are private sector mills and 67 are public sector mills.

Sugarcane is one of the main crops of Maharashtra, thus making it the largest sugar producing state in India. The state is one of the most notable and large scale sugar manufacturing region of the country and accounts for more than one third of the country's total sugar production. Sugarcane farming is the source of livelihood for nearly 25 million of the rural population of Maharashtra. The industry provides direct employment to 1,65,000 workers,

besides 8 lakh workers engaged in harvesting and transport operations for a period of six months in a year. The industry contributes an annual revenue of more than Rs. 2,200 crore to the Indian government in the form of logistics and taxes.

The sugar industry in Maharashtra is highly popular, as farmers own a portion in the sugar factories. There is a great deal of awareness amongst the farmers regarding the use of technology in sugarcane cultivation, selection of appropriate variety for plantation, timely plantation and harvesting and quick crushing of harvested canes. These factors with a favourable climatic conditions have enabled factories to reach higher recovery levels, thus, making sugarcane cultivation in Maharashtra more competitive as compared to other states.

### For co-generation

The Central Government has made it mandatory for all the co-gen power producing companies to buy 10% of non-conventional energy. India's non-conventional power output has not, yet, reached 10% of the total thermal power generation. This provides tremendous opportunity for exporting non-conventional power. Gangakhed sells its co-gen power through power trading companies.

### For ethanol

The Government has made it mandatory for all the petroleum companies to blend 10% ethanol in petrol. This generates an automatic demand for ethanol.

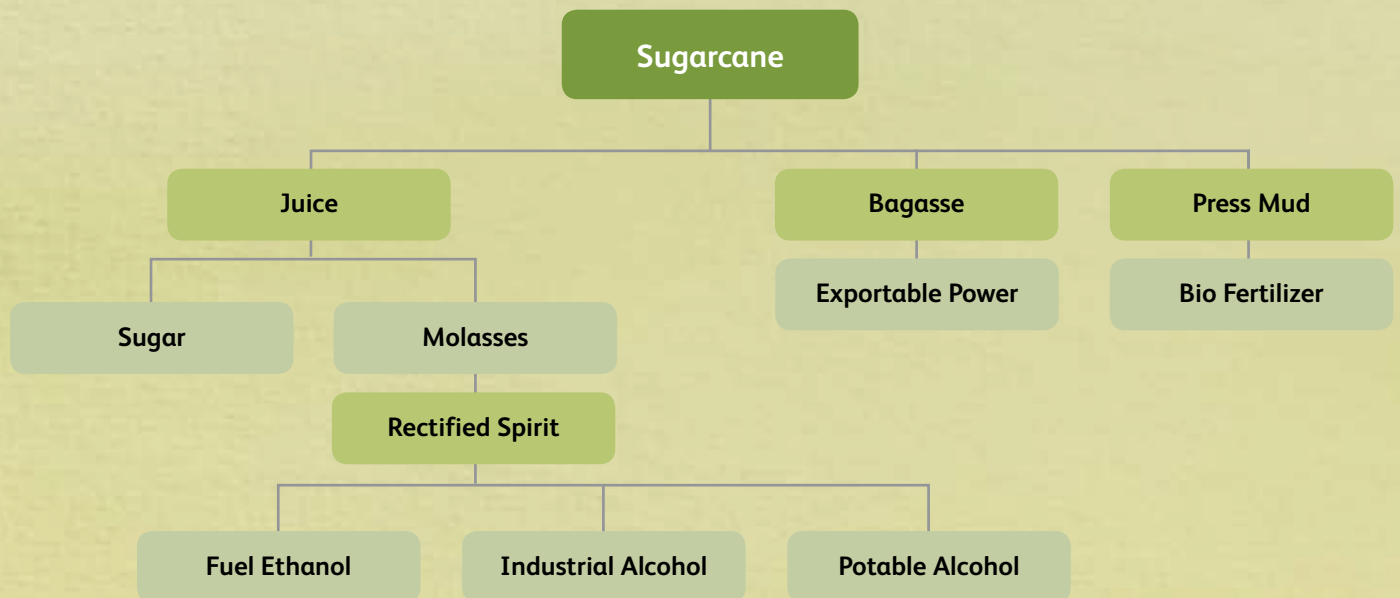
### Maharashtra at a glance

Sr.	Particulars	Crushing Season		
		2009-2010	2008-2009	2007-2008
1	Number of Sugar Factories			
	a. Installed	199	195	193
	b. In operation	141	145	174
2	Crushing Capacity per day (Million Tons)	0.499	0.475	0.471
3	Sugarcane Crushing (Million Tons)	61.427	40.013	76.227
4	Sugar Produced (Million Tons)	7.091	4.578	9.074
5	Recovery % Cane	11.54	11.46	11.94

(Source: Commissioner of Sugar, Maharashtra)



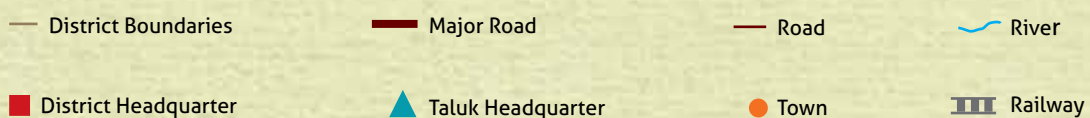
# Process Chart



## Our location



Map not to scale







*Co-generation plant*



*Co-generation TG*



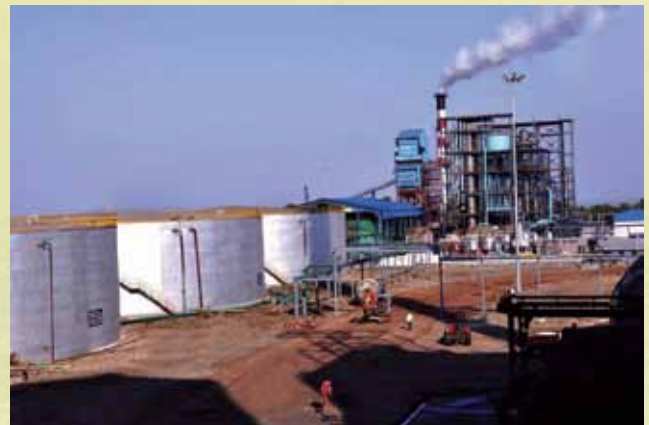
*Co-gen cooling Tower*



*Distillery*



*Switch yard*



*Molasses tanks*





*Bagasse and Coal handling system*



*Bagasse yard*



*Supply of cane*



*Cane Unloading system*



*Sugar conveyor belt*



*Sugar cylo*



*Night view of the whole plant*





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