

# NAVA BHARAT VENTURES LIMITED

## Sugar Division: Samalkot - Andhra Pradesh

### Division Profile:

Nava Bharat Ventures Ltd., is a diversified business with interests in Ferro alloys, Sugar and downstream products, Power and infrastructure with gross annual sales of Rs. 700 crores (2006-07). The company runs on a divisional structure. The Sugar Division operates a sugar plant which is 110 years old and was acquired by Nava Bharat in the year 1979. The division turn over is Rs. 102.4 crores (2006 – 07).

The plant produces plantation white sugar using double sulphitation process. The plant's capacity is 350 TPD of sugar with 20 KLPD distillery and 9 MW cogeneration power plant. The cogeneration facility is capable of exporting 3.6 MW to the grid during season and 6 MW during off season.

### The plant is a trendsetter for

- Installation of Mono vertical crystallizer for 'C' massecuite in 1981.
- Installation of AC motors with variable frequency drives for sugarcane mills in 2003 - 06.
- Use of Quintuple 3<sup>rd</sup> effect vapor in all batch & continuous pans for sugar crystallization in 2006.
- installation of Vapor Absorption Heat pump for total plant air conditioning needs in 2005
- commercial power export to grid in Andhra Pradesh way back in 1999
- Implementation of wireless wide area network connectivity for all the Zonal offices, saving fuel cost of all cane field staff for the first time in Andhra Pradesh.
- Non gravity type layout plant to excel in energy conservation

In pursuit of excellence in energy efficiency, the plant had implemented many ENCON projects during the last 6 years. A list of our efforts is given below.

- Mass flow meter for raw juice in 2001 - 2005
- Fully automated Continuous pans for A, B and C massecuite in 2002 - 2005
- Auto star delta starters based on motor load for various motors in 2002
- PLC based auto cane feed control system aided by AC VF drives for all cane carriers, preparatory equipment, rake carriers and mill drives in 2002 – 2006
- Replacement of HPMV lamps with metal halide lamps in 2002
- Replacement of all inefficient worm gears with planetary gears and helical gearbox in 2002
- First in Indian Sugar industry to introduce Microwave probe for “ A” batch pan feed automation in 2003
- Replacement of standard tube lights with CFL in 2003
- Automation of all batch pans in 2004
- Common condensate pumping in 2003
- Total sugar plant automation aided by 52 nos. flow meters, 128 nos. control valves and 58 nos. AC VF drives till 2006

### Awards & certifications:

- “Excellent Energy Efficient Unit” by CII for the year 2007
- ISO 9001 certification
- ISO 14001 certification

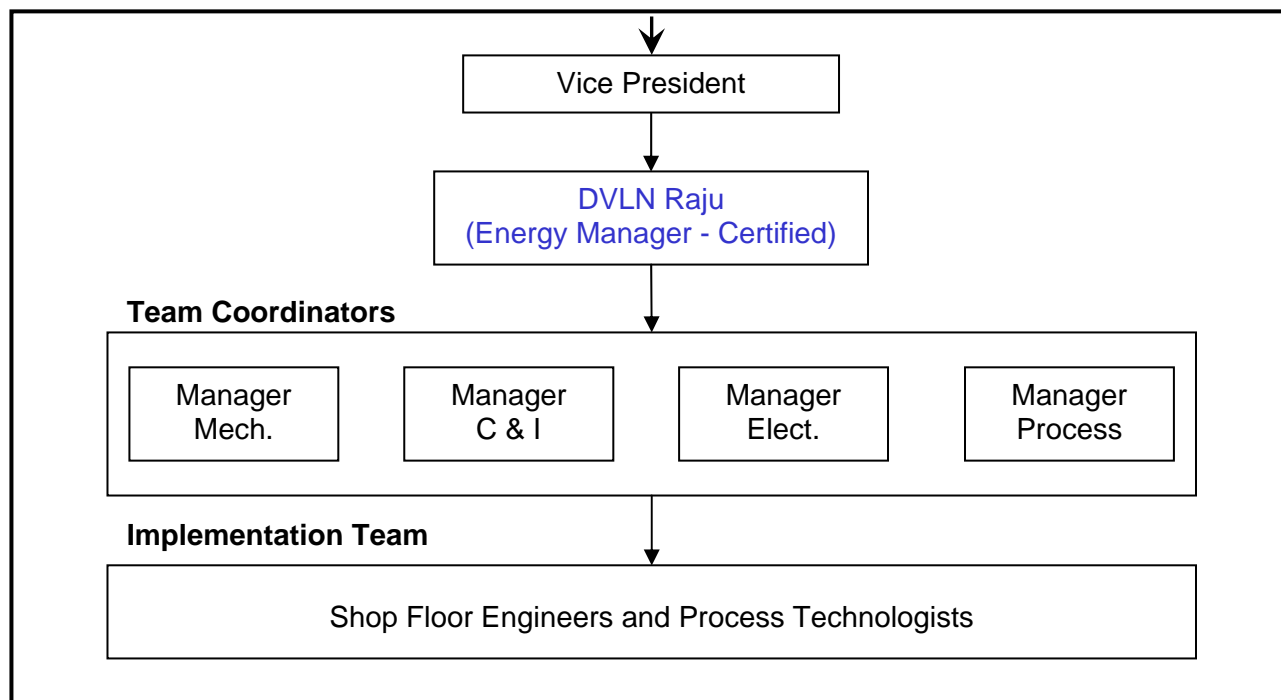
### Energy Conservation commitment:

Nava Bharat is committed to reduction in energy costs through ENCON measures. The Top management encourage employees to conceive new ENCON ideas through visits to best operating plants in India and countries like China, Japan, South Africa, Thailand, France, Vietnam, Mauritius etc...

Daily energy monitoring and reporting is done to the top management aided by 25 energy meters and 34 flow meters in the plant.

We continuously share knowledge in the industry through national & international seminars, workshops and study tours. We have presented our successful efforts of ENCON in the XXVI congress of International Society of Sugar Cane Technologists (ISSCT) 2007 held in Durban, SA and in the 67<sup>th</sup> Annual convention of Sugar Technologists Association of India (STAI) 2006 held in Ahmedabad.

### **ENCON CELL STRUCTURE**



### Energy Consumption:

Over the three accounting years the specific thermal energy consumption has declined by 24.93%. Though there was an increment in specific electricity consumption by 19.48 % due to total electrification and equipment addition, the total specific energy consumption has come down by 22.88 %.

### A brief of our energy consumption profile from 2004-2007:

#### **Energy Data w.r.t Raw material – Sugarcane**

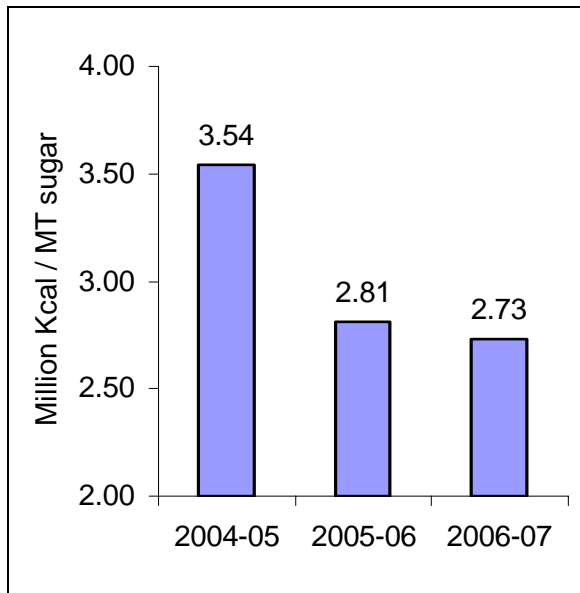
Description	Units	2004-05	2005-06	2006-07
Sugarcane crushed	MT	394771	437457	470758
Specific electricity consumption	kWh / MT	21.65	22.48	24.24
Specific thermal energy consumption	Million kcal / MT	<b>0.368</b>	<b>0.281</b>	<b>0.259</b>
Process steam % cane	%	<b>44.65</b>	<b>37.50</b>	<b>35.74</b>

#### **Energy Data w.r.t Product – Sugar**

Description	Units	2004-05	2005-06	2006-07
Sugar produced	MT	43183	46751	48250
Specific electricity consumption	kWh / MT	197.95	210.31	236.52
Specific thermal energy consumption	Million kcal / MT	<b>3.37</b>	<b>2.63</b>	<b>2.53</b>
Process steam % sugar	%	<b>408.16</b>	<b>350.88</b>	<b>348.71</b>

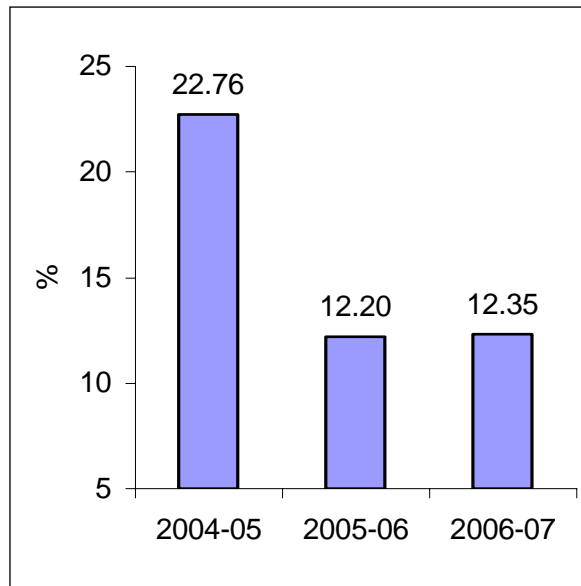
The specific thermal, electrical and total energy consumption figures for 2004-05,2005-06 & 2006-07 are shown in the tables below.

### Total Specific Energy Consumption



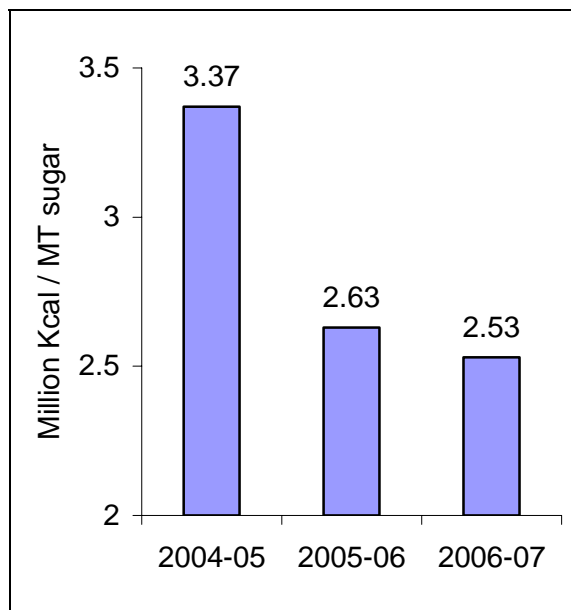
**\*\*22.88 % reduction**

### Energy cost as % of manufacturing cost



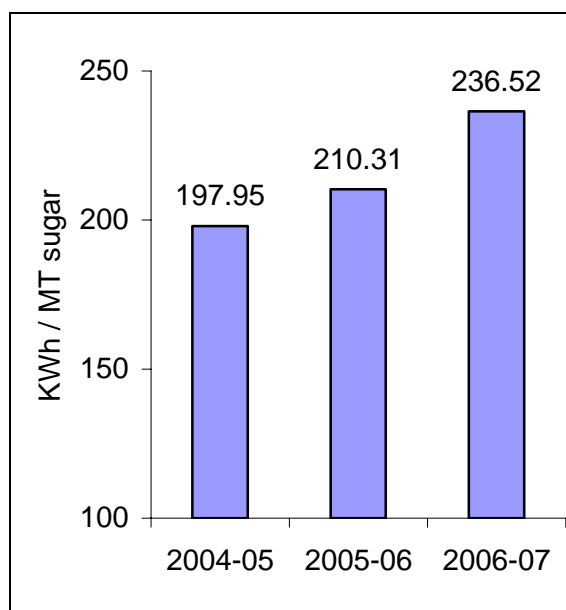
\*\*The increase in energy cost as % of manufacturing cost in 2006-07 is due to higher realization from by-products

### Specific Thermal Energy Consumption



**\*\*24.93 % reduction**

### Specific Electrical Energy Consumption



**\*\*19.48% increment**

# NAVA BHARAT VENTURES LIMITED SUGAR DIVISION, SAMALKOT



NAVA BHARAT

## ENERGY POLICY

We all working at the Sugar Division of Nava Bharat Ventures Limited, are committed to optimal utilization of various forms of energy to ensure cost effective operations and conservation of energy resources.

We shall achieve this by:

- Promoting awareness among all the employees on the importance of conservation of energy and natural resources
- Training the employees and promoting innovative measures for energy conservation
- Carrying out regular internal and external audits for identifying potential areas for energy saving
- Benchmarking our performance against the best in the world and reducing energy consumption
- Recovery of waste energy and recycling of various forms of wastes
- Continuous assessment and monitoring of energy consumption
- Up gradation of process technology and equipment

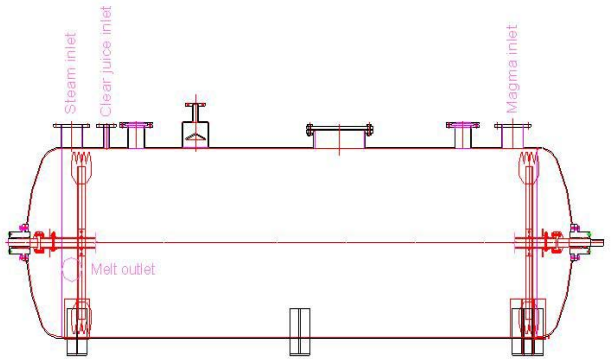
01.10.2006

**EXECUTIVE DIRECTOR**

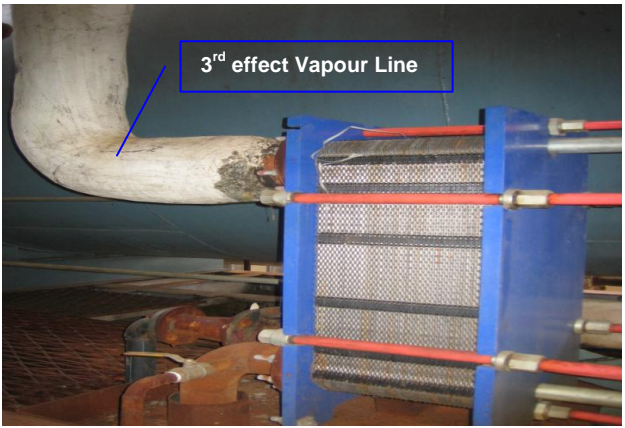
## Energy Conservation Achievements

During the period 2006-2007, the unit implemented 15 energy conservation projects with an investment of Rs.171.96 lakhs achieving a saving of Rs. 77.42 lakhs. The major energy conservation projects are presented below.

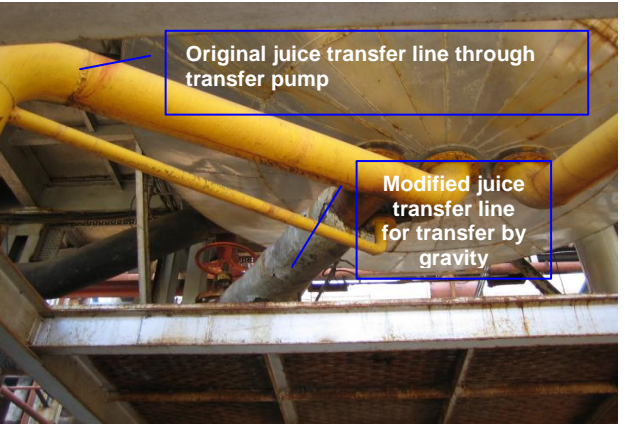
### 1. Quintuple 3<sup>rd</sup> effect vapour for sugar melting - Trend setter project

	<p>A new sugar melter for B &amp; C seed was designed in-house to utilize quintuple 3<sup>rd</sup> effect vapour instead of exhaust steam</p> <p>Annual saving:      Rs. 11.71 Lakhs</p> <p>Investment:            Rs. 10.82 Lakhs</p>
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### 2. Plate heat exchanger for turbine condensate heating

	<p>Installing the plate heat exchanger enabled heating turbine condensate along with DM water make-up from 40 °C to 98 °C with quintuple 3<sup>rd</sup> effect vapour avoiding use of LP steam.</p> <p>Annual saving:      Rs. 6.43 Lakhs</p> <p>Investment:            Rs. 2.70 Lakhs</p>
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### 3. Avoiding FFE transfer pump - No investment project

	<p>Juice transfer scheme was modified and resulting head difference was utilized to completely avoid 15 kW juice transfer pump at falling film evaporator</p> <p>Annual saving:      Rs. 1.113 Lakhs</p> <p>Investment:            Nil</p>
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4. Quintuple 1st effect vapour for FBD sugar dryer air heating



It is general practice to use MP steam for heating air in fluidized bed sugar dryer. The project utilized the same heat exchanger with quintuple 1st vapour as heating medium to heat FD air

Annual saving: Rs. 1.098 Lakhs

Investment: Nil

5. Energy saver for factory lighting



An energy saver transformer was installed to reduce voltage for all lighting loads. Thus saving 0.876 Lakh units.

Annual saving: Rs. 2.30 Lakhs

Investment: Rs. 4.05 lakhs

6. Installation of bagasse silos and boiler automation



Boiler excess air was optimized by proper sealing through installation of bagasse silos in fuel feeding system. Thus increasing the boiler efficiency.

Annual saving: Rs. 43.51 Lakhs

Investment: Rs.147.50 Lakhs

7. Quintuple 1<sup>st</sup> effect vapour condensate as superheated wash water - Trend setter project



Replaced usage of MP steam heated condensate with Quintuple 1<sup>st</sup> effect vapour condensate for washing sugar crystals in batch centrifugals

Annual saving: Rs. 0.72 Lakhs

Investment: Rs. 0.42 Lakhs

8. Clear juice in place of hot condensate – Trend setter project



Clear juice is utilized to the possible extent at pans, continuous centrifugals and melter replacing the use of hot process condensate. Thus reduced evaporation load.

Annual saving: Rs. 0.84 Lakhs

Investment: Rs. 0.65 Lakhs

9. Utilization of soda boiling vapour – No investment project



The vapour from soda boiling are being effectively utilized for process heating by mixing them with the vapour of the main stream, instead of venting to atmosphere as a normal practice.

Annual saving: Rs. 2.63 Lakhs

Investment: Rs. Nil

**Other major Energy conservation projects implemented:**

**Electrical:**

S.no	Project Description	Annual saving (Rs.Lakhs)	Investment (Rs.Lakhs)
1	9MW Bagasse based cogeneration replacing inefficient back pressure Turbo Generator	355.96	1872.77
2	AC motor with VFD for mill no. 2 & 3	78.24	54.04
3	AC VF Drives in cane handling and process house sections	2.10	14.34
4	Condensers automation and installation of low head pumps	20.76	84.73
5	77 TR Vapour Absorption Heat Pump	2.4	25.00
6	Two stationed hydraulic bagasse baling machine	1.77	9.00
7	Planetary drive for crystallizers and pug mills	1.64	13.00
8	Helical gearbox for cane carrier, rake elevator, cane kicker & rory screw conveyor	4.12	11.25
9	Energy efficient motors installed in 2005-06	0.65	4.90
10	Energy efficient motors installed in 2006-07	0.22	3.92
11	Avoiding clarified syrup pump	0.99	Nil
12	Avoiding raw filtrate pump	0.43	Nil
13	Replacement of CRT monitors with TFT-LCD monitors	0.18	5.00
<b>Total</b>		<b>469.46</b>	<b>2097.95</b>

**Thermal:**

S.no	Project Description	Annual saving (Rs.Lakhs)	Investment (Rs.Lakhs)
1	Continuous Vacuum Pan for B massecuite	77.59	119.07
	Design modification of pans		
	Rearranging vapour bleeding		
2	Condensate flashing system	20.56	20.00
3	Quintuple 1 <sup>st</sup> and 2 <sup>nd</sup> vapour for clear juice heating	11.38	5.00
4	Hot surplus condensate to heat juice	4.82	Nil
5	Third vapor for entire pan boiling - implemented for the first time in india	39.38	Nil
6	Quintuple 2 <sup>nd</sup> vapor for pan washing	0.21	Nil
7	Raise in syrup brix maintaining sugar quality	9.44	Nil
8	Clear juice replacing hot condensate at pans, continuous centrifugals and sugar melter	0.84	0.65
9	Sequential circulation of non-condensable gases	1.84	Nil
<b>Total</b>		<b>166.06</b>	<b>144.72</b>

**Energy Conservation Plans and Targets:**

S.no	Project Description	Annual saving (Rs.Lakhs)	Investment (Rs.Lakhs)
1	New energy efficient wet scrubber reducing pressure drop in flue path	15.66	100.00
2	New sugar melter	12.75	18.00
3	Installation of condensate recovery systems	2.50	7.00
4	Maximizing clear juice utilization in process	13.00	Nil
5	Dry seed affination with melt instead of hot water	2.60	Nil
6	Installation of VF drives from boiler ID fan	6.76	10.00
<b>Total</b>		<b>53.27</b>	<b>135.00</b>

**The target set for the coming two years is reduction by 16% in specific energy consumption.**

## **Environment & Safety**

Nava Bharat sugar division is ISO 9001 & 14001 certified. All the environment management systems are strictly maintained. The plant has a dedicated department for EHS.

### **Liquid Effluent**

All leakages from pumps have been effectively contained by installing mechanical seals.

The plant has state of the art (efficient) effluent treatment system to treat sugar plant effluent matching the norms prescribed by the PCB. 100 % treated water is being utilized for green belt development and own sugarcane farm irrigation.

The oil contaminated effluent is initially treated in oil skimmer. The collected waste oil is reused for gear lubrication.

### **Air**

The company has installed a fluidized bed sugar dryer followed by dust collection system to effectively contain sugar dust.

The boiler emissions are controlled by venturi scrubber within the norms prescribed by PCB.

A lime dust collector is being installed to contain lime dust emissions.

### **Solid waste**

Press-mud is the solid waste generated from the plant. It is composted with distillery vinasse to produce Bio-compost. This high value organic fertilizer is distributed to the cane growers replacing high energy consuming in-organic fertilizers.

Brick manufacturing from boiler ash is being promoted.

### **Safety**

Safety at Nava Bharat is given utmost importance and is an active participant of Godavari Environment Safety Health Organization, an NGO outfit to achieve the above targets in this region.

Work permit system is strictly followed in accordance with the safety of the work being permitted.

The entire plant is covered under the Fire hydrant system.

First Aid Training is imparted to the employees and regular mock drills are conducted to check the emergency preparedness.

Competitions are being held on safety which includes essay writing, elocution, slogans and suggestions to encourage and impart awareness on safety among employees.

### **5 S**

5 S technique is adopted for workspace excellence right from 2002

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