

Unit Profile



VASUDHARA DAIRY, NAGPUR

(A unit of Valsad District Co-operative Milk Producer union Ltd Alipur - Gujarat)

Vasudhara Dairy, Nagpur is unit of AMUL and manufactures/processes liquid Milk, Ice-cream, Sterilized Flavored Milk and Curd. It is a milk producers' cooperative organization having its head office at Alipur dist. Valsad (Gujarat) and through it affiliated to Gujarat Cooperative Milk marketing federation Ltd, Anand, Which is the apex marketing body of AMUL. More than 2 Lacs milk producers are the members of the Vasudhara Dairy, Alipur.

This dairy at Nagpur started in April 2002 when it acquired the sick and closed unit of M/s Frozen Food Pvt. Ltd. The unit had the capacity of 2000 L ice-cream per day. Soon after acquisition, expansion, modernization and addition of new product lines was taken up. Ice-cream capacity has been enhanced to now 10000 Liters per day per shift basis.

The capacity of the dairy too has been increased to process daily 0.80Lakh liters of milk. Facilities to manufacture and pack Amul milk, Sterilised Flavoured milk and Curd have been installed. A table showing year wise turnover and Profit& Loss is attached as **Exhibit 8 (a)**. The dairy has grown from **Rs 5.25 crores in 2002-03 to Rs 67.13 crores in the year 2007-08**.

This phenomenal growth has been possible because of the commitment of the dairy to its consumers as well as producer members mentioned in their quality and food safety policy. This commitment has resulted in their getting the ISO 9000 as well as HACCP certification in 2005 and recertification in 26 March 2008. The copy of their policy as well as certificate of ISO & HACCP is attached as **Exhibit 8(b) & 8(c)**

The dairy has been very conscious of the need to efficiently use and conserve energy. The old and inefficient plant and machineries have been replaced with new and highly power efficient machineries. Modern technology has been adopted in all the processes to get the consistent quality products. New energy saving equipments has been installed to get the better performance of the machineries. The list of measures taken at the dairy for efficient running and power/fuel saving is attached as **Exhibit 4(a), 4(b) and 4(c)**. Apart from this maintaining the power factor to unity and running the plant in low tariff zone to minimize the power cost has been on priority and **Exhibit 11** proves the point.

The management of the dairy is fully aware of the fact that what is committed cannot be achieved unless there is a well-laid system to monitor and measure the performance. The monthly Planning and Improvement Committee headed by the Chief Executive and all sectional /departmental heads as its members, take stock of planned vs achievement and resource requirement for future plans. It acknowledges the good performance and sets up task committees to look in to specific problem areas. The list of objectives set up to measure the results of actions of energy conservation is attached as **Exhibit 6**. From this exhibit it is clear that dairy has been able to improve the power, Fuel as well water utilization year after year.

Not only this it has subjected itself to independent energy audit by leading organization in this field **m/s PCRA**.They have appreciated the work done by the dairy in the field of energy savings as well as conservation.

The dairy has well laid system for preventive maintenance. The team headed by factory Manager, Maintenance Incharge and the supervisors/technicians as members not only monitor the day to day maintenance but also continuously look for areas of improvement.

Unless the people who man and maintain the machines are trained, the performance of the organization goes down. The dairy recognizes this fact and hence there is emphasis on training on Good Manufacturing Practices (GMP) as well as Good House Keeping (GHK).This is achieved through both in house as well as outside trainers.

Environment protection and safety is the responsibility of those who run the industry. This dairy has taken enough measures to ensure that its effluent don't contribute in polluting water bodies and air. The state of the art effluent plant installed in the dairy ensures that treated water is below the BOD/COD norms fixed by the pollution board. Air emissions in the premises are checked at regular interval. The copies of the report attached as **Exhibit 7 (a), (b) and (c)** will establish this fact.

In short, this milk producer's cooperative dairy has in a very systematic way institutionalized various practices that would constantly enable it to conserve and use the energy efficiently and get the measurable savings.

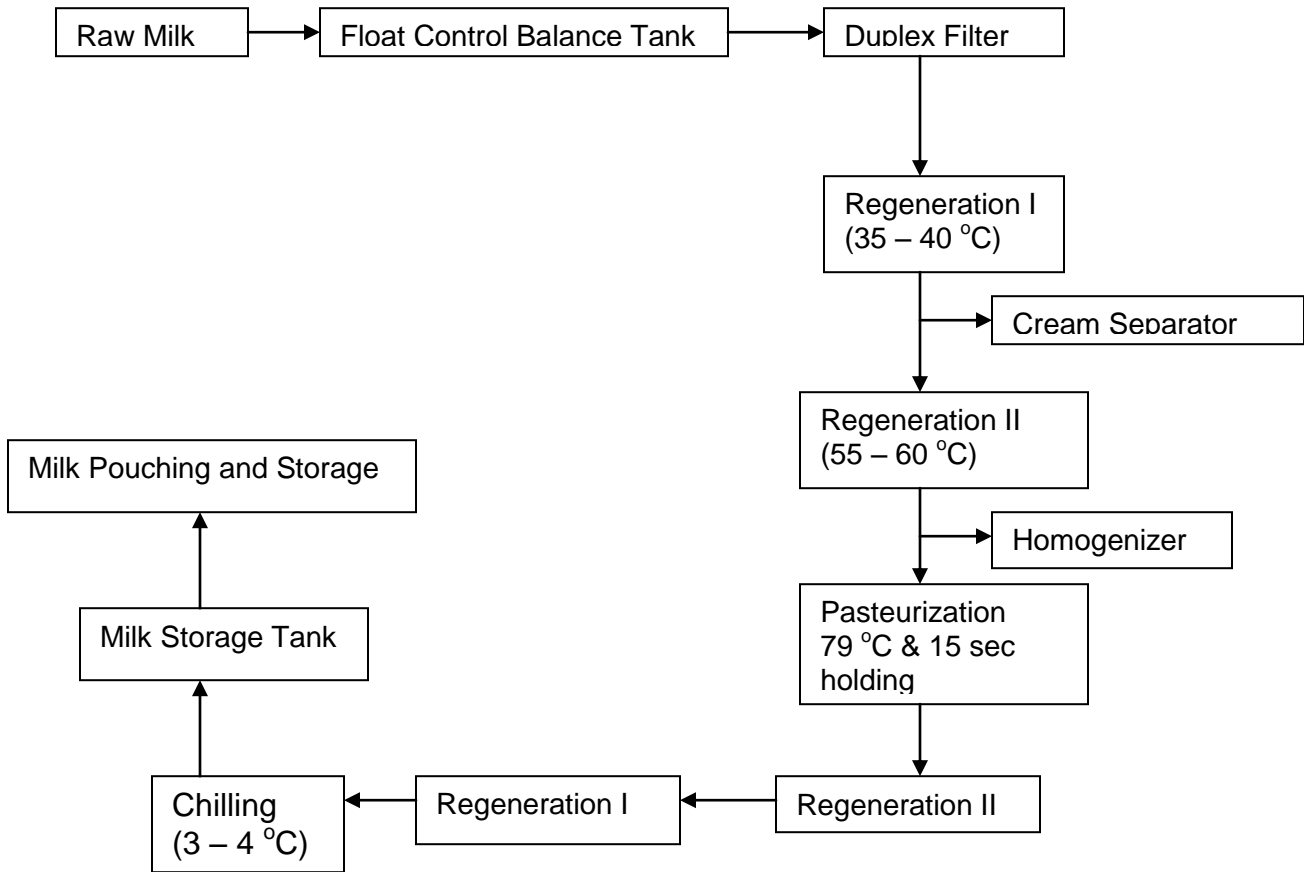
Production and Capacity utilization Details**Actual Production in Liters**

Products	Installed Capacity Liters/day	Year 2005-06	Year 2006-07	Year 2007-08	% Capacity utilization for 07-08
Liquid Milk	80,000	17636153	22810312	25104421	86 %
Ice- Cream	10,000	3754881	4092528	3877725	106 %
Sterilized Flavored Milk	5,000	1670716	2254264	1891375	96 %
Curd	1,000	164497	300886	271289	74 %

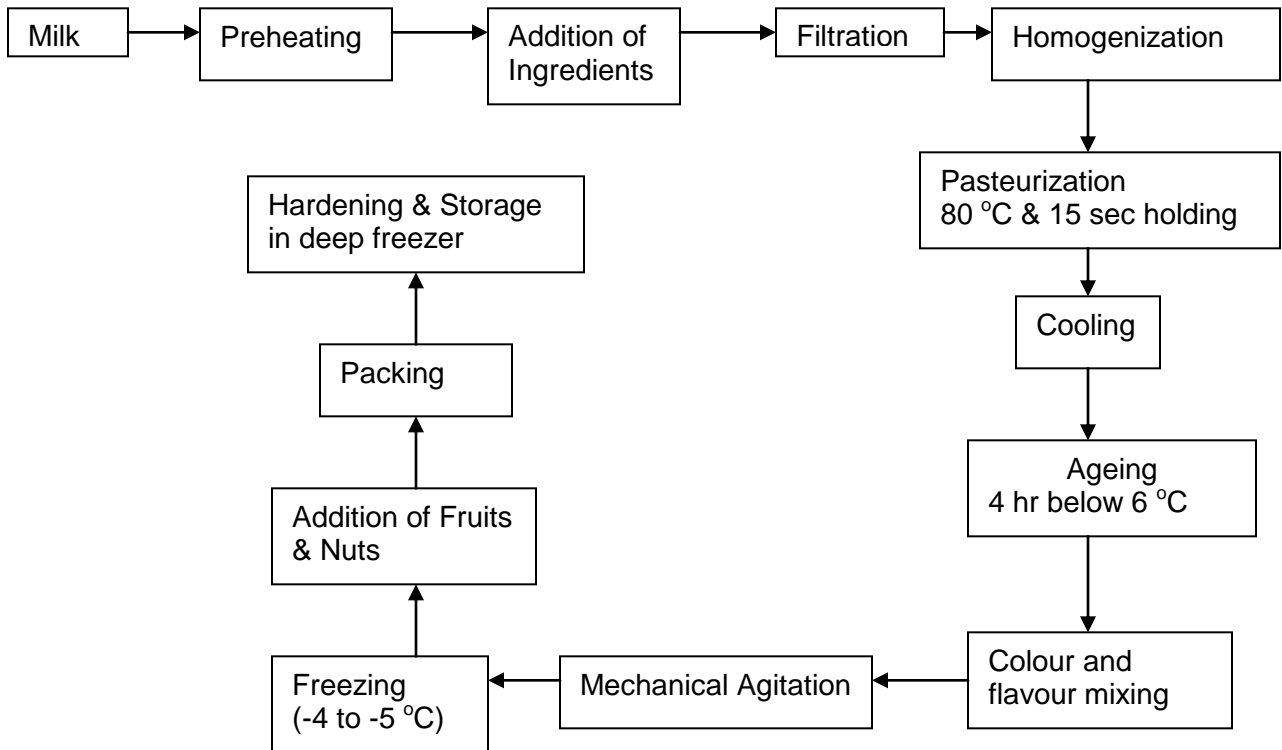
Note:

Installed capacity for Ice-cream, flavored Milk and Curd has been taken on per day per shift basis assuming 365 days of working. While in case of milk-installed capacity taken on per day three shift basis and 365 days working.

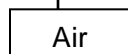
I. For Pasteurized Milk

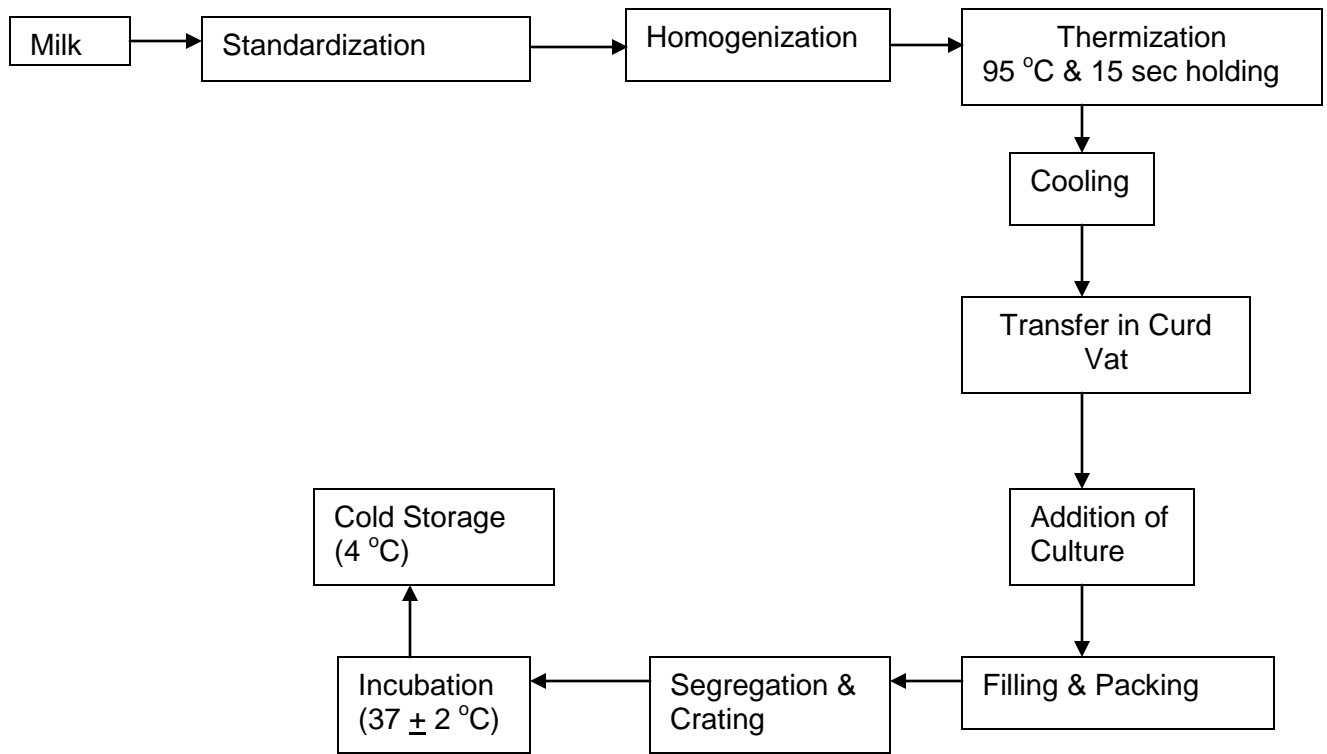


II. For Ice Cream

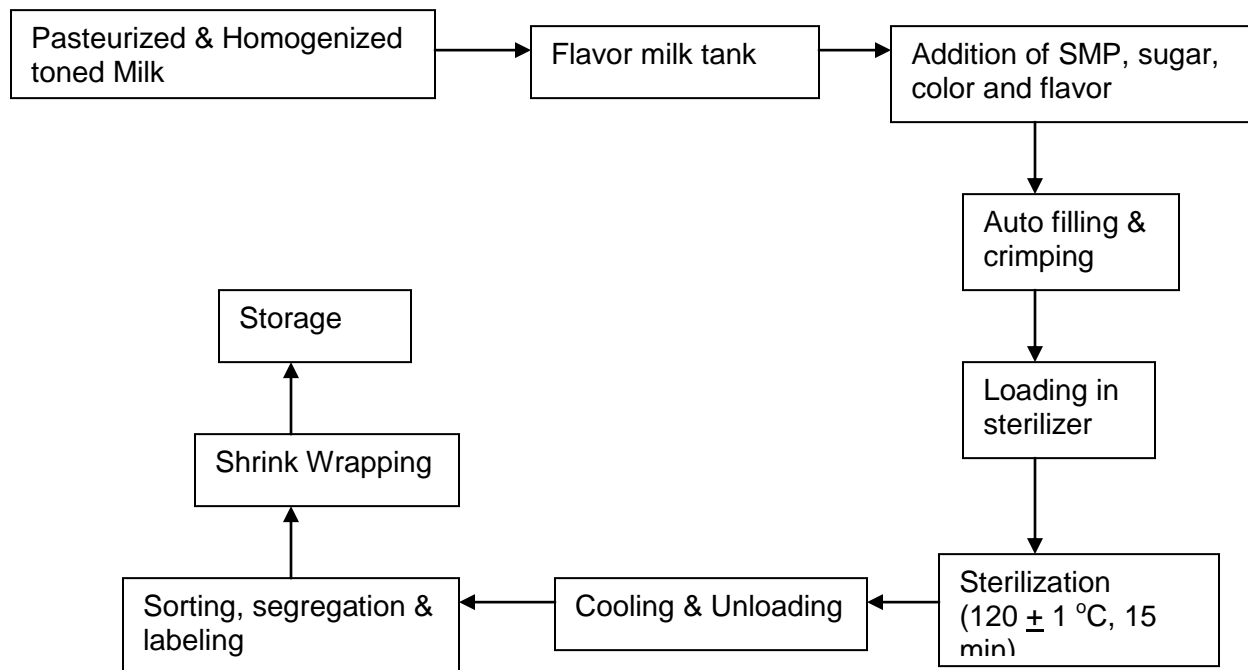


III. For Dahi





IV. For Sterilised Flavored Milk



Energy Consumption per Unit Production

Products	Year 2005 - 2006				
	Actual Production	Specific energy Consumption		Electricity consumed	Thermal Energy Con.
	KLiters	Kwh/ KLiters	KL/ KLiters	Lakhs Kwh	Lakh Kcal
Liquid Milk, Ice-Cream, Sterilized Flavored Milk, Curd	30736	57.45	84.60	17.65	26.00
	Year 2006 - 2007				
	37643	52.06	72.73	19.59	27.38
	Year 2007 - 2008				
	38900	58.04	68.26	22.57	26.56
% Total				100	100

Energy Conservation Policy and Setup

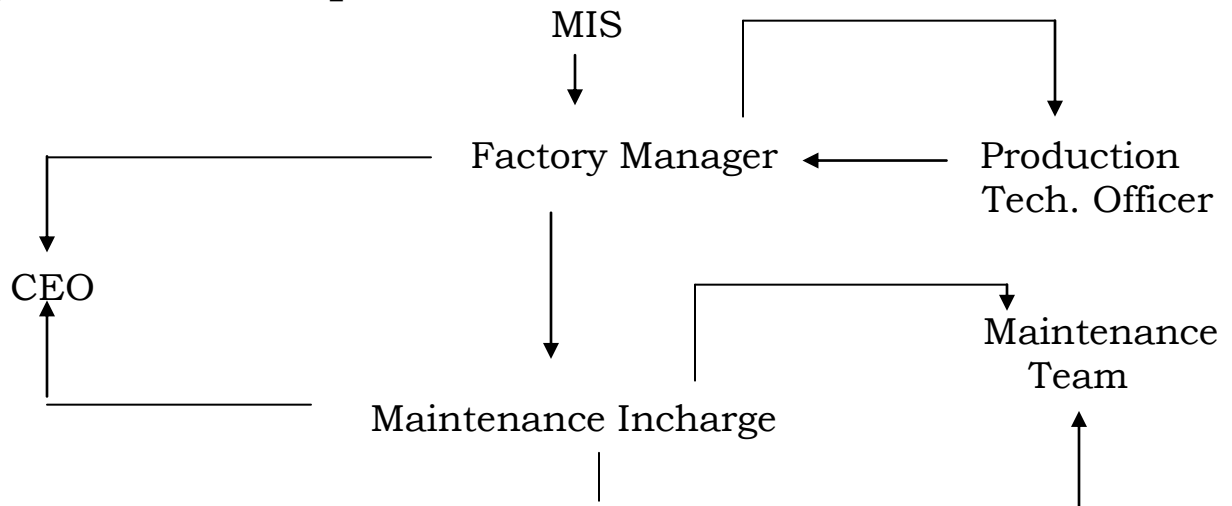
Energy Policy

Energy is a scant resource. Our team is committed to optimally utilize, conserve and minimize the wastage of the energy.

This is achieved through following process

1. Collecting of daily utility data by MIS
2. Ensuring regular interval audit for eliminate the wastages like steam trap audit, Air pipeline Audit, Housekeeping Audit
3. Analysis of Energy consumption and comparing with bench-mark
4. Identification of problem and finding solution through meetings, consultations and Pareto analysis etc.
5. Implementation of solution and keep under observation.

Organization Setup:



This process and setup has helped in-

1. Optimum utilization of resources
2. Continual improvement
3. Identifying resources required
4. Monitoring the process.

**Project Implemented
For
Energy Conservation During
Year 2005-2008**

VASUDHARA DAIRY, NAGPUR

List of Energy Saving Projects

Year-wise Energy Savings Projects

Year	Electricity Lakh Kwh	Thermal Lakh Kcal	Total Saving Lakh Rs.	Investment Lakh Rs.
2005-2006	1.62	2.14	13.46	5.90
2006-2007	2.35	-	10.37	4.59
2007-2008	0.15	18.12	54.12	12.42
Total	4.12	20.26	77.96	22.91

Note :

1. Electricity Cost 4.41 Rs. / Kwh
2. Furnace oil cost 35 Rs / Kg
3. Furnace oil Kcal =10200 Kcal / Kg

Exhibit No.4 (b)

Energy Savings Measures - Electrical

Sr. No	Particulars	Year	Savings
1.	Replacement of 7.5 Hp Chilled water Pump with 3 Hp Pump	2007-2008	Rs. 0.58 Lacs per annum
2.	Dry Nut Roasting oven Hot Air Blower shaft frequent bent and noise problem	2007-2008	Rs.0.09 Lacs per annum
3.	Replacement of normal tube light to electronic ballast	2007-2008	Rs. 0.14 Lacs per annum
4.	Installation of Advance New Technology Ammonia KC-Compressor by replacing old Compressor	2006-2007	Rs. 8.57 Lacs per annum
5.	Replacement of Al-Fan by FRP fan of cooling tower	2006-2007	Rs. 0.53Lacs per annum
6.	Use of Elgi Compressor for PID Valve operation In night shift	2006-2007	Rs. 1.27 Lacs per annum
7.	Installation of Automatic Power Factor Controller	2005-2006	Rs. 7.16 Lacs per annum
8.	Total Savings		Rs. 18.35 Lacs per annum

***** This above savings will be continuous ...**

Power Management

1. Replacement of 7.5 Hp Chilled water Pump with 3 Hp Pump.

Previous condition : We were using 7.5 Hp pump for IBT return chilled water tank Circulation purpose.

Observation : Frequent on-off of pump.

Status : Replaced 7.5 Hp pump with 3 Hp after flow rate calculation.

Vision : **To Reduce power consumption**

Date Of Installation : **Year 2007-2008**

Investment : **Rs. 25000**

Saving : 1. Saving of 2.27 Kwh & Pump running Hrs 16
Hence savings in Rs. $2.27 \times 16 \times 365 \times 4.41$
i.e. Rs 58462 per Annum.



3 Hp Chilled Water Pump

2. Dry Nut Roasting oven Hot Air Blower shaft frequent bent and noise problem

Previous condition : We were using 1.2 meters long pedestal mounted shaft blower for hot air circulation.

- Observation** : Due to inadequate balancing and induced draft, there was problem of frequent breakdown and improper hot air circulation.
- Status** : Replaced induced draft Blower (750 watt) with forced draft fan (370 watt)
- Vision** : To reduce power consumption & Maintenance cost
- Date Of Installation** : Year 2007-2008
- Investment** : Rs. 5000 /-
- Saving** : 1. Saving of 0.38 Kwh & Running Hrs 16
2. Hence savings in Rs. $0.38 \times 16 \times 365 \times 4.41$
i.e. **Rs 9786 per Annum.**
- Other Benefits** : * Reduction in Maintenance cost
Process time saved 30 mints per batch

Previous Condition



Present Condition



3. Replacement of normal tube light to electronic ballast

Previous condition : We were using normal tube light consuming 58 watt per hr.

Status : 30 nos. Normal tube light replaced with electronic ballast

Vision : To Reduce power consumption

Date Of Installation : Year 2007-2008

Investment : Rs. 12000/-

Saving : 1. Saving in wattage = $58-39=19$ watt
2. Hrs in operation = 16 Hrs per day
3. Hence savings in Rs. $30 \times 0.019 \times 16 \times 365 \times 4.41$
i.e. **Rs 14680 per Annum.**

Payback Period : 10 Months



Electronic Ballast Tube Light

4. Installation of Advance New Technology Ammonia KC-Compressor replacing old Compressor

We replaced all old technology compressors with most efficient advanced compressor for refrigerant plant. We put all kirloskar compressors instead of freeze 5/5.

Vision : To Reduce power consumption

Date Of Installation : Year 2006-2007

Investment : 3.7 Lacs

Calculation :

- Old comp. Gives 15 TR with 30 Hp power consumption
- New Comp. Giving 60 TR with 75 Hp power consumption
- Hence we get 540 Kwh saving per day.

Saving : $540 * 30 * 12 * 4.41 = 857304$

Therefore saving Rs. 8.57 per Annum

Previous Condition Photograph



Present Condition



5. Replacement of Al-Fan by FRP fan of cooling tower

- Previous condition** : We were using Al- fan air circulation.
- Status** : Replaced Al-fan with FRP fan
- Vision** : To reduce power consumption & Maintenance cost
- Date Of Installation** : Year 2006-2007
- Investment** : **Rs. 54000/-**
- Saving** : 1. Saving of 1.5 Kwh & Running Hrs 22
2. Hence savings in Rs. $1.51 \times 22 \times 365 \times 4.41$
i.e. **Rs 53600 per Annum.**
- Other Benefits** : * Reduction in Maintenance cost



FRP Fan 4 blades 2 Nos Cooling Tower

Air Management

6. Use of Elgi Compressor for PID Valve operation In night shift

Previous condition : We were running Atlas Copco Air Compressoer (30 Hp) for fulfilling the air requirement in night shift only managing the PID valve operation.

Status : In lack season now we are running Elgi Air Compressor (10 Hp) in place of 30 Hp Air compressor.

Vision : To reduce power consumption & Maintenance cost

Date Of Installation : Year 2006-2007

Investment : **Rs. 35000 /-**

Saving : 1. Saving of 15 Kwh & Running Hrs 8
2. Hence savings in Rs. $15 \times 8 \times 240 \times 4.41$
i.e. **Rs 127008 per Annum.**

Other Benefits : * Reduction in Maintenance cost



Elgi Make Air Compressor

7. Installation of Automatic Power Factor Controller

Our aim is to maintain the power factor unity and get the benefits of the same. Automatic power factor controller installed in APFC panel so that according to load it will on capacitor bank and maintain Power factor unity.

Date Of Installation – Year 2005-2006

Investment – 2.4 Lacs

Savings – 7.16 Lacs per Annum



CAPACITOR BANK No. 1



APFC Panel No.2

8. Voltage Management : To maintain the consistency in the Voltage

Previous condition : We were using 500 KVA Power Transformer for the managing entire plant load. Its tap setting was on 3 point.

Observation : Due to voltage fluctuation in higher side we were facing the problem to delectated electronic component damages.

Status : Change the tap setting from 3 to 2 set point, now we have getting the appropriate voltage i.e. range 420-447 volts.

Vision : To ensure longer service life of equipment & Maintenance cost

Date Of Installation : Year 2007-2008

Investment : Nil

Benefits : * Reduction in Maintenance cost
2005 Reduction in breakdown time.
2005 Smooth operation of equipment, this enhance
the productivity



500 KVA Transformer

Energy Savings Measures – Thermal

Sr. No	Particulars	Year	Savings	Investment
1.	Change over from FO fired Boiler to Biomass Briquettes fired Boiler	2007-2008	Rs. 53.31 Lacs per annum	Rs. 12 Lacs
2.	Installation of Condensate water Recovery system	2005-2006	Rs. 5.64 Lacs per annum	Rs. 2 Lacs
3.	Installation of Solar Water Heater system	2005-2006	Rs. 0.66 Lacs per annum	Rs. 1.5 Lacs
4.	Total savings		Rs. 59.61 Lacs per Annum	Rs. 15.5 Lacs

***** This above savings will be continuous ...**

Cumulative Energy Savings (In Rs)

Sr. No.	Year	Electrical	Thermal	Total Savings	Investment
1.	2005-2008	Rs. 18.35 Lacs	Rs. 59.61 Lacs	Rs. 77.96 Lacs	Rs. 22.91 Lacs

Steam Management

1. Change over from FO fired Boiler to Biomass Briquettes fired Boiler.

Vision : To Save fuel cost and maintain Environment Healthy

Previous condition : We were using the two Furnace oil fired water tube coil type boiler (Capacity 850 Kg/Hr) for generation of Steam.

Observation : We had getting less dryness fraction of steam. Also as the FO rates are escalating, this directly influenced on the profitability.

Status : Now we are using 1200 Kg / Hr Briquettes fired Boiler, by using this boiler we are getting dryness fraction 0.90 also steam cost reduced.

Saving Calculation :

Sr.No.	Parameters	Values
1.	FO consumption	284.099 KL / Annum
2.	Annual Billing of FO	Rs. 8522970
3.	Calorific value of Furnace oil	10200 Kcal / Kg
4.	Calorific value of Briquettes	3500 Kcal / Kg
5.	Efficiency of FO boiler	79 %
6.	Briquettes boiler Efficiency	72 %
7.	Heat equivalent to 1 kg of FO	3.21 Kg of Briquettes
8.	Briquettes required (Rate 3.5 Rs / Kg)	Rs. 3191852
9.	Total savings in Rs. Per Annum	Rs. 5331117
1.0.	Total savings in Kcal	1812579



Front Open Portion of Briquettes Boiler – 1.2 Ton



Briquettes fired Boiler – Capacity 1.2 Ton

Date of Installation : Year 2007-2008

Investment : **Rs. 12 Lakhs**

Savings & Benefits :

1. Power consumption low
2. Less maintenance so R & M cost reduce.
3. Dryness fraction of steam 0.90, hence sterilizer batch time reduced by 10 min.
4. Ash is using for gardening purpose
5. Very Less sulphur contain in flue gases it enhance the chimney life

2. Installation of Condensate water Recovery system

We replaced all old technology compressors with most efficient advanced compressor for refrigerant plant. We put all kirloskar compressors instead of freeze 5/5.

Vision : To Save the Fuel cost

Date Of Installation : Year 2005-2006

Investment : 2 Lacs

Calculation :

*** Condensate water Temperature - 65 °C**

*** Feed water Temperature - 30 °C**

*** Heat Recovery In Kcal = $m \cdot C_p \cdot \Delta T = (65-30) \times 1 \times 15000 = 525000$ Kcal**

*** Therefore FO saving = $525000 / 10200 = 51.47$ lits per day**

Savings in Rs. : $51.47 \times 365 \times 30 = 563602$ Rs. Per Annum

Savings in Kcal : 191624

Payback Period : 3.5 months



Condensate Recovery System

3. Installation of Solar Water Heater system

Previously we were using steam for hot water in CIP purpose. Now we are utilizing solar energy for hot water for the same purpose. This gives the temp. of hot water upto 75 °C

and further temp. will be raised upto 85 °C by injecting steam. It reflects in the saving of fuel consumption.

Vision : To Save the Fuel cost

Date Of Installation : Year 2005-2006

Investment : 1.5 Lacs

Calculation :

*** Solar hot water Temperature - 75 °C**

*** Feed water Temperature - 30 °C**

*** Heat Recovery In Kcal = $m.Cp.\Delta T = (75-30) \times 1 \times 2000 = 90000$ Kcal**

*** Therefore FO saving = $90000 / 10200 = 8.82$ lits per day**

Savings in Rs. : $8.82 \times 250 \times 30 = 66176$ Rs. Per Annum

Savings in Kcal : 22499

Payback Period : 23 months



Solar Energy Utilization system by Solar Heater

Energy Conservation Plan and Targets

1. Flue Gas wastage Heat Recovery :

We had already purchased SS Economizer along with IBR 1.2 Ton Briquettes fired boiler to recover the heat from flue gases. Present stack temperature is getting 250 to 270 degree c. As there is no sulphur contain in the flue gases we can extract the maximum temperature of flue gases.

The expected savings approx 16 Lacs per Annum



SS Economizer attached between IBR Boiler and Chimney