

HASSAN DAIRY, A UNIT OF HASSAN CO-OPERATIVE MILK PRODUCERS' SOCIETIES' UNION LTD., INDUSTRIAL ESTATE, INDUSTRIAL ESTATE, HASSAN – 573 201. KARNATKA.

UNIT PROFILE:

Hassan dairy, is a unit of Hassan Co-Operative Milk producers. Union Limited registered under the Karnataka co-operative act and has been commissioned in the year 1982. The rated capacity when commissioned was 60 TKPD (Thousand Kgs per day) and was subsequently expanded to 120 TKPD by NDDDB under the turn key project in the year 2000. At present, the Union is procuring, processing and marketing up to 3.5 lakh liters of milk per day The Union has under its jurisdiction 2 chilling centers and 1 mini dairy. The dairy receives milk in cans directly from dairy co-operative societies spread over in the districts of Hassan and Chickmagalore and also through tankers from Bulk Milk Coolers,(installed in Rural areas) chilling centers and mini dairy situated in the districts of Hassan, Chickmagalore and Kodagu.

HASSAN CO-OPERATIVE MILK PRODUCERS SOCIETIES UNION LTD, was established with an aim to ensure that milk producers and formers regularly and continuously receive market price by offering quality of milk products to consumers at competitive prices to support small, marginal farmers and agricultural labourers through dairy development hence we have entered new and far off markets like ,Pune and kolhapur in Maharashtra, Trivendrum and Kollam in Kerala. As the farmers are not sure of receiving a remunerative price for their agricultural produce more and more farmers are taking up dairying as their main occupation rather than subsidiary occupation for their livelihood. The milk union is committed to accept all the milk offered by the milk producers in the milk shed area and hence there is a considerable increase in milk procurement during 2005-06, 2006-07 & 2007-08.



We also believe that it is a **Co-Operative Social Responsibility (COSR)** to conserve and manage energy efficiently in order to bridge the gap between energy supply and demand.

Bulk Milk Coolers and Automatic Milk Collection units have been installed to improve the quality and transparency. It is targeted to handle more than 50% of the milk through Bulk Milk Coolers by 2010.

The dairy processes the milk and packs the following qualities of milk:

1. Toned milk with 3.1% Fat & 8.5% Solids not fat
2. Standardised Homogenized milk with 4.6% Fat & 8.5% Solids not fat
3. Double toned milk with 1.5% Fat & 9% Solids not fat

The dairy markets milk and milk products under the brand name “NANDINI” which happens to be registered brand name of “Karnataka Milk Federation”, the apex institution at the state level.

Hassan dairy is assisted both technically and financially by National Dairy Development Board, Anand, Gujarat under operation flood and vision schemes.

Hassan Dairy is an ISO 9001:2000 certified (by M/S TUV) organization committed to implement Quality Management System and efforts are on to implement HACCP(ISO:22000) at the earliest.

The other market developing activities taken up by the dairy are Creating awareness about milk and health and energy conservation in public especially among the women folk and school children through Training

The Commitment:-

Hassan Dairy considers energy management as a team approach and has included this under the “**TOTAL QUALITY MANAGEMENT(TQM)**” Wherein a continual approach has been bestowed to sustain the achievements made with due stress on improvement of product quality.

Cross functional teams were formed and the philosophy of energy management and quality improvement on a sustainable basis were inculcated among all the employees by way of display of posters, lectures and discussions. HRD experts were also invited to help building up of leadership qualities amongst employees. The dairy also practices the 5 “S” house keeping principles with due stress on Kaizen-a continual improvement.

ENERGY CONSUMPTION:

The energy consumption in the years 2005-2006, 2006-2007 and 2007-08 along with the milk handled is as follows:

DESCRIPTION	UNIT	2005-2006	2006-2007	2007-2008
Milk Handled	M T	80346.25	85937.82	73428.76
Total energy cost	Rs in Lakhs	101.261	96.459	89.08263
Energy cost v/s Manufacturing expenses	Percent	14.29	13.98	16.76263
Total energy consumption – Electrical	Lakhs kWh	18.024	17.160	16.21
Specific energy consumption – Electrical	KWh/Tonne	22.434	19.969	22.08
Total energy consumption – Thermal	Million Kcals	2539.70	2526.17	2920.96
Specific energy consumption – Thermal	Million Kcals/Tonne	0.03161	0.02940	0.028

Energy Profile:-

The energy profile of the dairy includes Electricity and Firewood mainly. HSD is used for power generation. The energy cost is 13.98% of the total manufacturing cost of the dairy.

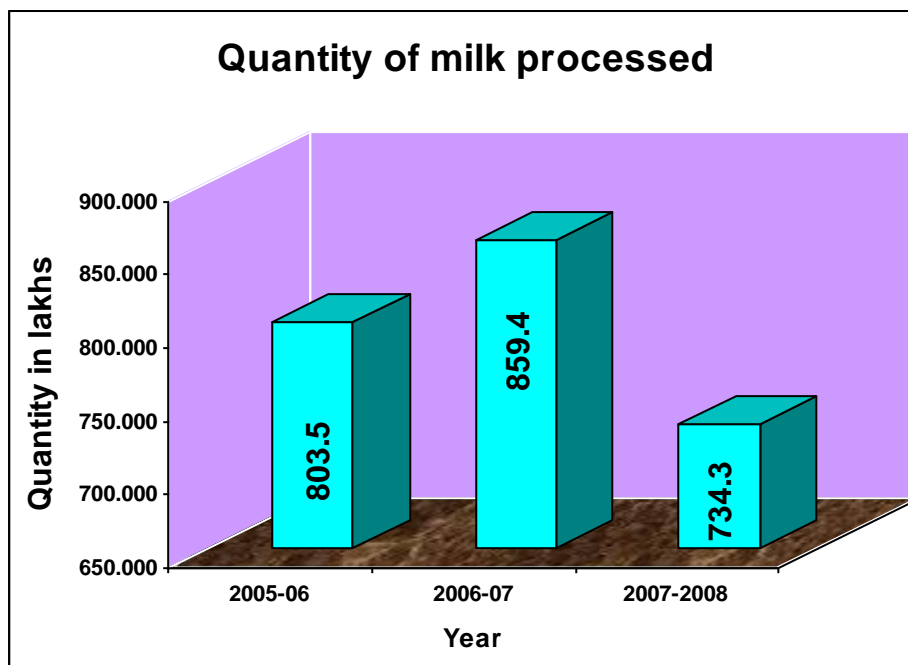
The total connected load is 750 KW and the contract demand is 300 KVA. There are standby motors to take over in case of breakdown or preventive maintenance.

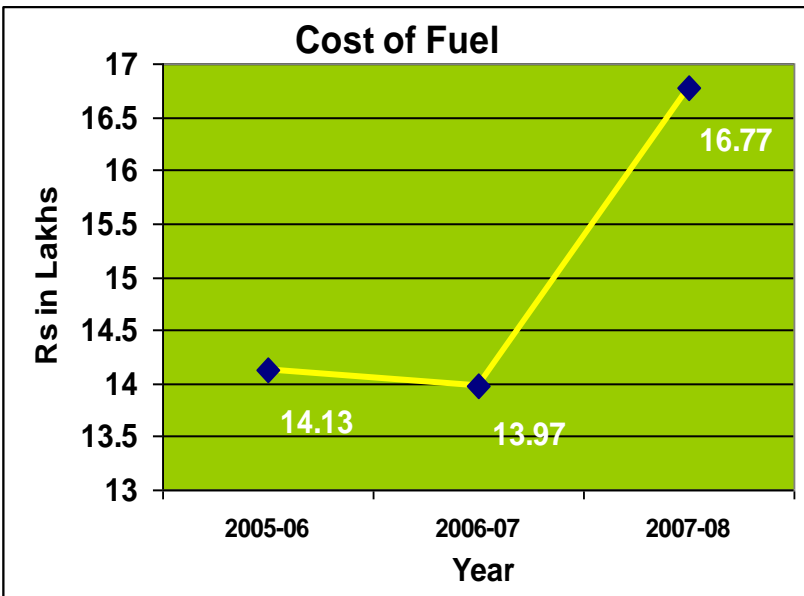
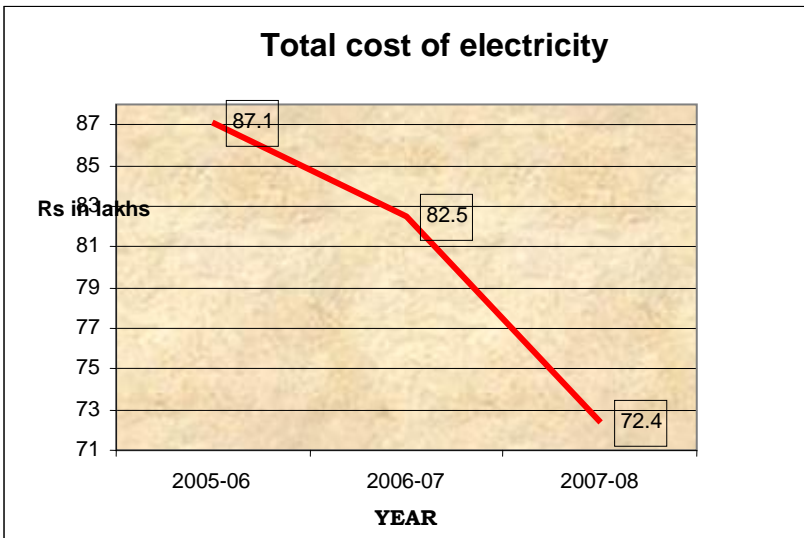
Electricity occupies the top position in the energy profile, since 78% of the total energy cost is spent on electrical energy. 70% of the total electrical energy is consumed for operating refrigeration system. Hence, major thrust was given in conserving energy in this area.

Thus, the connected load in this section 258 KW. The total running hours of ammonia compressors and chilled water pumps ranges between 20-23 hours per day. At any given point of time 3 ammonia compressors and 4 chilled water pumps will be in operation while the rest are utilized as standby.

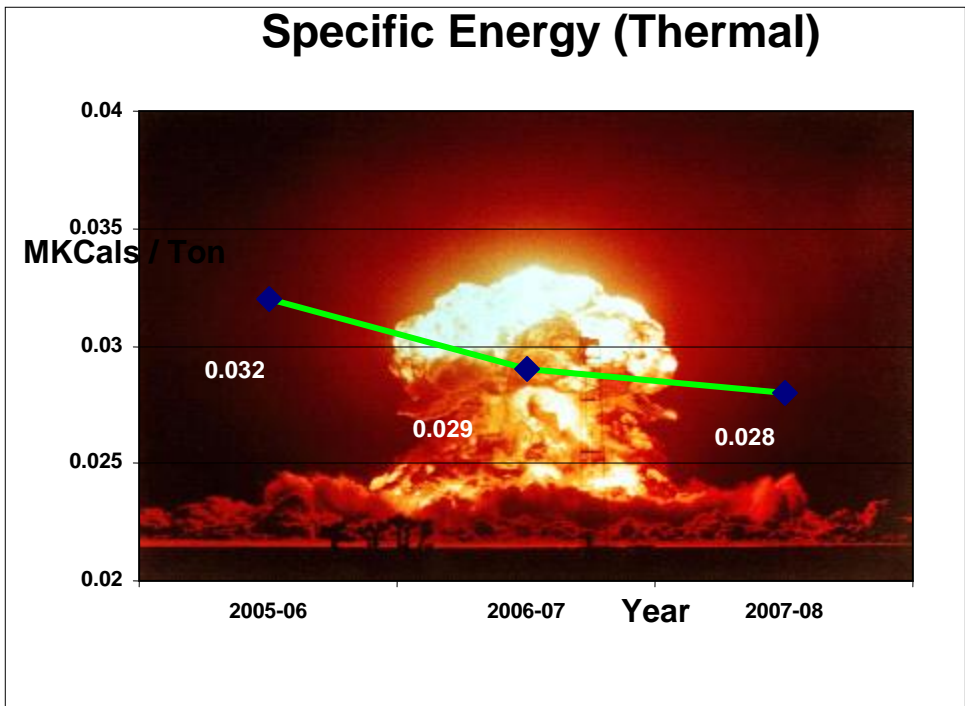
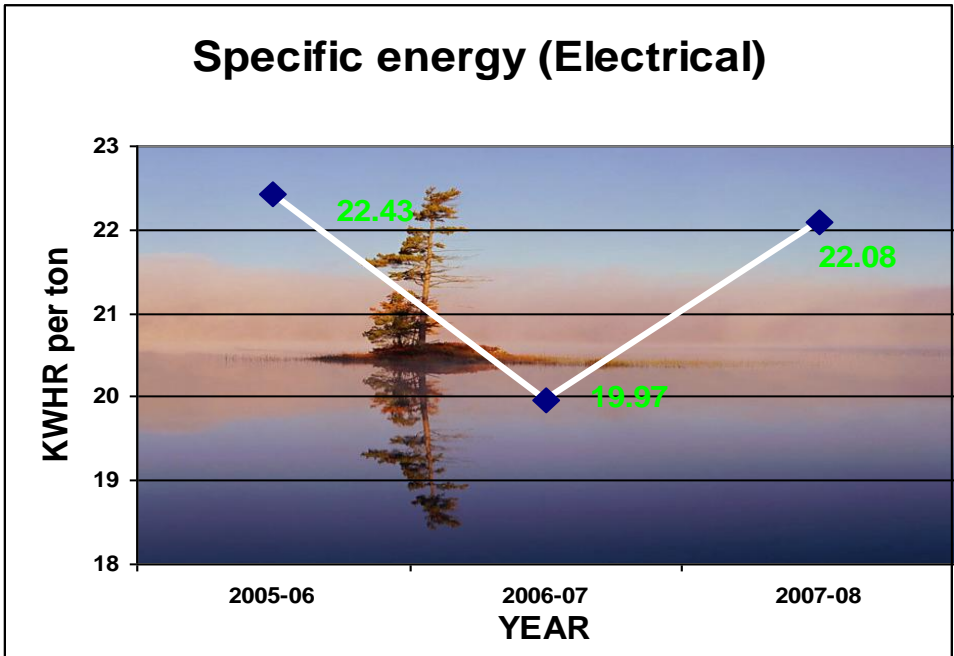
Firewood occupies second position in energy profile. The firewood is purchased from the Karnataka state forest department who are very judicious in deforestation keeping in view the ecological balance (Only eucalyptus is being supplied). The firewood constitutes 15% of the total energy. The major user of this energy is the milk processing section wherein more than 75% of the thermal energy is utilized.

Energy consumption analysis: (Base year 2005-06)





The above reduction in over all utilization of energy despite increase in milk procurement is mainly due to the concerted efforts of TEM core team and sub-section teams by way of monitoring the consumption on a continuous basis.



The specific energy consumption has also reduced considerably over 2005-06.

- * increase in Specific energy (electrical) : 10.56
- * Reduction in Specific energy (Thermal) : 3.57

Percentage reduction compared to the planned target :-

- specific energy (electrical) : 5.66
- specific energy (Thermal) : 0.18

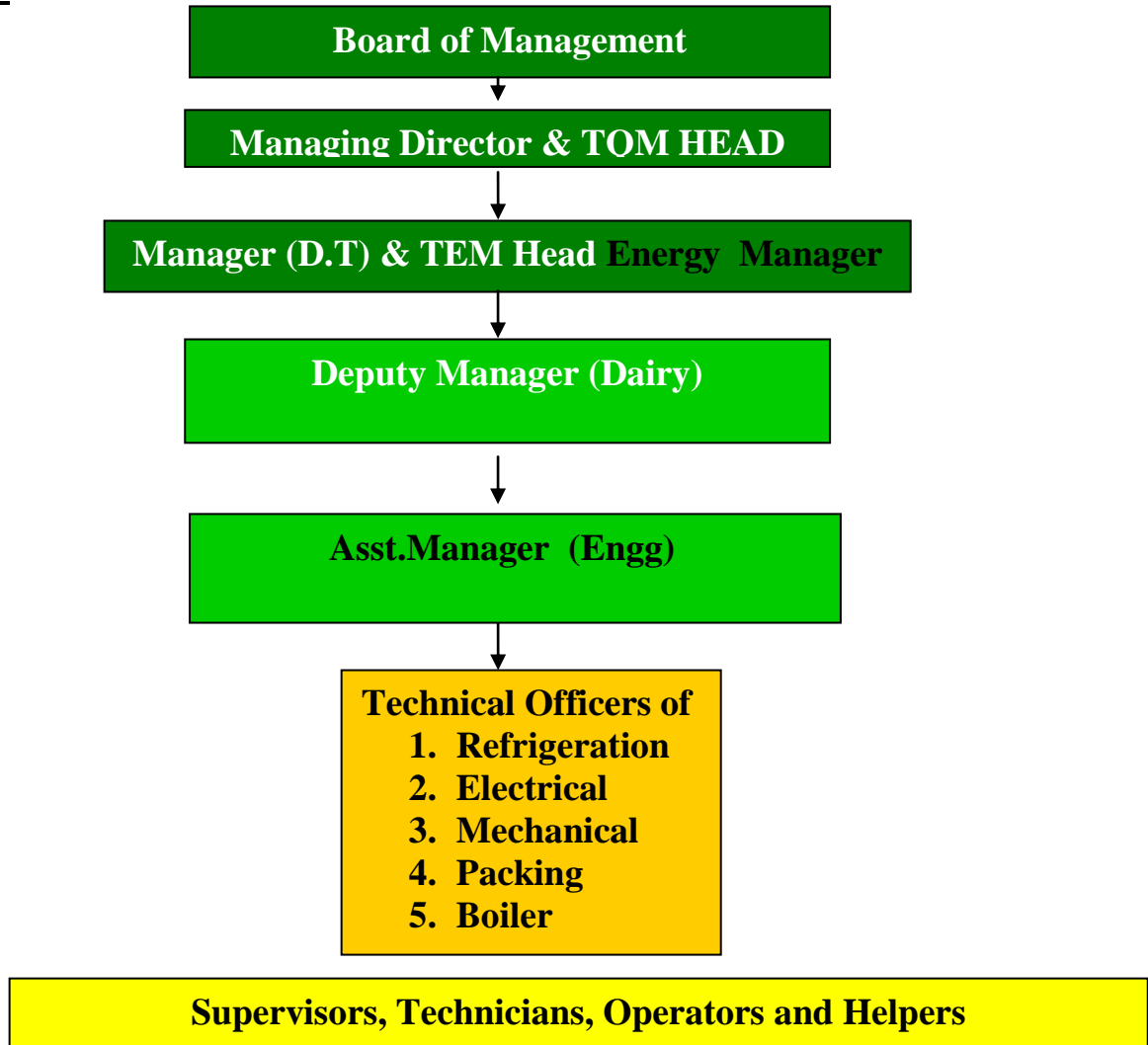
The energy conservation measures implemented during the year has contributed to the reduction, namely

- A. Installation of acid phase reactors instead of floating agitator motors

PROFILE OF ENERGY CONSERVATION CELL

The EC Cell is called as TEM Cell (Total Energy Management Cell). The main function of the TEM Cell is not just energy conservation/cost reduction but to evolve a comprehensive energy management system which shall focus on continuous improvement on a sustainable basis. The cell also evolve system to introduce Kaizen & good management practices (GMP). The core team members of the TEM Cell are responsible for identifying the training needs of sub section teams and shop floor level workers from time to time on a continual basis. They are also responsible for organising in house awareness programs and refreshers courses to all the employees and evaluate the impact of awareness programs at regular intervals.

Organization
Profile



The core team members are:

1. Manager (D.T) : Head of TEM Cell & Energy Manager
2. Manager (Finance)
3. Deputy Manager (D.T) :
4. Asst. Manager(Eng) :
5. Technical officer(Refrigeration)
6. Technical officer (Electrical)
7. Technical officer (Mechanical)
8. Technical officer (Boiler)
9. I/C Purchase section
- 10.I/C Training cell

Though the TEM cell is not vested with financial powers, the TEM has the liberty to implement energy saving project which does not call for any investment. The team prepares project proposals to be presented to the management with a focus on the envisaged energy saving opportunities, investment proposed and the pay back period. After detailed deliberations the management approves the project for implementation providing the required financial support.

The TEM core team evaluates the energy data and identifies the excess energy consumption over a specified period. The team identifies the energy intensive operations and works out the theoretical energy requirements for each section/process and compares it with the actual energy consumption. The excessive usage of energy are enlisted and the reasons are identified through a brain storming sessions. After detailed study of the efficiency of major equipment and discussions with user departments the energy saving opportunities are identified and prioritised.

The core and the sub section teams :

- A. Develop standardised formats for each process so that any deviation can be identified and corrected to enable the user section to fix their own specific energy consumption targets.
- B. Implement the energy saving projects with investment after a detailed discussion with equipment manufacturers.
- C. Automation of all the process operations with process modification where ever required.

Energy saving projects implemented during 2007-08:

1. Conversion of equalization tank in to acid phase reactors in ETP:

Anaerobic acid phase reaction is taking place in this process this protein in milk is digested. only clear water with disort solid moved to next tank .this process does not require any equalization.hence we could remove floating agitator motors.

No of hours operated/Day :20

Savings achieved per day : Rs.330=00

Electricity saved per year :

Savings per annum : 0.269

Investment incurred : 0.02lakhs



ACID PHASE REACTIORS



ENERGY CONSERVATION PLANS AND TARGETS:

Projects proposed for the year 2008-2010

1.Replacement of frick and reciprocating compressor with Screw compressor:

This project was envisaged to be implemented during the year 2007-08, due to financial constraints (we had to provide funds for maintenance and other projects) the same was postponed to 2008-09 and will be taken up under "Vision-2010". We are going to incorporate screw compressor system for the icemaking plants, as well as cold storage plants provided by icelings.

Analyzing the operation of our screw compressors. These are among the largest energy users in a dairy, so they are a good target for energy reduction. One possibility is to lower the head pressure so the compressor doesn't work as hard. This can be accomplished by operating the system as a liquid recirculation system instead of direct expansion. This can reduce power 10-15% per year

1.Installation of Power Boss to Ammonia Compressor motors:

This project was envisaged to be implemented during the year 2007-08, due to financial constraints (we had to provide funds for maintenance and other projects) the same was postponed to 2008-09 and will be taken up under "Vision-2010"

Power boss is a phase angle controller without affecting the frequency and the speed of the motor. It improves the power factor and reduces the KW consumption. There by the KWHr is reduced. The trials conducted at the premises for two days were encouraging. In phase – I we intend to install 03Nos of Power boss for motors connected to ammonia compressors(as they are energy intensive).

Expected savings(electrical)	1.00 Lakh KWHr
Expected savings	2.54 lakhs
Proposed investment	4.5 lakhs

2.Replacement of conventional lighting tubes with energy efficient CFLs(Inside and outside the buildings):

This project was envisaged to be implemented during the year 2007-08, due to financial constraints (we had to provide funds for maintenance and other projects) the same was postponed to 2008-09 and will be taken up under "Vision-2010"

The lighting system inside and outside the buildings will be revamped. The conventional tubes will be replaced with energy efficient CFLs. This does not include the critical process areas where the lumen requirement is more as per MMPO act. In phase II the entire system will be connected to a centralized Solar/wind/AC hybrid system.

Anticipated savings	0.19 Lakh KWHR
Savings expected	Rs 0.77 lakhs
Proposed investment	1.50 lakhs
Simple pay back period	< 02 years

3.Re-insulation of Steam and chilled water service lines:

This project was envisaged to be implemented during the year2007-08, due to financial constraints (we had to provide funds for mantainance and other projects) the same was postponed to 2008-09 and will be taken up under “Vision-2010”

As the insulation of most of the service lines are old we intend to replace the hot and cold insulation of these lines(with aluminum cladding). This would help in reducing the radiation losses.

Expected savings (Electrical)/year	0.49 lakh KWHR
Expected fuel savings/year	146 Tons
Total Expected savings	4.14 lakhs
Proposed investment	7.00 l akhs

4. Replacement of Fire wood boiler with multi-fuel boiler (agri waste-coffee husk, rice husk, bagass, coconut shell etc., as fuel):-

This project was envisaged to be implemented during the year2007-08, due to financial constraints (we had to provide funds for mantainance and other projects) the same was postponed to 2008-09 and will be taken up under “Vision-2010”

This project was envisaged to be implemented during the year2007-08, due to financial constraints (as we had to provide funds for a new Dairy at Kudige, Coorg District) the same was postponed to 2008-09 and will be taken up under “Vision-2010”

The agriculture waste is available in the area at a cheaper rate are coconut shell, paddy straw/husk, bagass and coffee husk. We intend to procure the above fuel through our co-op. societies spread over three districts. Project proposal has

already been approved by NDDB to change the existing boiler with high efficiency multi fuel boiler under Vision 2010. The proposed Multi-fuel boiler is estimated to consume additional electricity around 0.1702lakh Kwhr per year, as the multi fuel boiler needs additional Induced draught fan, shredder and conveyer, but the savings in fuel will offset the increased electrical consumption. Estimated savings is **Rs. 4.04 Lakhs**. Proposed investment is Rs. 15 lakhs.

5 Pre-Chiller for returned chilled water:-

This project was envisaged to be implemented during the year2007-08, due to financial constraints (we had to provide funds for mantainance and other projects) the same was postponed to 2008-09 and will be taken up under “Vision-2010”

The temperature of the returned chilled water from process to IBT ranges between 6-8⁰ C. Plate type chillers can be used along with Ice bank system to reduce power consumption. The returned chilled water from the process is first chilled in plate type chillers (instead of directly pumping to Ice bank tank) using vaporised ammonia (at -10⁰ C) as cooling medium. The returned chilled water would be chilled to at least 4⁰ C and the heat gain by ammonia ranges between 4- 5⁰ C. Approximate power saving of 0.3 BKw/TR can be achieved. At -5⁰ C the compressor can handle more quantity of ammonia delivering more capacity than at -10⁰ C.

If a nominal 15 hrs. of operation is considered the total savings per year would be 52560 Kwhr resulting in saving of **Rs. 239670** per annum. The proposed investment is **Rs. 6 lakhs**. The payback period is **2.5 years**.

The Environment:

The effluent treatment plant involving new technologies has established in our Dairy. The treatment system has been designed to meet the standards of PCB for disposal in to the inland surface standards, usage for gardening, fodderplots and for teak plantation.



Before



After



Teak Plantation



Fodder plot

New Sand filtration beds

For the purpose of reducing the suspended solids, two filtration beds were constructed to filter the treated water. Two sludge drying beds are using as a stand by always. Excess sludge from the aeration tank shall be routed to the sludge Drying beds through recirculation pump for solid removal in the secondary settling tank. The dried sludge can be used as manure for garden.

Before



After



The plant has an un-aerobic static bed digester (UASB) with extended aeration system. This system is used to remove the oxygen consuming organic matter from the effluent biological treatment. The UASB digests 60% of the bio-degradable constituents of waste water to generate methane gas. The blower operation will be there for 24 hrs. oxygen uptake at a pH range of 7.0-7.4



UASB Digester



Aeriation Tank

Solid Waste Management:

Wastes like polythene film and polythene bags generated from the dairy are bio-non degradable wastes, which seems to be a difficult affair, to solve this problem a solid waste disposal yard was constructed to segregate and store solid waste. On an annual contract basis this waste is disposed off to recyclers. Actions have been initiated to obtain the EMS 14001:2004 certification and documents are being developed with the help of consultant.



solid waste disposal yard

The Safety:

Since sewage/ effluent is enriched with various groups of highly pathogenic microbes & toxic elements, therefore top most priority has been given for safety measures while operating an effluents/ wastes water treatment plant. The operator uses personal protective equipments like hand gloves, gum-boots, mask, helmet and goggles. The on-site emergency plan is in place. The statutory requirements as per Karnataka State Prevention and Control of Pollution Act 1981 have been fulfilled. There has been no incidence of accidents from past 6 years. All the safety measures suggested by the statutory authorities like Inspectorate of Factories and Boilers & Inspectorate of Electrical Installations have been implemented.

PLANS AND TARGETS

In order to stabilize & enhance the efficiency of the treatment plant and the action plan for the up gradation of effluent Treatment plant, we have already submitted a project proposal to the regional office NDDB-Bangalore

The proposed projects are:

1. Additional UASB Digester.
2. Additional aereator.
3. secondary clarifier.
4. sand filter.
5. filter press.