



**Hassan Dairy, Unit of Hassan Co-operative Milk Union Ltd.
B.M.Road, Ind.Estate, Hassan, Karnataka.**

**Hassan Milk Union
Mission Statement**

Hassan Milk Union aims to render the best services at nominal cost to its Members to increase milk production and produce good quality milk by paying remunerative price throughout the year, thereby improving their economic and social condition while ensuring high quality milk & milk products to the delighted level of the consumers at competitive price.

**Hassan Milk Union
Vision Statement**

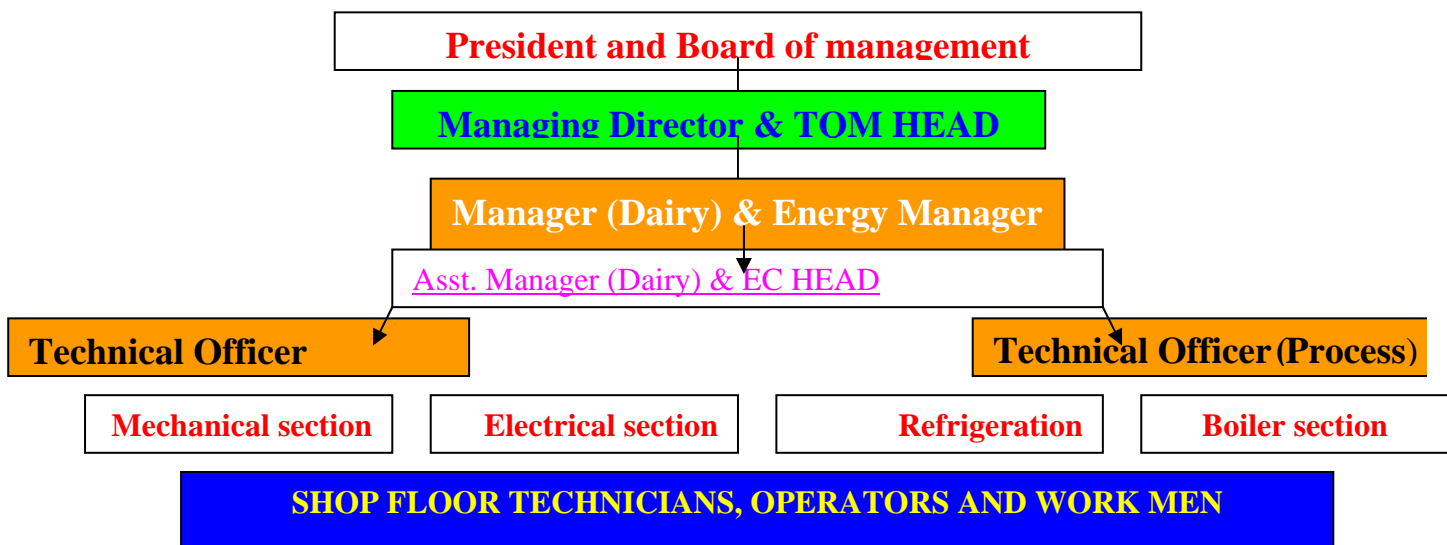
The Union thrives hard to adopt the modern & eco friendly technologies to produce milk & milk products of international standards to make our presence prominent in the global market.

ENERGY CONSERVATION POLICY

We at Hassan Milk Union are committed to establish total energy management system by –

- Adopting modern and eco-friendly technologies.
- Adopting 5 “S” principles to minimize and eliminate wastage at all levels of business operations.
- Develop bench marks for optimal use of energy at all levels of process operations.
- Creating awareness amongst all the employees and recognising their initiatives.
- Reducing specific energy consumption year after year.
- Harnessing non-conventional energy wherever viable.

ORGANISATIONAL SETUP:



ENERGY CONSERVATION ACHIEVEMENTS:

From the year 2002-2005, Hassan Dairy has implemented 16 energy saving projects through core team initiatives and innovative ideas by officers and shop floor workers resulted in a saving of Rs. 27.28 Lakhs with an investment of Rs. 32.68 Lakhs resulting in 17.825% reduction in specific electrical energy consumption and 35.36% in specific thermal energy consumption.

The energy saving projects implemented during 2004-05:

I. Installation of new condenser for Refrigeration:

The old closed type ammonia condensers(2nos) were operated with 14 HP (10.5KW)motors. These inefficient condensers were shut down and similar capacity energy efficient condenser with a connected load of 5HP(3.7KW)was installed.

- ❑ No of hours operated/Day : 20hrs
- ❑ Savings achieved per day: 136Kwh
- ❑ Electricity saved per year : 49640Kwh
- ❑ Savings per annum : Rs 2.37lakhs



- ❑ Investment incurred: 4.21lakhs
- ❑ Pay back period : 21months

2. Installation of 20KLPH energy efficient milk pasteuriser:

One of the existing 10KLPH milk pasteuriser was 20years old with a regeneration efficiency of 85% and with milk to chilled water ratio of 1:3.The throughput of the old pasteuriser was 8600KLPH only. The said equipment was replaced with energy efficient 20KLPH pasteuriser having auto controls with 90% regeneration efficiency. The required milk to chilled water ration and milk to hot water ratio are 1:2 and 1:1.2 respectively. The old pasteuriser used to consume additional operational time of 10.7hrs to process the same quantity of milk.

A. reduced chilled water ratio:

- ❖ Chilled water used by old pasteuriser(ratio 1:3) : 480kl/day
- ❖ Chilled water used by new pasteuriser(ratio 1:2) : 320kl/day
- ❖ Reduction in chilled water circulation : 160kl/day
- ❖ Electrical energy saved : 7270Kwh
- ❖ Savings per annum :Rs 35115

B. Improved regeneration efficiency(90%)and Reduction in milk pasteurization temperature from 82°C to76°C:

- Qty of milk processed /day with new pasteuriser :16000kpd,
- Delta 'T' heating : 6°C
- Thermal energy saved :453.34Mkcal
- Fire wood saved :187.64MTS
- Savings per annum :Rs 2.20lakhs

C. Improved throughput :

- Qty of milk processed /day with new pasteuriser :16000kpd
- Electrical energy saved : 58270Kwh
- Savings per annum :2.814lakhs

3.Chilled water management:

Chilled water management is a major thrust area in any dairy, wherein lot of energy is wasted by way of unnecessary circulation of chilled water. The milk to chilled water ratio can be brought down through regular monitoring and automation.



- ✓ Milk to chilled water ratio (2003-04) :1:10.75
- ✓ Milk to chilled water ratio achieved (2004-05) :1:9.25
- ✓ Total milk handled :73428.097MT
- ✓ Chilled water circulated if the ratio is 1:10.75 :789352.045KL
- ✓ Chilled water circulated if the ratio is 1:9.25 :679209.889KL
- ✓ Reduction in chilled water circulation :110142.146KL
- ✓ Total electrical energy saved :13694KWH
- ✓ Savings per annum :Rs. 66143

4.Installation of variable speed drive for butter churn:

The energy consumed by old geared motor drive butter churn was constant irrespective of its RPM. The energy consumed by variable speed drive varies according to RPM of the churn.

- Total quantity of butter produced :395.78MT
- Total electrical energy saved :1845KWH
- Savings per annum :Rs. 0.09lakhs



5.Replacement of agitator with blower for ETP aerator:

The air incorporated by the agitator provided for ETP aerator was insufficient when compared to the volume of effluent handled in the aerator. Installation of air blower has improved the waste water treatment.



<input type="checkbox"/> Connected load of agitator	:10HP
<input type="checkbox"/> Connected load of air blower	:5HP
<input type="checkbox"/> Total electrical energy saved	:32585KWH
<input type="checkbox"/> Savings per annum	:Rs.157386.00

6. Lower capacity pumps for bore wells:

Though the yield of the bore wells had gone down considerably old 10Hp submersible pumps were being used to lift water. 5Hp pumps installed are delivering the same quantity of water.

➤ Number of bore wells	:3
➤ Connected load	:10HP each
➤ Replaced load	:5HP each
➤ No. of hours of operation	:20hrs
➤ Total electrical energy saved	:81463KWH
➤ Savings per annum	:Rs.393467.00

7. Lower capacity pump for crate washer:

• Initial connected load	:15HP
• Replaced load	:10HP
• Total electrical energy saved	:10891KWH
• Savings per annum	:Rs.52606.00

8. Improved Boiler Efficiency:

The boiler flue tubes(smoke tubes) were replaced with new ones. The boiler efficiency improved from 50.7% to 54.1%.



✓ Firewood saved	:32.49MT
✓ Savings per annum	:0.38lakhs

✓ Investment made :Rs.2.25lakhs

9. Rain water harvesting:

- Average rainy days :60
- Average water collected :30000L/day
- Electrical energy saved :1119KWH
- Savings per annum :Rs.5404.00

ENERGY CONSERVATION PLANS AND TARGETS:

1. **Methane Gas Utilisation:-** The effluent treatment at the dairy is having anaerobic digester which produces methane gas which is being flared at present. The team intends to utilise the methane gas produced for operating 18 KVA diesel powered generator installed at ETP (with an admixture of methane & diesel in the ratio 70:30). We had discussions with Indian Institute Of Science



Bangalore and Karnataka renewable energy development Limited (KREDEL) to obtain a safe and efficient gas kit. At present the generation of methane is sufficient to operate the generator for 10 hours/day on an average. locally developed gas kit developed technical snags, and discussions are on with M/S Hydro-air Mumbai to supply a safe kit. The expected annual savings is **Rs. 1.96 Lakhs** per annum with an investment of **Rs. 0.50 Lakh**.

2. **Pre-Chiller for returned chilled water:-** The temperature of the returned chilled water from process to IBT ranges between 6-8 °C. Plate type chillers can be used along with Ice bank system to reduce power consumption. The returned chilled water from the process shall be first chilled in plate type chillers instead of directly pumping to Ice bank tank using vaporised ammonia (at -10 °C) as cooling medium. The returned chilled water would be chilled atleast 4 °C and the ammonia gains heat by atleast 8 °C. Approximately a power saving of 0.3 BKW/TR can be achieved. At -2 °C the compressor can handle more quantity of ammonia delivering more capacity than at -10 °C. If a nominal 15 hrs. of operation is considered the total savings per year would be 52560 kWh resulting in saving of **Rs. 239670** per annum. the proposed investment is **Rs. 6 lakhs**. The payback period is **2.5 years**.
3. **Heat Recovery Units:-** Heat recovery units can be introduced in the exhaust line of ammonia . This would reduce the load on ammonia condensers and improves cooling efficiency.

SLNO	EQUIPMENT	DISCHARGE TEMPERATURE (DEGREE C)	NO OF HRS OF OPERATION	EXPECTED YIELD OF H.W./DAY
1	AMMONIA COMPRESSORS	114	18	8000lts

The expected savings per annum is **Rs. 1.25 lakhs**. Proposed investment is **Rs. 2.5 Lakhs**. Payback period is **2 years**.

4. Changing of Fuel Source from Fire wood to Agriculture Waste:- The agriculture waste available in the area at a cheaper rate are coconut shell, paddy straw/husk, bagass and coffee husk. Discussions with various are on to procure briquetted fuel. The boiler manufacturers have been consulted regarding the modifications required for the existing boilers. Estimated savings is **Rs. 1.5 Lakhs**. Proposed investment is **Rs. 5 lakhs**. The payback period is **3.3 years**.

5. Water Management and Rain Water Harvesting:- We intend to reduce the present milk to water ratio from 1:2.3 to 1:1.75. opportunities of water conservation have been enlisted and required process and layout modifications have been worked out. Actions have been initiated to harvest rain water in consultation with the experts in the field. Initially, building top rain water is being routed to a sump and run off water is being routed to dummy bore wells to recharge the underground streams.

ENVIRONMENT AND SAFETY:

Actions have been initiated to get the EMS 14001:2004 certification. Documents are being developed with the help of consultants.

All the safety measures suggested by the statutory authorities have been implemented. There has been no incidence of accidents from past 3 years.

CHILDREN EDUCATION PROGRAMS:

Awareness programs were organized for school children regarding energy conservation both at school and our own premises. As per the available records 3045 school children and staff visited Hassan Dairy as part of their educational tour. Children were educated regarding need for energy conservation along with health and nutritional aspects of milk and milk products. The cartoon film "Bijlee" screened was appreciated by all the children.

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 refresher courses to all the employees and evaluate the impact of awareness programs at regular intervals.

The core team members are:

- | | |
|------------------------------|----------------|
| 1. Manager (Dairy) | Energy Manager |
| 2. Manager (Finance) | |
| 3. Asst. Manager (Dairy) | Co-ordinator |
| 4. I/C Refrigeration section | |
| 5. I/C Electrical section | |
| 6. I/C Mechanical section | |
| 7. I/C Boiler section | |
| 8. I/C Purchase section | |
| 9. 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 opportunities identified are as follows:

Energy Conservation Measures (Planned)	Anticipated savings in			Approx. investment (Rs.lakhs)	Project Commencement & Completion year
	Electrical Lakh Kwh	Wood Tons	Rs. Lakhs		
Heat recovery unit for Ammonia compressors	0.27	113.64	2.57	5.42	2005-2006
Methane gas utilisation	0.43	Nil	1.96	1.50	2005-2006
Replacing wood with agril.waste/Briquetts as fuel	Nil	Nil	1.5	5.00	2005-2006

Installation of Mechanical packing machines in place of pneumatic machines	1.36	Nil	6.58	11.98	2006-2007
Pre-chiller for returned chilled Water	0.53	Nil	2.4	6.00	2006-2007
Replacing conventional lighting tubes with energy efficient CFLs	0.14052	Nil	0.67	1.20	2006-2007
Total	2.73	113.64	15.67	31.10	

For the period from 2001-2004 the improvement opportunities with meager /no investment have been addressed to a greater extent. Hence forth the core team works out financially viable projects including machinery replacement with energy efficient technology and process modification.

The core and the sub section teams intend to:

- 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.