

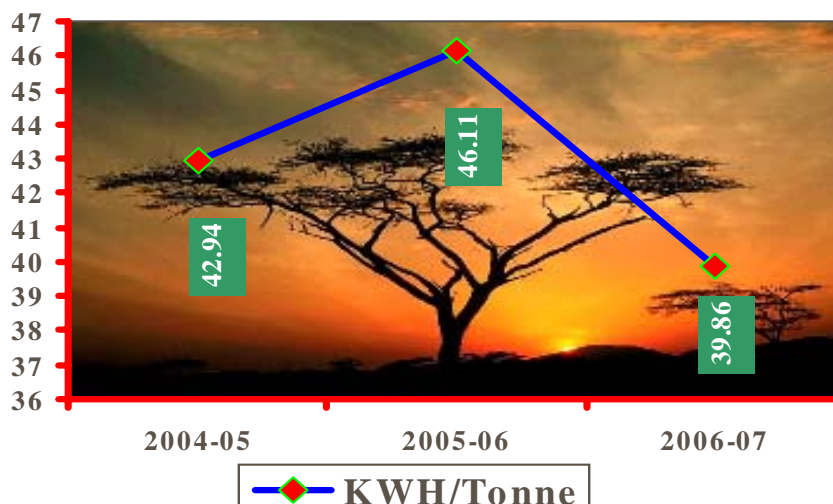
Energy consumption

With the implementation of various energy conservation measures, there is **considerable decline of specific energy consumption.**, there is significant reduction in energy consumption over last year due to the sustained efforts to conserve it and with the **implementation of various energy conservation measures & novel ideas** to increase efficiency of equipments. Last three years specific energy consumption figures are shown below.

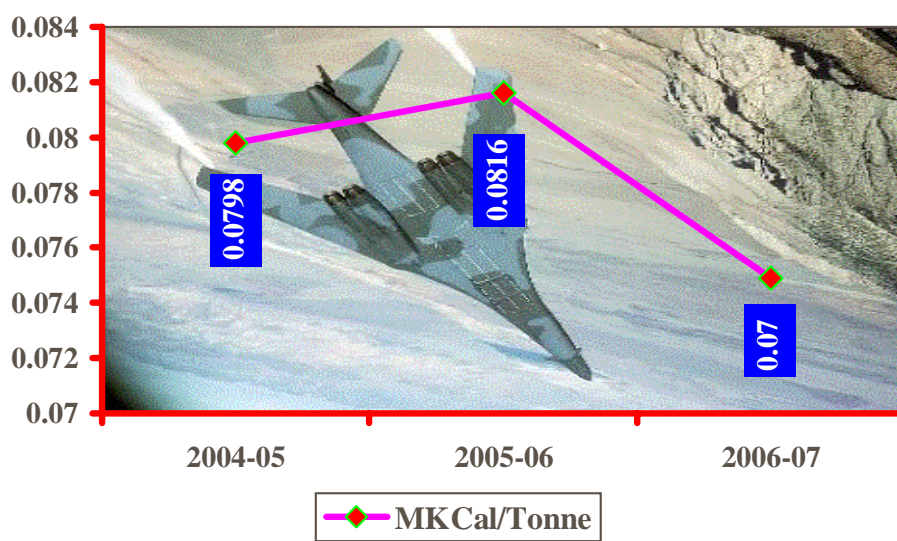
Description	Unit	2004-05	2005-06	2006-07
Specific Electrical energy	Kwh/tonne	42.943	46.109	39.859
Specific Thermal energy	Mkcal/Tonne	0.0798	0.0816	0.0749
Total manufacturing cost	Lakhs	2749.03	3031.59	2413.47
Total Energy bill	Lakhs	447.28	433.7	477.89*
Energy as % of Total cost of production	%	16.27	14.3	19.8

* Though there is a remarkable decline in specific thermal & electrical energy the total energy bill is at higher side due the upward revision of furnace oil, diesel and power tariff rates.

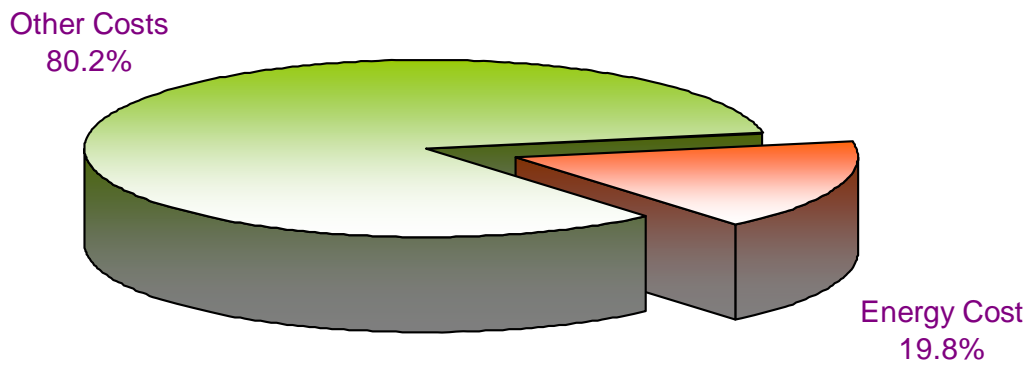
Specific Electrical energy consumption 2006-07



Specific Thermal energy consumption 2006-07



Share of Energy cost in Manufacturing Cost 2006-07



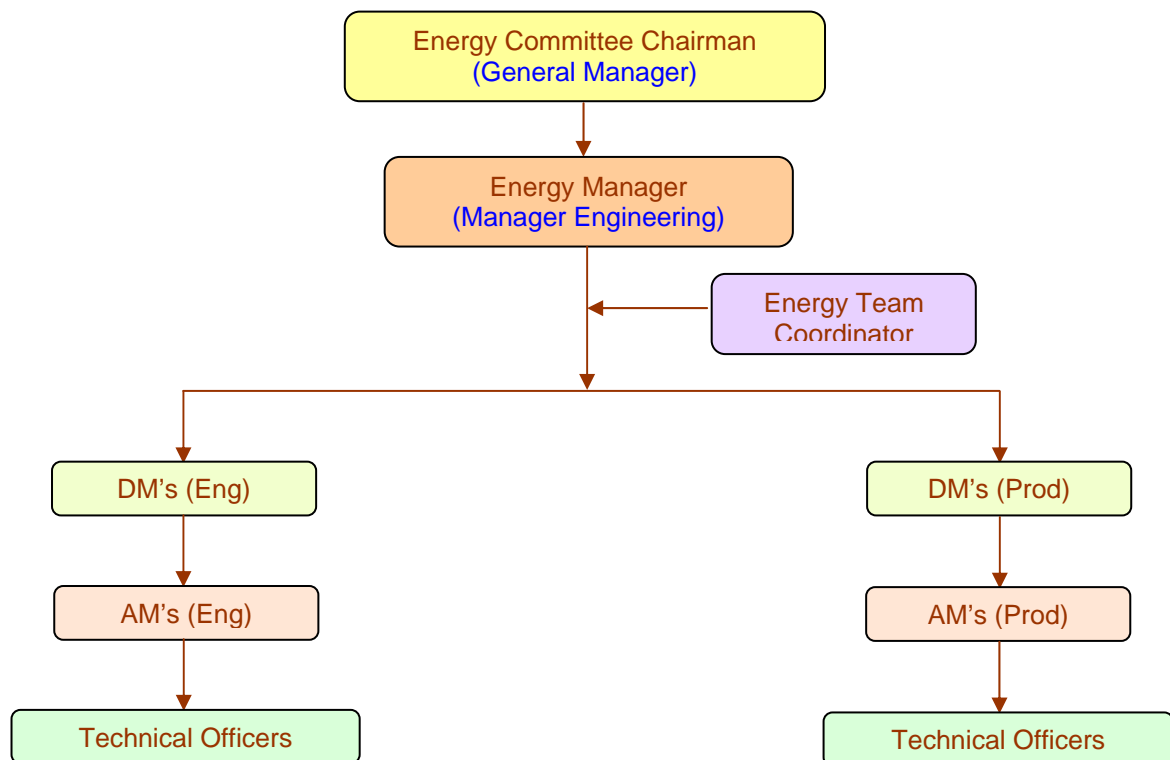
TOTAL ENERGY MANAGEMENT TEAM & COMMITMENT

The Total Energy Management Team of Kolar Milk Union is headed by General Manager [Tech] supported by departmental functional heads like Engineering, Production, Quality Control, Marketing and Purchase.

This team is being continuously advised & motivated by Managing Director and the Board of Management. This team considers Energy Conservation can be achieved only by team approach and commitment. The product quality was not sacrificed while saving the energy.

The core team meets regularly and discuss energy savings proposals and quality improvement and sustainability. These ideas are further percolated to all the employees of concerned sections who have been motivated through training program. On several occasions the ideas of the employees were considered and implemented in cost reduction and quality improvement.

ENERGY CONSERVATION CELL



Kolar District Co-operative Milk Producer's Societies Union Ltd.,

ENERGY POLICY

We continuously strive to effectively improve the overall operations and management systems by adopting cost effective advanced technologies and by educating and motivating the workforce to achieve maximized qualitative production with least energy consumption and safeguarding environment and natural resources.

Energy Projects during 2006-07

1. Replacement of 10 KLPH water softener by 30 KLPH.

The water quality in this area is very poor and having highest degree of hardness is



in the range of 800 to 1000 ppm, resulting in heavy scale deposits in all equipments at very short time. This was not only results in inefficiency in functioning but also reduces the life of the equipments due to corrosiveness. The losses in

thermal **Water Softening Plant** & electrical energy were more due to this factor. We have replaced the old 10 KLPH water softener by higher capacity 30 KLPH softener to provide soft water to all the equipments with water of less than 5 ppm hardness. This contributed in a major way to achieve higher savings in thermal and electrical energy apart from increasing life of equipments.

Thermal savings after giving soft water to all the service/process equipments

Number of operating hours of boiler before	=15 hours
Number of operating hours of boiler after	=14.5 hours
FO consumption per hour	=110 ltrs
Saving per annum	= 110x365x22.34x0.5
Rs	= 4.48 lakhs

Electrical savings achieved after giving soft water to all the service/process equipments

Refrigeration section	= 500kwh/day
Boiler section	= 40 kwh/day
Processing and sections	= 250kwh/day
Total	= 790kwh/day
Savings per annum	=790x4.75x365
Rs	= 13.69 lakhs
Total	= 18.17 Lakhs

2. Installation of 20 KLPH Self Cleaning Separator

Two Numbers of manual cleaning cream separators of 10 KLPH capacity with 15 KW electric motors were being used. Now we have provided one number of new 20 KLPH capacity self cleaning cream separator with 22.5 KW energy efficient motor. It has resulted in direct savings of 7.5 KW per hour of operation and also savings of manual labors cost.



Self Cleaning Cream Separator

Power consumption of 15 kw 2 no's
Power consumption of 22.5 kw 1 no's
Power savings
Savings per annum(8 hour operation per day)
Rs

=30 kw
=22.5 kw
=7.5 kw
= 7.5x8x365x4.75
= 1.04 lakhs.

3. 10.5 KW oil immersion heater provided in place of 6 KW for boiler oil pre heater



It is observed that 6 KW immersion heater in boiler to pre heat the furnace oil was not sufficient to pre heat the FO to the required temperature, which was resulting in improper

Oil Immersion Heater

firing in burner. After close study we have provided 10.5 KW immersion heater to increase the temperature and flow of FO. The firing of the FO in furnace is found satisfactory, resulting in reduction in boiler FO consumption.



FO consumption before
 FO consumption after
 Boiler operation
 Saving/annum
 Rs

=112 Ltrs/hour
 =110 ltrs
 = 13 hours
 = $2 \times 365 \times 22.34 \times 13$
 = 2.12 lakhs

4. Use of electronic ballast in place of magnetic ballast 200 no's

General studies have proved that choke losses in magnetic ballast are more compared to electronic ballast. Hence we have replaced 200 numbers of existing magnetic ballast fittings by electronic ballast fittings.



Tube light fittings with Electronic Ballast

Reduction in electrical consumption after using of electronic ballast (twin tube)
 Saving achieved with 200 no's of electronic ballast per annum (12 hour operation)

= 24 watts/hour
 = $\frac{24 \times 12 \times 365 \times 200 \times 4.75}{1000}$
 = 1 lakh

Rs

5. Replacement of 10 KLPH inefficient milk pasteurizer by new 20 KLPH milk pasteurizer



20 KL Milk Pasteurizer

As the union is handling more milk usage of 10 KL milk pasteurizer was found inefficient, with more energy losses. As the flow rate was found reduced to below the rated capacity. We have replaced the same by a new 20 KLPH new energy efficient milk pasteurizer. We have observed savings to an extent of 1.78 lakhs.

Reduction in operating hours of pasteurizer	= 1 hour/perday
Electrical energy saved	= 11.16 kwh/day
Savings/annum	= 11.16x365x4.75
Rs	= 1.93 lakhs

6. Replacement of new PID controllers for 10 & 20 KLPH Milk Pasteurizers

The PID controllers were not working satisfactorily, resulting in huge thermal losses in the pasteurizers. Hence we have provided new PID controllers to both the milk pasteurizers. Thus we observed energy savings up the extent of 13.25 lakhs.



PID controllers

a) Reduction of steam usage in 10 KLPH Pasteurizer	= 25 kg's/hour
FO savings	= 2.27 ltrs/hour
Pasteurizer operating time	= 12 hours/day
Savings per annum	= 27x365x12x22.34
Rs	= 2.22 lakhs
b) Reduction of steam usage in 20 KLPH Pasteurizer	= 50 kg's/hour
FO savings	= 4.55 ltrs/hour
Pasteurizer operating time	= 12 hours/day
Savings per annum	= .55x365x12x22.34
Rs	= 4.45 lakhs
Total savings per anum (a+b) Rs.	= 6.67 Lakhs

Energy Conservation Plans and Targets

Energy Conservation drive Installed Confidence among KOMUL staff and are deeply motivated to conserve energy and in turn our environment. In this regard few energy conservation projects were planned, discussed in detail to be taken up in the year 2007-08.

1. 225 TR De-Super Heater

We have planned to replace the existing 75 TR De-Super Heater with 225 TR De Super Heater. To conserve more thermal energy and to run the refrigeration plant efficiently, we have estimated savings of Rs. 15.0 Lakh/Year, with a investment of Rs 18.0 Lakhs.

2. Installation of 300 KVA UPS.

UHT Milk plant requires un interrupted power supply to avoid losses incurring in case of power failures. Hence at present UHT plant is fed through D.G Power, the cost/Unit from captive generation is Rs 15/Unit as compared to power from electric supply company which is Rs 4.75/Unit. Hence UPS of 300 KVA capacity is envisaged at a total cost of Rs 45.0 Lakhs and expected saving of Rs 60.0 Lakh.

3. Installation of energy saver for lighting system.

The lighting load of Kolar dairy is 70 KW, the energy savings by installing energy savers is Rs 2.00 Lakhs with a invest of Rs 2.75 Lakhs.

4. Improvement Of Power factor from 0.93 to 0.99

By providing additional power capacitors we are able to increase power factor from 0.93 to 0.99, there by decreasing the electrical load on the system. The total cost of providing additional capacitors is Rs 0.6 Lakhs and expected savings is Rs 1.2 Lakhs.

5. Replacement of Slip ring induction motors

At present 100 HP capacity of type slip ring induction motors are connected to 4 No's KC3 ammonia compressors. We have planned to replace higher capacity slip ring induction motor with lesser capacity (75 HP) high torque squirrel cage induction motor which consumes less electrical energy. The cost of 75 HP induction motor is Rs 6.0 Lakhs and expected savings is Rs 5.0 Lakhs.

6. Replacement of 7.5 HP reciprocating type boiler feed water pump.

The boiler is fed through 7.5 HP capacity reciprocating type boiler feed water pump we have planned to replace it 3,5 HP capacity vertical type boiler feed water pump at a cost of Rs 0.85 Lakh, the estimated savings is Rs 0.62 Lakhs.

Environment and safety

KOMUL has adopted many environmental friendly measures/new innovative steps to protect environment.



1. Planting Of Trees

KOMUL has planted around 200 Teak trees and bulk of its area is covered by different varieties of trees, flowering plants etc, which infuses fresh air and creates best working atmosphere.

2. Effluent water treatment plant

KOMUL has a full fledge effluent

treatment plant to treat all the dairy effluents, and the treated effluent is used to grow fodder in an area of 4 acres.

3. in water harvesting

Water is a scarce commodity in Kolar district, KOMUL has made efforts to conserve water. In this regard rainwater harvesting (RWH) project has been undertaken on a large scale with an investment of Rs 14.0 Lakhs. Borewells are charged through RWH measures.

World Environment Day was celebrated on 5-June-2006 to create awareness among the staff, and trees were planted.

Operational safety, Health and Risk (OSHR Policy)

KOMUL provides safety awareness, training to all level of workers. Safety of people and assets is given at most importance. KOMUL has formulated set of rules pertaining to human safety and clearly communicated to the employees. Workshops are held to create awareness among the staff. Safety equipments are provided to the working staffs who are working in hazardous working condition.

First aid facilities are provided in the plant. Periodical health checkup camps were conducted.

Annexure-1

Simple schematic diagram showing the Production Process of the entire unit

