

Mother Dairy , Gandhinagar

Details of In-House Energy conservation projects implemented during last 03 years.

Year of Commissioning	Project description	Achievement of energy savings per year basis (Approx.)				Investment incurred on the project (Rs. lakhs)
		Electricity	Fuels *		Total (Rs. lakhs)	
		(Lakhs KWh)	F.Oil (KL)	Total (fuel) in Mckal		
2001-2002	<p>Powder Plant</p> <p>Conservation of Electrical Energy by switching off supply fan during air sweeping.</p> <p>Air sweep time is 30 mins. after powder production. During this the outlet damper of supply fan remains closed. We started switching off the motor during this time and provided false input to PLC for normal operation.</p>	0.135			.607	0.00
	<p>Electrical</p> <p>Tariff change from KW to KVA & power factor improvement (Cost savings by billing pattern).</p> <p>Electricity Supplying Co. offered us two options -</p> <p>(1) KVA based tariff and</p> <p>(2) KW based.</p> <p>We changed KW to KVA based tariff and improved power factor from 0.95 to 1.00.</p>	1.77			8.00	0.00
	<p>Ice Cream</p> <p>1. Replaced Chocolate Heater with lower rating heater in Ria Candy M/c</p> <p>2. Optimized Aging tank motor running hours</p> <p>Earlier motor was running for 24 hrs but effective use was for 12 hrs.</p>	0.031			0.14	.01

	<p>Pouch section</p> <p>Reduction in Refrigeration losses</p> <p>A. Open cutouts in between packing room and cold store leading to refrigeration losses. Then Sliding doors were put.</p> <p>B. During dispatch activity all the doors were kept open. Then design a system to keep minimum doors open as per requirement.</p>	0.25			1.11	.01
		0.355			1.51	0.1
	Sub Total	2.54			11.36	0.12
2002-2003	<p>Pouch packing</p> <p>Recovery system CIP</p> <p>Initially 2 diff. RECOVERY lines were in existence. It needed separate CIP. We modified a system and make single line to reduce one CIP operations</p>	0.35			1.575	0.00
	<p>Powder Plant</p> <p>Conservation of soft water</p> <p>Vacuum and product pumps use soft water for seal cooling. The soft water used @8 KLPH was drained (total 38400 KL/year). Cemented underground tank was made for collection of the same. This water is then sent to water treatment plant (WTP) sump and recycled.</p>	0.23			1.03	1.00
	<p>Conservation of Electrical Energy in Air Heater</p> <p>The oil pre-heater is having electrical heaters to heat up furnace oil. Removed electrical heaters and used steam heating system for the same.</p>	0.43			1.94	.050
	<p>Conservation of Thermal & Electrical Energy</p> <p>We started unloading skim milk at powder plant directly instead of unloading at milk reception and reprocessing it. The overall processing cost of the same was Rs. 0.25/litre during this period. Total skim milk unloaded this way was 136.68 lakh litres in a year.</p>	7.59			34.17	1.00

	Electrical Conservation of Energy through Electronic ballasts. We had conventional electrical ballasts installed in the tube fittings, which were replaced with high-energy efficient electronic ballasts, and hence we achieve savings of electrical energy.	0.38			1.71	1.25
	Sub Total	8.98			40.42	3.3
2003-04	Boilers & Air Heater Installed new burner in the air heater for powder plant.(thermal)		50	48.4	5.33	9.00
	Reducing excess air in the boiler and electrical savings by installing VFD	0.92			4.10	3.25
	Insulation on boiler rear end		0.0001	0.3	0.02	0.02
	Installation of back pressure energy conservation steam turbine	Commissioning trials have started in June-2004. Expected incidental power generation				38.00
	Compressed Air System Elimination of Identified Air Leakage losses	0.58			4.51	2.00
	Reduction pressure fluctuation band of operation of air compressors	0.774			1.35	0.00
	Replacing existing dryer with HOC dryer	0.97			4.33	6.31
	Electrical System Use of Energy Efficient Lamps in Existing Tube lights	0.17			0.75	0.35
	Replacing Conventional Chokes With Electronic Ballast in Tube Fittings	0.25			1.12	1.77
	Optimizing voltage in lighting circuit	0.35			1.58	0.00
	Fans & Blowers Energy Efficiency Improvements in Fans & Blowers	2.77			12.47	8.79
	Replacing with Energy Efficient FRP Fan Blades in Condenser water cooling Tower	0.71			3.2	1.28
	Refrigeration & Air Conditioning Installation of auto control in cooling tower	0.33			1.5	2.20
	Closing Windows During Non-operation of Sachet Movement From Machine-to-storage Area	0.87			3.9	0.20
	Reducing Wastage of Refrigeration During Dispatch and Optimize Refrigeration in the Milk Sachet Storage Area	3.72			16.74	0.00

	Sub Total	12.474	50.001	48.8	60.9	73.17
	Grand total of 3 years	23.994	50.00	48.4	117.18	76.59

Note: In many of the above stated projects, electrical energy as well as thermal energy has been saved but as we can't measure the thermal energy directly, we have shown the electrical energy only.

Brief Write-up on Energy Conservation Projects Implemented During the year 2003-04

A) Energy Conservation Projects Implemented in Boilers and Air heater

1. Replacement of inefficient burner in Air Heater

Recurring annual savings (Rs. Lacs)	5.33
One time investment for implementation (Rs. Lacs)	9.00
Pay back period (Months)	20

Before Implementation

- In the past, the air was heated through combustion burner (pressure jet type).
- There was no control for limiting excess air and also there were leakages in the combustion system. Measured oil consumption was 308 lits per hour.
- Also O₂ level in the excess air was more than 60% against recommended level of 20 to 25 %.
- This resulted in thermal loss in the system.
- Daily oil consumption for 60 tones production of Milk powder 6160 liters.

Action Taken

- Replaced the burner having higher fuel efficiency.
- Reduced excess air to the required level.
- Daily oil consumption after replacement of air heater burner for 60 tones production of Milk powder 5990 liters.

Benefits

- Oil saving per day 170 liters.
- Cost saving Rs. 5.33 lacs per year.
- Annual Saving in M kcal is 445.

2. Reducing excess air in the boiler and electrical savings by installing VFD

Recurring annual savings (Rs. Lacs)	4.1
One time investment for implementation (Rs. Lacs)	3.25
Pay back period (Months)	10

Before Implementation

- Forced air combustion blower is installed in boiler with rated motor capacity of 15

KW.

- Manual Damper is provided for controlling FD air.
- Controlling by damper causes pressure drop in the system resulting in excess power consumption.
- Average power consumption per hour for all FD fans 28 kW.

Action Taken

- Installed VFD control for FD fans for all the three boilers.
- This resulted in saving of power consumption apart from controlling excess air.
- Average power consumption per hour for all FD fans 16.14 kW.

Benefits

- Hourly power saving of 11.86 kW
- Reduction in excess air.
- Annual power cost saving Rs. 4.1 lacs

3. Insulation on boiler rear end

Recurring annual savings (Rs. Lacs)	0.2
One time investment for implementation (Rs. Lacs)	0.2
Pay back period (Months)	12

Before Implementation

- Boiler rear end was not insulated.
- The temperature of the exposed area was around 140 °C.
- This resulted in thermal loss.
- Calculated thermal loss due to radiation was 16.68 Mkal/year.

Action Taken

- Insulated the boiler rear end and avoided thermal loss.
- The temperature of the exposed area after insulation was around 70 °C.

Benefits

- Calculated thermal savings 16.68 Mkal/year.
- Calculated fuel saving 1709 liters/year cost Rs. 20000/year.

4. Installation of back pressure energy conservation steam turbine

Recurring annual savings (Rs. Lacs)	30
One time investment for implementation (Rs. Lacs)	38
Pay back period (Months)	15

Before Implementation

- The plant requires steam at 15 bar for powder plant and aseptic packing system and 3.4 bar for milk processing and other usage

- Hence steam is produced up to 16 bar at boilers and through pressure reducing stations up to 3.4 bar

Action Taken

- Installed back pressure turbine to use kinetic energy of high pressure steam for power production
- The designed power production is in the range of 90-160 kW
- This power produced is free power as all the long the energy was wasted in pressure reducing valve
- Trails are under progress and the turbine will be operated on regular basis shortly

Benefits

- Generation free power of 2222 kwh/day at an average of 92.5 kWh.
- Minimum Annual saving expected is @ 30 lacs.

Energy Conservation Projects Implemented in Compressed Air System

5. Elimination of Identified Air Leakage losses

Recurring annual savings (Rs. Lacs)	4.51
One time investment for implementation (Rs. Lacs)	2
Pay back period (Months)	5

Before Implementation

- Compressed air system was tested for air leaks and it was around 30 % of the operating capacity
- The leaks were mainly on failure of flexible instrument piping and fittings and also for some of the solenoid valves
- Average daily power consumption for compressor 3240 units.

Action Taken

- Modified piping network to reduce the length of flexible tubing
- Replaced leaking instant type of fittings with reliable ferrule type fittings
- This action will reduce leakage losses on long term basis
- Leak checking done periodically
- Average daily power consumption for compressor 2966 units.

Benefits

- Saving in power consumption of 274 units/day and cost saving Rs. 4.51 lacs/year
- Reduced wear and tear on compressor.

6. Reduction pressure fluctuation band of operation of air compressors

Recurring annual savings (Rs. Lacs)	1.35
One time investment for implementation (Rs. Lacs)	0

Pay back period (Months)	0
--------------------------	---

Before Implementation

- Compressors were operated with load unload pressure setting of 6.6 to 7.1 kg/cm²g band
- Hence the average operating pressure was around 6.8 kg/cm²g
- Average daily power consumption for compressor 2966 units.

Action Taken

- Reduced operating pressure range to 5.9 to 6.4 kg/cm²g band
- This resulted in average pressure of around 6.2 kg/cm²g
- Average daily power consumption for compressor 2883 units.

Benefits

- This reduction reduced specific power consumption of compressor as well reduced air consumption
- Daily power saving of 113 units and cost saving of Rs. 1.35 lacs/year.

7. Replacing existing dryer with HOC dryer

Recurring annual savings (Rs. Lacs)	4.33
One time investment for implementation (Rs. Lacs)	6.31
Pay back period (Months)	18

Before Implementation

- Heatless type air dryer was installed for removing moisture in the compressed air
- There was continuous purging of 10-12 % compressed air for regeneration of absorbent (activated alumina)
- This resulted in excess air consumption
- Average daily power consumption for compressor 2883 units.

Action Taken

- Installed Heat of compression type energy efficient air dryer
- Heat of Compression is used for regenerating absorbent in this type of dryer.
- Average daily power consumption for compressor 2620 units.

Benefits

- This resulted in direct saving of 10-12% of compressed air consumption as well reduced power consumption for heat dissipation in the compressor cooling water system.
- Daily power saving of 263 units and cost saving of Rs. 4.33 lacs/year.

Energy Conservation Projects Implemented in Electrical System

8. Use of Energy Efficient Lamps in Existing Tube lights

Recurring annual savings (Rs. Lacs)	0.75
One time investment for implementation (Rs. Lacs)	0.35
Pay back period (Months)	6

Before Implementation

- 40 watts ordinary fluorescent tube-lights were installed through the plant.
- This type of lamp delivers only 60 lumens/watt
- No. of tubes installed of 40 watts is 200 no delivering 4.8 lacs lumens.
- Total hourly power consumption was 8 kw.

Action Taken

- Replaced all ordinary fluorescent with Polylux tube lights of 36 watts
- No. of tubes replaced of 36 watts polylux tubes 145 nos. delivering 4.8 lacs lumens.
- Total hourly power consumption 5.2 kW.

Benefits

- Hourly cost saving of 2.8 kw and cost saving Rs. 0.75 lacs/year.
- Increased life of tubes resulting in reduced in replacement cost.

9. Replacing Conventional Chokes With Electronic Ballast in Tube Fittings

Recurring annual savings (Rs. Lacs)	1.12
One time investment for implementation (Rs. Lacs)	1.77
Pay back period (Months)	19

Before Implementation

- Conventional magnetic chokes were installed throughout the plant. These chokes consumes around 13 watts also will work satisfactorily only in the range of 210 - 260 volts.
- No of tubes installed with conventional magnetic chokes 340 nos.
- Power consumption per hour is 4.42 kW at 13 watts/chokes.

Action Taken

- Replaced with electronic chokes, which consumes only 2-3 watts.
- These electronic choke works in the range of 180-280 volts.
- Power consumption per hour is 1.02 kW at 3 watts/chokes.

Benefits

- Hourly power saving of 3.4 units and cost saving is Rs. 1.12 lacs/year.

10. Optimizing voltage in lighting circuit

Recurring annual savings (Rs. Lacs)	1.58
-------------------------------------	------

One time investment for implementation (Rs. Lacs)	0
Pay back period (Months)	0

Before Implementation

- Operating voltage in the lighting circuit was around 230 volts.
- There is already lighting voltage stabilizer installed in the plant.
- Daily power consumption in lighting in the plant was 1774 units.

Action Taken

- Reduced lighting voltage to 210 volts in consultation with light suppliers.
- Daily power consumption in lighting in the plant is 1678 units.

Benefits

- Daily power saving of @ 96 units and annual cost saving Rs. 1.58 lacs.

Energy Conservation Projects Implemented in Fans and blowers

11. Energy Efficiency Improvements in Fans & Blowers

Recurring annual savings (Rs. Lacs)	12.47
One time investment for implementation (Rs. Lacs)	8.79
Pay back period (Months)	8

Before Implementation

- Three numbers small fan and one big fan installed in our powder plant.
- The capacity of these fans was more than required for the process for most of the time due to variation in process load.
- Daily power consumption recorded 3672 units.

Action Taken

- After detailed analyzing variable process demand installed Variable Frequency Drives (VFD) for all the fans.
- Daily power consumption recorded 2564 units after implementation.

Benefits

- Daily savings recorded @ 1108 units and annual saving 12.47 lacs.
- This resulted in accurate process control apart from accurate energy savings.

12. Replacing with Energy Efficient FRP Fan Blades in Condenser water cooling Tower Fans

Recurring annual savings (Rs. Lacs)	3.2
One time investment for implementation (Rs. Lacs)	1.28
Pay back period (Months)	5

Before Implementation

- Metallic aluminum alloy blades were installed for condenser water-cooling tower

- fan.
- This consumes excess energy due to profile design.
- Power consumption per day with existing blades was 1066 units .

Action Taken

- Replaced with aerodynamically designed, low-weight, FRP blades.
- Power consumption per day after replacement of blades is 871 units.

Benefits

Saving in power consumption per day is 195 units and annual cost saving Rs. 3.2 lacs.

Refrigeration and air conditioning plant.

13. Installation of auto control in cooling tower

Recurring annual savings (Rs. Lacs)	1.5
One time investment for implementation (Rs. Lacs)	2.2
Pay back period (Months)	18

Before Implementation

- Three numbers 825 cu. m/hr. cooling towers are installed for condenser water-cooling.
- The actual load varies with the ambient conditions as well the process requirements
- However, due to fixed speed motor, the cooling tower consumes same power irrespective of load variations.
- Daily measured power consumption was @ 1158 units.

Action Taken

- Installed microprocessor controlled VFD for all cooling towers for optimizing the energy efficiency.
- Daily measured power consumption was @ 1066 units after installing VFD.

Benefits

- Daily power saving of 91 units and annual cost saving Rs. 1.5 lacs.

14. Closing Windows During Non-operation of Sachet Movement From Machine-to-storage Area

Recurring annual savings (Rs. Lacs)	3.9
One time investment for implementation (Rs. Lacs)	0.2
Pay back period (Months)	1

Before Implementation

- Fourteen numbers dispatch windows were provided to transfer packed milk to the storage area.

- The average temperature in the storage area was around 4 – 5 deg. C as against 25 Deg. In the packing room.
- Due to this there was loss of thermal energy during non-operating hours, as all the openings were kept open.
- Calculated thermal loss is @ 198 TR/day.

Action Taken

- Installed insulated doors in all the windows
- These windows are kept closed during non-operating hours.

Benefits

- This resulted in appreciable thermal energy savings
- Calculated energy saving of 237 units/day and annual cost saving Rs. 3.9 lacs.

15. Reducing Wastage of Refrigeration During Dispatch and Optimize Refrigeration in the Milk Sachet Storage Area

Recurring annual savings (Rs. Lacs)	16.74
One time investment for implementation (Rs. Lacs)	0
Pay back period (Months)	0

Before Implementation

- 13 numbers of dispatch doors are provided in the milk storage room.
- At an average 1.79 doors were open for milk dispatch
- Calculated thermal loss is @ 849 TR/day.

Action Taken

- Detailed analysis of the product movement
- Creating awareness among the shop floor staff
- The average time for opening the doors has been to reduce to 1.08 doors for milk dispatch.

Benefits

- This resulted in appreciable thermal energy savings
- Calculated energy saving of 1019 units/day and annual cost saving Rs.16.74 lacs.
- This also reflected in the operation and performance of refrigeration plant.

UNIT PROFILE

Mother Dairy, Gandhinagar (MDG) is a unit of Gujarat Cooperative Milk Marketing Federation (GCMMF) Ltd., which markets its products under AMUL & SAGAR brand. The plant was set-up at Gandhinagar with a strategic intent of catering to requirement of fresh and wholesome milk of consumers of Ahmedabad and nearby cities and to handle every drop of surplus milk from member dairies of Gujarat and hence play a role of Mother. The most modern, PLC based automated dairy processing plant with in-built capability to produce milk products matching to the best quality standards was set-up in

the year 1994 with a capacity to handle 10 lac litre of milk per day.

MDG was commissioned in September 1994 by L&T with assistance of APV-Denmark, Westfalia-Germany, Niro-Sweden and Nu-con -New Zealand. The dairy initially had Liquid Milk, Pouch Filling, Butter Oil plant & Milk Powder Plant. To keep pace with changing time Ice Cream plant, UHT plant, Pouch filling Expansion Project and Mozzarella Cheese plant were installed subsequently. Recently, the milk processing capacity has been increased from 10 LLPD to 18 LLPD.

It is estimated that in the year 2010, MDG would receive 35 LLPD of milk. To meet this requirement, we are expanding our milk handling capacity by installing 100 MTPD milk powder plant as a 1st phase of expansion for which work has already been started and would be completed in the period of next 12 months. The plant would be of state of the art in terms of civil structural engineering and most modern process technology and automation. In the 2nd phase, we will have another 20 LLPD milk processing line and butter processing and packing facilities. In the 3rd phase of expansion, there would be another 100 MTPD milk powder plant.

The vast and varied product portfolio includes Market Milk, Ghee, Milk powders, Ice Cream, UHT milk and milk products and Cheese. The other product portfolios apart from milk and milk products are Soup, Kadhi and Pizza.

The plant is professionally managed and has adopted world-class quality management systems and quality initiatives like ISO 9001-2000, HACCP 9001-2000, ISO 14001, Total Productivity Maintenance, Six Sigma, Total Energy Management, Energy Management System etc.

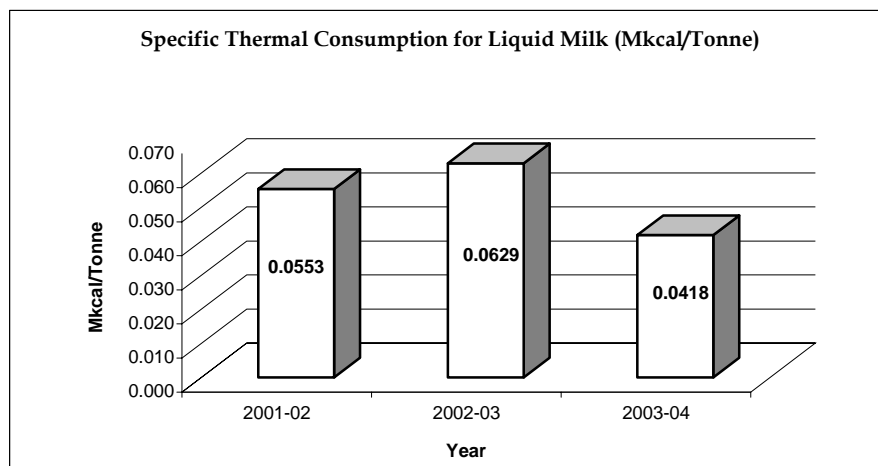
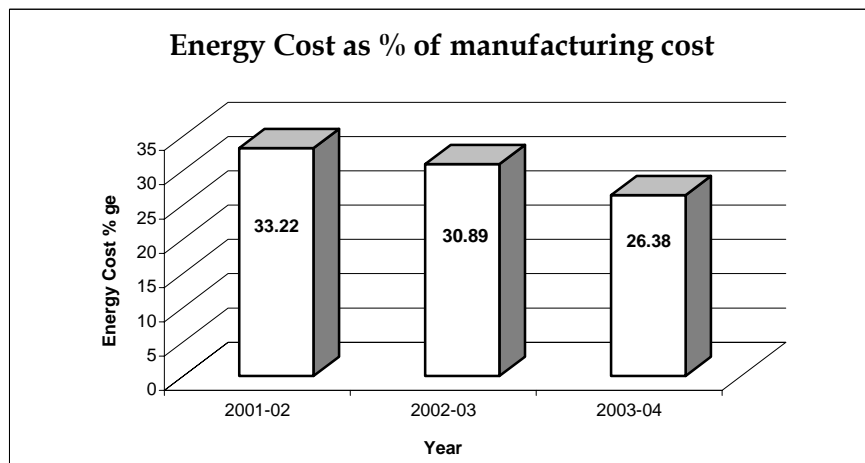
Mother Dairy being a unit of GCMMF Ltd., all the financial figures are merged with the balance sheet of the later. The sales turnover of GCMMF Ltd. for 2003-2004 was Rs. 2882 crores which includes consignment sales of Rs. 62.95 crores to Sri Lanka, Singapore and Gulf countries.

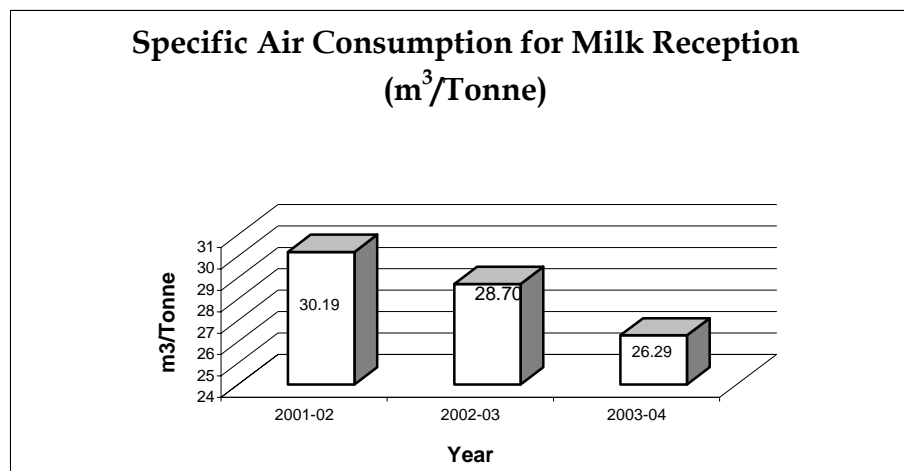
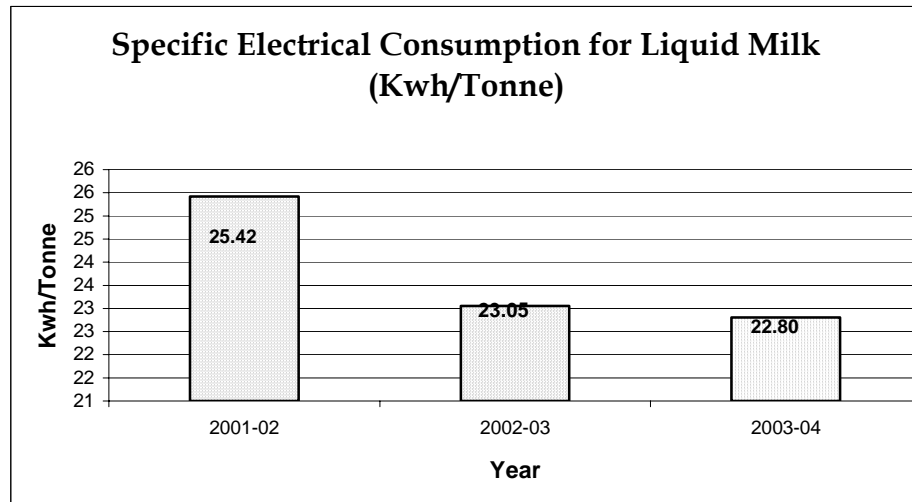
ENERGY CONSUMPTION

We at MDG are very focused about controlling our manufacturing cost. One of the major means is through energy conservation. There is a steady decline in specific energy consumption due to various energy conservation initiatives undertaken through TOTAL

ENERGY MANAGEMENT SYSTEM. The energy scenario of MDG in the past three years is given below.

DESCRIPTION	UNIT	2001-02	2002-03	2003-04
Annual Production	MT	195914	213642	235960
Total Electrical Energy Consumption	Lakh KWh	164.46	180.90	172.8
Specific Energy Consumption - Electrical	Lakh KWh/MT	0.0005504	0.000525	.0005667
Total Thermal Energy Consumption	Million Kcal	42445.107	53633.1	41846.4
Specific Energy Consumption - Thermal	Million Kcal/MT	0.141955	0.15230	0.13725
Total Manufacturing Cost	Rs. crores	33.87	44.26	45.98
Total Energy Cost	Rs. crores	11.2509	13.6722	12.1315
Energy Cost as % of Total Manufacturing Cost	%	33.22	30.89	26.38





ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP

MDG is committed to energy conservation at its premises. This is demonstrated by adopting TOTAL ENERGY MANAGEMENT (TEM) SYSTEM, our Energy Conservation Policy and the well structured Energy Management Cell. We have been using the best technology in the world in dairy processing and are committed to Reduce/Prevent energy wastage, Reuse it to the possible extent without affecting product quality and Recycle it for efficient energy utilization.

The Energy Conservation Policy of MDG is:



MOTHER DAIRY, GANDHINAGAR
ENERGY POLICY

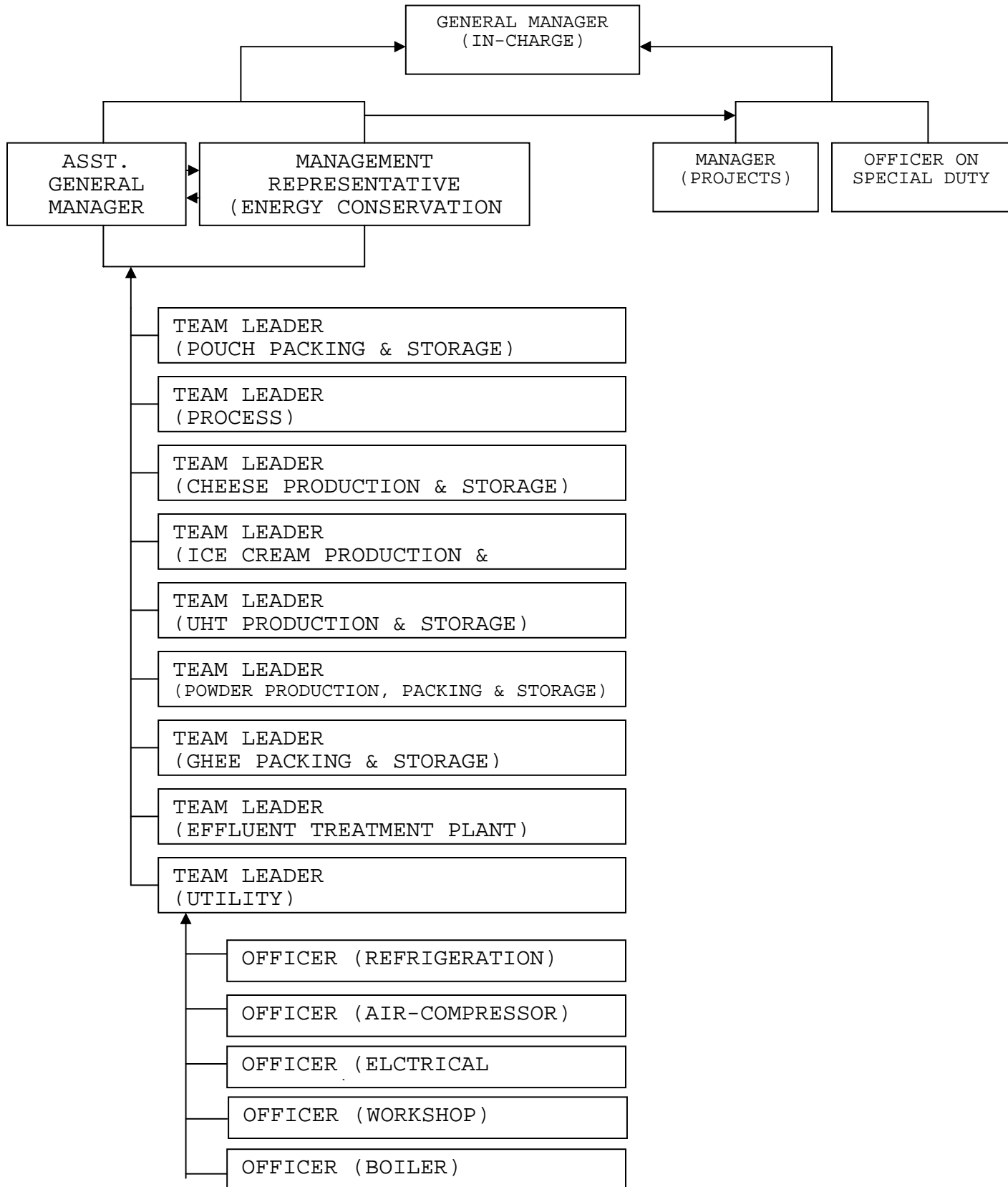
We, at Mother Dairy, Gandhinagar, are committed to optimally utilize various forms of Energy in a cost-effective manner to effect Conservation of Energy.

To accomplish this, we will:

- ☞ Monitor closely the consumption of Energy through an effective Total Energy Management System.
- ☞ Benchmark continuously our performance against the best in the world.
- ☞ Adopt Latest and Eco-friendly Technologies to minimize the waste and protect environment without compromising on product quality.
- ☞ Make Energy Conservation a mass movement with the involvement of all Employees by creating awareness and training them.
- ☞ Promote Reuse and Recycle of possible energy resources.
- ☞ Carry out regular Internal and External audits to identify areas for improvement.
- ☞ Enrich our experience on energy conservation by exchange of ideas with other industries/agencies.

The structure of TOTAL ENERGY MANAGEMENT TEAM is shown below.

ENERGY CONSERVATION CELL (TEM Team) AT MDG



ENERGY CONSERVATION ACHIEVEMENTS

During the period 2001-2004 MDG implemented various energy saving proposals generated through external energy audit and in-house suggestions. Total saving of Rs. 117.78 lakhs was achieved with an investment of Rs. 76.59 lakhs with a payback period of 7.8 months.

There is has increase of 8.3% in specific electrical energy consumption during 2003-04 over the year 2002-03. This is attributed to shorter production runs and decline in capacity utilization to the tune of 40% for all the major products. We have also improved the temperature of milk dispatched to the consumers as hence improved the quality of finished product.

But there is decline in specific thermal energy consumption in 2003-04 over 2002-03 by about 9.88% due to energy conservation measures taken up during the year.

MDG has grabbed silver ENFUSE AWARD 2003 (Energy & Fuels Users Association, Chennai) in the category of more than 2000 KVA energy users for the energy efficiency excellence.

The major projects implemented during 2003-04 are:

Year of Commissioning	Project description	Achievement of energy savings per year basis (Approx.)				Investment incurred on the project (Rs. lakhs)
		Electricity	Fuels *		Total (Rs. lakhs)	
		(Lakhs KWh)	F.Oil (KL)	Total (fuel) in MkCal		
2003-04	Boilers & Air Heater Installed new burner in the air heater for powder plant.(thermal)		50	48.4	5.33	9.00
	Reducing excess air in the boiler and electrical savings by installing VFD	0.92			4.10	3.25
	Insulation on boiler rear end		0.0001	0.3	0.02	0.02
	Installation of back pressure energy conservation steam turbine	Commissioning trials have started in June-2004. Expected incidental power generation				38.00

	Compressed Air System Elimination of Identified Air Leakage losses	0.58			4.51	2.00
	Reduction pressure fluctuation band of operation of air compressors	0.774			1.35	0.00
	Replacing existing dryer with HOC dryer	0.97			4.33	6.31
	Electrical System Use of Energy Efficient Lamps in Existing Tube lights	0.17			0.75	0.35
	Replacing Conventional Chokes With Electronic Ballast in Tube Fittings	0.25			1.12	1.77
	Optimizing voltage in lighting circuit	0.35			1.58	0.00
	Fans & Blowers Energy Efficiency Improvements in Fans & Blowers	2.77			12.47	8.79
	Replacing with Energy Efficient FRP Fan Blades in Condenser water cooling Tower	0.71			3.2	1.28
	Refrigeration & Air Conditioning Installation of auto control in cooling tower	0.33			1.5	2.20
	Closing Windows During Non-operation of Sachet Movement From Machine-to-storage Area	0.87			3.9	0.20
	Reducing Wastage of Refrigeration During Dispatch and Optimize Refrigeration in the Milk Sachet Storage Area	3.72			16.74	0.00
	Sub Total	12.474	50.00	48.8	61.51	73.17
	Grand total of 3 years	12.474	50.001	48.8	60.9	73.17

ENERGY CONSERVATION PLANS AND TARGETS

Future plans of Energy conservation in MDG include the following.

Year	Energy Conservation Measures (Planned)	Anticipated savings in Energy		Approx. investment (Rs. Lakhs)	Project commencement & completion year
		Value (Kwh/MKCal)	Rs. in Lakhs		
2004-05	Electrical Energy				
	VFD for Process CIP pump	26222	1.18	2.25	2005
	Replacement of Condensor Water Pump with optimised capacity for the system	129600	5.83	1.2	2004
	Installation of VFD for 1400 NM Cu. compressor	100000	4.50	5	2005
	Installation of separate compressor for UHT Plants	87600	3.94	5	2005
	Improving insulation in Chilled Water Line	52560	2.37	1	2004
	Thermal Energy				
	Waste heat recovery from milk condensate water, which is presently sent to water treatment plant and has outlet temp. Of 55 deg. centigrade	1343.68	15.6	15	2005
	Condensate and Flash Steam Recovery from UHT and Icecream Plant	1318.7	15.31	18.9	2004
	Total		48.73	48.35	
2005-06	Electrical Energy				
	Replacement of Fixed Surface Aerators with Diffused Aerators at ETP	312000	14	20	2005
	To Install VFD in existing chilled water pumps at our refrigeration plant.	61320	2.76	3	2005
	To remove existing pump of cooling tower to transfer condenser water from powder plant to Water treatment plant.	36000	1.62	0.4	2005
	Energy Conservation in deep-freezing room, Hardening tunnel and other areas in Ice cream Dept.	96600	4.35	2	2005
	Stoppage of compressed air in CIP lye tanks.	18000	0.95	0.15	2005
	Thermal Energy				
	Installation of captive power generation plant of MDG.	183.4	592.36	1400	2006
	Replacement of furnace oil for Boiler and air heater with LNG gas.		75.0	25	2006
	Installation of on line oxygen analyzer and installation of automatic TDS control blow down valve.	6333	28.5	42.5	2005
Total		768.27	1541.40		

2006-2007	Installation of Vapor absorption system for catering to A/c loads and raw milk chilling.	204444	9.23	20	2007
	Installation of evaporative condenser for old refrigeration system.	2.77	12.5	30	2007
	Total		21.73	50	
	Grand Total		752.96	1522.50	

By adopting the above TEM projects MDG will be able to achieve the set target of Energy Cost as % of Total Manufacturing Cost as 20% as against current 26%.

ENVIRONMENT & SAFETY







MDG is committed towards preservation, protection and performance improvement of environment and service to the society. The environment management program adopted is an example of management commitment towards it.

The Environmental Policy of MDG is:



MOTHER DAIRY, GANDHINAGAR ENVIRONMENTAL POLICY

We are conscious and committed to create, protect and preserve the global environment for sustainable development through -

-  Compliance with applicable environmental regulations and legislations.
-  Efficient utilization of natural resources, minimizing waste generation and maximizing waste recycling.
-  Adoption of systematic and planned approach to achieve continual improvement in environmental performance.
-  Creating awareness towards environmental issues among suppliers and stakeholders.
-  Involvement and empowerment of employees to implement environmental management system.
-  Communicating this policy to all employees and make it available to public on request

Our endeavor would be to develop clean and green environment by enlarging green belts and promoting lush green fields to work in harmony with nature.

Sanitation & Workers Amenities:

- Wearing of uniform, masks, caps and apron in production area is compulsory.
- Washing of hand and dipping in Ionosphere solution before entering production area.
- Daily spray of pesticides
- Fumigation at regular intervals
- Daily cleaning of Roads, corridors, offices, toilets and their regular maintenance.
- Over head drinking water tank cleaning (once in two month) of Administrative block, staff quarters, hostels, canteen and powder building.
- Weekly cobweb cleaning from all production, office & residential areas.
- Pest control: Spraying of insecticide with synthetic pyrethroids/ any suitable insecticide to control the prevalent insects in the dairy premises on daily basis.
- Rodent control: Baits without poison for 3 & 4 days in a week is being kept to study the rat movements. This has developed a habit for rat to pick up their foods from particular place.
- Termite control: We provide termite treatment as and when required.
- Lizard control: We provide Lizard control treatment as and when required.

Facilities to measure and prevent pollution

- We have full-fledged Effluent Treatment Plant (ETP) of 1500 Cu. M /day capacity, which is run by qualified and trained team of Engineers and Operators to monitor it.
- The BOD and COD levels are maintained within the prescribed norms of Gujarat Pollution Control Board (GPCB)
- These parameters are maintained by State of Art laboratory installed at Effluent Treatment Plant.
- We have provided Cyclone Separator and dust collection filter bags in the exhaust duct of Powder Plant and Packaging section respectively.
- We are monitoring emission from all our stacks from Gujarat Pollution Control Board (GPCB) recognized auditors as per their requirements.
- We are adopting 'Zero Water Discharge' in this state of art plant.

Recycling of waste generated

We recycle following waste generated from the plant:

Name of the waste	Mode of recycle or reuse
Condensate Water from drying plant	Total reuse as soft water for cleaning
Influent	Treatment at ETP and use watering of loans and plantations in the premises
Paper board for packaging	Sold to paper mills for recycling
Milk Crates	Broken crates are sent back to the supplier to recycle
Film spools	Sent back to the supplier for reuse
Plastic drums and containers	Sent back to the supplier for reuse
Solid waste from ETP	The scum from ETP plant is used as a base for soap manufacturing.

Use of the by-product generated during production

We utilize the following by-products generated like:

- Cheese whey, which is usually drained, is dried and converted into whey powder and mixed for standardization of milk solids in market milk and icecream production. New whey based energy drinks are also being developed.
- Butter milk, generated from continuous ghee making, is used for standardization of market milk.

Rain Water Harvesting

We are planning to install rainwater harvesting system for recharging borewells.