(i) Unit Profile of Surat Dist. Co-op. Milk Producers' Union Ltd., Sumul Dairy:

Surat District has been a Pioneer in India in channeling trade in Cotton and Milk through co-operatives. Before SUMUL stepped in, traditional Private Milk Traders were dominant in the area. Dairying on the other hand, was never popular with tribal (a major rural population in the District) as practically no infrastructure existed for milk marketing in their talukas, inaccessibility to their villages as well as taboos regarding keeping of buffaloes prevented the entire population of tribal from considering dairying as a source of income. To salvage the poor producers from the clutches of these Private Traders.

Sumul came in to existence with following objectives

1. To provide a guaranteed remunerative milk market round the year for all the marketable surplus of member producers in their villages.
2. To procure milk, process it into good quality milk/milk products and market it most economically and efficiently to give maximum overall net-returns to the producers and general satisfaction to the consumers.
3. To provide essential technical inputs and services to the producers' at their door-steps in an economic and efficient manner and also in a way most acceptable to them - to increase milk production and to reduce the cost of production.

SUMUL DAIRY SURAT	OTHER UNITS OF SUMUL		
	Bajipura chilling Center	Navipardi Chilling Center	Uchchal Chilling Center
			
	Nizar Chilling Center	Chalthan Cattle Feed Plant	Lahe, Shahpur Nasik Plant
			

Sumul Dairy Products

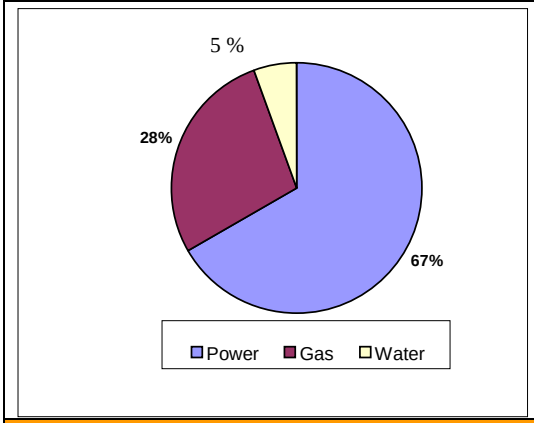
Name of Product	Packing Type	Production in (kg)
Amul Shakti, standardized Milk	500 ML , 6 Litres	328301659
Amul Gold, High Fat Milk	500 ML , 6 Litres	
Amul Taaza, Toned Milk	250 ML, 500 ML	
Skimmed Milk, Cow milk	6 Litres	
Butter Milk, Masala chhas	500 ML	
Ghee	Tin, Pouches	3293942
Paneer	Pouches. Tin	232651
Flavored milk	Bottle,	446812
Curd	Cups (200 & 400 gm)	1556623
Sweets	Box	640882
Powder	Bag	749400
Butter	cartons	732720
Pasteurized chilled water		2429000

(ii) Energy Consumption of Sumul Dairy:

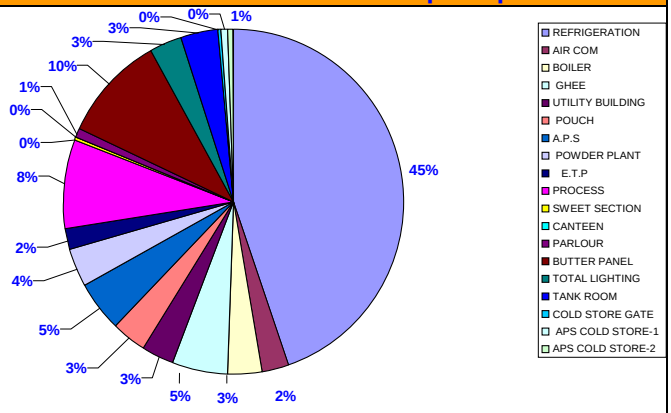
Sumul Dairy Available Energy Sources

- Natural gas, FO for Steam
- Electricity from State electricity board / DG set.

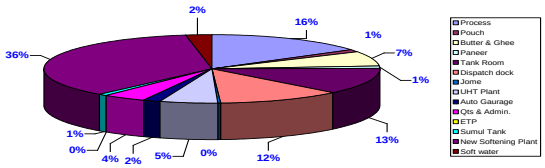
% Energy share in Sumul Dairy



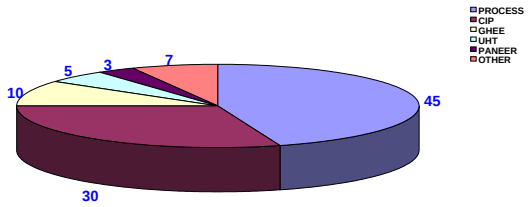
Section wise Power consumption pattern



Section wise Water Consumption Pattern



Section wise Thermal Energy Consumption Pattern



RECORDS OF ENERGY CONSERVATION IN LAST THREE YEAR

Energy Consumption:

There is a steady decline of specific energy conservation due to implementation of various energy conservation measures in last 3 years. The details are as given below:

DESCRIPTION	*UNIT*	*2005-06*	*2006-07*	*2007-08*
Annual milk & milk production	Mt	334461	329544	344307
Total electricity consumption/ annum	Lakhs kwh	91.90	88.73	90.01
Specific energy consumption	Kwh/mt	27.477	26.92	26.14
Total thermal energy consumption / annum	Million kcal	13007.41	12856.33	12684.2
Specific energy consumption – thermal	Million kcal /mt	0.0389	0.039	0.0368
Total manufacturing cost	Lakhs Rs.	3519.17	4247.97	4780.68
Total energy cost	Lakhs Rs.	633.0	596.65	668.78
Energy cost as % of total manufacturing cost	%	17.98	14.05	13.98

- IN SPITE OF INCREASE IN PRICE OF NATURAL GAS BY 3 RS/SCM & POWER BY RS 0.23 PER UNIT WE ARE ABLE TO CONTROL OUR TOTAL ENERGY COST.

IV) Energy Conservation Achievements

A. ENERGY CONSERVATION ACHIEVEMENTS IN ELECTRICAL

Sr. No.	Energy Conservation Activity done in 2007-08	Investment (RS. In Lakh)	Annual saving (in Lakh units)	Annual Saving (RS. In Lakh)
1	Replacement of old MCC with new MCC at boiler section.	7.0	0.182	0.91
2	Replacement of old MCC with new MCC at milk packing section.	14.0	0.777	3.88
3	Replacement of old Slip ring motor with new 180 hp induction motor to save power.	5	1.8	9
4	Replacement of old thermocol insulation with new PUF panel in pouch cold stores to save energy.	80	1.752	8.76
5	Replacement of new mechanical type of coding instead of pneumatic type.	3.9	0.78	3.92
6	Replacement of star delta ON/OFF system by VFD at cream tank pump for Continuous butter making.	0.5	0.117	0.589
7	Replacement of 63 no. tubes copper ballast chock with new electronic chock.	0.13	0.033	0.165
8	Replacement of star delta system with new Soft starter at powder plant in vacuum pump.	0.37	0.086	0.43
9	Replacements of 5 hp pump with 3.0 hp in CIP return line.	0	0.105	0.53
10	Replacing air compressor cooling tower with main cooling tower.	0.30	0.586	2.93
11	Replacement old water distribution with new hydro- flow system along with Header & VFD.	37.75	2.88 73000 kl water	25.36
12	Replacement of 250 watt HPMV with 80 watt low bay cft light in pouch section.	0.49	0.266	1.33
13	Removal of one milk transfer pump in tank room fro transferring milk.	0	.052	0.26
14	Elimination of one 3 HP pump from spira flow PST tank.	0	0.125	0.628
15	Increase in capacity of Amul Taaza milk transfer pump.	0.50	0.32	1.61
16	Installation of 150 kl Silo for improving the production efficiency.	36.43	3.25	16.25

Sr. No.	Energy Conservation Activity done in 2007-08	Investment (RS. In Lakh)	Annual saving (in Lakh units)	Annual Saving (RS. In Lakh)
17	Installation of 250 TR screw compressor.	47.0	1.90	9.83
18	Installation of 3 No. PLC based mechanical machine.	12.0	0.816	4.08
19	Installation of 6 lit mechanical machine.	7.4	0.544	2.72
20	Installation of ghee clarifier for improving the production efficiency & saving in power by reducing production hrs.	9.0	1.57	7.86
21	Installation of Harmonic control panel.	2.35	1.36	6.81
22	Installation of natural ventilation system in Process & Ghee section.	5.74	0.151	0.755
23	Installation of new data centre.	25	-	-
24	Power factor benefits.	Nil		20.11
25	Running of two cream separators instead of three during separation.	0	0.556	2.78
26	Synchronization of load on transformers.	0	1.003	5.01
	TOTAL SAVING	294.86		136.507

A. ENERGY CONSERVATION ACHIEVEMENTS IN ELECTRICAL

1. Replacement of old boiler MCC with New MCC for Boiler.

Background

Previously old panel was having no APFC for monitoring Power factor.

Current Status

With the installation of new MCC with APFC & capacitor bank power factor are maintained to unity.

Payback

- **Annual power saving - 18250 units**
- **Annual Money Saving - Rs 0.91 Lakhs**
- **Investment - Rs. 7.0 Lakhs**

BOILER OLD MCC

BOILER NEW MCC

2. Replacement of old MCC with New MCC for Milk Pouch.

Background

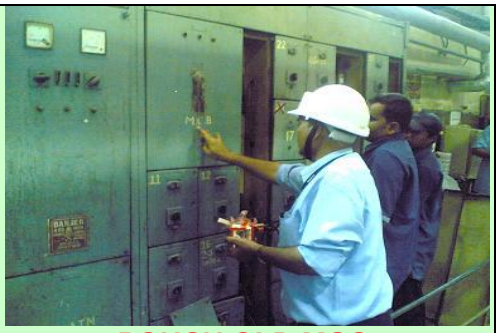
Previously old panel was having no APFC for monitoring Power factor.

Current Status

With the installation of new MCC with APFC & capacitor bank power factor are maintained to unity.

Payback

- **Annual power saving - 77745 units**
- **Annual Money Saving - Rs 3.88 Lakhs**
- **Investment - Rs. 14.0 Lakhs**



POUCH OLD MCC

POUCH NEW MCC

3. Replacement of slip ring motor with new 180 hp induction motor

Background

Previously, slip ring motor was of low efficiency & consuming more power.

Current Status

Due to commissioning of new 180 hp induction motor with soft starter there is saving around of 493 units per day.

Payback

- **Annual power savings - 180000 Units**
- **Annual Money Saving - Rs 9.0 lakh**
- **Investment - Rs. 5.0 lakh**

Old Slip Ring motor

New 180 induction motor

4. Replacement of old pneumatic coding with new mechanical type coding.

Background

Previously, all these cold store have got 20 year old insulation. Insulation has been torn out at many places. This is causing heat loss, hence increasing refrigeration loss.

Current Status

Currently, all cold stores converted into PUF panel cold store.

Payback

- **Annual power saving - 140010 units**
- **Annual Money Saving - Rs 7.0 Lakhs**
- **Investment - Rs. 80 Lakhs**

OLD COLD STORE

NEW PUF PANEL

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Background

Previously, pneumatic coding machine consumes lot of cfm of compressed air. This causes more consumption of power in air compressor.

Current Status

After installation of mechanical coding machine there is saving of around 200 units per day.

Payback

- **Annual power savings - 78475 Units**
- **Annual Money Saving - Rs 3.92 lakh**
- **Investment - Rs. 3.90 lakh**

Pneumatic coding machine

Mechanical coding machine

5. Replacement of old thermocol insulation in milk cold store with new PUF panel

6. Replacement of old on/ off pump system with VFD at cream transfer Pump

Background

Previously, pump use to run on full load at variable load on CBC.

Current Status

Due to installation of VFD now pump run on 50 % load only. This also lead to low maintenance cost due to smooth operation of pump.

Payback

- **Annual power savings - 11700 Units**
- **Annual Money Saving - Rs 0.589 lakh**
- **Investment - Rs. 0.5 lakh**

Cream transfer pump with VFD

Variable frequency drive

7. Replacement of old copper ballast with new Electronic ballast.

Background

Previously, old tube light was consuming 58 watt power per hour.

Current Status

Currently, only 28 watt power per hour consumed in one tube light.

Payback

- **Annual power savings - 3300 Units**
- **Annual Money Saving - Rs 0.165 lakh**
- **Investment - Rs. 0.13 lakh**

Copper blast tube

Electronic choke tube

8. Replacement of star delta system with new soft starter in powder plant vacuum pump

Background

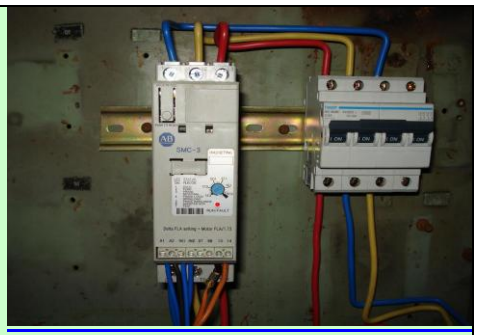
Previously, vacuum pump use to run on star delta. This causes more initial current & more line loss.

Current Status

Due to installation of soft starter initial load has reduced & pump load decreased by 5 ampere.

Payback

- **Annual power savings - 8615.5 Units (5 Months)**
- **Annual Money saving - Rs 0. 43 lakh**
- **Investment - RS 0.37 lakh**



Soft Starter for Vacuum Pump

9. Replacement of one 5 hp Pump with 3 hp pump in CIP return line.

Background

Previously, one 5 hp pump more were utilized for cip return line in pouch machine CIP.

Current Status

Currently, pouch machine CIP done 3 hp return pump after modification in line.

Payback

- **Annual power saving - 10500 units**
- **Annual Money Saving - Rs 0.53 Lakhs**
- **Investment - Nil**

CIP with 3 hp Return Pump

10. Replacing Air compressor cooing tower with main cooling tower.

Background

Previously, one separate pump use to run for cooling water. It consumes more power.

Current Status

By connecting air compressor with main cooling tower one pump has stopped.

Payback

- **Annual power saving - 58600 units**
- **Annual Money Saving - Rs 2.93 Lakhs**
- **Investment - Rs. 0.30 Lakhs**

Air compressor cooling tower

Main Cooling tower water line

11. Replacement of old water distribution system with new hydro-flow system along with Header & VFD

Background

Previously, 5 pump runs to fulfill the demand of whole dairy plant. Still there was problem of water flow & pressure in all section.

Current Status

Due to commissioning of new Hydro Flow system water flow & pressure is constant in all section. System is running with only one Pump with most of the time.

Payback

- **Annual power savings - 288256 Units**
- **Annual Water Saving - 73000 kl**
- **Annual Money Saving - Rs 25.36 lakh**
- **Investment - Rs. 37.75 lakh**

Old Water Distribution

New Hydro Flow System

12. Replacement of 250 watt HPMV lamp with new 80 watt low bay CFL light in pouch Section.

Background

Previously, 250 watt HPMV installed in pouch packing area.

Current Status

These are replaced by 80 watts Low Bay CFL light. This results in lot of saving of power.

Payback

- **Annual power savings - 26600 Units**
- **Annual Money Saving - Rs 1.33 lakh**
- **Investment - Rs. 0.49 lakh**

Old 250 watt HPMV

80 watt low bay cfl light

13. Elimination of one milk transfer pumps in Tank Room.

Background

Previously, at low level in buffer tank we use to run pump for emptying of milk tank into other tank by transferring milk.

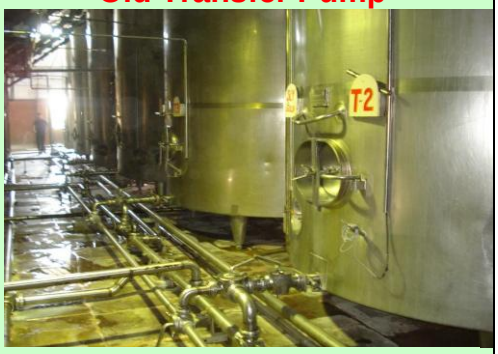
Current Status

But currently we are emptying tank by without transfer to zero level. This is done by proper slop of line to milk packing machine.

Payback

- **Annual power savings - 5200 Units**
- **Annual Money Saving - Rs 0.26 lakh**
- **Investment - Nil**

Old Transfer Pump



No Transfer Pump

14. Elimination of one hot water pump for Spira flow in Ghee section.

Background

Previously, One pump use to run in spira flow for circulation of hot water.

Current Status

This hot water pump is removed & hot water is transferred to boiler section.

Payback

- **Annual power savings - 12578 Units**
- **Annual Money Saving - Rs 0.628 lakh**
- **Investment - Nil**

3 HP pump for ghee making

Eliminated line from spira flow

15. Installation of high capacity milk transfer pump for Amul Taaza

Background

Previously, less capacity pump was installed. This pump was not able to build up balance fast in buffer milk tank use for running milk packing machine. Due to this machine has to be stopped for half an hour. This results in production loss.

Current Status

Due to installation of new pump balance build up fast in buffer tanks.

Payback

- **Annual Production loss - 2920 Hrs.**
- **Annual Money Saving - RS 1.61 lakh**
- **Investment - RS 0.50**

High capacity pump for transferring of milk

16. Installation of 1 No. 150 kl milk silo for improving production efficiency

Background

Previously, 6 hrs plant has to run on recirculation due unavailability of space.

Current Status

Due to commissioning of new Silo the plant circulation time decreased to almost zero.

Payback

- **Annual power savings - 325892 Units**
- **Annual Steam saving - 648040 Kg**
- **Annual Money Saving - Rs 16.25 lakh**
- **Investment - 36.45 Lakh**

New 150 KL Silo

17. Installation of new 250 screw compressor.

Background

Previously, two 200 TR compressor use to run. This results in more power consumption.

Current Status

Due to commissioning of 250 compressor, we can meet our demand by running one 90 TR compressor & 250 TR compressor.

Payback

- **Annual power savings - 190000 Units**
- **Annual Money Saving - Rs 9.83 lakh**

Investment - Rs. 47 Lakhs

New 250 TR Screw Compressor

18. Installation of 3 no. high speed 500 ml mechanical machine instead of pneumatic machine for milk packing.

Background

Previously, Pneumatic machine consumed 35 CFM of air per hour.

Current Status

With new machine there is no requirement of air.

Payback

- **Annual power savings - 81600 Units**
- **Annual Money Saving - Rs 4.08 lakh**
- **Investment - Rs. 12 lakh**

PLC based mechanical machine

19. Installation of high speed 6 lit mechanical machine instead of pneumatic Machine for milk packing.

Background

Previously, Pneumatic machine consumed 35 CFM of air per hour.

Current Status

With new machine there is no requirement of air.

Payback

- **Annual power saving - 54400 units**
- **Annual Money Saving - Rs 2.72 Lakhs**
- **Investment - Rs 7.4 Lakhs**

New 6 lit mechanical m/c

20. Installation of ghee clarifier for improving production efficiency & saving of power by reducing production hrs.

Background

Previously due to less capacity of clarifying the production efficiency was low.

Current Status

With the installation of new clarifier the production efficiency has improved. Hence reduction in production hours.

Payback

- **Annual power saving - 157315 units**
- **Annual Money Saving - Rs 7.86 Lakhs**
- **Investment - Rs 9.0 Lakhs**

New Ghee Clarifier

21. Installation of Harmonic control panel.

Background

Due to increase in inductive load there is distortion in voltage & loss in neutral conductor.

Current Status

With the installation in Harmonic control panel at substation the voltage distortion has been controlled significantly.

Payback

- **Annual power saving - 136000 units**
- **Annual Money Saving - Rs. 6.81 Lakhs**
- **Investment - Rs. 2.35 Lakhs**

Harmonic control panel

22. Installation of natural ventilation in Process & Ghee Section.

Background

Previously, light were on in process & ghee section during day time also.

Current Status

But after installation of natural ventilation system in process & ghee these lights are switched off during day time.

Payback

- **Annual power saving - 15100 units**
- **Annual Money Saving - Rs 0.755 Lakhs**
- **Investment - Rs. 5.74 Lakhs**

Ghee section without ventilation

Ghee section with ventilation

23. Installation of new data centre

Background

Previously, data security was an issue.

Current Status

New data centre made with precision air conditioning. 100 % data security.

Payback

- **Investment - Rs. 25 lakh**

New Data centre

New Data centre

24. Synchronization of load on 1000 KVA transformer.

Background

Previously, all three transformer runs for 24 hrs. but in night shift the load is very less. Transformers run on very less loading.

Current Status

But currently we are shifting load of one transformer on two transformers & optimize loading capacity of transformer. This results in saving of power.

Payback

- **Annual power savings - 87000 Units**
- **Annual Money Saving - Rs 4.4 lakh**
- **Investment - Rs. Nil**

Loading on two transformer instead of three