



**Welcome to the
presentation of**

PALAKKAD DAIRY

(ISO 9001-2000 CERTIFIED)

Malabar Regional Co-operative Milk Producer's Union Ltd.

Energy Policy

We “milma” shall strive for continuous energy economizing through

- Monitoring closely&control consumption of various forms of energy through an effective EMS
- Improved capacity utilization and bench marking
- Up gradation of process, technology and equipments
- Maximise the use of cheaper and easily available form of energy
- Maximise the recovery of waste energy
- Creating awareness among the employees of all levels.



General Information

- Started in 1967
Capacity 6 KLPD
- Expanded to 60 KLPD in the year 1994
- Expanded to 100 KLPD in the year 2000
- Curd and Sambharam production started in this Unit in the year 2000



Production Details

- MILK 3 Varieties

JERSEY MILK
HOMOGENIZED

Sale: 60000 ltr/day

TONED MILK

Sale: 30000 ltr/day

SMART

Sale: 1500 ltr/day

- SKIM MILK CURD

Sale: 9000 ltr/day

- BUTTER MILK (Sambharam)

Sale: 12000 pkts/day

- GHEE

Sale: 30 tons/month



Energy Management Committee

- Sri. V. Vijayaraghavan, Manager, Palakkad Dairy
- Sri. A. Chandrasekharan, Dy. Engineer(Mech)
- Smt.Mary Samuel, Asst. Manager(QC)
- Sri. S. Nirish, Technical Officer.
- Sri. V.R. Sathish Chandran, Tech.Supdt.(Elect.)
- Sri. K. Prakash, Technician
- Sri. K. Ramakrishnan, Plant Operator



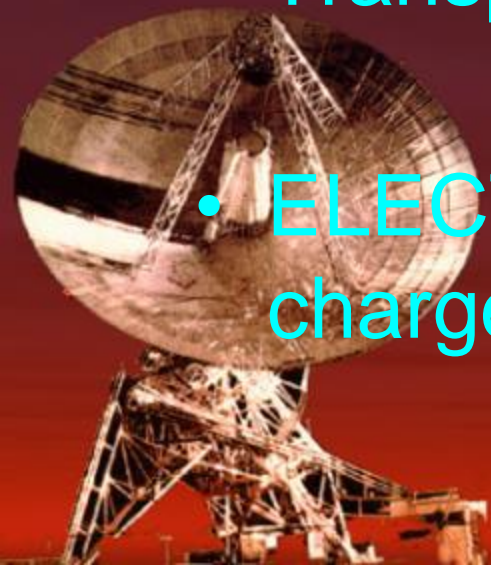
Consumption Details

- ELECTRICAL ENERGY: 4500 kwh / day
- COCONUT SHELL : 1800 Kg/ day



Energy Cost

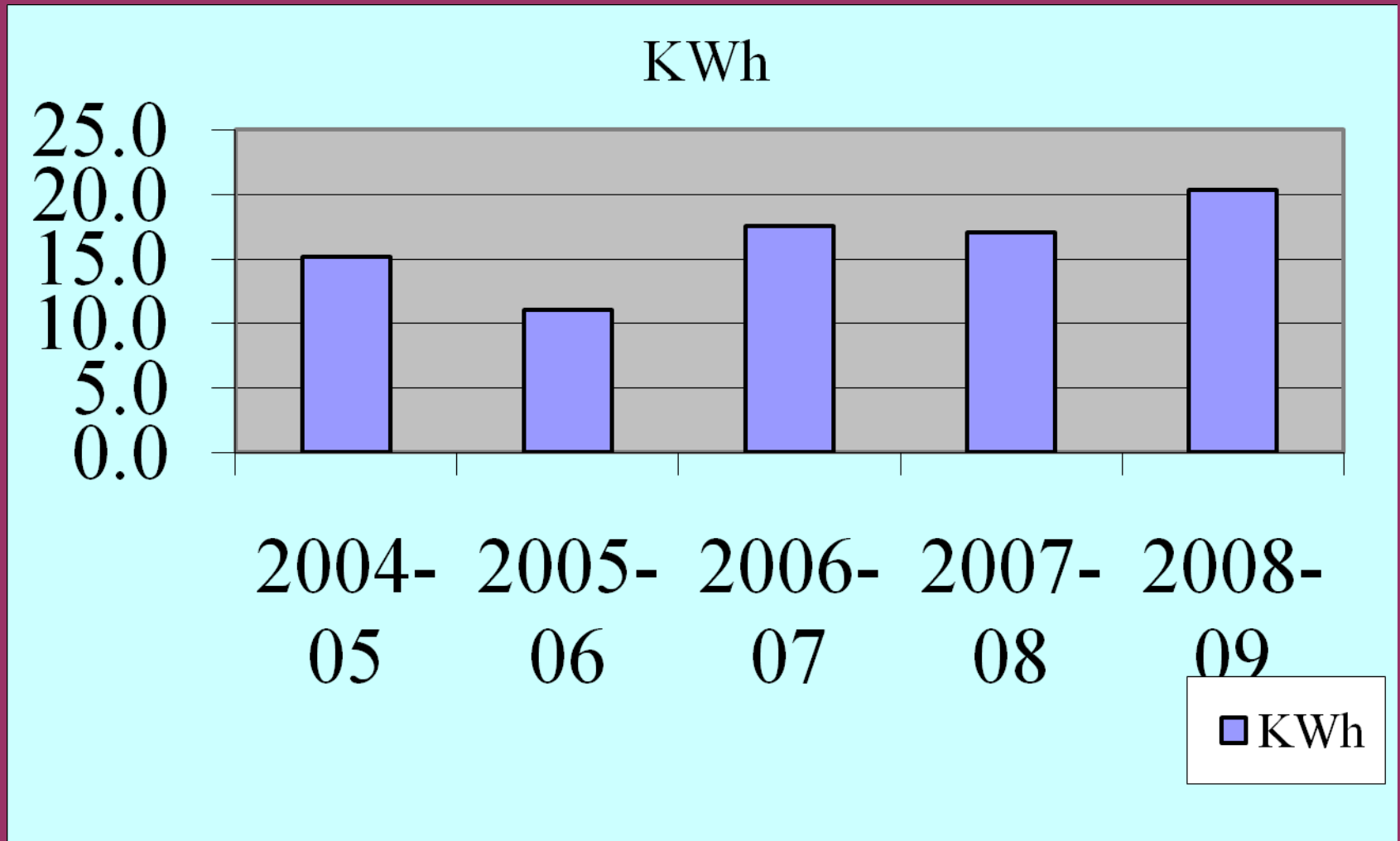
- HSD Rs.39.89/ ltr
- COCONUT SHELL Rs.4.225/Kg (Including Transportation charge)
- ELECTRICAL ENERGY: Average effective charge: Rs.4.00/Unit



Specific Energy Consumption

Year	Milk	Kwh	
2004-05	21622756	1431763	15.1
2005-06	21426099	1952052	11.0
2006-07	28681849	1642534	17.5
2007-08	28207992	1657864	17.0
2008-09	33439513	1645612	20.3

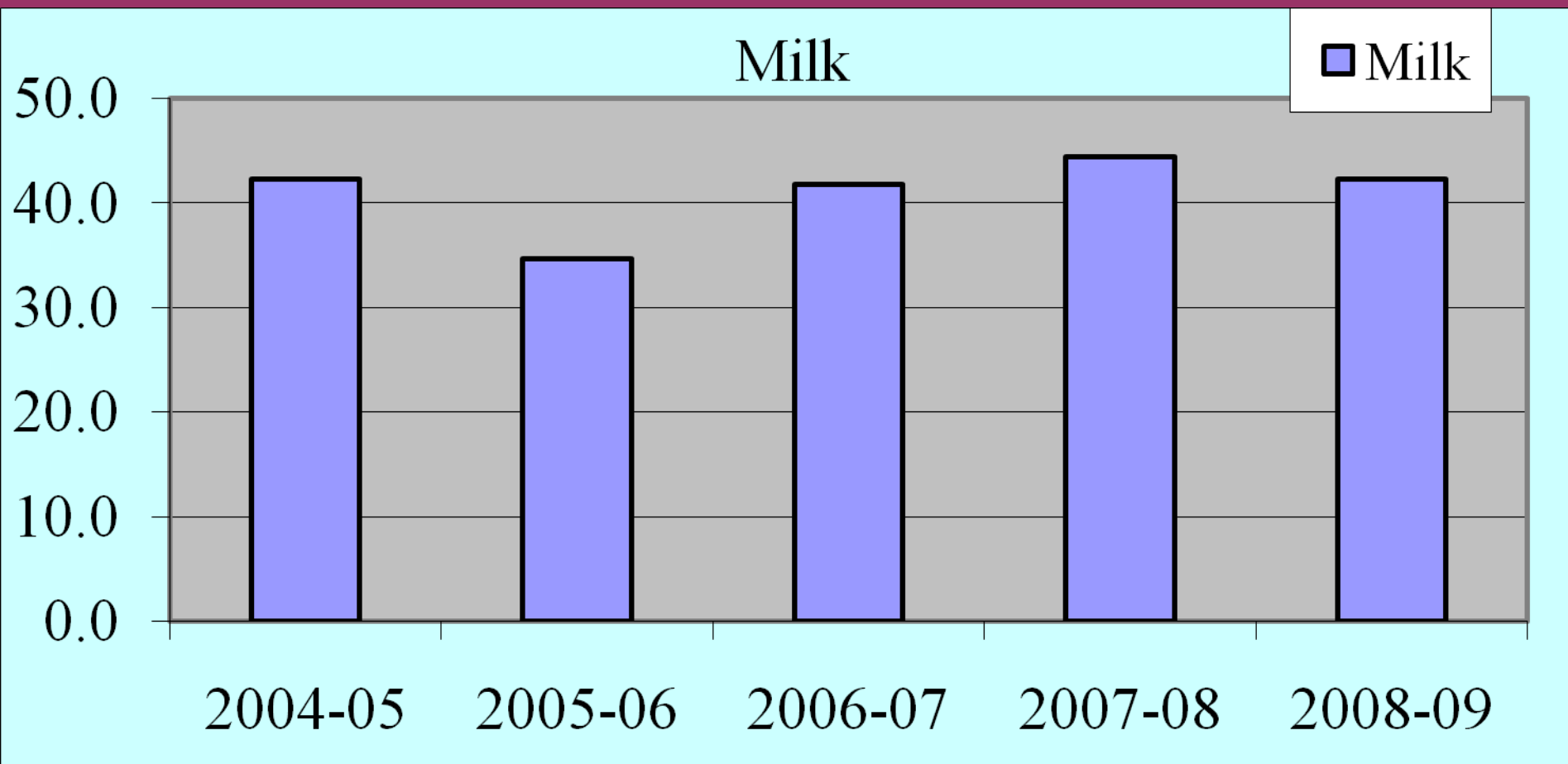
Specific Energy Consumption



Specific Fuel Consumption

Year	Milk	Coconut shell	
2004-05	21622756	511218	42.3
2005-06	21426099	616968	34.7
2006-07	28681849	685985	41.8
2007-08	28207992	635745	44.4
2008-09	33439513	790274	42.3

Specific Fuel Consumption



Year	Milk	Curd-KL	Ghee-ton	Kwh	KSEB cost	Coconut shell	Furnace oil
2004-05	21622756	1734	200	1431763	59.8	511218	59800
2005-06	21426099	3071	254	1952052	61.4	616968	32227
2006-07	28681849	2432	303	1642534	63.0	685985	34350
2007-08	28207992	2482	336	1657864	61.5	635745	4059
2008-09	33439513	2677	303	1645612	69.1	790274	60870



Energy Conservation 2003-04

- Converted the use of Furnace oil Boiler to Coconut Shell Boiler
- Average Furnace oil consumption per year = $500 \times 365 = 182.5 \text{KL}$
- Cost of Furnace oil @ 17ltr = 31.02 lakhs
- Average coconut shell consumption/year = $1800 \times 365 = 657.0 \text{ton}$
- Cost of coconut shell @ Rs.3/kg = 19.71 lakhs
- Savings = Rs.11.31 lakhs





Modification in tray washer pump

- 15 HP Tray washer pump replace with 7.5 HP Pump
- Working hours of tray washer =8 hours
- Savings /year = $5.6*8*30*12*4.2$
=0.68 lakhs

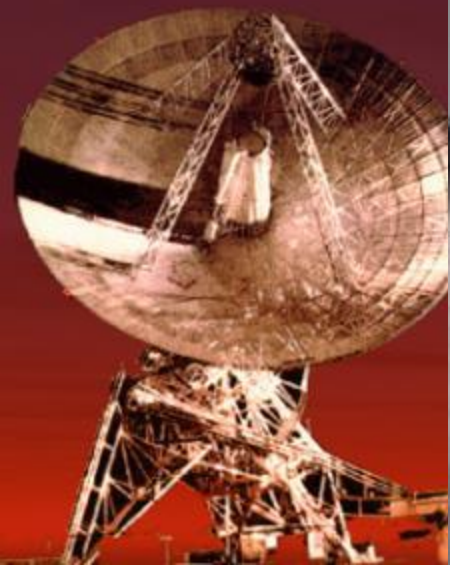


Installed APFC Panel

- Before Installing the APFC Panel
- MD =300KVA
- Power Factor =0.8 lag
- MD Charge =Rs.350/KVA
- KWh charge =3.20KWh
- After Installing APFC
- MD =300KVA
- Power Factor =0.99
- MD charge =Rs.350/KVA
- KWH charge =Rs.3.20/KWh
- Savings in MD
- MD at 0.8 lag =300KVA
- Md at 0.9 lag = $300 \times 0.8 / 0.99 = 242 \text{KVA}$
- Savings in MD =58KVA
- Savings @Rs.350/unit/year = $58 \times 350 \times 12 = 243600$
- Savings in KWh
- Ampere at 300KVA =400A
- Ampere at 242KVA =323 A
- Savings in transformer loss with 1.03 ohm Transformer resistance
= $(400 \times 400 - 323 \times 323) \times 1.03 = 5.73 \text{KW}$
- Savings in transformer loss/year @ 3.20/unit = $5.73 \times 24 \times 365 \times .302 = 160623$
- Total savings=Rs.404223/-







Energy Conservation

- Installed transparent sheets for lighting





Energy conservation =2004-05

1. Converted 2 Pneumatic type Filling machine to Mechanical type
2 numbers Pneumatic machines replace with Mechanical machines
Compressed air consumption of each pneumatic machine=50CuM/hr at 6kg
Total compressed air consumption=100CuM/hr at 6kg/cm²
Free air delivery of Air compressor+156CuM/hr
Assuming the efficiency of compressor=80%
Out put of air compressor:124CuM/hr
For operating the filling machine for 2 shifts=1400CuM/hr
Savings achieved /year=1400124*22*08*365*4.2=Rs.3.04 lakhs
(Rating of air compressor motor:22KW, PF:0.8, KSEB charge:Rs./unit4.2



Energy conservation -2004-05

- Modification in Process Heat temperature.
- Average quantity of milk Processed/day=60000 ltrs
- Specific heat of milk=0.93Kcal/kg.degree celsius
- Assuming that the regeneration efficiency is 80%
- Load reduction= $60000 \times 0.93(1-0.8)=22320\text{Kcal}$
- Assuming the boiler efficiency is 75%
- Equivalent K Calsavings= $11160/0.75=29760\text{Kcal}$
- Savings in Furnace oil
consumption/year= $29760/10500 \times 365 \times 17:\text{Rs.}0.18\text{lakhs}$
- Calorific value of FO :10500Kcal, FO cost: Rs.17/ltr



Energy Conservation –2004-05

- Load Management in Refrigeration System
- Shut down of refrigeration system from 6PM to 10PM
- Energy savings/year= $94 \times 4 \times 0.8 \times 365 \times 4.2 = \text{Rs.}4.61 \text{ lakhs}$
- (Ammonia compressors-2Nos*40HP, 1No*60KW)
- Condenser pump 1*15HP.1*10HP, PF:0.8
- KSEB rate:Rs.4.2/unit



Energy Conservation-2004-05

- Heat Recovery from Process
- Hot water at 80 degree celsius) over flow from hot water chamber=.120kg/hr
- Working hours of Pasteuriser=8 hrs
- Net enthalpy content of water /day@80degree for 8 hrs= $120*8*1(80-30)=48000\text{Kcal}$
- Annal savings in Furnace oil possible with 50% efficiency = $4800010500*2*365*17=\text{Rs.}0.56\text{ lakhs}$



Installation of Solar Heating System(10KL)

- Quantity of hot water (at 75 degree celsius) available /day=10000 Itrs
- Savings of Energy/year = $10000 * 1 * (75 - 30) * 300 = 13500 \text{Kcal}$
- Savings in Furnace oil = 21.8 lakhs





Energy Conservation-2005-06

- Modification in air compressor






Energy Conservation 2006-07

- Installed one De- Super heater in refrigeration section
- Project cost-5.46 lakhs
- Feed water temperature to the Boiler raised from 27 degree to 70degree
- Quantity of hot water available from De super heater:10000
- Temperature savings= $70-27=47$ degree
- Energy saved $10000*47*365:175200000$ calories
- Savings/year: $175200000/10500*29.50*0.8:3.93$ lakh \$
- Payback : 20 month





DE SUPER HEATER

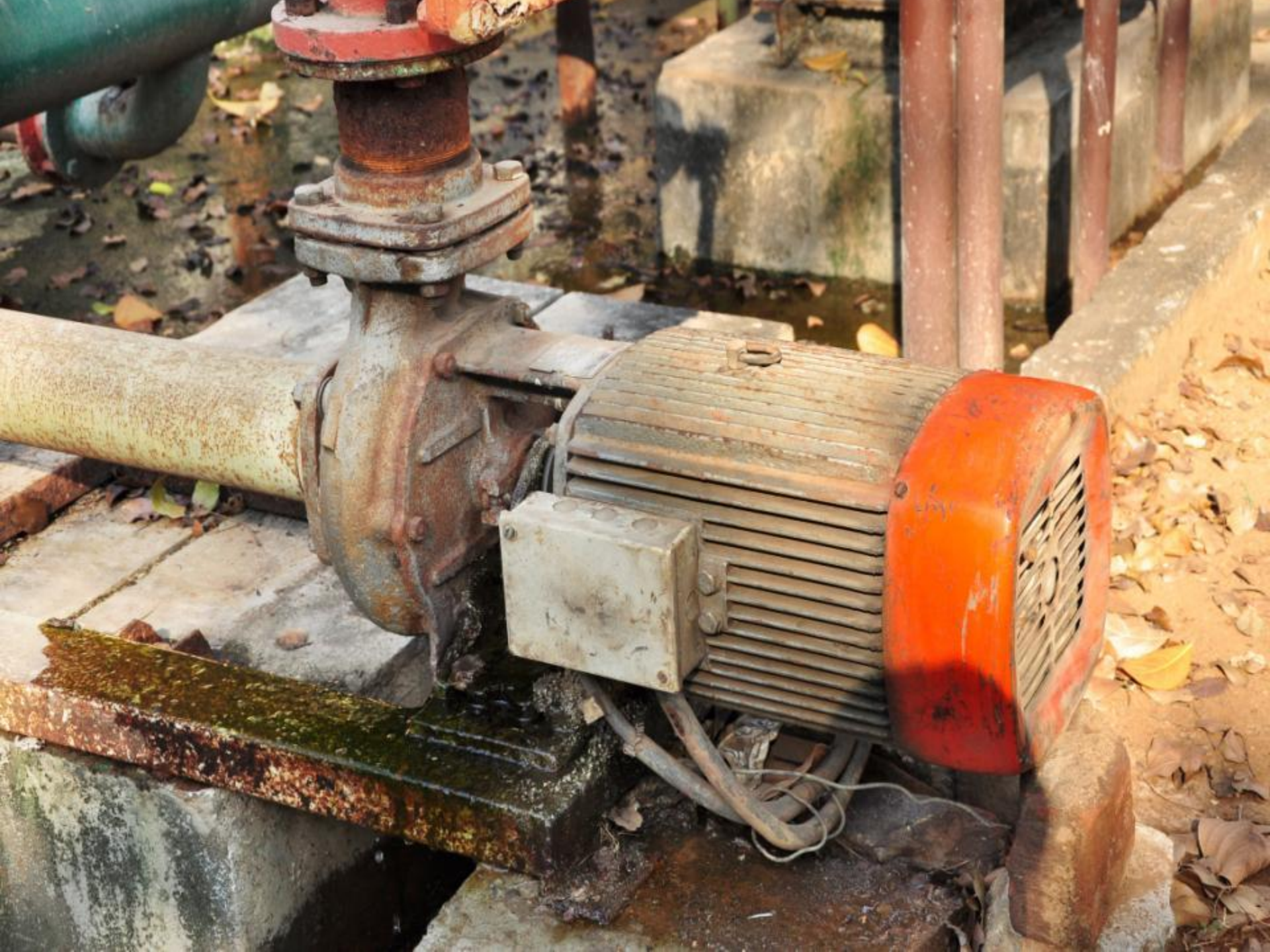


DE SUPER HEATER

Installation of Energy efficiency Pump(2006-07)

- Normally we are operating 2 pumps(one 15HP&one 10HP)
- After installation of 15HP energy efficiency pump 10HP pump is removed.
- Net savings : 10 HP for 24 hours
- Total energy saved : $7.45 * 24 * 365 : 65262$ kwh
- Cost of energy saved : $65262 * 4 : 2.6$ lakhs
- (Energy cost Rs.4.00)





Eliminated One 5 HP Motor From Curd Section

- Initially we used to cool the hot milk for curd with cooling tower operated with 5 HP cooling fan.
- At present we are cooling the milk with the same pump which is using for condenser cooling in refrigeration section.
- Savings calculation
 - Total running of pump : 6 hours/day
 - Energy saved : $4.47 * 6 * 365 * : 9802 \text{kWH}$
 - Savings in terms of cash: $9802 * 0.8 * 4 : 0.3 \text{ lakhs}$



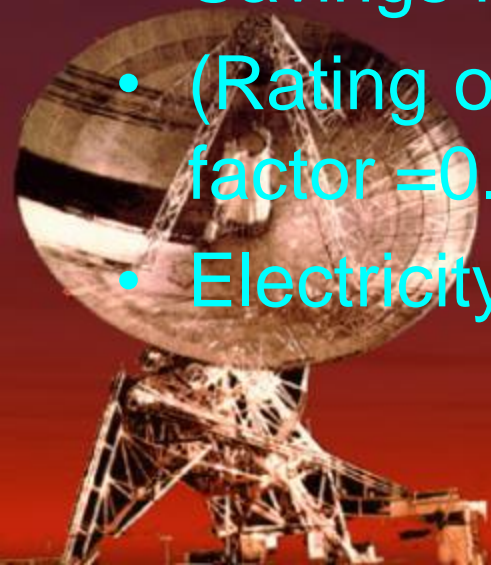
Energy Conservation 2005-06

- Modification in Filling Machine



Savings Due To Modification in filling machine

- Replaced 2 nos 30HP compressors.
- Energysaved : $2 * 22KW * 14hrs * 365days$:
179872kwh
- Savings in terms of cash : $179872 * 4$: 7.2 lakhs
- (Rating of Air compressor motor =22 KW, power factor =0.8,
- Electricity charge =4.0 per Unit)





Energy Conservation 2007-08

- Installed 2 mechanical type filling machine



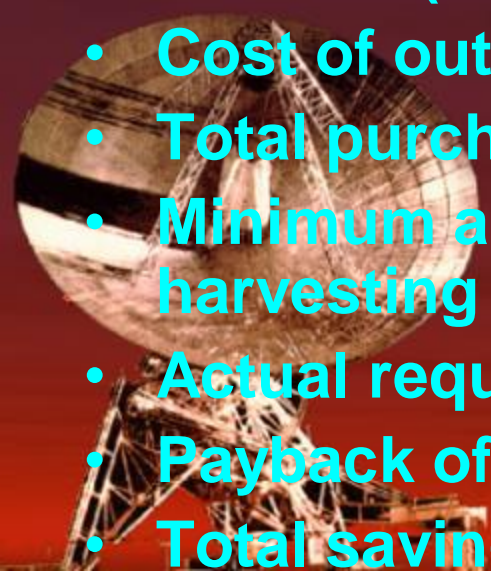
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Sub Surface Rain Water Harvesting System

- Investment cost : 19 lakhs
- Water consumption per year: $1.5 \times 365 = 54750$ KL
- Water available from bore wells: $50 \text{KL} / 365 = 18250 \text{KL}$
- Water available from open well: $50 \text{KL} \times 365 = 18250 \text{KL}$
- Water available from water authority: $15 \text{KL} \times 365 = 5475 \text{KL}$
- Total available quantity : 41975KL
- Balance (expected from other source): 12775KL
- Cost of out source water: (including TC): Rs.108/KL
- Total purchase cost : $12775 \times 108 = \text{Rs.}1379700.00$
- Minimum assured water available in the rain water harvesting system: 70KL/day ie 25550KL/year
- Actual requirement : 12775KL
- Payback of the investment: 18 months.
- Total savings/year : 13.79 lakhs





Energy Conservation Activities Carried Out From 2002

- Converted Furnace oil fired boiler operation to coconut shell boiler.
- Replaced one 15 pump with 7.5HP in tray washer
- Installed Solar Water heaters for hot water
- Installed APFC panel for power factor stabilization
- Heat recovery from process
- Modification in process heat temperature
- Modification in tray washer for water savings
- Modification works in Anteroom
- Water from ETP is using for gardening purpose



Next Year Programme In Energy Conservation

- Replacing the ordinary choke with electronic choke
- Replacing the twin tubes with CFL
- Replacing the 2 nos 10 Hp pumps (chilled water) with one no.10HP energy efficiency pump in Refrigeration section
- Installation of Screw compressor in refrigeration section.



Thank You...

