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 benchmarking
- Upgradation 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: Sale: 60000 ltr/day
  - HOMOGENIZED 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
<table>
<thead>
<tr>
<th>Year</th>
<th>Milk</th>
<th>Kwh</th>
<th>Specific Energy Consumption</th>
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Specific Energy Consumption

![Bar chart showing specific energy consumption from 2004 to 2009.](chart.png)
<table>
<thead>
<tr>
<th>Year</th>
<th>Milk</th>
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Specific Fuel Consumption

![Chart showing specific fuel consumption for Milk from 2004-05 to 2008-09.]
<table>
<thead>
<tr>
<th>Year</th>
<th>Milk</th>
<th>Curd-KL</th>
<th>Ghee-ton</th>
<th>Kwh</th>
<th>KSEB cost</th>
<th>Coconut shell</th>
<th>Furnace oil</th>
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• Converted the use of Furnace oil Boiler to Coconut Shell Boiler

• Average Furnace oil consumption per year=500*365=182.5KL

• Cost of Furnace oil@17ltr =31.02 lakhs

• Average coconut shell consumption/year=1800*365 =657.0ton

• Cost of coconut shell@Rs.3/kg =19.71lakhs

• 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*0.8/0.99 = 242KVA
  - Savings in MD = 58KVA
  - Savings @Rs.350/unit/year = 58*350*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*400-323*323)*1.03 = 5.73KW
  - Savings in transformer loss/year@3.20/unit = 5.73*24*365*302 = 160623
  - Total savings = Rs.404223/-
Energy Conservation

- Installed transparent sheets for lighting
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*0.8*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 = 0.93 Kcal/kg degree celsius
- Assuming that the regeneration efficiency is 80%
- Load reduction = 60000 * 0.93(1-0.8) = 22320 Kcal
- Assuming the boiler efficiency is 75%
- Equivalent K Calsavings = 11160 / 0.75 = 29760 Kcal
- Savings in Furnace oil consumption/year = 29760 / 10500 * 365 * 17: Rs. 0.18 lakhs
- Calorific value of FO: 10500 Kcal, 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 * 4 * 0.8 * 365 * 4.2 = Rs. 4.61 lakhs
  - (Ammonia compressors - 2 Nos * 40HP, 1 No * 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)=48000Kcal
  • Annal savings in Furnace oil possible with 50% efficiency =4800010500*2*365*17=Rs.0.56 lakhs
Installation of Solar Heating System (10KL)

- Quantity of hot water (at 75 degree celsius) available /day = 10000 ltrs
- Savings of Energy/year = 10000 * 1 * (75 - 30) * 300 = 13500 Kcal
- Savings in Furnace oil = 21.8 lakhs
• 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 70 degree
- 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 lakhs
- Payback: 20 months
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: $4.47 \times 6 \times 365 = 9802$ kWh
- Savings in terms of cash: $9802 \times 0.8 \times 4 = 0.3$ lakhs
Energy Conservation 2005-06

• Modification in Filling Machine
Savings Due To Modification in filling machine

- Replaced 2 nos 30HP compressors.
- Energysaved : $2 \times 22\text{KW} \times 14\text{hrs} \times 365\text{days} = 179872\text{kwh}$
- Savings in terms of cash : $179872 \times 4 = 7.2 \text{lakhs}$
- (Rating of Air compressor motor = $22 \text{ KW}$, power factor = 0.8,
- Electricity charge = $4.0 \text{ per Unit}$)
• Installed 2 mechanical type filling machine
Sub Surface Rain Water Harvesting System

- Investment cost: 19 lakhs
- Water consumption per year: 1.5*365: 54750 KL
- Water available from bore wells: 50KL/365: 18250KL
- Water available from open well: 50KL*365: 18250KL
- Water available from water authority: 15KL*365: 5475KL
- Total available quantity: 41975KL
- Balance (expected from other source): 12775KL
- Cost of out source water: (including TC): Rs.108/KL
- Total purchase cost: 12775*108: Rs.1379700.00
- Minimum assured water available in the rain water harvesting system: 70KL/day i.e. 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...