

**WELCOME TO THE
PRESENTATION ON**

ENERGY CONSERVATION

KOZHIKODE DAIRY

(ISO 9001: 2000 & HACCP CERTIFIED)



Recognitions

- First Dairy in Kerala Certified with ISO 9001-2000 and HACCP Certification.
- Kerala State Pollution Control Board award winner in 2002 and 2004
- State Energy Conservation award winner in 2005
- Short listed for Rajiv Gandhi National Quality Award among food industries (2005-06)
- State Award for the Industrial Safety for the Year 2009 among the food industries.



KERLA STATE ENERGY CONSERVATION AWARD - 2005

Kerala State Safety Award 2009



General Information

- Started in 1995 with capacity 0.6 LLPD
- Expanded in 2000 with capacity 1 LLPD
- Expanded in 2006 with capacity 1.25 LLPD

Products Handling

- Curd
- Sambharam
- Ice Cream
- Sip up
- Frozen Milk

Milk Sale (Variety) / Day

❖ TONED MILK	50,000 lts
❖ HOMOGENIZED TONED MILK	30,000 lts
❖ STANDARDISED MILK	5,000 lts
❖ DOUBLE TONED MILK	<u>25,000 lts</u>
❖ TOTAL	<u>1,10,000 lts</u>

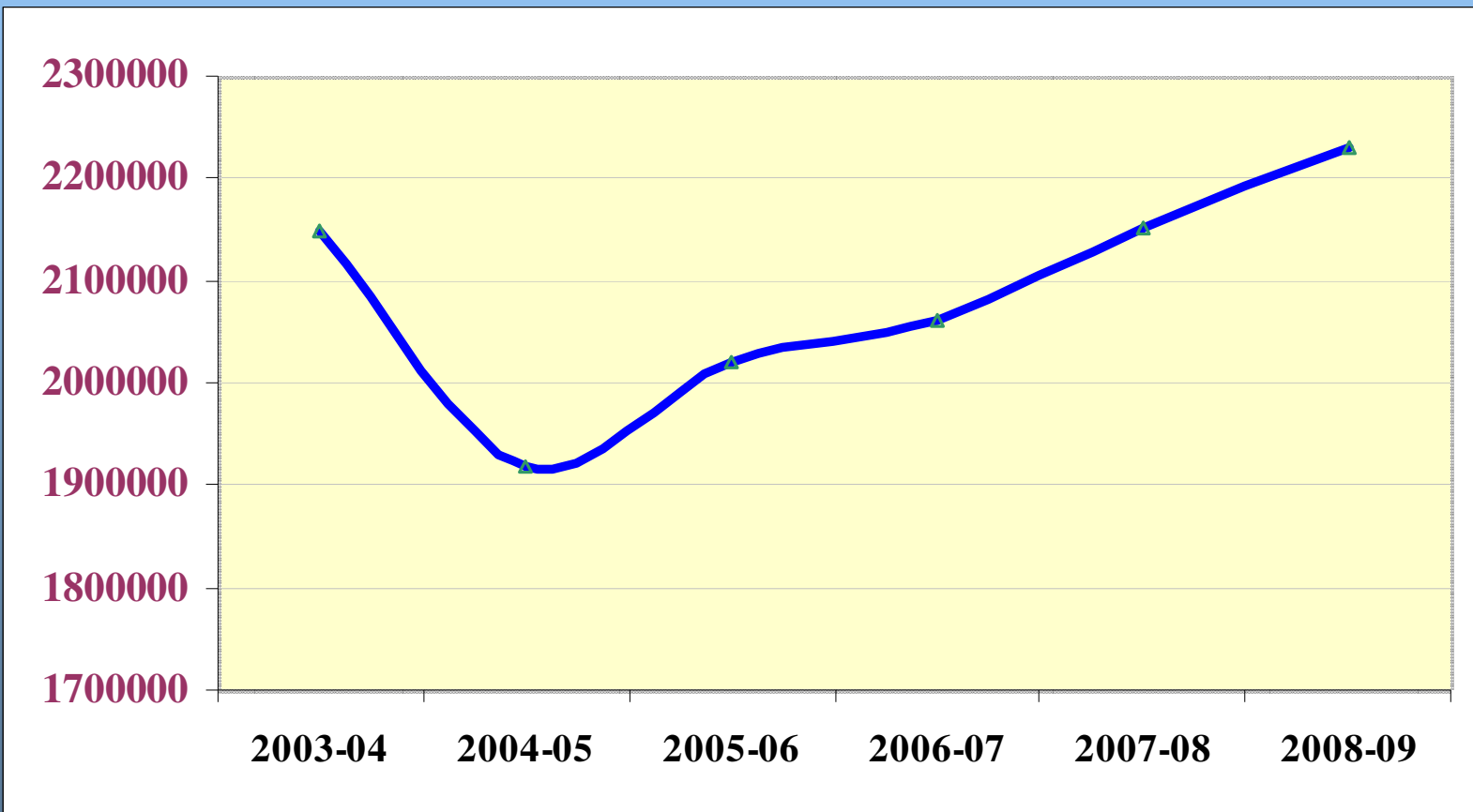
Energy Audits

Done in the Years 2004 and 2008 by
M/s. Petroleum Conservation Research
Association

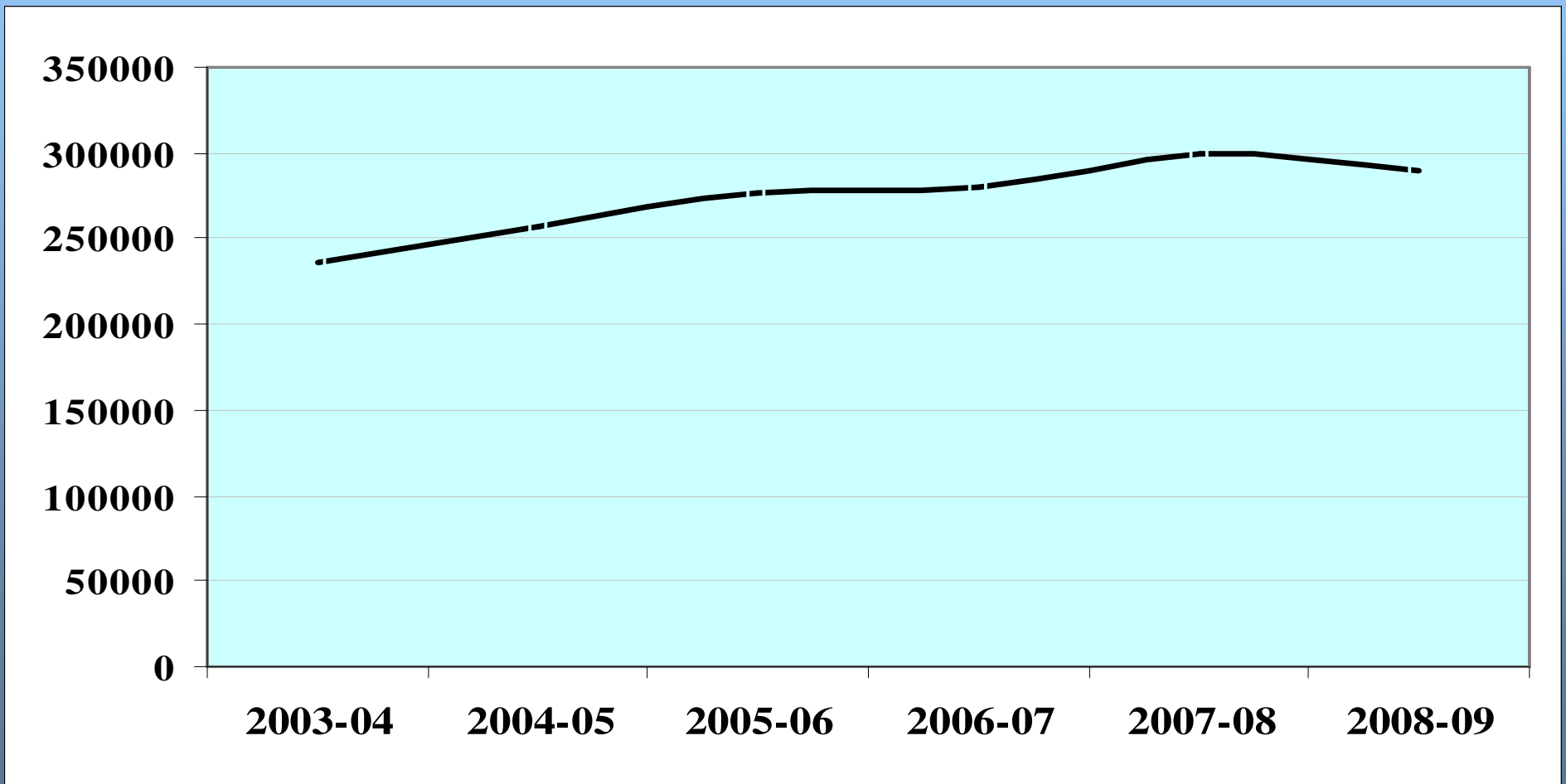
Products Sales Day

SKIM MILK CURD	15000 Ltr
SAMBHARAM	2000 Ltr
SIP-UP (Skim milk)	13,000 Pouches (35 ml)
SIP-UP (Water)	16,000 Pouches (40ml)
ICE CREAM	870 Ltr
FROZEN MILK	1000 Ltr

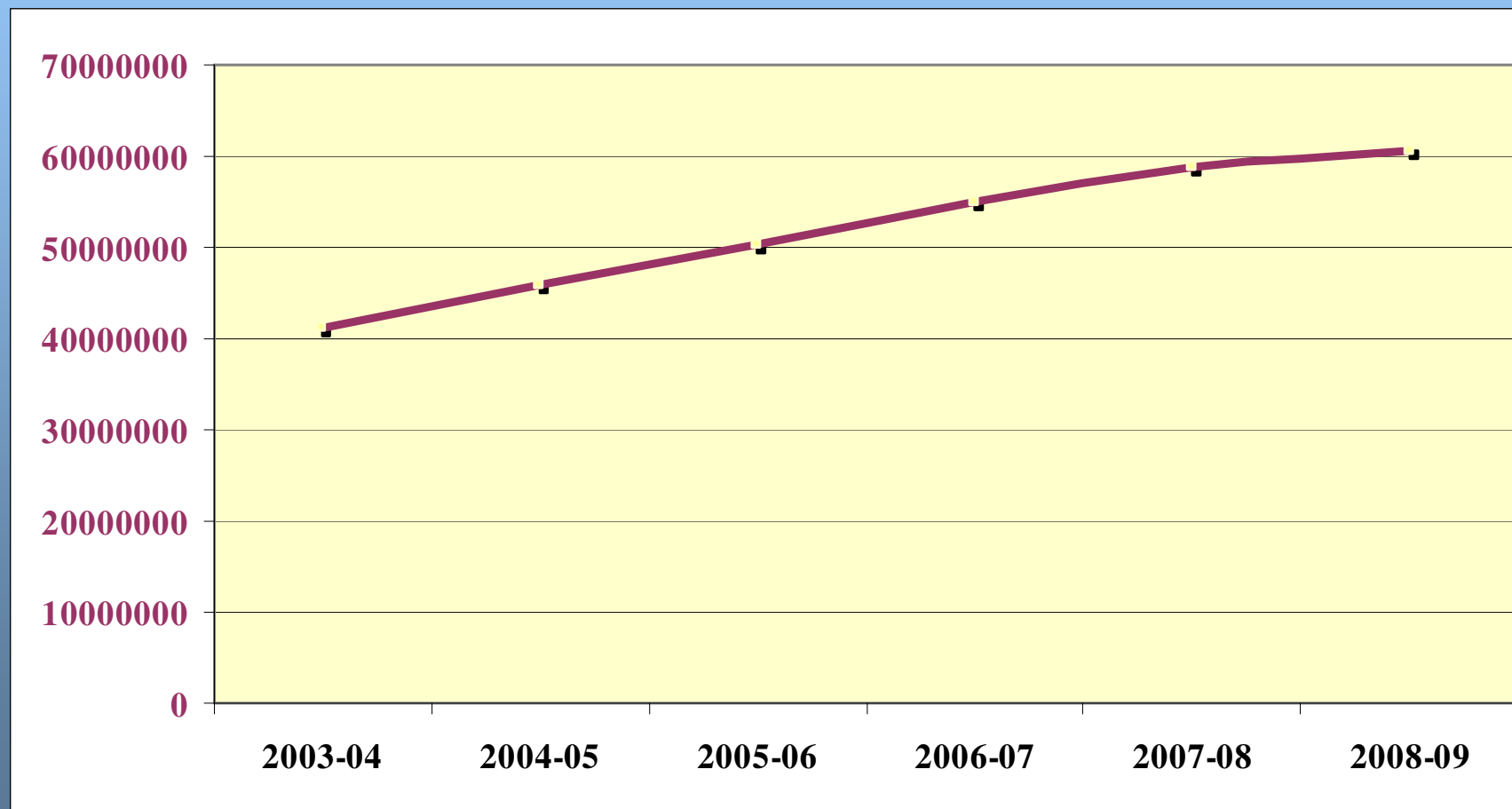
Electricity Consumption



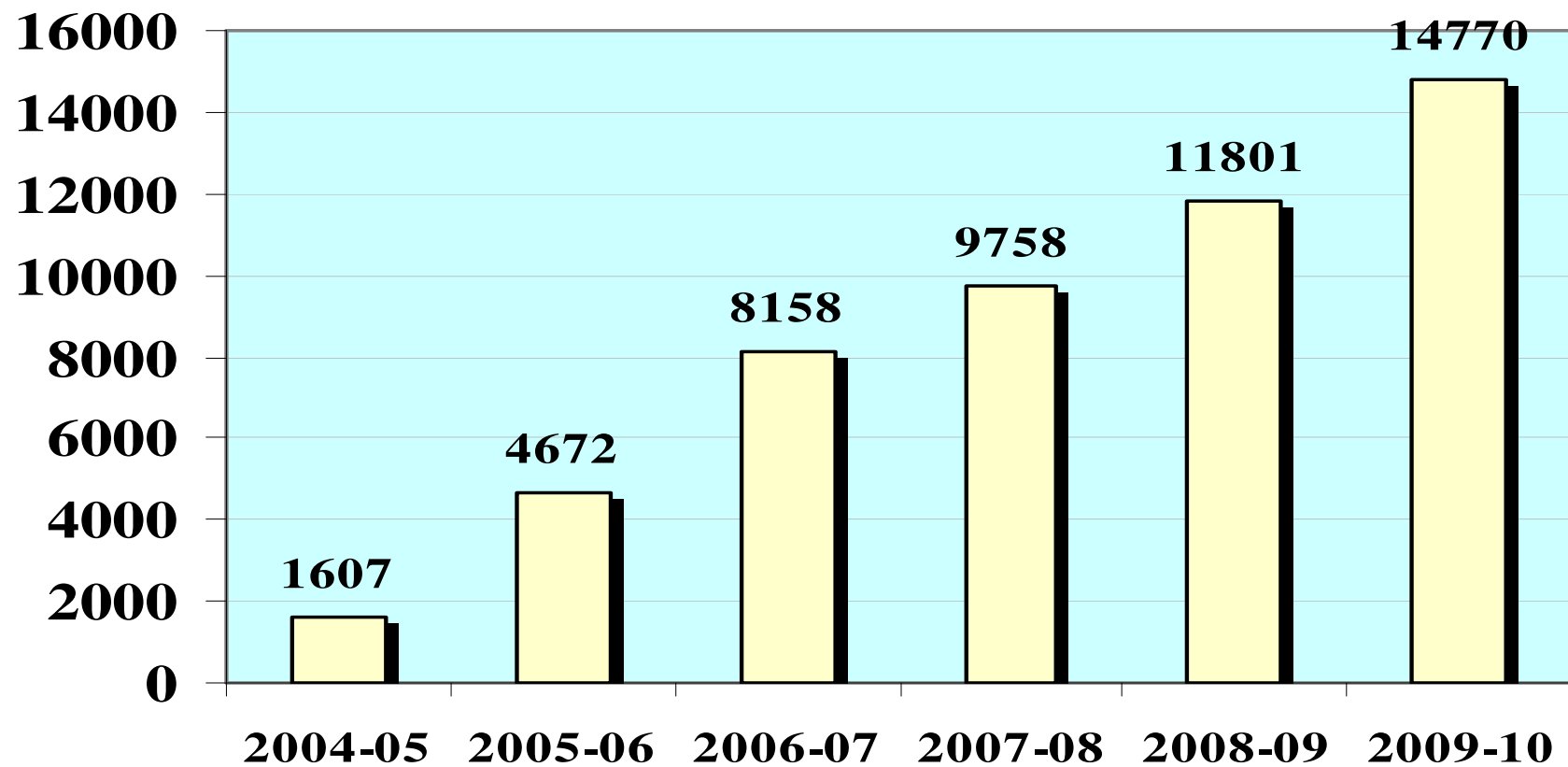
Furnace Oil Consumption



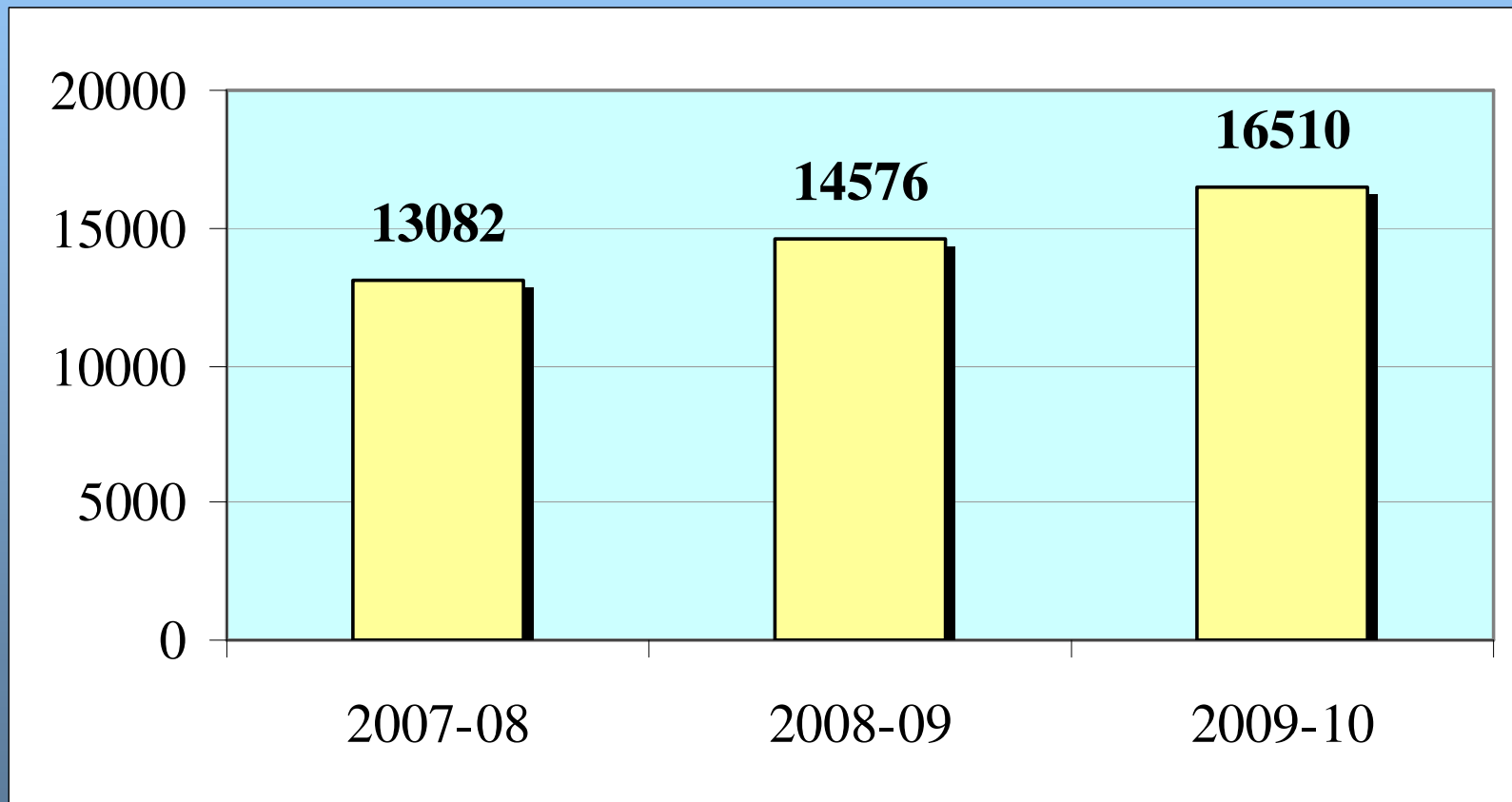
Quantity of Milk Processed



Ice Cream Production /Month

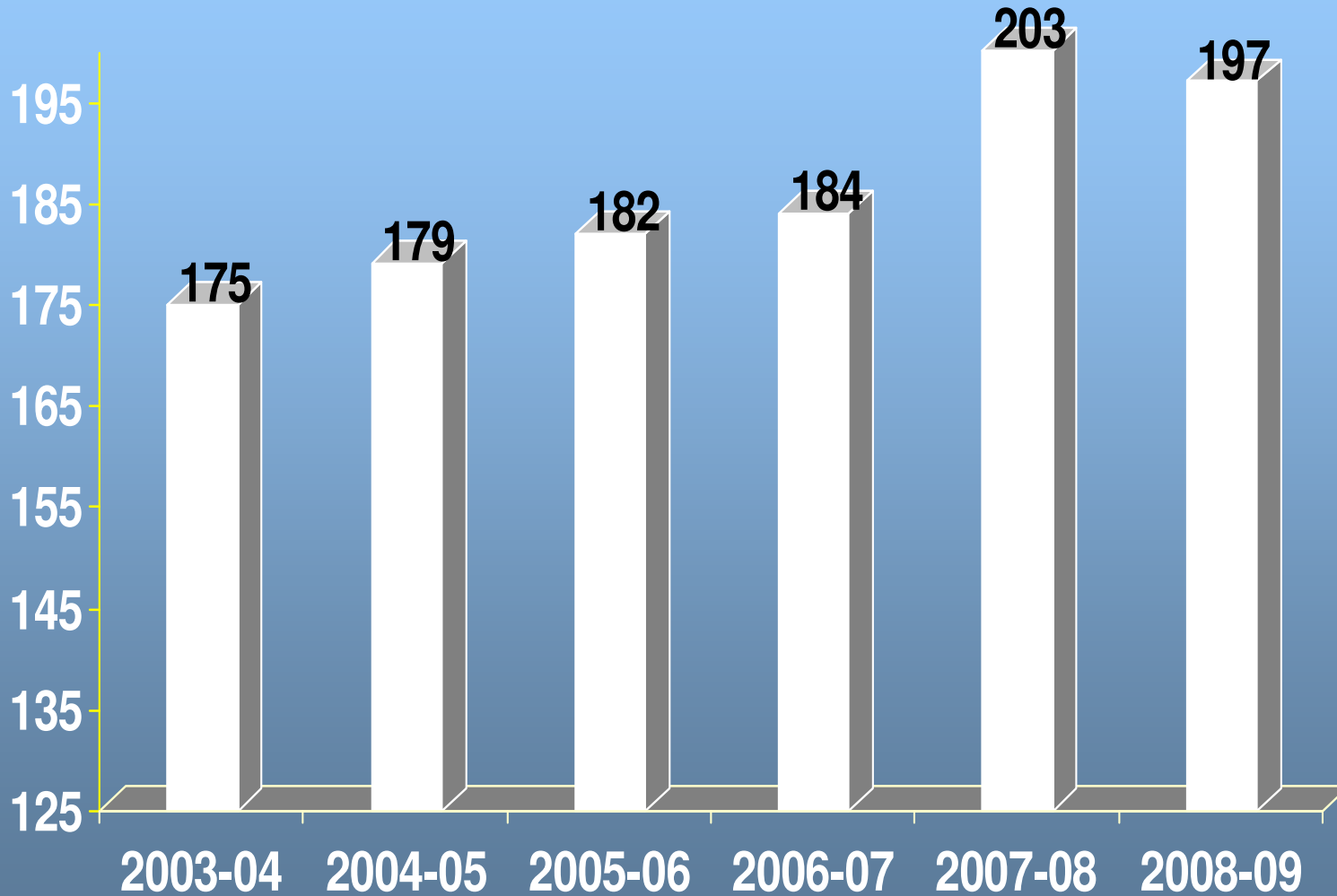


Curd Sales / Day



Specific Fuel Consumption

(Milk Ltr / Ltr F O)

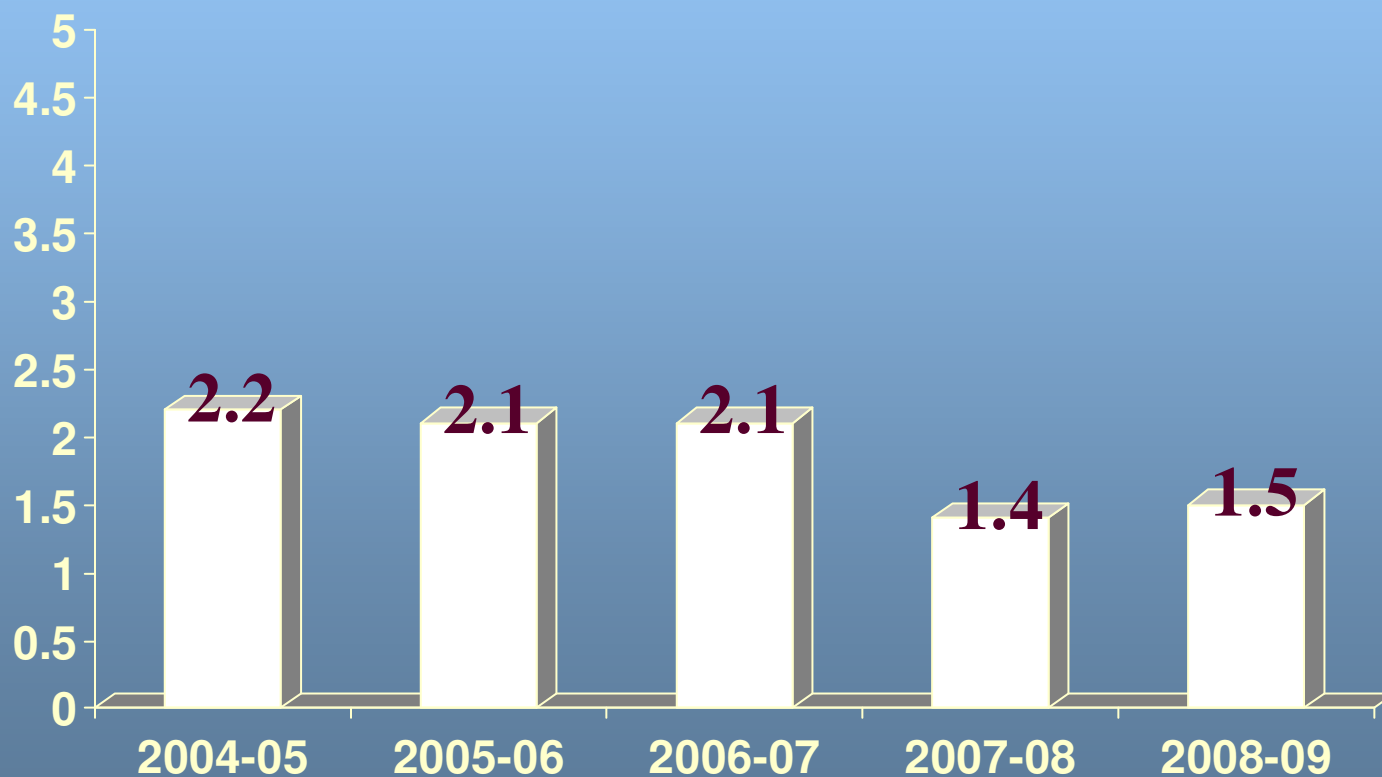


SPECIFIC ENERGY CONSUMPTION (Milk Ltr/ kwh)



SPECIFIC WATER CONSUMPTION

(Water/ Ltr of Milk)





MALABAR REGIONAL CO-OP. MILK
PRODUCERS' 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, bench marking
- Up gradation of process, technology & equipments
- Maximise the use of cheaper & easily available form of energy.
- Maximise the recovery of waste energy.
- Creating awareness among the employees of all levels.

27 July 2004

Managing Director

Energy Management Committee

Committee Members:

- 1. Abdul Khader, Sr. Manager**
- 2. Premanandan.K, Dy. Engineer (Ele)**
- 3. Chandralal T.R , Dy. Engineer (Ele) .**
- 4. Shaji Mon.K.K, Asst . Manager (PM)**
- 5. R.S. Vinod, Quality Control Officer**
- 6. K. Vijayakumar, Technician,**
- 7. P. Balakrishnan, Plant Operator.**

Energy Saving Projects Implemented

- 1. Replacement of Condenser Pump.**
- 2. Water saving in the Pouch filling section.**
- 3. Replacement of Pneumatic Filling M/cs**
- 4. Power factor Improvement.**
- 5. Solar water Heater system Installation.**
- 6. Heat exchanger for Curd plant.**
- 7. Running time reduction in ETP aerator.**
- 8. Replacement of Chilled water pump.**
- 9. Elimination of Cooling tower in the Curd plant.**
- 10. Modification in the can washing jetting system.**
- 11. Replacement of Light Fitting in the Plant.**
- 12. Replacement of under loaded FD fan Motor in the Boiler.**

Replacement of Condenser Pumps

- Earlier 2 Nos of 10 HP pumps coupled split case type were operated to get sufficient water circulation.
- Now a new single 10 HP Mono block pump with a flow rate equal to the sum of old pumps

Savings

(7.5 KW * 16 Hrs*Rs.4.20) Rs. 504/= per day

Amount saving per year Rs. 1.83 Lacs

E C Projects implemented

Water saving in Pouch Filling

- Earlier the cooling water of the Filling machines was being drained out.
- Now Cooling water from the Filling machines is being collected to a tank with spraying arrangement and re circulated by 1 HP pump which was idling in our stock.

Savings

Qty of water wasted per day(120Lts* 6Nos*16Hrs)– 12000 Lts

Cost of water as per kva rate(Rs.10.60/Kl) - 125.00

Energy charges for Pump(.75Kw*16Hrs*4.20) - 50.00

Cost of Pumping to OHT and ETP charges - 95.00

Net saving per year - 62,050.00

In addition, depletion of natural resource and pollution prevented

Replacement of Pneumatic filling Machines

- Replaced above with Mechanical Machines – 4 Nos
- Compressed air consumption per hour - 50 CUM/Machine
- Savings by reduction in working Hours
of air compressor @ 44 kwh per day*4 -176 kWH /day
- Additional Elect load @ 0.75 kWH * 4* 14hr - 42 kwh / day
- Net saving per year (176- 42) - 48910 kWH
- **Amount Saving per year Rs, 2,05,422.00**

The loss due to high maintenance cost of air compressors and air leakages eliminated

Power factor improvement

M D before the installation of APFC -	440 kVA
M D after the installation of APFC -	370 kVA
Reduction in Demand	70 kVA
Savings Per year @ Rs. 350/=	Rs. 2.94 Lacs
Capital Investment for 300 kvar APFC	Rs. 4.00 Lacs

**We are getting Rs. 3500/- per month as incentive
for the improvement in Power factor**

Installation of solar water heating system – 10 KLPD

Before the installation of solar heating system

- Milk heated up to 90 Deg C from 20 Deg C by the hot water from the HW generator

Furnace oil consumption for 10 kL milk - 66Lts

After the installation of solar heating system

- An additional heat exchanger inserted in the plant and milk heated from 20 Deg C to 45 Deg C by the hot water from solar water heater.

Reduction in furnace oil consumption - 23 Lts

Amount Saving per year $(23 * 15 * 365)$ Rs.

1,25,925-

Installation of Heat exchanger in curd plant

- Conventionally for pre heating milk for curd preparation the milk at a temperature of 4 Deg C is heated up to the required temperature of 95 Deg C by hot water from HW generator.
- After Installation of Heat exchanger in curd plant raw water from atmospheric condenser is circulated through PHE and attained a temperature of 20 Deg C.

Furnace oil saving per day - 15 Lts

Charges for circulating pump @ 3.5kW * Rs.4.20 *365 - Rs. 5365/-

- **Net Amount saving per year Rs. 76760.00**

Running Time Reduction - ETP floating aerator.

Timer provided in ETP floating aerator.

Daily Saving: 2.2 kW x 12 hr

Annual saving

Rs.40,000.00

Replacement of Chilled water pump Motor with Energy efficient Motor

- **Replaced 2 No. 10 HP Motor with a single 15 HP pump with Energy efficient Motor**
- **Savings per day - Rs. 205.00**
(3.5 kW * 14 Hrs * Rs. 4.20)
- **Amount saving per year - Rs. 0.75 Lacs**
- **Investment made for Motor - Rs. 20.000.00**

Elimination of cooling tower of Curd Plant

- The 90 TR FRP cooling tower used for cooling of milk in the curd section discontinued.
- Instead of the cooling tower, the water from the existing atmospheric condenser of the refrigeration plant used for curd plant.
- Saving per day due to the non operation of FRP cooling tower fan - Rs. 50.40 per day
- $3 \text{ kW} * 4 \text{ Hrs} * \text{Rs. } 4.20$

Amount saving Per Year

Rs. 0.18 Lacs

Modification of Can washer

- The hot water circulation pumps used in the can washer eliminated
- Re circulation made by the existing Jetting pumps
- Total kW eliminated 5 kW
- Annual savings 0.45 Lacs

(5 kw x 6hrs x 365 x Rs.4.20)

Replacement of Light Fittings

- 2 Nos 250w MV lamps in the Ref Plant replaced by 4 Nos 36 W CFL fittings.
- 8 Nos.of 40w tube lights in the AD Block and Plant replaced by 11W CFL fittings.
- 2 Nos 250W SV Lamps replaced by 72W CFL Light fittings.
- Timer provided to the Display boards at city office (20 Nos*36w) to limit the lighting time (6PM to 11PM)

Annual saving

Rs.17,365.00

(The above modifications in illumination are done without compromising on sufficient light at work floor)

Replacement of Light Fittings

Continued..

- Replaced 8 Nos 250 w Mercury vapour lamps in the processing plant by 70 w Metal halide lamps

Annual saving : Rs.35320/-.

$$(0.180*8*16hrs*4.2*365)$$

The above modifications are done without compromise on sufficient light at work floor.

Investment – Rs. 24,000/=

Replacement of under loaded Blower motor (FD Fan) of Hot water Generator

Existing blower motor capacity	5.6 kw
Replaced motor capacity	2.2 kW
Average running hours per day	12 Hrs
Saving per day (12 x 3.4 kw)	41 kwh

Annual saving Rs.0.65 Lac.

Investment - Nil

**Installation of De Super Heater
in the Refrigeration Plant for
Cooling the hot gas out from
the compressor before going to
Atmospheric condenser**

The model Fitted is ADS 40 E SS
Technical details & Techno-economic calculations

DE super heater - Type

**Tube in tube
Desuperheater**

Gas in / out temperature °C

110 / 60 (+/- 5)

Estimated Water in / out temperature °C

28 / 65 (+/- 3)

Hot water generation.

24000 Ltrs per day

Hot water generation / day	Litre	24000.0
Incoming temp from OH Water tank	Deg C	28.0
Outgoing temp to Sec .Hot Water tank	Deg C	65.0
Temp gain	Deg C	37.0
Heat Gain (80% Eff)	k cal	7 Lac
NCV of FO (Efficiency of HWG also considered)	k cal / Ltr	6500.0
Net saving of FO	Ltr	107
Net saving / Day	22	2354
Net saving / Year		8 Lac

The following savings are also envisaged and pay back is only 12 months.

- 1. Reduced load on condenser results in consistence performance of air Conditioning system and reduced load at Cooling Tower throughout the year.**
- 2. Reduced water flow in condenser due to only condensing load. This reduces pump power consumption**
- 3. Reduced compressor running hours due to reduced load on compressor thereby extending life of compressor.**
- 4. Higher through put of system due to improved system performance results in lower compressor running hours thereby extending life of compressor.**

Replacement of Crate washer

- The 900 crates per hour crate washer replaced by 1200 crates per hour machine with a new design without changing Electrical load.
- Minimized the operational hours & minimized the ETP load.
- Saving in power as well as water consumption
- Saving in kWh (3hrs*11kw) /Day -10000 kwh/year
- Saving in water 5000 Lts / day
- Investment 9.0 Lacs



NEW CRATE WASHER – 1200 CRATES PER HOUR

31 8:59

Steps taken to minimise losses

- Timers provided for RMRD blowers
- Weak insulation of hot water lines replaced.
- Exclusive water meter provided for process water line.
- Curtains provided for cold store hatch doors.

Proposed Action Plans

- Installation of Frequency Drive for Hot water circulation Pumps

Expected Saving: 25000 kWh/year

- Increasing regeneration efficiency of Pasteuriser

Expected Saving: 6000 Lts F oil/Yr

- Replacement of Pneumatic sachet Filling machine with Mechanical machine - 2 nos

Saving : 30 HP x 6 hrs.

- Collecting the Cooling water from the Homogeniser and using the same for condenser sump top up.

Saving: 2000 Lts Water Per day

The following savings are also envisaged

- **Reduced load on condenser results in consistence performance of air Conditioning system and reduced load at Cooling Tower throughout the year.**
- **Higher through put of system due to improved system performance results in lower compressor running hours thereby extending life of the compressor**
- **Reduced water flow in condenser due to only condensing load. This reduces pump power consumption.**



31 9:19



Thank you