



PRESENTATION

on

Total Energy Management

by

DAKSHINA KANNADA CO.OPERATIVE
MILK PRODUCERS' UNION LIMITED
MANGALORE-5

For energy conservation award-2004



Sep. 2004

DKMU



QUANTITY HANDLED/ENERGY CONSUMPTION DURING JAN-DEC 2001

UNIT	QUANTITY HANDLED	ELE+DG UNITS	ELE+DG EXPENDITUR	F.O/HSD LITRES	FO/HSD EXPENDITURE
MANGALORE DAIRY	41762851	1978001	8431000	289325	3034143
MANIPAL DAIRY	9800460	544373	2330922	35230	575177
PUTTUR CC	-----	290383	1347785	0	0
	51563311	2812757	12109707	324555	3609320



QUANTITY HANDLED & ENERGY CONSUMPTION FROM JAN-DEC 2002

UNIT	QUANTITY HANDLED	ELE+ DG UNITS	ELE+DG EXPENDITUR	F.O/ HSD (In Ltrs)	FO/HSD EXPENDITURE
MANGALORE DAIRY	45311981	1970542	8360433	309400	3713826
MANIPAL DAIRY	9573259	5477101	2352051	29915	562835
PUTTUR CC	-----	281690	1365781	0	0
	54885256	2799962	12078265	339325	4276661



QUANTITY HANDLED/ENERGY CONSUMPTION DURING JAN-DEC 2003

UNIT	QUANTITY HANDLED	ELE+ DG UNITS	ELE+DG EXPENDITR	F.O/ HSD (in Ltrs)	FO/HSD EXPENDITURE
MANGALORE DAIRY	51485103	2161810	9973426	344105	4504788
MANIPAL DAIRY	9599000	595396	2748085	32860	722920
PUTTUR CC	-----	225568	1121559	0	0
	61084103	2982734	13843070	376965	5227708



ENERGY INTENSITY(UNIT WISE)



		MANGALORE DAIRY	
DESCRIPTION	JAN-DEC 2003	JAN-DEC 2002	JAN-DEC 2001
Total milk handled in the dairy plant	51485103	45311981	41762851
Ltrs of milk per KWH	25	24	21
Ltrs of milk per ltr fuel	188	176	171
		MANIPAL DAIRY	
DESCRIPTION	Jan-dec 2003	Jan-dec 2002	Jan-dec 2001
Total milk handled in the dairy plant	18200000	19735000	19255069
Ltrs of milk per KWH	31	36	36
Ltrs of milk per ltr fuel	554	526	556
		PUTTUR CHILLING CENTRE	
DESCRIPTION	Jan-dec 2003	Jan-dec 2002	Jan-dec 2001
Total milk handled in the dairy plant	10308102	13771937	13279419
Ltrs of milk per KWH	46	47	47
Ltrs of milk per ltr fuel	NA	NA	NA



QUANTITY HANDLED/ENERGY CONSUMPTION DURING JAN-JUN 2004

UNIT	QUANTITY HANDLED	ELE +DG UNITS	ELE+DG EXPENDTR	FO/ HSD (In ltrs)	FO/HSD EXPENDITURE
MANGALORE DAIRY	27950860	1118476	5446656	185160	2612192
MANIPAL DAIRY	5173000	390039	1872433	25930	622320
PUTTUR CC	-----	133272	620954	0	0
	33123860	1641787	7940043	211090	3234512



ANNEXURE A1

ACTION TAKEN UNDER ENERGY MANAGEMENT SYSTEM

- 1) Main capacitor bank strengthened. PF improved to avg. 0.94 from 0.86**
- 2) All the existing energy meters Main, Lighting, ETP serviced & put into operation.**
- 3) Energy meter are fixed to individual ammonia compressor motors. as well individual capacitor banks are installed at compressor motor load end thereby current drawal has reduced from 10 to 15%. Capicitors fixed at Homogenizer, air compressor load ends**
- 4) Daily recording of energy meters, PF, Maximum demand, Refrigeration hours /carresponding energy meter reading Hr/shift basis initiated. & being monitered daily.**



ANNEXURE A2

5) Water meters are installed at dairy end .daily consumption of water being recorded & monitored

6) Hot water from curd chiller (~70 C) is continuously used in boiler feed water overflow of boiler feed water is connected to condenser basein/sump

7) Water meter is installed from boiler feed tank to boiler side daily recording started. Which will help in monitoring efficiency in due course in association with studies of other parameters.

8) Air compressor head cooling improved by providing return line to condenser pond/sump.



ANEEXURE A3

9) Two nos of double head mechanical packing machines & double row efficient crate washer added

10) 2KL solar water heating system installed at Puttur cc for can cleaning.

11) Manipal dairy expansion work completed. energy meters are connected to all panels & sectionwise energy recording being done & monitored



ANNEXURE B1

INITIATIVE FOR ENERGY SAVINGS

1. PASTEURIZATION

Steam temperature being regulated manually earlier with which chances in variation in pasteurization temp. from 75-80 C. To monitor it properly, provision of FDV, repair of steam regulating valve, panel etc being done.

Due to Refrigeration problems & less procurement at Main dairy ,we used to separate the skim milk the day before & using for standardization with which around 30% of milk getting reprocessed. To avoid this on line separation being done during raw milk collection time itself



ANNEXURE B2

2. REFRIGERATION:

Efficiency of the plant has come down, considering theoretical load for the required processing parameters plant has to run maximum of 28-30hrs/day whereas normally used to run to an extent of 32-36 hrs daily loss of avg 425units/day.

Loss: $425 \times 365 \times 4.25 = \text{about } 6.6 \text{ lakhs/yr.}$

On calling consultants, after inspection parties have submitted the offers with a condition to run the plant as per the theoretical load for a month & to show performance.

Investment done: **Rs 7.5 lakhs** (scope included all the controls, instrumentation, IBT overhauling, receiver gauges, compressor overhauling, all cutouts, gauges, trial runs etc.

Payback period: 18 months (work carried out by M/S Assosiated Technical services already. saving being realized to the tune of 300-350 units per day.



3. BOILER

Operation with variable pressure is under study. except water, fuel consumption we don't have any instrument to measure the parameters.

we are finding abnormal variation in steam & flue gas temperature. the performance of the boiler depends on flue gas, excess oxygen, fuel quality, burning system. etc. before proceeding further consultant from S.V Engineers Chennai has been approached for detailed study & guidance.

SOME MODIFICATIONS OF NOZZLE CHANGE, REAR, FRONT SURFACE INSULATION, FEED WATER TEMP. (>60 C) WITH HEAT RECOVERY ETC. BEING CARROED OUT.



ANNEXURE B4

4. WATER SYSTEM

Pumping from kaikamba & padeel being arranged in general & night shifts. Though monitored some of the times we are finding overflow in overhead tank.& dry run of sump pump etc.to avoid this installed high/low level sensor probe at overhead tank & low lvl sensor at sump.alarm at overflow level.

Further providing direct water line for domestic purpose from dairy tank with meter for proper monitoring & to avoid overflow in domestic tank.With this we are saving 30000-40000 litres of water everyday .

Investment done is only **Rs.30000/-**.

Now the work completed.& the realization is Rs.500/- per day.



ENERGY SAVING POTENTIAL

PERIOD	QUANTITY HANDLED(KGS)	FUEL CONSUMPTION PER LITRE OF MILK	ELE+DG CONUMTION
JAN-DEC 01	51563311	0.0059	0.0545
JAN-DEC 02	54885256	0.0057	0.051
	SAVINGS	0.0002	0.0035
REALIZATION ELECTRICITY		54885256*.0035*4.25	RS.8.16 LACS
FUEL		54885256*.0002*13.00	RS 1.42 LACS
REALIZATION IF MAJOR PRODUCTS HOMOGENIZED MILK APPORTIONED ADDL.34883 UNITS(34883*4.25			Rs 1.48 lacs
REALIZATION OF ELECTRICITY BY STATISTICAL FORECAST METHOD			
54885256*.0036*4.25			<u>Rs.8.3 lakhs</u>
REALIZATION IN BOILER FUEL (BY REGRESSION METHOD)			
54885256*00001050*13			Rs.0.75 lakhs(-)
REALIZATION BY OTHER MEANS			
Puttur cc MD arrears			0.58 lakhs
ele.recovery from civil contractor at MANIPAL dairy			0.52 lakhs



LITRE OF MILK/LITRE OF FO AT MANGALORE
DAIRY FROM JAN-01---JUN 04

month	milk	curd	lassi	cream	butter	ghee	FO	FO/Produ	FO/Milk	LTR MILK	LTR FO
jan-dec 01	41762851	1194518	60000	1283000	563266	477832	289325	44796	244529		<u>171</u>
jan-dec 02	45311981	1893318	144000	1373740	617849	497924	309410	51544	257866		<u>176</u>
jan-dec 03	51485103	2574495	361129	1636253	770001	661112	344105	68892	275213		<u>188</u>
jan-04	4635698	264568	36167	154800	72847	62545	33885	6946	26939		172
feb	4411030	262499	32683	140850	66282	56909	29370	6482	22888		193
mar	4817591	314758	46907	151075	71094	61040	31480	7291	24189		199
apr	4778054	341722	55000	141400	66541	57131	30615	7260	23355		205
may	4826824	303911	33000	147750	69529	59697	31180	7004	24176		200
jun	4481663	233148	21235	146500	68941	59192	28360	6347	22013		204



LITRE OF MILK/KWH AT MANGALORE DAIRY FROM JAN 01 ---JUN 04

					<i>LTR MILK/</i>
					<i>UNIT KWH</i>
month	Homo.milk	Total units	Units/Homg.	UNIT/MILK	
jan-dec 01	2955271	1978001	29550	1948451	<u>21</u>
jan-dec 02	6443507	1970562	64435	1906127	<u>24</u>
jan-dec 03	11487929	2161810	114879	2046931	<u>25</u>
jan-04	1228667	181999	12287	169712	<u>27</u>
feb	1204876	172025	12049	159976	<u>28</u>
mar	1346057	197056	13461	183595	<u>26</u>
apr	1358479	194023	13585	180438	<u>26</u>
may	1438859	192125	14389	177736	<u>27</u>
jun	1292687	181248	12927	168321	<u>27</u>



IMPACT OF ENERGY CONSERVATION INITIATIVE IN DK MILK UNION

(Reference to base year 2000-01)

ANNEXURE-I



SLNO	DESCRIPTION	YEAR (APRIL TO MARCH)			
		2000-01	2001-02	2002-03	2003-04
A	Quantity of milk processed (million litre)	41.46	45.63	48.31	56.7
B	Total electricity purchased (million KWh)	2.373	2.684	2.59	2.926
C	Total furnace oil(kilo litre)	219.7	240.1	261.4	287
D	Total diesel consumption(KL)	69.36	70.76	89.42	92.91
E	Specific energy consumption kwh/litre of milk(B/A)	0.05724	0.05882	0.05361	0.05160
F	Specific energy consumption ltr of FO/litre of milkC/1000A)	0.00530	0.00526	0.00541	0.00506
G	Specific energy consumption ltr of diesel/litre of milk(D/1000A)	0.00167	0.00155	0.00185	0.00164
H	Av.electricity price(Rs/kwh)	4.15	4.35	4.35	4.6
I	Av.FO price(Rs./litre)	11.5	10.5	12.75	13
J	Av.diesel price(Rs/litre)	18.7	18.9	21.5	21.5
K	Ele.cost savings(Rs.10 lacs)	reference	-0.3146	0.7615	1.4687
L	FO cost saving(Rs 10 lacs)	reference	0.0178	-0.0689	0.1750
M	Diesel cost saving(Rs 10 lacs)	reference	0.1054	-0.1849	0.0418
N	Total cost savings(Rs 10 lacs)		-0.1914	0.5078	1.6854
O	Total energy(Ele+FO+Diesel)(Rs.10 lacs)	13.67	15.53	16.52	19.19
P	% Energy cost savings		-1.23	3.07	8.78
Q	Total water con.(million litre)	120.4	131.25	134.6	142.3
R	Specific water consumption(Q/A)	2.90	2.88	2.79	2.51
S	Total water savings(million litre)	reference	1.14	5.38	22.36
T	Average water price)(Rs/litre)	0.01	0.01	0.01	0.015
U	Total water cost saving(Rs 10 Lac)		0.0114	0.0538	0.3354
V	Water saving percentage		0.87	3.99	15.71



IMPACT OF ENERGY CONSERVATION INITIATIVE IN DK MILK UNION

(Reference to preceding year)

ANNEXURE II



SLNO	DESCRIPTION	YEAR (APRIL TO MARCH)			
		2000-01	2001-02	2002-03	2003-04
A	Quantity of milk processed (million litre)	41.46	45.63	48.31	56.7
B	Total electricity purchased (million KWh)	2.373	2.684	2.59	2.926
C	Total furnace oil(kilo litre)	219.7	240.1	261.4	287
D	Total diesel consumption(KL)	69.36	70.76	89.42	92.91
E	Specific energy consumption kwh/litre of milk(B/A)	0.05724	0.05882	0.05361	0.05160
F	Specific energy consumption ltr of FO/litre of milkC/1000A)	0.00530	0.00526	0.00541	0.00506
G	Specific energy consumption ltr of diesel/litre of milk(D/1000A)	0.00167	0.00155	0.00185	0.00164
H	Av.electricity price(Rs/kwh)	4.15	4.35	4.35	4.6
I	Av.FO price(Rs./litre)	11.5	10.5	12.75	13
J	Av.diesel price(Rs/litre)	18.7	18.9	21.5	21.5
K	Ele.cost savings(Rs. 10 lacs)	reference	-0.3146	1.0946	0.5235
L	FO cost saving(Rs 10 lacs)	reference	0.0178	-0.0918	0.2574
M	Diesel cost saving(Rs 10 lacs)	reference	0.1054	-0.3118	0.2589
N	Total cost savings(Rs 10 lacs)		-0.1914	0.6910	1.0397
O	Total energy(Ele+FO+Diesel)(Rs.	13.67	15.53	16.52	19.19
P	% Energy cost savings		-1.23	4.18	5.42
Q	Total water con.(million litre)	120.4	131.25	134.6	142.3
R	Specific water consumption(Q/A)	2.90	2.88	2.79	2.51
S	Total water savings(million litre)	reference	1.26	4.36	15.68
T	Average water price)(Rs/litre)	0.01	0.01	0.01	0.015
U	Total water cost saving(Rs 10 Lac)		0.013	0.044	0.235
V	Water saving percentage		0.96	3.24	11.02



Audited statement till oct 2003 submitted to NDDDB

Impact of Energy Conservation Initiative in D.K. Milk Union.

During the year 2000/01, 2001/02, 2002/03 and 2003-04 (upto October 2003) the D.K. Milk Union spent an amount of Rs.130.7 lakhs, Rs.155.3 lakhs, Rs. 165.2 lakhs, Rs.107.7 lakhs respectively on account of total energy purchase. Because of the Total Energy Management (TEM) programme of the Union the energy cost savings for the year 2001/02, 2002/03 and 2003-04 (upto Oct 03) were Rs. -1.9 lakhs, Rs. + 5.08 lakhs, Rs. + 6.6 lakhs respectively. As a proportion of the total energy cost, the savings were -1.23%, 3.07%, 6.12% for the year 2001/02 and 2002/03 and 2003-04 respectively.

During the years 2001-02, 2002-03 and 2003-04 because of the TEM initiative, the Union also saved water worth Rs.0.114 lakh, Rs.0.54 lakh and Rs.0.37 lakh respectively. As a proportion of the total water cost, the savings were 0.87%, 3.99% and 2.76% for the year 2001-02, 2002-03 and 2003-04 respectively. (Applicable where water is purchased like Bamul, Komul, Mother Dairy Bangalore etc.,)

Signature

Date:

B. Menon
Diary Manager. *B.M.*

Signature.

Date:

B.S. 15/12
Managing Director.

Signature.

Date:

B.S. 15/12
Internal Auditor.



F.O/ELECTRICITY CONSUMPTION AT MANGALORE DAIRY SINCE 98-99 *Over-view*

YEAR	FO (in Litres)	AMOUNT (in Rs.)	ELEC+DG (Kwh)	AMOUNT (in Rs.)	QTY OF MILK
1998-99	225100	1500456.00	1529694	6013136.00	29712518
1999-2k	218550	3034748.00	1437422	6209267.00	32765961
2000-2k1	258425	2958892.00	1749719	7256850.00	37834225
2k1-2k2	287525	3013872.00	2007802	8700704.00	42753335
2K2-2K3	316825	4030610.00	1984456	8594321.00	46217926
2K3-2K4	360450	4831973.00	2199578	10362799.00	53351615
MAJOR PRODUCTS					
Year	GHEE		CURD	HOMOGENISED MILK	
1998-99	314	Tons	135000		
1999-2k	366	Tons	603000	660900	
2000-2k1	421	Tons	951000	2546500	
2k1-2k2	493	Tons	1391000	4030300	
2K2-2K3	537	Tons	2043994	7390700	
2K3-2K4	691	Tons	2828986	12952000	



MANAGEMENT

(ANNEXURE C)

- 1) Conversion of 1 no. boiler to agrobased (M/s SIVI Consultancy)
- 2) Refrigeration system revamping, screw compressors, (Basic audit by M/s System & components in co-op with NDDDB)
- 3) Using well in adjacent land with necessary pumping system as well using all terrace rain water in monsoon (alternative utilization of existing water system)
- 4) replacement of old pumps with energy efficient ones (Survey by Grandfoss in co-op with NDDDB)
- 5) Survey of all domestic/internal electrification & other gadgets & replacing with latest energy efficient appliances. (M/s Enercon)
- 6) Modification of steam lines, fittings, adopting controls/instrumentation.
(M/s Forbes Marshall Co.s has been approached)
- 7) Planned to install new 20klph pasteurizer & mechanical packing machines (for which energy saving criteria considered)



COMPARISION OF PASTEURIZERS

CAPACITY	10KLPH	20KLPH	20KLPH
Past.temp	75	75	75
Milk inlet temp	6	6	6
Regeneration efficiency(%)	90	90	93
Heating gradient	7	7	4.8
Heat required	70000	140000	96600
Steam required(Kgs)	130	260	180
Milk temp at chilling section	13	13	10.8
Refn.load reqd.(TR)	30	60	45



COMPARISION FOR PNEUMATIC/MECHANICAL PACKING M/C(5 LTR CAPACITY)					
DETAILS	PNEUMATIC	MECHANICAL			
OUTPUT	350Pkts/Hr	600Pkts/Hr			
Air compressor energy	6 KWH	Nil			
M/c Energy	2 KWH	2 KWH			
Packing Quantity	1800PKTS(9000 Ltrs)				
Running Hours	5	3			
Energy(KWH)	40	6			
SAVINGS	34 UNITS/DAY	ANNUALY Rs.56000/-			



BOILER CONVERSION TO **AGROBASED FUEL**

We are having one no boiler as standby, it is proposed to convert one of the boilers to agro based, bio fuel type with conversion of furnace, blower etc.(non touching the IBR part)which may cost around **Rs.5-6 lakhs.**

Recurring expenditure:

**Biomass briquette(from agro raw materials)required
0.2kg per Kg. of steam**

**Our requirement of steam around 12000 kgs
(FO REQUIREMENT: 1000-1100 LTRS/DAY)
i.e approx. Rs.15000/- per day**



Total briquette required per day around 3Ton per day (Considering wastage of around 25%)
Approximate cost is around Rs.3000 per ton including transportation from B'lore.

COST OF THE FUEL Rs. 9000/- per day

Labour Rs. 500/- per day

Daily expenditure Rs 9500/- PER DAY

If we shift the operations from FO based fuel to Bio fuel the savings per month will be around Rs.1.5 lakhs .

If we consider 8 months operation (excluding rainy season, breakdowns, statutory inspection etc)in a year, the savings will be around Rs.12 lakhs per year



WATER SUPPLY

Presently we are having two pumping stations which are situated at 3kms(Kaikamba) & 6kms(Padeel) from main dairy. The approximate water bill for month comes around Rs.1.5 lakhs. With an average pumping of 3.5 lakh liters per day. Whereas the actual consumption is less. Unaccountable losses are here & there may be due to illegal tapings or unidentified leaks or crossings in between corporation public supply lines, which are difficult to trace. Further operating cost is Rs.12000/- month with an electricity bill of Rs.35000/- per month. **Total expenditure per year works out to be around Rs. 24 lakhs per year.**



PROPOSED SUGGESTIONS;

I) Mangalore is known for heavy rainfall for 4-5 months. There is a lot of scope for rainwater harvesting

a) Creating an additional storage capacity of around 10 lakh litres

b) Diverting all the terrace water terminations of all the buildings via carbon/sand filters to the sump.

c) In the nearby adjacent land there is a well with good water table. It is recommended to install submersible pump with accessories & pump water from well to sump keeping starter at sump point with controls.

With which we can able to suffice our water requirement for 4 –5 months (preferably in rainy season).

With above provisions. (**SCOPE TO SAVE TO THE TUNE OF 6-7 LAKHS, INVESTMENT REQUIRED IS AROUND 18 LAKHS**)



REPLACEMENT OF PUMPS



Most of the pumps installed during 1991 at Mangalore dairy are working satisfactorily. However the technologies are changing day by day as a result most effective energy efficient pumps of different make are available in the market.

To begin with we have conducted a survey of most used pumps at our Mangalore dairy unit with the help of M/s Grundfoss (one of the named manufacturer for energy efficient pumps) along with NDDDB's representative.



The abstract of the study is as detailed

Sl no	Place of use	Existing pump cons/hr	Proposed replacement Pump consumption/hr	Replacement Cost (Rs.)	Savings per Year(in Rs.)
1	Sump	6.2	3.63	70,492	66,976
2	Chilled water	4.3	3.8	70,492	30,660
3	Boiler	3.6	2.2	56,724	25,574
4	Hot water	1.4	0.9	20,778	12,264
5	Kaikamb	9.7	8.4	56,724	27,900
6	Padeel	8.5	7.9	56,724	12,877

Rs.402426/-

Rs.206911/-

Approximate payback period will be 2 years



IMPROVEMENT IN REFRIGERATION SYSTEM

M/S System & Components have studied the plant & the abstract of Cost benefit analysis for

Compressor /condenser replacement

IKW/TR for existing condensing unit 1.71

IKW/TR for new condensing unit 1.12

Saving IKW/TR 0.59

Saving in power consumption 65.49(0.59x111TR)

No.of operation/Day 17.50

No.of days of operation/annum 360.00

Annual energy saving 412587.00 KWH

Annual saving envisaged 19 LAKHS

INVESTMENT PROPOSED 50 LAKHS



ANNEXURE X

ENERGY POLICY

WE HAVE DETERMINED TO SAVE ENERGY TAKING CARE OF QUALITY OF PRODUCTS EXPLORING ALL THE POSSIBLE MEANS OF METHODS, KNOWLEDGE, MANPOWER, TECHNOLOGY & TO BECOME PERMANANT MEMBERS OF ENERGY CONSERVATION TEAM



PREAMBLE:

ENERGY MANAGEMENT SYSTEM WAS COMMENCED IN THE YEAR 2002. THOUGH THE HANDLING WAS INCREASING YEAR BY YEAR IN OUR UNITS, ALLMOST ALL THE MAJOR OPERATIONS/ACTIVITIES ARE STREAMLINED/SYNCRONIZED TO COMPLETE IN GENERAL SHIFT SO AS TO CUT ENERGY COSTS SINCE 1999.

WE HAVE CELEBRATED ENERGY CONSERVATION DAY BY INVITING MESCOM CHAIRMAN (REGIONAL ELE.BOARD)SHRI GOURAV GUPTA , IAS OFFICER.

FURTHER ALMOST ALL QUALITY SYSTEM IMPLEMENTATION PROCESS IS ON & SUPPORT TO THIS,FACE LIFT,ENERGY CONSERVATION & WATER HARVESTING WORK PROCESS INITIATED.

ENERGY CONSERVATION

A) INITIATION & ACTION

- 1) Main capacitor bank strengthened. PF improved to avg.0.94 from 0.86
- 2) All the existing energy meters Main, Lighting, ETP serviced & put into operation.
- 3) Energy meter are fixed to individual ammonia compressor motors. as well individual capacitor banks are installed at compressor motor load end thereby current drawal has reduced from 10 to 15%.
- 4) Daily recording of energy meters, PF, Maximum demand, Refrigeration hours /corresponding energy meter reading Hr/shift basis initiated. & being monitored daily.
- 5) Water meters are installed at dairy end. daily consumption of water being recorded & monitored
- 6) Water meter fixed to boiler feed water line.
- 7) Hot water from curd chiller (~70 C) is continuously used in boiler feed water overflow of boiler feed water is connected to condenser basin.
- 8)Water meter is installed from boiler feed tank to boiler side daily recording started. Which will help in monitoring efficiency in due course in association with studies of other parameters.
- 9)Boiler pressure adjustment (variable)trial runs are on to study the system. meanwhile action initiated as per consultants(M/S SIVI CONSULTANCY CHENNAI)suggestions.10)Air compressor head cooling improved by providing return line to condenser pond/sump.
- 11) From the existing solar water heating system ,2nos of hotwater points provided in labs,1 no in HMST tank room,
- 12) Awareness has been drawn for minimal uses of energy at domestic lines, fans, lights etc.& to avoid leakages, wastage of energy.(approximately 100units/saving per day in domestic lighting & canteen)
- 13) In Puttur cc maximum demand has been reduced to 100KVA from 160KVA.
- 14) 2KL solar water heating system installed at Puttur CC for can cleaning.
- 15) Manipal dairy expansion work completed. chilled water pump/agitator operations streamlined. Energy meters are fixed for individual panels.

B) IMPROVEMENTS CARRIED OUT ON ENERGY FRONT (SECTIONWISE)

1) PROCESSING:

A) At present separation being done earlier & the standardization follows. thought being given to online processing As the process need continuous use of separator or new 20KLPH pasteurizer.

M/c received. 10klph separator (if not also standby unit is required as the process is continuous. It is planned to shift the standby units of 5klph lying in mangalore dairy to new manipal dairy. further indent is given for 20KLPH pasteurizer. But as a trial run, in the afternoon reception milk being directly separated with which 2 hrs of plant operations reduced.

B) Steam temperature being regulated manually with which chances in variation in pasteurization temp. from 75-80 C. to monitor it properly provision of FDV, repair of steam regulating valve, panel etc is installed.

2) REFRIGERATION:

Efficiency of the plant has come down, considering theoretical load for the required processing parameters plant has to run maximum of 28-30hrs/day whereas at present plant runs to an extent of 35-36 hrs daily loss of avg 425 units/day.

Loss: $425 \times 365 \times 4.25 = \text{about } 6.6 \text{ lakhs/yr.}$

On calling consultants, after inspection parties have submitted the offers with a condition to run the plant as per the theoretical load for a month & to show performance.

Investment done around 8 lakhs (scope includes all the controls, instrumentation, IBT overhauling, receiver gauges, compressor overhauling, all cutouts, gauges, trial runs etc. now the savings being realized

3) BOILER

Operation with variable pressure is under study. except water, fuel consumption we don't have any instrument to measure the parameters. we are finding abnormal variation in steam & flue gas temperature. the performance of the boiler depends on flue gas, excess oxygen, fuel quality, burning system. etc. before proceeding further consultant from S.V Engineers Chennai has been approached for detailed study & guidance.

4) AIR COMPRESSOR

Effective head cooling work completed. high/low level monitoring sensor probes installed for auto run of pump as well to stop wastage of water. Later tank capacity was increased & return line from the tank is diverted to UG sump & condenser pond. with which we are able to save 25 units of electricity .

5) WATER SYSTEM

Pumping from kaikamba & padeel being arranged in general & night shifts. Though monitored some of the times we are finding overflow in overhead tank. & dry run of sump pump etc. to avoid this it is preferred to install high level sensor probe at overhead tank & low level sensor at sump.

Further providing direct water line for domestic purpose from dairy tank with meter for proper monitoring & to avoid overflow in domestic tank. With this at least we can save 10000 litres of water

ENERGY SAVING PROPOSAL AT MANGALORE DAIRY

1)BOILER SECTION:

1)We are having 2 nos of boilers, out of which one no. is standby.

Technical details:

Capacity: 2 Ton /Hr.

Working pressure: 10.5kg/sq.cm

Fuel used: Furnace oil

Average water consumption:12 KL

Average fuel consumption: 1000-1100 liters per day

Average unit cost of fuel: Rs.14/-

Average cost per Kg. Of steam works out around Rs.1.20

With which total FO cost at Mangalore dairy alone works out around Rs.50 lakhs per Year, moreover the boilers being old given 13 years of service & the efficiency is reducing day by day. It is high time to think about energy saving measures & to improve system with cost saver, Eco friendly (free from noxious gases) renewable energy source

As we are having one no boiler as standby, it is proposed to convert one of the boilers to agro based, bio fuel type with conversion of furnace, blower etc.(non touching the IBR part)which may cost around Rs.5 lakhs.

Recurring expenditure:

Biomass briquette(from agro raw materials)required 0.2kg per Kg. of steam

Our requirement of steam around 12000kgs

Briquettes required per day 2400 kgs

Handling losses 25% 600 kgs

Total briquette required per day around 3Ton per day

Approximate cost is around Rs.3000 per ton including transportation from B'lore.

COST OF THE FUEL Rs. 9000/- per day

Additional labour 500/- per day

Daily expenditure Rs 9500/- PER DAY

If we shift the operations from FO based fuel to Bio fuel the savings per month will be around Rs.1.5 lakhs .If we consider 8 months operation (excluding rainy season, breakdowns, statutory inspection etc)in a year the savings will be around Rs.12 lakhs per year.

2)WATER SUPPLY:

Presently we are having two pumping stations which are situated at 3kms(Kaikamba) & 6kms(Padeel) from main dairy. The approximate water bill for month comes around

Rs.1.5 lakhs. With an average pumping of 3.5 lakh liters per day. Whereas the actual consumption is less. Unaccountable losses are here & there may be due to illegal tapings or unidentified leaks or crossings in between corporation public supply lines, which are difficult to trace. Further operating cost is Rs.12000/- month with an electricity bill of Rs.35000/- per month. **Total expenditure per year works out to be around Rs.24 lakhs per year.**

PROPOSED SUGGESTIONS;

I) Mangalore is known for heavy rainfall for 4-5 months. There is a lot of scope for rainwater harvesting

a) Creating an additional storage capacity of around 10 lakh litres

b) Diverting all the terrace water terminations of all the buildings via carbon/sand filters to the sump.

c)In the nearby adjacent land there is a well with good water table. It is recommended to install submersible pump with accessories & pump water from well to sump keeping starter at sump point with controls.

With which we can able to suffice our water requirement for 4 –5 months (preferably in rainy season) with above provisions.**(WHICH ITSELF CAN GIVE THE SAVING TO THE TUNE OF 8-9 LAKHS,INVESTMENT REQUIRED MAY BE AROUND 18 LAKHS)**

Further to this proposal, Recommendations for usage of existing pump houses

OPTION I :

Both the pump houses owned by us, which were created using infrastructure fund. To avoid pilferage, illegal tapings, leakages, operations etc. It is preferred to handover both the pump houses to corporation with pakka legal agreement under the condition to cater our requirement of water to the tune of 3-4 lakh liters per day, providing water meter at our premises. As we are handing over a big asset(around 30 lakhs) of public utility for social benefits the existing rate can be negotiated with the corporation.

OPTION II:

The existing pump houses can be created as parlours with necessary alterations & agent/contractor can be entrusted with the operations of pump houses as per our assigned schedule during his operational hours as per mutually agreed terms.

REFRIGERATION:

At present 1st & 2nd shift operations in order to give load to all IBTS, Cold stores, Product stores we have to run 2 nos of compressors having 120 HP motors each. The efficiency of the compressors reduced with which we are not in a position to get rated output. IBT coils were blocked, Short gap arrangement of cleaning has been done.30% of the coil volume is blocked with paste like mass with which good refrigeration effect is not there in IBTs. It is required to replace IBT coils of all the compartments one by one with individual coil purging system.

Present electrical consumption is around 3500 units/day

If we revamp the system with replacement of compressors, IBT coils Cold store ACUs at least 20% of the energy can be saved .Moreover efficiency will be improved for better quality which is essential for Today's market & for long run as the handling is increasing day by day. Total saving per year will be around 19 lakhs.

The detailed provision for all these expansions & automation of the Refrigeration plant has been considered in mid course prospective plan. (Approximate investment is around 50 lakhs)

PUMPS:

Most of the pumps installed during 1991 at Mangalore dairy are working satisfactorily. However the technologies are changing day by day as a result most effective energy efficient pumps of different make are available in the market. To begin with we have conducted a survey of most used pumps at our Mangalore dairy unit with the help of M/s Grundfoss (one of the named manufacturer for energy efficient pumps) along with NDDDB's representative.

The abstract of the study is as detailed:

Sl no	Place of use	Existing pump cons/hr	Proposed replacement Pump consumption/hr	Replacement Cost (Rs.)	Savings per Year(in Rs.)
1	Sump	6.2	3.63	70,492	66,976
2	Chilled water	4.3	3.8	70,492	30,660
3	Boiler feed	3.6	2.2	70,492	30,660
4	Hot water	1.4	0.9	56,724	25,574
5	Kaikamba	9.7	8.4	20,778	12,264
6	Padeel	8.5	7.9	56,724	27,900
				56,724	12,877

Rs.402426/-

Rs.206911/-

Approximate payback period will be 2 years.

ENERGY POLICY

***WE HAVE DETERMINED TO SAVE ENERGY
TAKING CARE OF QUALITY OF PRODUCTS
EXPLORING ALL THE POSSIBLE MEANS
OF METHODS, KNOWLEDGE, MANPOWER,
TECHNOLOGY & TO BECOME
PERMANANT MEMBERS OF ENERGY
CONSERVATION TEAM***