

REPORT

Two – day residential advanced training program on Energy Efficiency in Dairy Sector

Against the request of MILMA, EMC has organized a two day residential advanced training program on Energy Efficiency on 11th and 12th March 2010 at Riviera Suites, Ernakulam. The program has been conducted as per the schedule attached.

Participants' profile

MILMA		MILMA representation	
➤ Dairy	24	Federation Managing Director	1
➤ Cattle feed	5	Regional Managing Directors	2
Resource persons		General Manager	1
➤ Equipment manufacturers	5	Senior Manager	2
➤ Consultant	1	Assistant Manager	6
➤ Academicians	2	Manager	8
EMC Personnel	5	Deputy Engineer	8
		Technical Superintendent (Eng)	1

The following officers of EMC attended and organized the above program

- A.M. Narayanan, Head, Energy Efficiency Division (EED)
- R. Harikumar, Energy Technologist – E1, EED
- Johnson Daniel, Energy Technologist – B, EED
- B.V. Subash Babu, Energy Technologist – B, EED
- M.R. Arun, Junior System Analyst

Mr. A.M. Narayanan gave an overview of the program covering:

- structured approach for implementing Energy Management program in Dairy industry
- advanced technology options which can be explored for Energy Efficiency &
- features of Energy Conservation Act 2001

Presentations by participating units - Comments

- 10 numbers of presentations from MILMA dairy units and 2 numbers of presentations from MILMA cattle feed units
- Efforts taken by MILMA units in implementing certain energy conservation projects, as an additional responsibility (apart from their routine jobs like production supervision, maintenance etc.) is commendable.
- However due to lack of a structured approach and lack of proper energy auditing methodology it is felt that a major share of energy savings projected as achieved would not have really reflected in their Balance Sheet.
- Also as performance evaluation of individual utilities (refrigeration plant, pumping system, air compressors, motors, fans etc.) are not evaluated for their individual/system efficiencies/effectiveness, a good amount of energy savings is still left unattended/explored.

- It is observed that there is scope for scientific analysis on the optimum pasteurization temperature, leading to better product quality/productivity.
- Utility wise (or section wise) energy metering is not being done in majority of units. Once this is employed there is scope for better bench marking.

Case Study (Dr. R. Sethumadhavan, Professor, Institute for Energy Studies, Anna University)

- Majority of motors due to over sizing, could be in under loaded condition presently. This obviously lowers the power factor and also efficiency. The logic of costly APFC for a wide band pf correction needs to be evaluated rationally.
- Decision related to replacement with energy efficient motors and/or installing VFDs has to be taken after a proper and detailed study on the load pattern as well as the prime movers (fans, pumps, blowers etc.) as costly energy efficient motors are not more efficient above 3 % from the conventional motors and costly VFDs are wiser solutions only for varying loads.

Refrigeration (Mr. P Sudhir Kumar, Frick India Limited)

- Highlighted the advantages of screw compressors in terms of its higher energy efficiency, lesser maintenance, better life etc. vis-à-vis reciprocating compressors (installed in all dairy units in Kerala) for larger capacities above 80 TR – 100 TR

Note: - Part load efficiency of screw compressors are claimed to be better. As they are not discussed in the presentation slides, the part load efficiency details has been asked for and would be circulated once received.

- Introduced the concept of Evaporative Condensers

Pumping System (Mr. R Shankar, Grundfos Pumps Limited)

- Highlighted the aspect of over sizing and therefore under loading + improper selection of pumps (matching the Q and H with the characteristics and system curves) taking examples of their detailed studies in dairy units outside Kerala.
- Scope exists for energy savings to the tune of 20% – 30% in pumping systems in Dairy sector.
- Explained about the innovation made for energy savings in IBT by introducing 1.5 kW fluid mixer in lieu of 7.5 kW agitator

Steam (Mr. J.J. Thomas, Forbes Marshall)

- In view of varying steam loads, the idea of changing over from oil fired boilers to solid fuel firing needs to be done after a detailed study as there is good chance for wet steam drawal during peak demand time, leading to high milk to steam ratio.
- Condensate being pure and very hot, practice of using the same for crate washing or so may be stopped immediately and taken to a properly designed feed water tank (mostly oversized leading to drop in feed water temperature) for energy conservation and reducing water treatment costs.

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- The phenomenon of stalling in PHEs (where the inlet steam valve is throttled to reduce the inlet temperature below 100 degree Celsius leading to a vacuum condition thus prohibiting the smooth outflow of condensate) has been explained with video shots in test rigs and effective solution has been illustrated.
- The glaring gaps in Milk to Fuel Ratios of the various plants to be identified. Two factors which contribute to this is Steam Generation (Steam to fuel ratio) and Steam distribution/utilization (Milk to steam ratio). As a primary step it is recommended to install Vortex Steam Flow metering stations in each plant main steam line- to authentically measure, bench mark/establish norms, monitor, maintain and manage the steam system.
- Energy Audits of the Steam & Condensate System to be undertaken on priority in at least one plant from each union.

Energy efficient motors (Mr. R Tamil Selvan, Baldor)

- Company treated as No. 1 in US, is new to India with a premium range of motors.
- For specific application in cooling towers (or similar), they have a special motor with variable speed drive which can do away with the long shaft, gearbox and the constant speed induction motor system presently being employed, leading to energy efficiency.

Vapour Absorption Refrigeration (Mr. Rejith Retnakaran, Thermax)

- Technology though old can find applications in dairy units in Kerala (which has not so far tried VAR) with IBT and also without IBT mode.
- This could be economical where waste heat or low cost heat is available.

Suggestions on way forward

- Detailed professional Energy Audit needs to be done at least in one dairy unit utilizing a pool of external expertise to clearly arrive at
 1. Utility wise Energy Consumption pattern
 2. Performance evaluation of utilities
 3. Demand (kVA) profile
 4. Cost benefits of energy conservation options.

- Such interactions need to be made periodic, including topics not discussed in the meetings like ETP, transformers, air compressors, cables etc.

- *Energy Management Centre – Kerala would be glad to facilitate a detailed study as well as implement innovative projects and disseminate them, in close association with reputed service providers (equipment manufacturers, consultants and academicians) and in cooperation with MILMA personnel.*

- *When a synthesized report on “Energy Efficiency Status and potential of Dairy Industries in Kerala” is made available by our resource person from the academics, Dr. R. Rajendra Kumar, the same will be appended.*

- *Feedback was encouraging (please refer the feedback analysis)*

Enclosures:

1. Program Schedule (1 page)
2. Feedback analysis (1 page)

**TWO – DAY RESIDENTIAL ADVANCED TRAINING PROGRAM
ENERGY EFFICIENCY IN DAIRY SECTOR**

11 – 12 March 2010

Ernakulam. Kerala

Thursday, 11 March 2010	
10.30 – 11.00	Registration and Tea
11.00 – 11.30	Inauguration <ul style="list-style-type: none"> ➤ Welcome & Presidential Address - Sri. A.M. Narayanan, Head - EED, EMC ➤ Inaugural Address - Sri. Sanjeeb Patjoshi, IPS, MD, KCMMF ➤ Felicitations - Sri. Baby Joseph , MD, TRCMPU Sri. Jose Abraham, MD, ERCMPU Sri. K.T.Thomas, GM, MRCMPU ➤ Vote of Thanks - Sri. Jimmy Abraham, Senior manager -Projects MILMA
Presentation by Participating Units on their already implemented Energy Conservation measures & Energy Management Programs and response from Expert Panelists. Presentation by one team – 15 minutes; followed by interaction by panelists – 10 minutes (expected number of teams – 10)	
11.30 – 12.00	Program Overview – Sri. A.M. Narayanan, Head EED, EMC
12.00 – 13.00	Presentation Session 1
13.00 – 14.00	Lunch
14.00 – 15.00	Presentation Session 2
15.00 – 15.30	Tea
15.30 – 17.15	Presentation Session 3
17.15 – 17.45	Tea
17.45 – 19.00	Case Study - Dr. R. Sethumadhavan, Professor, Institute for Energy Studies, Anna University, Chennai
Friday, 12 March 2010	
Presentation on Energy Efficiency improvement options in Dairy Units, further to what has been already done (45 minutes presentation & 15 minutes discussion)	
09.00 – 10.15	Refrigeration – Sri. P Sudhir Kumar, GM – Marketing & Sri. P P Krishna Moorthy, FRICK India Limited, Mumbai
10.15 - 10.45	Tea
10.45 - 12.00	Motors & Pumping System – M/s Sri. R. Shankar & Sri. C.R. Unni, Grundfos Pumps India Limited
12.00 – 13.15	Steam utilization – Sri. J.J Thomas, Forbes Marshall
13.15 – 14.00	Lunch
14.00 – 14.30	Energy efficient Motors – Sri. R Tamilselvan, Baldor Electric, Coimbatore
14.30 – 15.00	Vapour Absorption Refrigeration – Sri. Rejith Retnakaran, Thermax, Bangalore
15.00 – 15.30	Discussions
15.30 – 15.45	Tea
15.45 – 16.00	Valedictory Session

FEEDBACK ANALYSIS

Maximum Ratings out of 5

1.	Was the course content relevant for your work?	4.29
2.	Was the subject covered adequately?	3.33
3.	Was the interactive session helpful in discussing key issues?	3.83
4.	Your expectation and satisfaction about the presentation?	3.91
5.	Duration of the program	3.25

Ratings for specific lectures

1.	Refrigeration	4.08
2.	Motors & Pumping System	3.21
3.	Steam utilization	4.04
4.	Case Study	3.51

Suggestions on making the training program more effective and relevant:-

- To include subjects like
 - ✓ Packing Section
 - ✓ Case studies on practical implications
 - ✓ Cattle feed plant material handling, gearbox etc.
 - ✓ Usage of non conventional energy sources
 - ✓ Bench marking
- Expert panel may include equipment manufacturers of other companies for comparison
- Interaction time to be increased
- Advanced technologies used in Dairy sector to be discussed
- Standard format for presentation by participants to be introduced