










1	ID: 35	Title of measure	Sector: Dairy
2	Survey Year: 2007	Replacement of higher capacity blower motors with lower capacity blower motors in the evaporative condensers	Technology: Blowers
3	Name of the Company	: Mandya Dairy, Maddur Taluk, Mandya District Karnataka, INDIA	
4	Agency that executed the project	: In-house	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: Mandya Dairy, A unit of Mandya District Co-Operative Milk producers' societies milk unions limited was commissioned in 1983. The dairy manufactures 1346 tons of skimmed milk powder and 1440 tons of butter, 1300 tons of ghee, 3963 tons of curd, and other products like butter milk, peda etc. The dairy markets milk under the trade name NANDINI.</p>		
7	<p>Description of Energy Conservation Measure:- The dairy has 5 evaporative condensers with blower motors each put to operation with the help of one 12.5 HP motors. At any given point of time 4 condensers used to be in operation. The study of the in-house team revealed that these motors were under loaded. Hence these 12.5 HP blower motors were replaced with 7.5 HP motors and the performance was closely observed for decrease in the efficiency and the level of load on the motors. The performance was as good as was with 12.5 HP motors and the motors were operating at optimum load.</p>		
8	<p>Picture before Modification</p> <p>7.5 Hp Blower motor</p> 		<p>Picture After Modification</p> <p>5 Hp Blower motor</p> 
9	Total investment :	3,750 US\$	
10	First year energy cost savings :	12,500 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual electricity consumption before, MWh	287	
13	Annual electricity consumption after, MWh	172	
14	First year electricity savings, MWh	115	
15	First year tons of CO ₂ mitigated	115	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	1,150	



1	ID: 36	Title of measure	Sector: Dairy
2	Survey Year: 2007	Installation of Heat recovery unit for ammonia compressors(120TR)	Technology: De-Superheater
3	Name of the Company	: M/s Hassan Co-operative Milk Producers' Societies Union Limited, Industrial Estate, B.M. Road, Hassan, Karnataka, INDIA	
4	Agency that executed the project	: M/s Refricon Magic Systems, Pune, Maharashtra, INDIA	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: HASSAN DAIRY is a unit of Hassan Co-Operative Milk producers. Union Limited registered under the Karnataka co-operative act and has been commissioned in the year 1983. The rated when constructed was 60 Thousand kgs per day and was subsequently expanded to 120 Thousand kgs per day in the year 2000. Hassan dairy has under its jurisdiction 2 chilling centers and 1 mini dairy.</p> <p>The dairy processes the milk and packs toned milk, standardized homogenized milk, & double toned milk. In addition, Hassan dairy also manufactures ghee (38 metric tons per year), curd (1095 metric tons per year), peda (7.3 metric tons per year) and butter milk (292 metric tons per year). The annual turnover of Hassan dairy for the year 2006-07 is US\$ 32 million.</p>		
7	<p>Description of Energy Conservation Measure:- Adiabatic compression in ammonia compressor results in high discharge gas temperatures at compressor outlet (120° C and above). This gas is cooled and condensed in condenser and stored in receiver at 14 - 16 kg/cm² pressure. Condensing temperature (varying from 30° to 45° C) vary depending upon type of condenser cooling and atmospheric conditions.</p> <p>De-superheater installed in ammonia circuit between compressor discharge and condenser, removes high temperature gas heat(super heat) and passes entire gas to condenser to condense similar to normal refrigeration cycle. Gas heat removed in de-superheater heats circulating water to 55° – 70° C. The hot water generated per day at Hassan dairy is around 19.45KL at 62°C. This hot water is stored in 10KL hot water tank to meet fluctuating demand of hot water in plant. The hot water is pumped to an over head insulated tank (2KL) and then distributed to all the user sections including boiler.</p>		
8	<p>Hassan Dairy</p> 		<p>Picture After Modification</p> 
9	Total investment :	19,825 US\$	
10	First year energy cost savings :	8,675 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual electricity consumption before, MWh	1,087	
13	Annual electricity consumption after, MWh	1,020	
14	First year electricity savings, MWh	67	
15	First year tons of Co ₂ mitigated	67	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	670	

1	ID: 37	Title of measure	Sector: Dairy
2	Survey Year: 2007	Improvement of Co-Efficient of Performance (COP) of refrigeration system	Technology: Refrigeration System
3	Name of the Company	: Mandya Dairy, Maddur Taluk, Mandya District Karnataka, INDIA	
4	Agency that executed the project	: In-house	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: Mandya Dairy, A unit of Mandya District Co-Operative Milk producer's society's milk unions limited was commissioned in 1983. The dairy manufactures 1346 tons of skimmed milk powder and 1440 tons of butter, 1300 tons of ghee, 3963 tons of curd, and other products like butter milk, milk cake etc. The dairy markets milk under the trade name NANDINI.</p>		
7	<p>Description of Energy Conservation Measure:- The refrigeration section in the unit has 4 Ammonia compressors, each driven by 12.5 Hp motors. The unit also has 5 evaporative condensers each energized by one 12.5 Hp (blower) & one 7.5 Hp (Water pump) motors. The in-house team found that these 12.5 Hp motor at blower was overrated. Moreover there was scale formation on the coils of the evaporative condensers due to which the heat transfer efficiency was low resulting in lower COP as low as 2.5 against the standard 5.0. In order to acquire the required cooling, all the 5 condensers were kept in operation. The team took the initiative to replace these 12.5 Hp motors by 7.5 Hp motors get the descaling done for all the 5 condenser coils. This resulted in efficient heat transfer and improvement of COP from 2.5 to 4.0. These measures resulted in putting off one evaporative condenser completely and reducing the running of each existing ammonia compressors by 1 hour.</p>		
8	Picture Before Modification	Picture After Modification	
			
9	Total investment :	1,875 US\$	
10	First year energy cost savings :	13,550 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual electricity consumption before, MWh	3,389	
13	Annual electricity consumption after, MWh	3,264	
14	First year electricity savings, MWh	125	
15	First year tons of CO ₂ mitigated	125	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	1,250	

1	ID: 38	Title of measure	Sector: Dairy
2	Survey Year: 2007	Methane Gas Utilisation	Technology: Fuel Substitution
3	Name of the Company	: Mysore Dairy, Mysore, Karnataka, INDIA	
4	Agency that executed the project	: M/s Indavar & Company, Mysore	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: MYSORE DAIRY, A UNIT OF Mysore – Chamarajanagara District Co-Operative Milk producers. Union Limited registered under the Karnataka co-operative act has been commissioned in the year 1980. The dairy markets milk and milk products under the trade name “NANDINI” a registered trade name of “Karnataka Milk Federation”, the apex institution at the state level. The dairy processes the milk and packs Toned milk with 3.1% Fat, Standardised milk with 4.6% Fat, Double toned milk with 1.6% Fat, Full cream milk with 6.1% Fat.</p>		
7	<p>Description of Energy Conservation Measure:- In the unit, the effluent treatment plant has been expanded and renovated. The new system is yielding methane gas in sufficient quantum. Mysore Dairy made an attempt to utilize the Methane Gas for cooking purpose at canteen. The canteen is catering everyday the food & snack needs of about 400-450 employees working in the Institution. The dairy made one time investment on this project to run the gas pipe line from Effluent Treatment Plant to the canteen. The Electrical Steam Generator used earlier for cooking at canteen is now stopped.</p>		
8	<p>Picture Before Modification</p>  <p>Gas Utilization at Canteen</p>	<p>Picture After Modification</p>  <p>Gas Holder</p>	
9	Total investment :		3,750 US\$
10	First year energy cost savings :		7,000 US\$
11	First year additional savings beyond energy (i.e. water, raw materials etc.):		Nil
12	Annual electricity consumption before,	MWh	---
13	Annual electricity consumption after,	MWh	---
14	First year electricity savings,	MWh	59
15	First year tons of CO ₂ mitigated		59
16	Assumed sustainability, years		10
17	Expected tons of CO₂ mitigated throughout life cycle		590

1	ID: 39	Title of measure	Sector: Dairy
2	Survey Year: 2007	Preheating the inlet air by providing Steam coils	Technology: Heating Coils
3	Name of the Company	: Nestle India Limited, Moga, Punjab, INDIA	
4	Agency that executed the project	: In-house	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: Nestle is a multinational company with its worldwide operations in over 80 countries, and a turnover of US\$ 63 billion. Nestle Moga is the first & the largest factory of seven of the Nestle India limited factories. Moga factory started production in 1962. Today Moga contributes almost 75% of Nestle India's total production volume, manufacturing 105,000 tons of food products. The entire range of milks, culinary products and cereals are manufactured in Moga with brand names like Lactogen, Cerelac, Milkmaid, Maggi Noodle, Maggi tomato ketchup, Everyday Dairy whitener & many more.</p>		
7	<p>Description of Energy Conservation Measure:- The unit has 8 number of air heaters for providing hot air to dryers in Egron department for drying of milk into base powder. The temperature of hot air is around 360°C. Furnace oil is used as fuel for its operation. A high pressure (HP) fan forces ambient air into the heater which is eventually passed on to dryers through induced draft (ID) fans after heating. As the cost incurred ating of air with steam is much lower as compared to that of FO. Therefore the in-house team decided to use steam for air heating, as much as possible and opted to preheat the inlet air, with a help of steam heat exchangers. The team installed a steam-heated coil in between HP fan & heater furnace to increase the temperature of inlet air to 100°C. This measure reduced the oil consumption from 98 Ltrs/hr to 88Ltrs/hr.</p>		
8	Nestle Pvt. Ltd	Picture After Modification	
			
9	Total investment :	12,500 US\$	
10	First year energy cost savings :	33,650 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual oil consumption before, kl	647	
13	Annual oil consumption after, kl	581	
14	First year oil savings, kl	66	
15	First year tons of CO ₂ mitigated	199	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	1,990	

1	ID: 40	Title of measure	Sector: Dairy
2	Survey Year: 2007	Replacement of PID controllers for 10 & 20 KLPH Milk Pasteurizers	Technology: PID Controllers
3	Name of the Company	: Kolar Milk Union Limited, Huttur, Kolar, Karnataka, INDIA	
4	Agency that executed the project	: In-house	
5	Year of Implementation	: 2006-07	
6	<p>Unit Profile: Kolar Dist. Cooperative Milk Producers' Societies Union Limited, (KOMUL) registered under Co-operative Societies act, is Karnataka's second highest Milk Producing District organization. KOMUL has full-fledged dairy at Kolar with installed handling capacity of 0.2million liters per day, along with 3 milk chilling centers with an installed capacity of 0.1 million liters per day each. Presently Kolar is processing 0.25 million liters per day of milk at Kolar dairy to meet the requirements of market milk in sachets, UHT Milk and Curds. The products manufactured are Butter,Ghee,Peda,Buttermilk and Set Curd.</p>		
7	<p>Description of Energy Conservation Measure:- The in-house team observed that the PID (proportional–integral–derivative) controllers were not working satisfactorily, resulting in huge thermal losses in the pasteurizers. Hence the team provided new PID cotrollers to both the milk pasteurizers. This resulted in reduction in steam usage in both the 10 KLPH and 20 KLPH Pasteurizers and saved 30 kilo liters of furnace oil.</p>		
8	<p>Picture before Modification</p> 		<p>Picture After Modification</p> 
9	Total investment :	4,000 US\$	
10	First year energy cost savings :	16,675 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual oil consumption before, kl	--	
13	Annual oil consumption after, kl	--	
14	First year oil savings, kl	30	
15	First year tons of CO ₂ mitigated	90	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	900	

1	ID: 41	Title of measure	Sector: Dairy
2	Survey Year: 2007	Stoppage of 15 HP pump by pipeline modification	Technology: Pipeline Modification
3	Name of the Company	: Kolhapur Zilla Sahakari Dudh Utp. Sangh Limited, Kolhapur, Maharashtra, INDIA	
4	Agency that executed the project	: In-house	
5	Year of Implementation	: 2006-07	
6	Unit Profile:	Kolhapur Zilla Sahakari Dudh Utpadak Sangh Limited well known with its popular brand 'Gokul' is an Operation Flood co operative dairy project established on in 1963. Gokul is supporting the producers by giving all technical input services like animal health care, feed & fodder supply animal breeding facility with necessary training. Gokul has also strengthened its Animal Husbandry, Artificial Insemination, Feed and Fodder Development activities. At present Gokul has modern 0.7 million Liters/day capacity dairy plant with 4 chilling centers having 0.37 million Liters/day milk handling capacity with modern Packing Unit at Navi Mumbai.	
7	Description of Energy Conservation Measure:-	The in-house team, during inspection, suggested some modifications to be done in the 30 TPD powder plant. After carrying out these modifications, one no. of cooling water pump (15HP) could be stopped.	
8	Cooling Water Pumps	Picture After Modification	
			
9	Total investment :	250 US\$	
10	First year energy cost savings :	1,925 US\$	
11	First year additional savings beyond energy (i.e. water, raw materials etc.):	Nil	
12	Annual electricity consumption before, MWh	--	
13	Annual electricity consumption after, MWh	--	
14	First year electricity savings, MWh	21	
15	First year tons of CO ₂ mitigated	21	
16	Assumed sustainability, years	10	
17	Expected tons of CO₂ mitigated throughout life cycle	210	