EnConTea

A Quarterly Newsletter of the Project -
Energy Conservation in Small Sector Tea Processing Units in South India

Issue - 10 September 2010

EDITORIAL

Mr. R. Ambalavanan, IA & AS,
Executive Director, Tea Board
National Project Director of the Project

I am happy that Encontea, the quarterly newsletter of the project "Energy Conservation in Small Sector Tea Processing Units in South India" has given me a platform and an opportunity to reach out to all tea factories in south India. You are aware that my professional experience is in the area of audit and accounts. But, my educational qualifications in Environmental Studies and Remote Sensing always kept me involved in areas of environmental protection and energy conservation, while taking up the audits of public sector undertakings. I am happy to associate myself with this project on energy conservation and feel good about contributing to national efforts in protecting the environment.

The focus of the project was on the estate sector in the past couple of years and remarkable progress was made in the area of energy conservation in plantations. Now the project focuses on the Bought Leaf Factories, as reduction in energy cost would directly benefit the small growers of the area. I have been associated with the project in the past 3 months and I found that the bought leaf sector has responded positively and adopted several recommendations for energy conservation, based on the energy audits conducted by the approved energy auditor of the project - M/s Elpro Energy Dimensions Pvt. Ltd., Bangalore. 105 factories have installed Automatic Power Factor Controllers, 74 factories use the Maximum Demand Controller, 74 factories adopted the Star Connection mode of running lowly loaded motors, 64 factories adopted a Variable Frequency Drive to run flue gas exhaust fans as per the hot air temperature requirement and so on. This is a good response from the bought leaf sector and we look forward to working with you on other initiatives as well. I am also urging the bought leaf sector to seriously consider our risk mitigation initiative for partial financial support for the Hot Water Generator. This scheme is only for the bought leaf sector and tea factories are free to buy the equipment from any supplier as long as it adheres to the minimum performance standards. I am also inviting the sector to take advantage of the support offered for setting up three dedicated briquetting units that contribute to meeting the thermal energy needs for tea drying.

We find that there is a growing interest in sustainable energy issues worldwide. With depleting fossil fuels, interest in renewable sources of energy is growing. As most of you would be aware, the project is promoting cultivation of fast growing, high yielding varieties of bamboo in tea estates and the response has been very good. If tea industries can grow their own fuel on their own estates, the cost of fuel can come down significantly. I also find that there are many estates with potential for hydro power. I am told that the estates are facing problems in adopting hydro power. I request you to please share your problems and concerns with me so that we can find a solution and stimulate adoption of hydro power in tea estates. I am happy that High Fields has taken the initiative to install the first biogas plant. I hope that this would lead to more industries installing biogas plants.

Our project in the tea industry is one of the few initiatives that has produced results in a relatively short time, although there is a lot more that we can do. I was present at the discussion on carbon credits for the tea industry at the UPASI Annual Conference and I observed that there was a stimulated discussion on the theme with a lot of participation from the tea factories. I have suggested to the project team that they investigate the option of carbon credits completely and report back on the possibilities.

I thank the Chairman Tea Board, Mr. Basudeb Banerjee, and my predecessor, Mr. R. D. Nazeem, for bringing this project to south India. The project team would do its very best to ensure that this project becomes a pioneering one in India.

(For Internal Circulation Only)

PROJECT IN BRIEF

The project - Energy Conservation in Small Sector Tea Processing Units in south India, has been initiated by the Tea Board to remove barriers to energy conservation and energy efficiency that inhibit the realization of large energy saving potential in the tea sector. This 4-year project is supported by the United Nations Development Programme - Global Environment Facility. The project's objective is to remove barriers and to develop replicable strategies for energy efficiency and energy conservation interventions in the tea processing industry in south India.

INSIDE

VIEWPOINT

ESTATE FACTORY SHOWS THE WAY

Mr. Bharath Mandanna, VP – BBTC

1. Energy accounts for the second highest cost of tea production. In spite of this, why would you say, has the sector not concentrated on energy use reforms?

There is no doubt that addressing energy needs is absolutely essential for both economic as well as environmental reasons. But all these years, the tea industry focused more on plantation and not as much on energy aspects of tea production. The latest developments in energy technology were either not available or not exploited by the industry. We are aware that our consumption levels of electrical and thermal energy are very high and that there is scope for substantial savings. Bringing this back to the lowest possible level is necessary to mitigate CO_2 emissions to a very high extent. As planters live in very beautiful locations, contributing to the preservation of the environment is very satisfying and fulfilling. If each of the 300 small and large factories started to take energy conservation very seriously, we could make a huge difference. Small drops, indeed, make the mighty ocean.

2. As a standard measure of energy consumption, we use the term Specific Energy Consumption (SEC) with reference to the ratio of energy consumption per kg of made tea. What measures have you taken to reduce the SEC in your factory?

"Specific energy consumption" is definitely the right technical term; not only to compare energy consumption patterns before and after an energy intervention within a factory, but also to compare energy consumption patterns of different factories. We are a group of several estate factories in 8 locations and we have started to implement various EnCon measures. Our entire team, of more than 45 personnel in all locations, is convinced of this. Currently, we have begun the installation of energy efficient motors, flat belts to reduce electricity consumption and the Hot Water Generator (HWG) in our Thaimuddi factory to reduce thermal energy consumption. Besides the above, we have also reduced power consumption by motor size reduction, optimized motor loading, power factor controlling, etc.

3. What made you opt for HWGs in the Thaimuddi factory? Can you elaborate on the background to this decision?

We were extremely concerned about the fuel usage in our factories. Prof Madhavan guided our decision, especially when we were informed that fuel saving would be in the range of 20 - 25%. An additional bonus was that we could get uniform air temperatures, better quality of tea and possibly higher selling prices. The quality factor reinforced with energy conservation aspects propelled us to take this action. Of course, we did contact other factories that had already installed HWGs and after receiving positive feedback we were convinced that installing HWGs will work to our benefit.

4. We understand that "Energy plantation – bamboo cultivation" has got your imagination. Is that so?

Yes, you're right! Being a planter, we continuously seek sustainability without environmental degradation. The rampant usage of firewood in tea processing and its effects on the environment has always left us with an unpleasant feeling of discomfort. We admit that several of us did not know how to address this issue and the first thought was to reduce fuel consumption through efficient burning. We heard that the project had created awareness on sustainable energy plantations, and, that was my dream. An article in the EnConTea newsletter further kindled our interest. This prompted me to initiate an awareness campaign in the Valparai area. As BBTC owns land in Valparai as well as in Tirunelveli, we are planning to grow sustainable varieties of bamboo in both locations. Estimations are that the growth rate can be as high as 100 tons / acre / year.

5. An obvious question that awaits your answer: Do you think "EnCon measures make economic sense from the viewpoint of a tea planter" and, if so, to what extent?

Operating in the plantation business, we are convinced of the economics and we do hope that the same would be true for other businesses as well. On behalf of the tea sector, I can say that everyone supports energy conservation, not only because we are planters but also because we are responsible citizens. I only advise that we tread carefully, weighing the pros and cons, before taking a step in any direction. Energy conservation is certain to pay off for itself, there is no escaping it and we should therefore embrace it at the earliest.

BOUGHT LEAF FACTORY SHOWS THE WAY

Mr. S. Kannappan, Managing Partner Snowdon Tea Factory, Nilgiris

1. When was the energy audit conducted in your factory and what prompted you to take up the audit?

The energy audit was conducted in March 2009. It all began when the UNDP – GEF – TIDE project took off in 2008. I routinely attended the awareness meetings organized by the project, with expert consultants offering their views on energy conservation. Prof Madhavan significantly helped us to understand the importance of energy conservation. Based on numbers quoted by experts, I felt that my factory consumed more energy. This prompted me to take up the Detailed Energy Audit in my factory. The Snowdon Tea Factory was one of the first to take up energy audits.

VIEWPOINT

2. Were there any concerns about the recommendations made?

Not really. The recommendations were communicated in a very comprehensive manner for even a non-technical person to understand. After conduct of the audit, I had a detailed discussion with energy auditors and Prof Madhavan. When I was convinced, I embarked on the implementation phase.

3. Can you please list the measures you have adopted?

Over the last 10 - 12 months we have started to use:

(i) Maximum Demand Controller

(ii) Automatic Power Factor Controller

(Iii) Flat Belt Drives for the CTC and Hot Air Fan

(Iv) VFD Controller for the CFM Machine, Screw Conveyor, Green Leaf Even Feeder and Feeding Conveyor of Wet Dhool

(v) 4 Timers for Motors in the Withering Section

(vi) Star-Delta-Star Starter for operation of the Hot Air Fan

(vii) ID Fan Controller for the Heater

These implementations took place in a phased manner.

4. Have you made any measurements of energy saved or estimated cost savings due to implementation of energy conservation measures?

I was concerned whether the investments made by me were resulting in the kind of financial returns projected in the audit report. I therefore developed a working sheet to track the energy consumption patterns on a weekly, monthly and quarterly basis. That enabled me to closely track energy consumption levels. Based on the data collected, I could say that our factory has achieved a 20% saving on electrical energy. In terms of cost, I estimate a saving of Rs. 0.60 per kg of made tea. In other words, I would say that I invested Rs. 4 lakh (over a 1 year period) and savings would be Rs. 4.2 lakh per year.

Based on the data collected and on the confidence that I developed in light of the recommendations made, I also plan to invest in energy efficient motors. It would be good if Prof Madhavan continues to be associated with the project for a longer period, so that the sector benefits from expert advice provided.

5. You seem to have focused on electrical energy conservation in the past. Is there some hesitation in adopting the thermal energy recommendations or is there need for more technical assistance from the project for thermal energy interventions?

It is true that my focus has been on electrical energy and I have plans of installing section-wise energy efficient motors, after suitable downsizing, and energy efficient lighting, combined with transparent roofing, natural lighting and ventilation. We also have plans of procuring a wood splitter, a fuel shed and maybe a Hot Water Generator, when the finances permit. We can use the assistance provided by TIDE, especially on very technical issues.

6. Any word of caution or advice for would-be adopters of EnCon schemes?

Conviction is the name of the game. Please be convinced about the correctness of the decisions taken and then make respective investments. I asked questions to Prof Madhavan and to the energy auditors and depending on the answers and the situation in my factory, I took up the phased implementation. I now think that some energy conservation measures are very obvious, but about 20% of the recommendations require technical inputs. The TIDE team can be requested to fill in those 20%. Nonetheless, the bottom line is to be convinced yourself about what is good for your factory and then take an appropriate decision.

WOOD MOISTURE STUDY

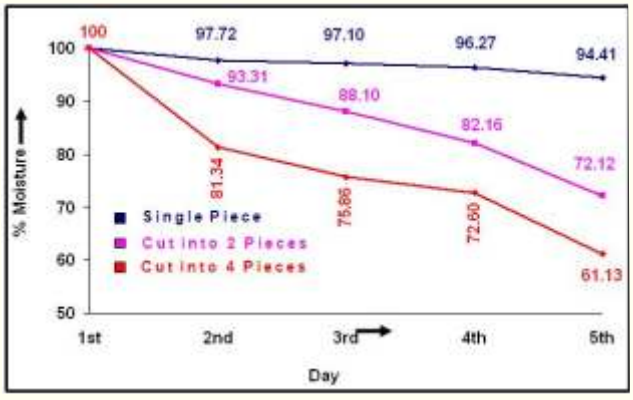
A study was taken up by TIDE's Technical Team to establish the effect of splitting wood into pieces (in a splitter or manually). A lower wood moisture level obviously results in better combustion, better heat transfer and therefore less specific fuel consumption.

The result of the study are depicted in tabular and graphical form.

Relative moisture loss in % with reduction in wood size:

	Day 1	Day 2	Day 3	Day 4	Day 5
Single Piece	100	97.72	97.10	96.27	94.41
Cut into 2 Pieces	100	93.31	88.10	82.16	72.12
Cut into 4 Pieces	100	81.34	75.86	72.60	61.13

When wood was cut into 4 pieces and left for drying* as usual, the moisture reduction was much higher compared to that which was left for drying as a whole piece.



Suggestion: Cut the wood into about 4 pieces before using them. It helps in energy conservation.

* *The wood samples were kept in a shed covered from the sides and on top; not sun dried.*

DATA

IMPLEMENTATION STATUS OF ENCON MEASURES

Legend

Electrical Energy

1. Sectionwise Energy Meter	**2.** Maximum Demand Controller	**3.** Automatic Power Factor Controller	**4.** Star Connection of Motors in Sifting Section
5. Flat Belt Drives in CTC / Pulverizer / Hot Air Fan	**6.** Energy Efficient Motors in C T C / Pulverizer	**7.** Energy Efficient Lamps	

Thermal Energy

8. Firewood Shed / Splitter	**9.** VFD for Flue Gas Fan	**10.** Hot Water Generator	

= Audited Factory

#	Factory Name	1	2	3	4	5	6	7	8	9	10	Total
1	Akshaya Tea Industries			■	■	■	■		■	■		6 / 10
2	Allada Valley Factory							■	■	■		3 / 10
3	Ambica Tea Factory				■							1 / 10
4	Amko Tea P. Ltd.		■	■			■		■	■		5 / 10
5	Arthibala Tea Plantations		■	■	■					■		4 / 10
6	Ashok Kumar Tea Industry		■	■	■					■		4 / 10
7	Banacombai Tea Plantations		■	■		■		■	■	■		6 / 10
8	Barnie Tea Factory								■			1 / 10
9	Beekad Tea Producing Co. (P) Ltd.		■	■	■	■		■	■	■		7 / 10
10	Bengalmattam Tea Factory		■	■						■		3 / 10
11	Bengal View Tea Factory		■	■						■		3 / 10
12	Bharathi Tea Factory		■	■	■					■		4 / 10
13	Bhima Tea Industries			■	■			■				3 / 10
14	Chambala Tea Factory		■	■				■	■	■		5 / 10
15	Crosshill Aravenu Tea Factory		■	■						■		3 / 10
16	Darmona Tea Industry Aravenu		■	■				■	■	■		5 / 10
17	Dee Pee Tea Industries (Pvt)			■								1 / 10
18	Doddabetta Tea Factory			■				■	■	■		4 / 10
19	Doddacombu Tea Factory Co. Pvt. Ltd.			■					■	■		3 / 10
20	Dollar Tea Industry		■	■				■				3 / 10
21	Elavankudy Tea Company							■	■	■		3 / 10
22	Ella Tea Industry		■	■	■		■	■	■	■		7 / 10
23	Ellithorai Tea Factory (P) Ltd.			■	■					■		3 / 10
24	Essen Tea Industry		■	■	■							3 / 10
25	Evergreen Tea Factory			■			■		■	■		4 / 10
26	Garswood Tea Produce Co.			■					■	■		3 / 10
27	Gee Vee Tea Industries			■	■							2 / 10
28	The Gnanam Tea Plantations P. Ltd.			■				■				2 / 10
29	Glenrock Estates			■				■				2 / 10
30	Golden Dew Tea Factory		■	■		■				■		4 / 10
31	Golden Hill Tea Plantations		■					■	■	■		4 / 10
32	Gottacombai Tea Industries		■	■				■				3 / 10
33	Greenview Tea Industries		■	■	■			■		■		5 / 10
34	Hadathorai Tea Factory		■	■	■							3 / 10
35	Hallasholai Tea Factory			■	■							2 / 10
36	Hatari Tea Industry				■				■	■		3 / 10
37	Havukal Tea and Produce Co. Pvt. Ltd.		■	■	■	■			■	■	■	7 / 10
38	Highfield Tea Factory	■		■	■	■	■		■	■		7 / 10
39	Hittakkal Estate Tea Factory		■	■								2 / 10
40	Homedale Tea Factory			■								1 / 10
41	H. R. D.		■	■	■							3 / 10
42	I. B. S. Tea Plantations		■	■	■	■		■	■			6 / 10
43	Jeyam Tea Plantations		■					■	■			3 / 10
44	Jai Sai Enterprises		■									1 / 10
45	Kannavarai Tea Industries		■	■	■	■	■		■			6 / 10
46	Karodaiya Tea Industries		■	■	■	■			■			5 / 10
47	Kotagiri Estate Tea		■	■						■		3 / 10
48	Limtex (India) Ltd.		■	■	■			■	■	■		6 / 10
49	Madeshwara Est. Tea Factory	■	■	■	■			■	■	■		7 / 10
50	Mahalinga Tea Factory		■	■	■							3 / 10
51	Maharaj			■	■				■			3 / 10
52	Manikal Tea Factory		■	■	■	■			■	■		6 / 10
53	Madhamalai Tea Plantation P. Ltd.			■	■							2 / 10
54	Mavukarai (N) Estate		■	■								2 / 10
55	Meedhane Tea Industry			■	■							2 / 10
56	Moria Tea Factory				■							1 / 10
57	Motherland Tea Plantations		■	■	■			■		■		5 / 10
58	Nakubetta Integrated Tea Co. P. Ltd.		■	■	■			■				4 / 10
59	Nankemp Tea Industry		■	■	■		■	■	■	■		7 / 10
60	National Tea Plantations (P) Ltd.			■	■	■			■	■		5 / 10
61	Neelamalai Enterprises P. Ltd.			■	■							2 / 10
62	Narumukai Tea Company		■	■	■					■		4 / 10
63	Nilgiri Glenburn Tea P. Ltd.		■	■				■		■		4 / 10
64	Nilgiri Monarch Tea P. Ltd.		■	■	■			■	■	■		6 / 10
65	Nilgiri Tea Producing Co.		■	■					■			3 / 10
66	Nirsan Plantations		■	■	■			■		■		5 / 10
67	Orange Valley Tea Industry			■		■		■	■	■		5 / 10
68	Orchid Tea Factory				■				■			2 / 10
69	Pandian Tea Industry		■	■				■				3 / 10
70	Pramas Tea Industries		■	■	■							3 / 10
71	Preethi Tea Industries Pvt. Ltd.		■	■	■	■		■	■	■		7 / 10
72	Powsland Tea Factory		■	■	■			■				4 / 10
73	Raja Plantation			■	■	■	■		■	■		6 / 10
74	Rajchand Tea Industries		■	■	■					■		4 / 10
75	Rajeshwari Tea Industries			■	■							2 / 10
76	Riverside Tea Plantation		■	■						■		3 / 10
77	Rock Valley Tea Industry		■	■	■				■	■		5 / 10
78	Rose Mount Tea Factory Pvt. Ltd.								■			1 / 10
79	S. N. Valley Tea Factory		■	■		■		■	■	■		6 / 10
80	S. R. K. Tea Industries		■	■					■	■		4 / 10
81	S. V. T. Tea Factory		■	■	■							3 / 10
82	Sanjay Bala Tea Plantations		■	■	■				■			4 / 10
83	Santhosh Tea Industries		■	■		■			■			4 / 10
84	Saranam Tea Factory		■	■	■			■				4 / 10
85	Selvaganapathy Tea Industries		■	■					■	■		4 / 10
86	Shanthi Tea Industry		■	■	■			■				4 / 10
87	Seethal Tea Factory		■	■	■				■	■		5 / 10
88	Silver Valley			■						■		2 / 10
89	Siva Tea Plantations		■	■	■	■		■	■	■		7 / 10
90	Sivakumar Tea Industries		■					■	■			3 / 10
91	Sivalinga Tea Industries			■	■							2 / 10
92	Sivaram Tea Industry		■	■		■		■	■	■		6 / 10
93	Snowdon Tea Factory		■	■	■	■			■	■		6 / 10
94	Sogathorai Vani Vilas Estates			■	■	■			■	■		5 / 10
95	Springdale Co-Tea Factory			■	■							2 / 10
96	Sree Devi Tea Factory			■	■				■			3 / 10
97	Sri Bathma Tea Industries			■	■			■		■		4 / 10
98	Sri Jedayalinga Tea Factory			■	■					■		3 / 10
99	Sri Ram			■	■				■			3 / 10
100	Sree Lakshmi Tea Industry		■	■		■	■	■		■		6 / 10
101	Sree Ram Tea Factory		■	■	■							3 / 10
102	Sree Sakthi Tea Industries		■	■	■				■	■		5 / 10
103	Sree Sastha Tea Factory			■	■							2 / 10
104	Sree Venkateshwara Tea Industries		■	■	■	■			■	■		6 / 10
105	Sterling Tea Factory		■	■	■			■				4 / 10
106	Suprajith Tea Factory		■	■	■			■	■			5 / 10
107	Sushil Shiv Tea Plantations		■	■	■				■	■	■	6 / 10
108	Silent Valley		■	■	■			■	■			5 / 10
109	Terramia Tea Factory		■	■					■	■		4 / 10
110	Thaimatha Tea Factory		■	■	■							3 / 10
111	Top Hill Tea Factory				■				■	■		3 / 10
112	Velmurugan Tea Plantations			■	■							2 / 10
113	Venkataramana Tea Factory (P) Ltd.			■				■				2 / 10
114	Venus Tea Factory		■	■	■					■		4 / 10
115	Vigneshwar Estate Tea Factory		■	■	■			■	■	■		6 / 10
116	West Berry Tea and Produce Co. P. Ltd.			■					■	■	■	4 / 10
117	Wood Bridge Tea Factory		■	■		■			■	■		5 / 10
118	Yedakadu Tea Mfg Co. (P) Ltd.				■			■				2 / 10
119	Yuvraj Tea Mfg Co. P. Ltd.			■	■				■			3 / 10
	Total Implementations	2	74	105	74	23	9	43	60	64	3	457 / 1190

The information collected from the Bought Leaf Factories (BLF) regarding the implementation of various EnCon schemes is summed up and presented in the table above.

This exercise has been done to create awareness among BLFs regarding the status of adoption of EnCon schemes.

We expect that this information would be made use of by the prospective implementer to get first-hand information on the techno-economic viability of schemes from the BLFs that have already implemented.

We are publicizing this data as a confidence building measure.

ARTICLE

FLAT BELT VIS-A-VIS V-BELT
A COMPARISON ON OPERATION & ENERGY

By Mr. R.D. Nazeem & Dr. R.S. Madhavan

Belt drives are usually the simplest means of transmitting power over long distances.

In the past, the tea sector has commonly employed V-belts for transmission drives. However, with increased awareness on energy conservation combined with its greater durability, flat belts have become popular. Several industries have shifted from the conventional V-belt drives to the usage of flat belt drives.

A brief comparison between the operational aspects of a V-Belt and a Flat Belt:

No.	V-Belt	Flat Belt
1.	Frictional engagement between the lateral wedge surfaces of the belt profile.	Frictional engagement on the outer pulley.
2.	Large bending cross-section and large mass.	Small bending cross-section and small mass.
3.	Different effective diameters and, thus, varying speeds of individual belts.	Precisely defined effective diameters across the belt width and, therefore, equal speed.

The primary advantages of Flat Belt Drives

1. Efficiency & Energy Savings:

The small bending cross-section of the flat belt causes little bending loss and only slight deformation work. This, together with smooth operation and the absence of pulley wedge effects, results in higher efficiency of flat belts as opposed to V-belts.

In addition, an improperly tensioned or wobbling V-belt leads to substantial losses.

2. Operation Life:

The flat belt is frictionally engaged on the outer pulley diameter and not on the lateral wedge surfaces (as is the case with V-belt drives).This results in less wear and tear on the belt and pulley. However, when several V-belts run on one drive, they wear out unevenly due to production allowances.

3. Minimal Maintenance:

Flat belts keep their uniformly high tension force throughout their service life and therefore require no maintenance, whereas V-belts have to be checked and re-tensioned from time to time. Thus, once a flat belt drive is correctly installed, it is more or less maintenance-free (besides requiring occasional control checks). It also guarantees constant power transmission during its entire service life.

4. Smooth Running:

In contrast to flat belts that have a uniform distribution of tension over the entire belt width, V-belts have the disadvantage that the tension in individual belts is unevenly distributed due to different effective diameters, which in turn are brought about by unequal wear on the belt pulleys as well as manufacturing tolerances. Such belt tension leads to vibrations and fluttering, uneven and noisy running. The consequence is the premature bearing damage (which is not expected to occur in a flat belt drive).

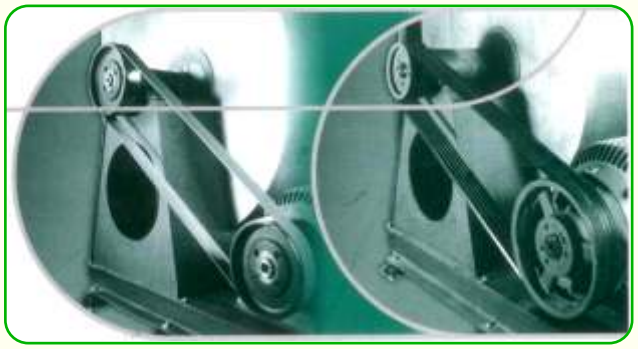


Figure 1: *A comparison between Flat Belt and V-Belt*

5. Chemical & Electrical Properties:

Since the flat belts are manufactured from synthetic materials (polyamide with elastomer), they are normally resistant to oil, water and most chemicals which are commonly used in industries. The belts are also antistatic, rendering them electrically resistant. Furthermore, the belts have an optimal μ (friction coefficient) that makes them operate smoothly without slipping.

6. Installation:

Finally, the installation of flat belt drives is more straightforward in contrast to the installation of V-belts, which on the other hand are often haphazardly tensioned until individual belts cease to wobble. Flat belts can be very securely installed.

Proven advantages as listed by manufacturers

1. Efficient transmission of power
2. Energy savings
3. Longer service life
4. Maintenance free operation
5. Capability of absorbing high load fluctuation
6. Lower load on the bearing (bearing damage omitted)
7. Pulleys fitted with taperlock system for easy assembly

More than 45 tea factories have opted for flat belt drives, for smoother power transmission in:

Rotorvanes, CTC cuts, Hot Air Fans and Pulverisers.

This shift to flat belts is sure to save 5% of your operating energy of V-belt drives. It is strongly recommended that flat belts be installed instead of V-belts.

ARTICLE

ADVANTAGES OF THE MAXIMUM DEMAND CONTROLLER

By Mr. R.D. Nazeem & Dr. R.S. Madhavan

The Maximum Demand (MD) Controller is a device that puts a limit to the maximum level of kVA being consumed by a factory.

The tariff structure of electricity consumption consists of two parts:

- Part 1 relates to the charges paid to the Electricity Board (EB) based on the Contracted Demand (CD) of kVA. This amount is billed at the rate of Rs. x / kVA / month (which varies from state to state). The demand charges to be paid depend on the maximum kVA recorded in a given month. In a well managed power consumption system, this forms around 20% of the overall power charges. With poorly managed power consumption, this kVA contribution can amount to 30% of the overall charges.
- Part 2 deals with the actual unit charges to be paid (i.e. kWh charges). This can account for 70 – 75% of the total power cost.
- The MD reached in a month - as would be recorded by the EB – is a one-time occurrence. The EB meter continuously records and aggregates the kVA consumption and averages the same once every 30 minutes. Thus, in a metering month, there will be around 1440 kVA readings and the charges are paid for the maximum value of these 1440 recordings.

Thus, the MD recorded by a factory / EB in a month is always the highest value recorded for that month which can well be a one-time occurrence.

The role of the MD Controller is to constantly monitor the kVA consumption and maintain it at a preset value. When the kVA consumed reaches the given limit, MD Controller comes on line and either shuts down or reduces the non–critical load, to maintain the preset kVA. It prevents the kVA from rising beyond our control. In addition to controlling the kVA, it also optimizes cable and transformer loads.

The principle of operation of the MD Controller

The MD Controller works on the principle of instantaneous readings of voltage and current, calculating the kVA. Simultaneously, the inbuilt Real Time Clock (RTC) keeps track of the system and calculates the MD of a given time period. Consequently, the recorded MD and the configured MD are compared with each other and the predefined load tripping action is taken. After a specified time, another comparison is made between the recorded and the set MD. If the recorded MD is lower, the loads are reconnected in a pre-programmed sequence.

This action continues repeatedly and loads get controlled, restricting the desired MD from exceeding its set level.

Advantages of an MD Controller

High Tension (HT) Industries:

It maintains the MD consumption without affecting production.

Low Tension (LT) Industries:

It serves to avoid penalty payment to the EB, as a 3 - time default can result in the EB instructing the LT industries to switch over to the HT category, which could be an expensive proposition.

To sum up, the MD Controller is suitable for both LT & HT industries, in limiting power consumption and curtailing the CD charges payable to the EB.

Many tea factories have adopted this system and gained economical benefits.

FUEL LAB FACILITIES FOR TEA FACTORIES

The EnConTea project has found that convincing tea factories to implement thermal energy interventions takes a longer time, as there are several issues that have not been addressed in the past. The quality of fuel (i.e. calorific value, ash content and moisture level) is one such issue that must be given utmost consideration. Presently this is not being done in spite of knowing that a low calorific value or wet fuel results in higher fuel consumption and cost. Better quality fuel is certain to lower consumption levels.

To provide an enabling mechanism for factories to understand the quality aspects of fuel procured and used, four Fuel Testing Facilities (FTF) have been set up in four different tea producing regions of south India. This is in addition to the one already established in UPASI.

The locations of the FTFs set up by the project and the contact persons are:

1. Valparai BBTC Thaimudi Factory (Mr. Leonit Shaji, Factory Engineer)
2. Vandiperiyar AVT Carady Goody (Mr. Sunil Sivaraman, GM, Vandiperiyar)
3. Munnar HML Surianalle (Mr. Dhiraj, Chief Manager of Factories)
4. Wayanad AVT Chulika (Mr. P.S. King, Sr Manager of Operations)

These facilities have been created to enable tea factories to test the quality of the fuel they burn. Although these facilities are in select tea factories, all tea factories in the region can avail of the facility created for a fee.

The indicative charges for fuel analysis (of one sample) are as follows:

1. Calorific Value: Rs. 250
2. Ash Content: Rs. 180
3. Moisture Content: Rs. 80

All tea factories are requested to make use of these FTFs and make sure that a sub optimal fuel does not add to their energy costs.

FUEL ANALYSING LAB ESTABLISHED IN VANDIPERIYAR , WAYANAD , VALPARAI & MUNAR REGIONS FOR TEA FACTORIES IN SOUTH INDIA

ANNOUNCEMENT

WELCOME TO MR. R. AMBALAVANAN

The project team at TIDE extends a warm welcome to **Mr. R. Ambalavanan**, IA & AS, who has taken over as the Executive Director of the Tea Board of India (Southern Region) and National Project Director of the project. He has a graduate degree in Agricultural Science and post graduate degree in Environmental Studies (MSc) and Remote Sensing (M.Tech). He joined the Indian Audit and Accounts services in 1994. He has worked as Asst. Accountant General and Deputy Accountant General, Tamil Nadu, as Director of Audit (ONGC & Air India), Mumbai, and as Director (Personnel) in the O/o the Comptroller and Audit

Figure 1: *Mr. R. Ambalavanan & Mr. R.D. Nazeeem*

He also served as First Secretary in the High Commission of India at London and Sr. Dy. Accountant General in the O/o the Accountant General, Kerala. He was a member of the audit team to the UN Organization, FAO, Rome during 2000 and 2004.

The project team would like to assure Mr. R. Ambalavanan of their complete commitment and support to make the project a greater success.

We are also happy that **Dr. R. Sethumadhavan** will continue to be the Director of Implementation & Monitoring of the project til 5th March 2011. He has been a source of inspiration for many factories and we are happy to have him on board for another 6 months.

We take pleasure in informing you that **Mr. R. D. Nazeem**, IAS, will continue to be associated with the project as a member of the Technical Advisory Committee and the Project Steering Committee.

PROMOTING ENERGY CONSERVATION AT THE 117th UPASI ANNUAL CONFERENCE

The 117th Annual Conference of UPASI was held on 13th and 14th September 2010. The exhibition held on the occasion had several equipment suppliers promoting their products. TIDE had also displayed project related information in its stall. Information on the energy audits conducted region-wise, section-wise recommendations of the energy audits and their adoption was communicated. A document called the energy score card which was a self assessment tool for the tea factories to gauge their level of implementation was displayed and circulated. Many energy efficient equipment suppliers sensed an opportunity and used the occasion to market their products. Some of them were (i) Industrial Controls & Drives Pvt Ltd, Chennai, (ii) Nirmal Bio Gen Technology, Idukki Dt, Kerala, (iii) Thermax Limited, Bangalore, (iv) Veesons Energy Systems (P) Ltd, Tiruchi, (v) C M Engineers and Traders, Coimbatore, (vi) Growmore Biotech Ltd, Hosur, (vii) Elgi Ultra Industries Ltd, Coimbatore and (viii) Instrument Automation, Coimbatore.

Figure 1: *The TIDE Stall at the UPASI Exhibition*

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