

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 This 4-year project is sector. 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. The objective would be achieved by:

- a. Awareness creation among the target sector about energy efficiency/renewable energy technologies and their relation to profitability
- b. Elimination of financial barriers that inhibit investment in energy conservation equipment
- c. Adoption and procurement of energy efficiency/renewable energy equipment/practice
- d. Learning, knowledge sharing and replication



EDITORIAL



As I write this editorial, regretfully for the last time, I am happy to inform my friends in the industry that the project has turned the crucial corner and is now on

course to delivering quality service to the industry. The significant momentum generated in the last quarter due to some high voltage action by the project team has resulted in good adoption of energy efficient equipment. I have data that shows that 7 CTC factories and 6 orthodox factories have invested in a Hot Water Generator (HWG), a key equipment for thermal energy conservation. On the electrical front, data shows that 56 factories have adopted at least one energy efficient intervention and the number is steadily increasing. There is also quiet acceptance of the recommendation on the use of enclosed sheds for fuel storage, which in turn translates into energy savings. At the current rate of implementation we estimate that adoption of energy efficient equipment is saving 5187 MWh / annum of electrical energy and 8326 tons of firewood per annum, with a carbon emission mitigation potential of 17,200 tons of CO₂ / year. Such encouraging data, with a relatively low rate of adoption percentage-wise, indicates to me that the tea sector in south India is ready to think beyond energy efficiency and take on greater challenges of energy security in tea manufacture.

I am grateful to the tea factories for reposing confidence in the project recommendations. I am also confident that the project would continue to monitor the energy consumption of new equipment and issues relating to maintenance, simultaneously communicating this information back to the sector. I am happy that the tea

Mr. R.D. Nazeem, I.A.S., Executive Director, Tea Board National Project Director of the Project

> industry is unreservedly sharing information with each other and I congratulate gestures of HML and Glendale for inviting other factory owners to their factories to observe the operation of the HWG and share their experiences.

The project had launched a study to assess risks to adoption of energy efficiency and findings indicate that technology and lack of facilities for servicing and maintenance of equipment are the most severe risks. The Project Steering Committee that recently met in Chennai has recommended that the project work with equipment suppliers and motivate them to set up maintenance and servicing facilities in tea growing clusters. In response to the high technology risk, the project has initiated the creation of reports on performance studies of different key equipment like energy efficient motors, ID fan controllers, HWGs, etc. It is important that the project regularly share such information with the sector.

The midterm review of the project, carried out by independent national and international consultants, has commended the project for its multistakeholder engagement strategy, and also for very good documentation, information sharing and the barrier removal approach in implementation.

I would like to sign off by thanking the Tea Board, UPASI, the Bought Leaf Association, Tea Factories, UNDP, Anna University and TIDE, for the opportunity to be the National Project Director of such a challenging project and for their support in steering it through its most difficult phase. I request that my successor enjoy the same level of cooperation and support that I received from everyone. I wish the project and the team all success in the future.



INTERVIEW WITH MR. V. UNNIKRISHNAN Vice-President - AVT Plantations

1. AVT is one of the leading tea manufacturers in south India with a renowned brand name. Do you have

an approach or strategy for energy conservation in group?

As a leading manufacturer of tea, we certainly accord top priority to energy conservation. We periodically conduct energy audits in our tea factories and have started to implement various EnCon schemes. Thanks to TIDE's Energy Conservation Project, we have taken bold steps with reassurance that certain changes will have beneficial impacts in the future. Flat belts, energy efficient motors, HWGs, etc. are some of the major technologies that we have ventured into.

2. How did you begin to move to energy efficient equipment? Do you think the energy savings are tangible and justified?

We first understood the EnCon measures, before embarking on the implementation. We started by installing energy meters section-wise. We realized that benchmark establishment is the first step in any EnCon scheme, as measurement of energy saving is important to us. We spent a couple of lakhs on these measures, as we were certain to take up these changes. Fortunately, our views were consistent with the recommendations of Prof Madhavan, and this gave us the confidence that we were doing the right thing. We have been monitoring the section-wise power consumption for the past 20 months. We now understand energy consumption patterns in detail and are in a position to make mid-course corrections. I would also recommend that the same procedure be adopted in other factories who want to take up energy conservation seriously.

3. Have you noticed any reduction in production costs?

Yes, we have. I would not like to quote the exact numbers, as being an agro industry there would be seasonal and annual variations, due to various unavoidable factors. However, we have started saving a lot of energy, definitely above 10%. We are aiming for an energy reduction of 25% as our benchmark and we are confident of achieving it.

4. Can you please list the EnCon schemes you have adopted?

So far, we are using 7 different EnCon measures in our factories, namely: section-wise energy meters as well as energy efficient motors in various sections, APFC, flat belt drives in hot air fans and CTC banks, shaft mounted blowers in the withering section and a closed shed for fuel storage.



INTERVIEW WITH MR. RAJENDIRAN Sr. Manager - Tyford Tea Estate

1. You have undertaken a completely unique, very appreciable and worthy approach to

energy conservation, by installing capacitor banks for each motor in your factory. Would you like to comment on this?

We knew that capacitor banks are often installed for a group of motors at centralized locations. However, in our factory we wanted a more accurate and detailed picture of motor capacities and performance. This did take some more time and required more intense monitoring, but we knew that capacitor banks would give us great benefits and prove advantageous in several aspects and for a long time to come.

2. Have you really achieved any improvements and benefits by installing so many capacitor banks?

Yes, indeed. Recently, on the recommendation of the TIDE team, we had carried out a detailed energy audit. The measurements taken by the energy audit team clearly showed that we were maintaining a power factor of more than 0.9 in almost all our motors. The loading on current and power was also comparable, which is usually difficult to achieve. I am sure that we are extracting maximum benefit from our motors, and we are also clear on the energy front.

3. Do you recommend this step to other factories as well?

Yes, I would. But it is advisable only if you are very serious and proactive about monitoring and have decided to take corrective action on a regular basis. Half-hearted attempts would not yield desired results. There's no point in installing equipment and then abandoning them.

4. Do your factories have any special challenges in energy conservation or tea manufacture?

Our factories are situated in a valley where the average rainfall is more than 5,000mm / annum. This is great for fermentation but it also makes things more difficult for us on the withering front. Withering of leaves is equally dependent on the quantity as it is on the quality of air. Our air quality is quite inferior as the relative humidity is always around 85%. On some days it can go as high as 95%, resulting in absolutely nil withering. With guidance now available to us, we have started working on this aspect in a scientific manner and hope to achieve a break-through in 2-3 months' time. Once the results show, we would be glad to share them with you.

5. Is there anything else you are contemplating?

We are considering installing a maximum demand controller, section-wise energy meters, a roof extractor, flat belt drives and other energy conserving equipment, but we would need expert advice for the same. We are grateful to the Tea Board for the much needed professional services that they have provided.

BAMBOO FOR BIOMASS NEEDS

by Dr. N. Barathi, Director, Growmore Biotech Ltd. - Hosur

Tea factories are regularly experiencing fuel stress as manifest in the rising cost of firewood, scarcity of briquettes and poor quality of fuel (i.e. high moisture in firewood, low CV of briquettes, etc.). This affects the profitability of the factory and can lead to higher maintenance costs, reduction in the life of the equipment and other consequences. The Tea Project is exploring options to reduce fuel costs and offer energy security to the sector. Cultivation of a fast growing species of bamboo is one such option that can offer good quality fuel at an attractive price.

In the past, Growmore had not considered the use of bamboo, due to its low average yield, difficulty in harvesting and the lack of standardized agricultural practices for cultivating the plant.

Growmore has developed a thornless bamboo variety called Beema. Not only is its yield high (around 40 tons / acre / year), but its energy value of 4000 kcal / kg is also quite substantial, almost 80 percent that of coal. The bamboo crop can be harvested annually after only 2 years, unlike regular crop that can be harvested only after 6 or 7 years. Furthermore, bamboo or 'green coal', is available at merely two thirds the cost of regular coal. In current times, we are not only witnessing coal shortage but also a steep rise in its price. Opting for such bamboo biomass could save foreign exchange, protect the environment and simultaneously reduce the cost of tea manufacture.

Growmore, whose monthly production capacity is 10 lakh bamboo plants, has been involved in supplying bamboo plants to the Government of Mizoram, Tamil Nadu and Gujarat. The company is currently in discussion with the Maharashtra Government, and corporates are also coming forward for supply of tissue culture plantings. The company has also supplied bamboo saplings to farmers in Tamil Nadu with small land holdings of upto 10 acres. Planters in Kerala have raised bamboo as a border crop in swampy lands.

The bamboo variety Beema serves as an excellent carbon sink under well managed conditions with drip and fertilizer. The combustion property and energy value / kg can further be improved either by pelletising the chips and powders made from all bamboo plant parts or by gasification through heating of bamboo biomass.

Bamboo varieties can be selected and grown according to climatic conditions. Growmore – pioneer in this area – feels that the tea industry stands a lot to gain by taking up cultivation of bamboo species and clones suitable to their climatic conditions.

Tea factories have severe limitations in growing their own fuel, owing to land related issues. However, there could be other possibilities of sourcing Beema bamboo for the tea industry. The project would try and procure adequate quantities of the same and test it first.

MID-TERM REVIEW OF THE TEA PROJECT

UNDP requires that all its projects go through a mid term review half-way through the implementation of the project. A mid-term review of the Tea Project was conducted this quarter. Dr. Kim Thoa Vu (International Consultant from Vietnam) and Dr. Sameer Maithel (National Consultant) carried out the mid-term review between the 1st and 5th June 2010. The review process consisted of review of all documents generated by the project, field visits to the project implementation sites in Coonoor, Wayanad and Valparai district and meetings with all stakeholders such as the Tea Board, TIDE, UNDP, tea factories and the UPASI KVK laboratory in Coonoor. They also presented their initial impressions to the Project Steering Committee (PSC). The project team made an introductory presentation on conceptualization of the project, the activities carried out during the project development phase and during the first two years of implementation. Presentations were also made on the project's progress and achievements so far, the recommendations of energy audits and their adoption. The team was happy with the excellent cooperation received from the industry.

A detailed report from the evaluation team is awaited, but the introductory presentation complimented the project for its multi-stakeholder involvement in project implementation and the technical competency of the implementation team. The project team would like to thank the evaluators for their extensive travels into tea factories, the quality of time spent and the response that they were able to obtain from the various stakeholders. The project team is extremely grateful to the tea factories for welcoming the review team into their estates and factories, for the time spent and for unreservedly sharing information with them. We await their report and look forward to implementing their suggestions.

Figure 1: The project review team in discussion with dignitaries





RISK PERCEPTION FOR TECHNOLOGY ADOPTION By Mrs. Svati Bhogle, TIDE, and Mr. Prakash, Dawn Consulting

The Tea Project has adopted a barrier removal approach as its method of initiating energy use reform and therefore impacting climate change mitigation. This approach systematically identifies hurdles that hinder the project from delivering its development goals. Implementation of the barrier removal strategies creates a set of circumstances that are favorable for the desired impact to be achieved.

The project was conceived when the tea industry was experiencing a crisis and the price of south Indian teas was at an all-time low. The project therefore prepared to overcome several barriers. Fortunately, the situation in the tea industry is much better today. But our assessment shows that some barriers to energy use reform still remain, despite the sector recording good profits.

The project therefore engaged the services of a financial consultant, to look into and advise the project on the risk aspects relating to energy efficiency.

The consultants understood the energy audit recommendations and the technical feasibility of implementation, as well as the performance of and investments for each intervention. Realizing that the investments in electrical energy were lower and the adoption of electrical energy interventions need not be a one-time decision but could be staggered, and upon suggestions from the project implementation team, the focus of risk assessment was directed towards techno economic factors, especially with regard to the adoption of Hot Water Generators (HWG).

The consultants evolved typical and hypothetical investment models, for which significant inputs were provided from technical studies of the HWG. Data on comparative assessments between the production of tea and the fuel saved were very useful in estimating payback periods on investments made. One clear outcome of this assessment was that the investment in the HWG does not increase linearly with the size of the factory. This non-linearity in savings implies that the bigger the size of operations in the factory, the shorter the payback period. The outcome of this observation is that smaller factories, like the bought leaf factories or factories that operate in a single shift, are at a serious disadvantage.

The inputs for the risk assessment were provided through site visits, group discussions, personal discussions and responses to questionnaires. Respondents were questioned on risk perceptions related to the industry and company, organizational strategy, the availability of and access to information, risks associated with schedule and production, financing and access to finance, performance of equipment and vendors and services. The tea factories were of the view that the HWG and energy efficient motors were priority interventions. The key high risk items in order of decreasing priority were (i) Risk associated with poor after-sales service and availability of spares, (ii) Equipment performance risk (iii) Risk associated with the life of the equipment (iv) Risk associated with production loss and (v) Risk

associated with quality of tea.

The recommendations made to the tea factories were:

To select quality vendors who are backed by strong Service Level Agreements (SLA)

To visit tea factories that have already adopted key energy efficient equipment and understand / prepare for practical challenges faced

The recommendations made to the project were infrastructure related, technical, professional and finance related:

The project was asked to take the lead in creating local infrastructure for after-sales service

The project was asked to develop an information booklet on performance indicators based on technical studies

The project was asked to offer financial incentives for the setting up of briquette-making units, solely for the purpose of providing alternative fuel for tea factories

The Project Steering Committee (PSC) understood that tea factories faced constraints in sourcing good quality briquettes because of competing demand for the same from other industry sectors. The PSC also reviewed the data presented, which showed that if a tea factory used 2500 tons of briquettes a year (@ Rs. 4200 / ton instead of firewood at Rs. 3000 / ton), it would save Rs. 28 lakh / year in fuel costs. This would also result in GHG emission reduction and help arrest deforestation. The PSC considered the constraints and understood that there is a need to support the pioneer briquette-making unit who would supply briquettes exclusively to the tea sector. The PSC recommended that in the calendar year 2010, upto 3 briquetting units be incentivized on a first-comefirst-serve basis, with one-time financial assistance of Rs. 5 lakh, provided they commit to the following terms:

Supply of 2500 tons of briquettes annually to the tea sector

Min CV of briquettes: 4000 kcals / kg and more

Max moisture content: 10%

Max ash content: 5%

Price fixed at Rs. 4000 / ton plus tax ex briquetting unit

Briquette-making units who commit to the above terms and undergo scrutiny as specified, may please contact the Tea Project office in writing, expressing their interest and clearly mentioning their willingness to abide by the above 5 criteria.

ANNOUNCEMENT

ENERGY UPDATE

Status of Energy Audits undertaken at Tea Factories *:

Energy Audits Conducted								
No	Year	State						
		Tamil N	adu	Korolo	Karnataka	Total		
		Bought Leaf	Estate	Kerala				
1	2008	7	4	-	-	11		
2	2009	12	15	10	3	40		
3	2010	-	6	7	-	13		
	64							

Status of HWG Installations at Tea Factories *:

Hot Water Generator Installations							
No.	Factory Name	Туре	Nos.	Status			
1	HML - Arrapetta	Orthodox	1	Installed			
2	HML - Chundale	Orthodox	1	Installed			
3	HML - Wentworth	Orthodox	1	Installed			
4	HML - Wallardie	Orthodox	1	Installed			
			(Non Thermax)				
5	HML - Surianalle	CTC	2	Under			
				Installation			
6	Parry Agro-Mayura - Valparai	CTC	1	Installed			
7	Waterfalls - Valparai	CTC	1	Installed			
8	Glendale - Coonoor	Orthodox	1	Installed			
9	Parrisons - Mananthavady	CTC	1	Installed			
10	Westberry - Ooty	CTC	1	Installed			
11	Poabsons - Vandiperiyar	CTC	1	Installed			
			(Non Thermax)				
12	AVT - Chulika	CTC	1	Ordered			
13	BBTC - Mukkotu Mudi	Orthodox	1	Ordered			
Total = 14							

* as of 31.05.2010

REPORTS FROM THE TIDE TECHNICAL TEAM

Several tea factories are now seriously engaged in implementing energy conservation measures in their factories based on the recommendations of the energy audit. However, as can be expected, each factory is carrying out implementation at its own pace and taking decisions based on their own prioritized needs and resources. The project would like to technically support the efforts of tea factories and can conduct performance tests on equipment in tea factories through the efforts of the TIDE Technical Team (TTT).

The TTT has the capability to conduct various equipment performance studies in tea factories. The process for obtaining technical reports from the TTT is as follows:

- i) The factory takes its independent decision to procure an energy efficient equipment and would like to know the energy saving potential of that equipment.
- ii) The factory would then contact the Tea Project Office, inform of its decision to install the specific equipment and request baseline studies on that particular equipment which it would like to replace.

VISIT TO HML & PARRISONS BY THE TEA PROJECT TEAM

Seemingly, one of the factors preventing factory owners from opting for a Hot Water Generator (HWG) is the lack of information regarding its beneficial aspects and energy-saving properties.

In order to spread awareness regarding the functioning of HWGs, several tea and bought leaf factory owners and managers were invited to visit the HWGs installed at HML, Arrapetta and Parrisons Estate, Mananthavady.

During the visit, Dr. RS Madhavan and Mr. K. Edwin Franklin (Territory Manager, Thermax, Coimbatore) explained comprehensive details to the visitors and answered burning questions.



Figure 1: Dr. RS Madhavan and Mr. K Edwin Franklin interacting with participants

- iii) Depending on the proposed date of installation of the energy efficient equipment and on the time commitment of the TTT, a date and time would be set for the performance study.
- iv) The TTT will visit the factory, conduct required performance studies and compile the findings along with recommendations in a detailed report. A softcopy of the comprehensive report, including recommendations and inputs from Dr. RS Madhavan, would be sent to the factory. All factory level reports are only meant for the factory and will be kept confidential.

The main objective of this service is to create more information for each tea factory so that they have a better understanding of their factory's performance and the scope for increased energy efficiency. The project is not charging for this service, but it is offered only on the condition that the factory would shift to an energy efficient equipment and is limited to factories that have already carried out energy audits.

For further information and request for a performance study, please contact Mr. RL Narasimhan at the Tea Project Office (kindly refer the last page for contact details).



KAIKATTY INDCO SHOWS THE WAY

By Mr. Arunachalam, Special Officer, Kaikatty INDCO Tea Factory Ltd.

"Cost reduction" is a mantra ever chanted in any production industry. With regard to tea factories, efficient usage of power and fuel is a key factor to manage production costs. Other financial aspects involving social obligations, statutory requirements and economic fluctuations, are often beyond a company's control. However, the relevance and importance of cost reduction cannot be underestimated. The tea market is a buyer's market and demand-supply mismatch is an often created scenario on international and national levels, rendering an average sale not possible at all times.

Out of proceeds from the sale of Made Tea, the portion available for green leaf payment is the amount left after deducting Cost of Production (CoP). Hence, the lower the CoP, the better the leaf price available. Ensuring supply of quality leaves is one basic way of cost control, as it reduces energy consumption (and cost) required for reprocessing and also puts less load upon the rolling room machinery.

Kaikatty INDCO soon understood this and, with recommendations from energy audits conducted, started implementing energy efficient measures with expert guidance from TIDE. Downsizing motors to energy efficient ones, replacing fan blades and installing automatically regulated controls, ensuring light efficiency, etc. were some of the key measures taken. Implemented in May 2009, it produced perceivable results for the financial year 2009 – 10. The power consumption used per kg of Made Tea was reduced by 0.07 units, which amounted to substantial savings, given the scale of operations.

Measurements of energy consumption at various

factories of Kaikatty INDCO were taken. As depicted below, factories Kaikatty and Salisbury have drastically reduced their power cost per kg of Made Tea:

Factory Name
Bitherkad
Bikkatty
Ebbanad
Frontier
Ithalar
Kaikatty (EnCons Implemented)
Karumbalam
Kattabettu
Kinnakorai
Kundah
Mahalinga
Manjoor
Mercunad
Salisbury (EnCons Implemented)
Pandalur



The UNDP dignitaries and energy analysts who visited Kaikatty on 1st June 2010, were appreciative of the fact that the energy costs saved are ultimately passed on to the tea growers in cooperatives. Kaikatty INDCO stays committed to energy conservation.

FIRST DEDICATED BRIQUETTING UNIT by Mr. Ranjit Pratap, Proprietor, Sri Ra Ra Biofuels

Sri Ra Ra Biofuels has recently launched a briquette making facility and committed that it would exclusively supply briquettes to the tea sector. The tea sector has often indicated that they would prefer to use briquettes in place of firewood or coal, but they hesitate to buy briquettes because of uncertainty about the quality and continued availability. We have opened a briquetting factory at #2/115, Billichi Village, Karamadai, Coimbatore – 641104, where we make high quality briquettes from good quality raw materials like saw dust, ground nut shell, etc. The average



Figure 1 : Briquette samples



Figure 2 : Drying of saw dust

calorific value of our raw material / briquettes is always around 4000 kj / kg. Our objective is to demonstrate to the tea sector that biomass briquette is an excellent fuel, both in terms of fuel use efficiency and low maintenance of heat equipment. We would also like to demonstrate that briquettes are cost effective and we are in business to serve the tea sector. For any enquiries and further clarifications, you may contact Sri Ra Ra Biofuels at (0) 9962 744 693 (Mr. Ranjit Pratap, Proprietor), or at ranjit_new@yahoo.co.in.

ENERGY CONSERVATION (ENCON) MEASURES IMPLEMENTED AT TEA FACTORIES

- as on 31.05.2010 -

No.	Description of Energy Conservation Measure	No. of Factories
1	Installing an Automatic Power Factor Controller (APFC)	52
2	Using Shaft Mounted Blowers in the Withering Section	29
3	Installing a Maximum Demand Controller	22
4	Using Star Connection of Motors in Sifting Section	22
5	Having Flat Belt Drives for the Hot Air Fan	13
6	Installing Energy Meters Section-wise	12
7	Using Lighting Load Optimization	9
8	Having Flat Belt Drives in CTC Banks	9
9	Installing Energy-efficient Motors (Section-wise)	6
10	Installing an ID Fan Controller	21
11	Using a Closed Shed for Fuel Storage	18
12	Installing a Hot Water Generator	7

The table depicts the types and number of EnCon measures that have been implemented in 60 bought leaf, estate, tantea and indco tea factories. There are 12 energy conservation schemes, of which 9 pertain to electrical and 3 to thermal energy conservation.

FAREWELL TO MR. RD NAZEEM EXECUTIVE DIRECTOR OF TEA BOARD

The Tea Project team wishes to thank Mr. RD Nazeem, Executive Director of the Tea Board, for his tremendous support and his valuable contributions and encouragement. His efforts have been instrumental in steering the project towards the right direction and achieving the success we have witnessed thus far.

Mr. RD Nazeem will continue to be associated with the Tea Project as a member of the Project Steering Committee and the Technical Advisory Committee. We are grateful for his continued involvement and wish him all the best in future endeavours.



Figure 1 : TIDE's project team presenting Mr. RD Nazeem with a memento

New Website Design



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EnConTe.

Welcome to EnConTea Energy Conservation in Small Sector Tea Processing Units in South India

www.encontea.org

The Tea Project website has a completely new design! Now you can find lots of information on the Project, the Tea Board, TIDE, the Project Team, Steering and Technical Advisory Committees, Articles, Presentations, Newsletters, Briquetting Machines and Cut Wood Suppliers, Consultation Services, Events and more ...

... We look forward to seeing you online!



DID YOU KNOW?

TEA CAN BE USED TO DYE FABRIC

Often, substandard tea produce can not be sold in the market at a profitable price. However, the project experimented with a new, interesting & creative alternative to turn such tea into a prospective business venture ...



Voilà, tea industry meets fashion industry!

Substandard tea can be used to dye fabrics and produce colored silk scarves, stoles, dupattas, handkerchiefs, etc. Colors range from beige to dark brown and can even have green and maroon undertones.

Regions like Ooty and Coonoor being major tourist attractions, these fashion accessories can also have immense business potential as gift ideas or souvenirs.

To view dyed samples, please contact the TIDE Project Office: Tea Board Zonal Office, Shelwood, Coonoor Club Road, Post Box #6, Coonoor – 643 101, Nilgiris District - Tamil Nadu; Ph: (0423) 222 20 90 "When one tugs at a single thing in nature, He finds it attached to the rest of the world." - John Muir

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