Energy Conservation in Small Sector Tea Processing Units in Southern India

Millennium Development Goal:
Goal 7 – Ensure Environmental Sustainability

Targets:
Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

Background
India is one of the largest tea producers in the world, producing 870 million kilograms of tea annually. South India contributes about 24 percent to the country’s annual tea production. The region is home to about 300 tea factories, of which 125 are small-scale units. Tea processing is energy intensive, and energy costs constitute 30 percent of the total tea processing costs. Tea factories rely heavily on biomass to meet their thermal energy requirements for drying tea leaves. Even as data from audits suggests that it is possible to save 20 percent of both electrical and thermal energy, there are few examples of energy conservation measures that can enable the tea industry to capture these savings.

The project, supported by Global Environment Facility, has introduced energy-efficient measures in the firewood intensive tea sector in the region by building awareness, providing technical support, strengthening the supply chain with established equipment manufacturers and enabling financial support through subsidies from the Tea Board and the Ministry of New and Renewable Energy. In addition, the project has helped develop useful knowledge products through tutorials, promotional and management documentaries and process documents that will serve as a reference for future efforts to replicate this project.

Objectives
The primary objective of the project is to remove barriers to adoption of energy-efficient technologies and develop replicable strategies for energy efficiency and energy conservation interventions in the tea processing sector of south India. The project aimed at helping 30 factories adopt energy efficiency measures and practices, which would further result in a cumulative saving of 55,800 tons of carbon dioxide emissions.

Relevant India Development Goal:
India is a signatory to the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Indian government supports international efforts for mitigating the impact of greenhouse gas (GHG) emissions

Project Information
Area: Environment and Energy

Budget: Total: US$ 2.05 million
US$ 950,000 (GEF)
US$ 241,000 (Government of India)
US$ 859,000 (Others)

Duration: 2008–2012

Government Counterpart: The Ministry of Commerce, Government of India

Implementing Partner(s): The Tea Board, Coonoor (Ministry of Commerce), Tamil Nadu

Responsible partner: Technology Informatics Design Endeavour (TIDE)

Other Partner(s): United Planters Association of South India (UPASI)

Location(s):
Nilgiris, Tamil Nadu; Vandiperiyar and Wayanad, Kerala
Results so far

- Over 200 small tea processing units have implemented a range of energy efficiency measures in both thermal and electrical energy triggering close to US$ 2.5 million in private investment. Thermal energy measures include building wood sheds, using wood splitters and VFD blowers; and 10 electrical energy interventions, such as lower HP motors that are energy efficient, appropriately-sized proper-sized efficient motors, flat belt drives, VFD for rotor vanes, individual capacitor bank for high power motors and LEDs for lighting.
- The initiative has enabled savings of US$ 10.4 million through savings of 19.5 million kWh in electricity consumed and reduced firewood required for heating by 142,000 tons
- The present interventions have resulted in reducing carbon dioxide emissions generated from producing a cup of tea from 17 to 12 grams per cup of tea.
- While energy cost savings are INR 2.78 per kg of made tea, investments in energy efficient measures are INR 2.4 per kg of made tea, allowing for a comfortable payback period of nine months on these investments.
- Impact studies of 86 factories post implementation show that energy efficiency measures have helped reduce carbon dioxide emissions by 263,952 tons. On an average, the tea produced with ENCON measures generated 0.266 kg lesser CO₂ (10 percent lesser) than the earlier amount of 381 kg CO₂/kg of tea.
- Reduction in energy costs by INR 2 per kg of tea through popularization of briquettes, made of agriculture residues. Two briquetting units have been set up with private investment, and a third is being set up by a Periyar Maniammai University staff. GEF grants of US$ 20,000 were also provided.
- Four fuel testing facilities have been set up in Valparai, Vandipe riyar, Munnar and Wayanad to ensure good quality of biomass wood and briquettes. These facilities help to measure calorific value, ash content and moisture of the fuel sample.
- Innovative methods introduced in Jayshree Tea briquetting unit have helped the unit maintain moisture content of raw materials to 15 percent which is optimal for tea processing.
- Three hot water generators, with a capacity of 10 lakh kcal per hour, have been purchased, which will, based on studies, help in reducing firewood consumption by 350-400 tons per year and carbon dioxide emissions by 600 tons per year in a medium-sized factory.
- A strong supply chain of energy equipment dealers has been established which has also helped cater to the special needs of the tea units. For example, Thermax Pvt. Ltd. customized their large capacity boilers to meet capacity requirements of the tea units.
- Knowledge products such as tutorials on energy efficiency measures like ‘Destination Efficiency,’ promotional documentaries, process document, a dedicated project website ‘www.encontea.org,’ and a compendium ‘Consolidation of Detailed Energy Audits’ were developed as part of the project.
- Several tea processing units have employed energy managers to systematically explore and implement energy saving measures on a regular basis.
- The Tea Board has included replication of energy efficiency and energy conservation measures in Assam, and energy Access to labour colonies of tea factories in the draft 12th Five-Year Plan.

Looking to the Future

- The Tea Board is initiating the replication of energy efficiency measures in other tea producing regions of the country – east and north-east.
- Inclusion of energy efficiency as a parameter for measuring the overall performance of the tea sector by the Tea Board of India, the nodal agency of the Ministry of Commerce.
- Stakeholders are discussing second generation of interventions such as energy plantations, wind farms, etc, which would lead to ‘Zero Carbon’ tea processing.
- Tea Board as Renewable Energy Nodal Agency of MNRE will trigger Renewable Energy provisions including for labour colonies who do not have adequate energy supplies.

Last updated: September 2013

Empowered lives. Resilient nations.

UNDP partners with people at all levels of society to build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. With offices in more than 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations.

Website: www.in.undp.org