

CEPF FINAL PROJECT COMPLETION REPORT

I. BASIC DATA

Organization Legal Name	: Norden Pines
Project Title	: Production of Alternative Fuel from Sawdust and other Wood Waste by Using Briquetting Technology
Implementation Partners for this Project	: CEPF is the Co-financer in the project establishment. No Partners in the project implementation.
Project Dates	: July 1, 2007 - December 31, 2008
Date of Report	: 28th February, 2009

II. OPENING REMARKS

Bhutan is a small landlocked Kingdom in the Eastern Himalayas. Bumthang is one of the twenty Dzongkhags (districts) located in the North Central part of the country. Its location at a relatively higher altitude means that the homes need to be heated - especially during the cold winter months. In Bhutan, fuel wood has been the traditional source of heating homes as well as for cooking. Therefore, the country has one of the highest per capita fuel wood consumption in the world and Bumthang is one of the highest consumers of fuel wood in Bhutan.

In modern times, Bumthang has emerged as the most preferred destination for tourists. Consequently, Bumthang has seen the establishment of a large number of tourist related services such as lodges and hotels, creation of trekking routes etc. All this translated into increased demand for timber - for use as fuel wood and as construction material. This is a serious challenge to the country's conservation efforts.

The Constitution of the Kingdom, the National Environment Protection Act, 2007 and the Forest and Nature Conservation Act, 1995 mandates that 60% of the country's total land area should be maintained under forest cover at all times. But the ever increasing demand for timber and fuel wood is beginning to pose a serious challenge to these political commitments. Over the past decades, the Royal Government has launched various plans to reduce timber and fuel wood consumption as a measure towards environment conservation. The government has streamlined timber and fuel wood harvesting procedures and enhanced reforestation through adoption of the Forest and Nature Conservation Act, 1995. Export of raw timber has been banned since 1998. More than 40% of the total land area has been declared as National Parks and the biological corridors connecting these parks.

The Sawdust Briquetting Project launched in Chumey valley of Bumtahng by Norden Pines has, in its own small way, contributed to the environmental conservation efforts of the Royal Government. On the one hand the demand for fuel wood has been on the increase year after year while on the other hand, the sawdust generated by the numerous saw mills in the Dzongkhag remained unutilized. It has been taking up the limited space of the sawmill compounds and causing pollution while at the same time running the risk of incidence of fire. With Sawdust briquetting, demand for fuel wood on the forest is reduced and the efficient management of sawdust in the saw mills means that there is less pollution. The harvest timber achieves greater economic value - through the utilization of sawdust for briquetting. More importantly, Norden Pines Briquetting Unit is located within the corridors of the two National Parks - Thrumshingla and Jigme Singye Wangchuck National Parks. The strategic location of the Unit helps reduce pressure of fuel wood extraction from these Park systems. Already, the unit meets some of the fuel wood requirements of the nearby valley of Chokhor as well as Trongsa district. In the near

future, the supply of the briquettes from this Unit is expected to expand to Thimphu in the West and Mongar in the East.

III. ACHIEVEMENT OF PROJECT PURPOSE

Project Purpose : *To develop a public-private partnership to support conservation friendly alternate energy strategies in two pilot sites within the key corridor linking Thrumshingla National Park and Jigme Singye Wangchuck National Park in B2C2*

Planned vs. Actual Performance

Indicator	Actual at Completion
Purpose-level:	
1. No. of households and institutions that have adopted alternate energy source	10 institutions (Bumthang District Hospital, Jakar Higher Secondary School, Sherubling Higher Secondary School, Taktsi Middle Secondary School. Vocational Training Institute, Ugyen Wangchuck Institute for Conservation and Environment, Jakar Village Lodge, River View Lodge, Rinchenling Lodge), 4-5 individuals have adopted the alternate energy source. In addition more than 50 individuals have been opportunistic buyers of the briquette.
2. Tons of fuel-wood consumption reduced by the alternate energy program	Most of the individual and institutions have adopted the alternate energy program in the past 2-6 months and therefore it will not be realistic to quantify the tons of fuel wood consumption reduced at this stage. Realistic figures will emerge after at least a year of adoption. However a case study on the economic and environmental perspectives of adopting alternative energy by two institutions showed trends that wood based briquettes would help in reducing fuel wood use. Note- The preliminary results of the case study is attached

Describe the success of the project in terms of achieving its intended impact objective and performance indicators.

It can be said with certainty that the project has successfully achieved its intended objectives of developing a public-private partnership to support conservation friendly alternate energy strategies. The project has been instrumental in creating awareness among the private sawmill owners on how to add value to the harvested timber. The local public has been suitably convinced of the benefits of using briquettes to substitute the traditional firewood. The Unit has been successful in demonstrating the superiority of the briquette over firewood - not only in terms of labor saving that it affords, but also in terms of cost as well as combustive efficiency.

Initially, due to people's ignorance, the briquette faced resistance from the market which is expected given that briquette was a new concept. However, once the users became aware of the benefits of briquettes, its use in homes picked up towards the end of 2008. By the start of 2009, the market improved and sales were recorded at around 45 tons in the past few months - out of the total production of 153.50 tons. The market expansion and the interest in the product is encouraging. Every ton of briquette sold means proportionate cut in the felling of trees.

Were there any unexpected impacts (positive or negative)?

Initially, the briquetting project targeted only the individual rural households to consume the product for domestic heating and cooking. Unexpectedly, demand from the institutional consumers such as schools and hotels now outstrip those from the traditional consumer – the households. This turn of events is clearly a very positive one since these institutions are large consumers of fuel wood. Their conversion to use of briquette not only means that the pressure on the forests for fuel wood will be drastically reduced, but it also means that the project will become more profitable through increased production.

The other unexpected impact on the production of the briquette was the need to the sawdust prior to briquetting. The need to manage the moisture content in the sawdust was overlooked while planning the briquetting project. Currently, 2.5 days sawdust drying is required prior to briquetting. The 2.5 days dried sawdust could last only half a day to produce the briquette. The machines therefore remains underutilized and the production process is economically not efficient. An efficient sawdust drying process needs to be considered to improve the efficiency of the project.

Also, it was envisaged that the sawdust generated from the sawmills within Chumey valley would be sufficient to run the briquetting unit continuously. The capacity of the unit now proves that the sawdust from the locality is not sufficient. Methods to transport sawdust from other areas is under due consideration. This way, the briquetting project will not only help management of sawdust and reduction of forest cut in Bumthang, but its benefit will expand to other *dzongkhags* (District Administration) as well.

IV. PROJECT OUTPUTS

Project Outputs:

Planned vs. Actual Performance

Indicator	Actual at Completion
Output 1: Environment friendly domestic energy source introduced for the communities in two pilot sites of the project area	
<i>1.1. Tons of briquettes produced from wood waste</i>	153 tons of briquettes were produced till the end of the project period December 2008). Another 60 tons were produced since then.
<i>1.2. No. of households and institutions that have adopted briquettes</i>	10 institutions (Bumthang District Hospital, Jakar Higher Secondary School, Sherubling Higher Secondary School, Taktsi Middle Secondary School. Vocational Training Institute, Ugyen Wangchuck Institute for Conservation and Environment, Jakar Village Lodge, River View Lodge, Rinchenling Lodge), 4-5 individuals have adopted the alternate energy source. In addition more than 50 individuals have been opportunistic buyers of the briquette.
Output 2: Awareness and capacity building programs to achieve change in behavior and practices for more sustainable energy use introduced in the two pilot sites	
<i>2.1. No. of awareness generation materials produced and activities implemented</i>	For awareness, the project was advertised in the national media-; Bhutan Broadcasting Services television and radio programs, and Kuensel (national newspaper). For sensitization of adopting the briquettes

	<p>about 7 tons were distributed for free to institutions.</p> <p>These activities were proved to be more effective than producing materials.</p>
<p>2.2. Targeted marketing strategy for the adoption of alternate energy</p>	<p>-Project initially targeted the individual rural households. However the institutions and the hotels proved to be viable market.</p> <p>-Reduction in briquette sale rate from Nu 3/kg (\$.06/kg) to Nu 2.50/ kg (\$.05/kg) to the bulk consumers as a marketing strategy compared to the Natural Resource Development Corporation Limited rate for Nu 3.50/kg (\$.07/kg)</p> <p>-Continuation of providing sample briquettes to new institutions and commercial fuel wood base ventures to gain beneficial experiences</p>

Describe the success of the project in terms of delivering the intended outputs.

The primary consideration for initiating this project was to help reduce felling of trees for firewood and thereby conserve the natural environment. Secondly, it was intended that through the introduction of briquetting, an awareness would be created among sawmill owners to better manage timber wastage and value addition. Thirdly, it was hoped that it would help fuel wood consumers to save costs and time in gathering fuel wood for heating as well as cooking.

Considering that the consumers have now accepted briquettes as a more cost effective and environment friendly alternative to fuel wood, it can be said that the project is a resounding success and while at the same time achieving the intended output.

Were any outputs unrealized? If so, how has this affected the overall impact of the project?

When the project was conceptualized, it was not understood that the saw dust – the primary raw material in the production of briquettes – would contain high percentage of moisture. Thus, during actual production process, it became apparent that there was a serious mismatch between the drying unit and the briquetting unit. The drying unit could not dry enough to fully utilize the installed capacity of the briquetting unit. The 1,000 Kgs/Hr drying capacity of the furnace drier was less than 20% of the capacity of the briquetting unit. This severely affects the production and output capacity of the briquetting unit. Therefore, either a higher capacity dryer needs to be installed or a sawdust storage facility needs to be installed in order that the saw dusts can be stored under covered condition and not be exposed to rain water.

V. SAFEGUARD POLICY ASSESSMENTS

Provide a summary of the implementation of any required action toward the environmental and social safeguard policies within the project.

In terms of the Constitution, National Environment Strategy - *The Middle Path*, the Forest and Nature Conservation Policy, Biodiversity Action Plan, Labor and employment Act, etc., the briquetting unit implementation is in line with the national policies. Its targeted intention of public-private partnership towards environment conservation through energy alternatives is in line with the national environment related policies. Providing employment and safety gadgets to the workers were in line with the labor and employment Act of the kingdom.

VI. LESSONS LEARNED FROM THE PROJECT

Describe any lessons learned during the various phases of the project. Consider lessons both for future projects, as well as for CEPF's future performance.

Lack of expertise and experiences in formulation of such projects had been disadvantage for the proponent throughout the project. Planning, designing, obtaining approvals and sourcing for funds consumed considerable time, energy and resources. Bumthang being remote and far away from the city, has add to the disadvantages. For a simple matter, the promoter had to come to p/ling investing lots of time, energy and resources. Even for procurement of equipment sets and spare parts and finding experts to set up the briquetting unit, it was not a simple task. Everything had to be purchased from Phuentsholing and nearby Indian town of Siliguri. Days, weeks and months had to be spent waiting for obtaining small nuts and bolts. Obtaining necessary approvals from the government agencies was lengthy and cumbersome.

Until CEPF came into picture, the dream of establishing the briquette unit remained vague. The government had no wishes to financially support such ventures and no local financial institutions found the venture viable for loans. The CEPF programme is not known in Bhutan and only through sheer luck the entrepreneur came in contact with the CEPF.

The future projects should explore adequate information prior to planning of such projects and CEPF should enhance awareness of its support programmes in the country.

Project Design Process: (aspects of the project design that contributed to its success/failure)

The project area falls within the buffer zones and biological corridors of two important national park systems of Bhutan, i.e. TNP and JSWNP. The broad objective of this project is to assist conservation of forest through optimization of forest-based resources. Sawdust, the by-product from saw mills could be used as an energy source. Prior to the installation of the project, sawdust was a problematic waste. Therefore, the project was designed to make use of this wood waste to provide raw material for a product that can serve as an alternative energy source.

The project was designed to consume the sawdust generated by the local sawmills and wood-based furniture units to produce briquettes that could serve as an alternative to fuel wood. Initially the rural households were targeted. However, over time it gained popularity with the institutional consumers such as hotels and schools. On a pilot basis the capacity of the unit was designed to produce approximately 4 to 5 tons of briquettes per day. The unit design includes a moisture drier furnace, a dried sawdust conveyor and a briquetting machine. Around 10 menial workers are employed. A supervisor oversees the operation and manages the entire unit.

Project Execution: (aspects of the project execution that contributed to its success/failure)

Upon acceptance of the project proposal by CEPF and obtaining necessary government approvals, the promoter visited Hyderabad to inspect the machines and confirm the supply order with the principle supplier, sometime in mid May 07. The machines reached Bumthang in September 07 and installation process was completed by November 2007. The project was inaugurated by Mr. Jorgen Thomson, senior vice President and Executive Director of CEPF and Dasho Dzongdag, Bumthang Dzongkhag. Full operation of the unit began by March 2008. The project execution is fully undertaken by the sole promoter, Mr. Tashi Wangdi, Proprietor of Norden Pines Sawmill.

The project execution has been successful primarily due to the supportive policy of the government for such ventures, timely financial support accorded by the CEPF, availability of required technology in the neighboring country India and decision making advantages of a single promoter.

VII. ADDITIONAL FUNDING

Provide details of any additional donors who supported this project and any funding secured for the project as a result of the CEPF grant or success of the project.

Note: There were no other donors than CEPF. Bearing 50% of the cost by the promoter, it was a joint funding project between the CEPF and the promoter of the project.

Donor	Type of Funding*	Amount	Date Received	Notes
		\$		
		\$		
		\$		
		\$		
		\$		
		\$		
		\$		

***Additional funding should be reported using the following categories:**

- A** Project co-financing (Other donors contribute to the direct costs of this CEPF project)
- B** Complementary funding (Other donors contribute to partner organizations that are working on a project linked with this CEPF project)
- C** Grantee and Partner leveraging (Other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF project.)
- D** Regional/Portfolio leveraging (Other donors make large investments in a region because of CEPF investment or successes related to this project.)

Provide details of whether this project will continue in the future and if so, how any additional funding already secured or fundraising plans will help ensure its sustainability.

The project is expected to continue. The promoter however remains the sole guarantor for the continued sustainability of the project. With the government rules becoming stringent every year on firewood collection and more and more fuel wood consumers becoming aware of the advantages of using briquettes, the promoter is confident that the briquette business will continue to be viable for a long time to come.

VIII. ADDITIONAL COMMENTS AND RECOMMENDATIONS

This is a unique and straight forward project that has tremendous benefit to the environment. The proper disposal of sawdust has been a concern to the National Environment Commission (NEC) for a long time. The NEC has been fully supportive of the initiation of this unit and, thus has been instrumental in obtaining government approval. The project is not expected to generate huge profits but is environmentally friendly while at the same time providing useful self-employment.

The CEPF grant to such a project, which is capital intensive and economically not advantageous has immensely benefitted the local environment of Chumey and nearby areas. Therefore, the Norden Pines management would like to place on record its sincere gratitude to the CEPF for providing the grant to this project benefitting the Bhutanese environment, local people of Chumey and the management in particular. The management commits to work ever harder to promote more of such ventures and look forward to the continued support of the CEPF.

III. INFORMATION SHARING

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned and results. One way we do this is by making programmatic project documents available on our Web site, www.cepf.net, and by marketing these in our newsletter and other communications.

These documents are accessed frequently by other CEPF grantees, potential partners, and the wider conservation community.

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