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This case study is about exploring and promoting usage of cane field residues or cane thrash as alternative fuel in the bagasse based cogeneration plant in sugar factory. The main objective of utilising cane trash was to help enable sugar mill to extend the plant operation even during off-season and to help reduce landed fuel cost of power generation.

## Introduction

Shree Pandurang Sahakari Sakhar Karkhana Limited (SPSSKL), situated at Shreepur, Taluka Malshiras, District Solapur, Maharashtra, was a sick sugar factory run by the Brihan Maharashtra Sugar Syndicate. It was established in 1934, which got co-operatized in 1992, using obsolete and inefficient machinery. In 2006, SPSSKL implemented a pioneering modern 9.4 MW bagasse based cogeneration plant, with a view of meeting its steam and power requirements, as a CDM project activity by simultaneously increasing the cane crushing capacity from 2,500 to 3,500 TCD. The project involved commissioning of one 55 TPH (tonnes per hour) high pressure modern travelling grate boiler with 67 kg/cm<sup>2</sup> pressure at 485°C temperature and a Siemens make 9 MW capacity condensing-cum-double extraction turbine. Additionally, existing 45 kg/cm<sup>2</sup> pressure and 450°C temperature boiler of 50 TPH capacity with backpressure turbine (Triveni make) of 3 MW capacity is also operated. Thus, total of 12 MW of power is generated at the plant.

## Need for exploring cane trash as a alternate feedstock

Initially, during off season, the cogeneration plant was running on bagasse brought from other adjacent factories at a price of Rs 600 to Rs 700 per tonne. But within few years the cost of bagasse increased substantially and reached to a price level of Rs 2,500 to Rs 3,000 per tonne due to shortage of feedstock, as other adjacent sugar factories too implemented cogen plants resulting in sharp rise in demand for bagasse in the region. In order to overcome the barrier of fuel availability at reasonable price, SPSSKL management decided to explore the cane trash as a potential fuel, which would also help extending the plant operation in the off-season. Cane trash had no commercial value at that time with farmers burning the cane trash in the field itself to clear their land for the next crop because of the cumbersome collection and harvesting process.



SPSSKL also checked with boiler manufacturer for extent of use of cane trash as fuel in the existing supplied boilers. As suggested mixing of upto 10% of the cane trash with bagasse

does not affect the boiler performance. SPSSKL planned to use 5% of the cane trash used in the plant.

### Infrastructure for cane trash collection and utilization

Ministry of New and Renewable Energy under the MNRE-UNDP/GEF project on “Removal of Barriers to Biomass Power Generation in India” has supported SPSSKL to upgrade its facility for using the cane trash as an alternate fuel resource. Since the cane trash cannot be combusted directly unlike bagasse and has to undergo harvesting, cutting and processing; there was a need for creating requisite support infrastructure, which was created under the programme.



In all 10 numbers of New Holland make (model 565) twin rectangular hydraulically operated trash balers suitable for bale size of 36 cm x 36 cm with adjustable bale length of up to 180 cm and tractors were bought under the programme. Later on company imported four more sets of tractor and baling machine at its own cost to expand the operations. In addition two sets of bale shredders (disintegrators) were also deployed at the plant site.

### Experience of using cane trash



Each field processing unit comprised of one tractor and one baler for bailing purpose, one tractor and two trolleys for transportation of the baled trash. The unit was supported by a team of 10-12 workers comprising of both men and women. The team were engaged for collection, separation, bailing and loading of trash.

Approximately 40 hectares of cane was harvested, which had the potential of creating 300 tonnes of cane trash. Thus cane trash availability works out to about 12 tonnes per hour. Each tractor-baler collect about 10 tonnes cane trash daily. The baled trash stored for two weeks before processed through shredder/disintegrator installed on the belt conveyor, which feeds the prepared trash to the bagasse carrier.

The experience of SPSSKL of exploring field residue cane trash as an alternate fuel for biomass based cogen plant showcased the following advantages:

### ***Good alternate fuel***

The moisture content of prepared trash is about 10% with calorific value in the range of 3,800-4,000 kCal/kg. This is much better than the mill's wet bagasse which generally has relatively very high moisture content of the order of 45-50% with calorific value 2,200-2,300 kCal/kg

### ***Cheaper fuel***

The factory incurred a cost of Rs 900 per tonne of baled trash to SPSSKL, which included the bailing cost, transportation, wages and royalty to the farmers at a rate of Rs 350, Rs 250, Rs 200 and Rs 100 per tonne of baled trash respectively. This was much lower than the higher cost of bagasse of the order of Rs 2,000 to Rs 2,500 per tonne due to increasing bagasse shortage in the region.

### ***Increased power production and extended duration of plant operation***

The collection and use of cane trash upto 10% mix in bagasse as boiler fuel helps cogen plant to produce not only produce higher power but also help extend plant operation by almost one month during the off-season period.

### ***Additional income to farmers and local population***

The collection, transportation and use of field residue cane trash, as alternate/supplementary boiler fuel of cogen plant gives additional revenue source to many namely farmers through sale of cane thrash, wages to collectors, transporters, thrasher/processors.

### ***Improved local environment***

It also helps in improving the local environment as else the left out cane trash in the field is usually burned in the field itself causing massive air pollution in the neighbouring areas.

