



# **FEED WATER HEATER FOR INCREASING BOILER EFFICIENCY CASE STUDY AT PELW ATTE SUGAR INDUSTRY**

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## Abstract

Sugar cane is grown in rural areas in Sri Lanka, and the residue of sugar cane production called bagasse, can be a cheap source of primary boiler fuel, when processing sugar cane. For each 100 tones of sugar cane harvested and milled, 9-10 tones of sugar is produced together with 29-33 tones of solid waste in the form of crushed cane, or bagasse. Typically, the mill uses about 53% of bagasse in a low efficiency steam cycle to produce the electricity and steam which needs for own use. Surplus bagasse is sometimes used for paper making or cattle feed but in Sri Lanka neither of these applications are effectively used. Bagasse is a major bio-mass fuel, which can be used to produce significant quantity of surplus electricity. Progressive sugar cane companies are beginning to see the advantages of creating a substantial additional cash flow by setting up cogeneration power plants fuelled by bagasse.

Using proven technology a 5000 tones/day cane mill can use its own bagasse to supply the mill with steam and power and export approximately 22 MW of electricity. Some large sugar cane mills currently have co-generation power plants that export over 25 MW. In Pelwatte sugar industry, there is 3MW electricity generation and 90T/h steam generation to meet its total demand. Modern conversion systems also ensure lower air emissions meeting latest environmental standards. Because of the harvesting of sugar cane is seasonal, maximum utilization of the co-generation plants is only achieved, if bagasse is stored for use in the off season or other biomass or fossil fuels are employed. Therefore, optimum usage of bagasse is important for minimizing fossil fuel usage. In Sri Lanka, price of fossil fuel is increasing rapidly. If the sugar factory consumes fossil fuels, then those factories are directly affected by the price changes of fossil fuels. For the existence of Sri Lankan sugar industry, and to compete with other sugar industries all over the world, optimum usage of bio-mass usage, such as bagasse is very important.

For the optimum usage of bagasse consumption, various methods can be used. But the sugar factories, which are already installed, have been equipped with some of



these methods. Later modification for optimization and saving of bagasse directly affects the whole system. To optimize bagasse usage, and to minimize fossil fuel usage, it was decided to increase existing boiler efficiency by introducing a feed water heater. But for that, extensive studies were conducted. By this modification it was revealed that an increase of 3% in boiler efficiency could be achieved thereby a saving of 54.2 million LKR could be gained annually. In addition, an obvious reduction of fossil fuel usage and reduction of emissions are the other achievements. Outcomes of this project are significant and it is bound to benefit sugar industry in Sri Lanka.