

Engineering Data Sheet

4301

Process: Sugar Wastes-To-Renewable Energy

Over 100 countries grow sugarcane. There are 130,000 km² (32 million acres) of sugarcane worldwide. The top twenty countries harvested 1,200 million tonnes of sugar cane in 2002. The largest producers are Brazil, India, and China. Both sugarcane and sugar beets are feedstocks for producing the white refined sugar that is consumed around the world. Worldwide sugar production continues to increase and is projected at 165 million tonnes by 2010. White sugar marketplace prices are eroding while governmental subsidies and mill air and water pollution continue to increase. It is today an unhappy industry at best.

The sugarcane industry generates many important but seasonable jobs which last during the harvest only. After cutting, sugarcane must be immediately processed into raw sugar within about 24 hours before extracted sugar yields begin to decrease. Mills must therefore operate around the clock during the harvest. The vast majority of mills sell their raw sugar output to distant refiners for conversion into white sugar.

During the last 10-15 years or so, traditional mill profits have plummeted due to the laws of supply and demand, and other marketplace factors. Over this same time period many mills have neglected routine maintenance in an attempt to maintain profitability. This practice has resulted in even less efficient mills. In order to return to profitability many mills will have to adapt to the next generation marketplace by producing other value added products such as fuel ethanol and white sugar. At the same time, the mills will eventually have to modernize in order to maximize their overall efficiency of operation. Many weaker mills no longer have the capital or credit to produce value added products or to consider plant modernization.

After some ten years of continuing engineering effort and study, **WaterSmart Environmental** has developed build-own-operate waste-to-renewable energy technology that has the potential for enabling mills to produce value added products while simultaneously modernizing their facilities. The technology is Kyoto Protocol compliant and generates CO₂, NO_x, SO_x, and Renewable Energy financial credits while converting seasonable jobs to new permanent employment on a sustainable basis. In addition, fresh fish farming and processing is included as a standard feature. Substantial electricity is sold to the grid on a firm basis. It is combined cycle power generation efficiency coupled with nonrecourse project financing that enables the eco-

nomically feasible of this **next generation** build-own-operate technology. This is compelling technology because it enables the mill to return to sustainable profitability as a direct result of the value added fuel ethanol and white sugar value added products. In addition, routine waste-to-energy operator profits are also shared with the mill.

WSE's cutting edge **Optimized Anaerobic Treatment (OAT™)** Process provides highly efficient and cost-effective treatment of both sugarcane milling and white sugar refining wastes. In addition, it goes a step further and converts one co-product of that treatment, biogas, into a usable and sustainable fuel source. With the **OAT™ Process** the burden of waste treatment is transformed into a sizeable resource. The other co-products of the OAT™ Process always consist of carbon dioxide gas, organic fertilizer, liquid fertilizer concentrate, and reverse osmosis permeate water.

Additional product storage equipment is provided to capture ammonia-nitrogen, orthophosphates, and potassium nutrients as liquid fertilizer. The fully treated mill effluent is recycled for boiler make-up water and other mill processing requirements. The anaerobic digester sludge qualifies as Class A biosolids and may be used as an organic fertilizer. All of the bagasse is anaerobically digested and none is used for boiler fuel. Some of the bagasse is stored to enable firm power delivery to the grid between cane harvests. Fuel ethanol, white sugar, and fresh fish are produced and processed throughout the entire year.

The moisture content of the cane is captured by the technology resulting in a treatment system which produces excess high quality reverse osmosis water. This excess water may be beneficially used as irrigation water and for fresh fish farming. All wastes from fish farming and processing are treated with the OAT™ Process. All wastes associated with fuel ethanol production are also treated in the same manner. The entire treatment technology is disclosed on WSE engineering drawings S-5063 and S-5064.

After 15 years of operation, 100% ownership of the waste-to-renewable energy technology is automatically donated to the mill.

Senior management, process engineers, and dedicated scientists at **WaterSmart Environmental** welcome your inquiries with enthusiasm.

From the Engineering Department of
WaterSmart
Environmental, Inc.



