

# Golden lining to wastewater treatment



Amid surging energy prices, the benefits of wastewater treatment to generate green energy are growing. **CST Wastewater Solutions** discusses the planned upgrade of Golden Circle's wastewater treatment plant.

**GLOBAL WATER ENGINEERING** (GWE), represented in Australia by CST Wastewater Technologies, encourages businesses with organic content in their wastewater and waste streams to investigate their anaerobic potential.

Golden Circle, the Australian canned fruit and fruit drinks company owned by Heinz Australia, already operates a wastewater plant that saves the company more than \$2 million a year in effluent disposal. It is now planning to install a larger boiler to better take advantage of biogas produced from the anaerobic processing of the wastewater from its main processing facility in Northgate, Brisbane.

"The existing boiler burns around 30 per cent of the biogas produced. The new boiler is a 10MW dual fuel (oil and biogas) boiler, designed to burn up to 600 cubic metres of biogas per hour. When it is completed and running before the end of 2011, the boiler will utilise about 90 per cent of the generated biogas," says Jason Carter, environmental manager of the Northgate facility.

## UASB WASTEWATER TREATMENT

Golden Circle's Upflow Anaerobic Sludge Blanket (UASB) wastewater treatment plant uses wastewater predominantly from its fruit processing operations.

Two digesters were installed in 1989, while a third digester from GWE was added in 1996 to cope with increased production volumes.

"The UASB plant has reduced the concentration of fruit sugars in the effluent, saving us \$2 million a year in discharge fees, although there is still some daily discharge to the Queensland Urban Utilities sewage treatment system," Carter says.

In the late 1990s, the factory began using the biogas it produces, which was previously being flared off, to contribute to the steam needs of the operation. The biogas presently feeds a 3.5MW boiler that produces about five tons of steam per hour for cooking, pasteurisation and sterilisation.

It doesn't supply all of the factory's steam needs, but supplements the steam produced by burning coal.

"At the moment, the burnt biogas is offsetting about five per cent of coal usage, while the new boiler will offset 15 per cent," Carter says. "Coal was a cheap fuel for producing steam when we began treating our wastewater in the 1990s, so the need to supplement coal with biogas wasn't there.

"However, energy prices are rising and the need to curb greenhouse emissions is growing. This means that our investment in a new boiler to utilise most of the biogas is now viable."

## BENEFITS

The concept of using wastewater to create green energy is much more widely applicable than is often realised, says CST Wastewater Solutions.

"A factory with a biological waste stream or

wastewater with high chemical oxygen demand (COD) can easily use this model to generate energy," says Michael Bambridge, managing director of CST Wastewater Solutions. "While this can contribute to reduced discharge fees, wastewater treatment installations have never been seen as significant revenue generators.

"However, by using anaerobic wastewater treatment to generate biogas, an entirely different light is shed on the cost structure of wastewater treatment. It can now become a substantial additional source of income for many factories and processing plants," he says.

The first benefit of anaerobically treating the organic effluent and waste material is, of course, cleaner effluent.

"On average, the removal efficiency of GWE's anaerobic wastewater treatment installations is as high as 90 to 95 per cent, easily bringing the organic load down to regulatory discharge standards for most types of wastewater," Bambridge says. "For the most heavily loaded wastewaters, extra post-treatment steps can further purify the effluent, meeting even the most stringent discharge regulations for water re-use.

"Besides cleaning the wastewater, by far the greatest advantage of anaerobic wastewater treatment is the controlled, continuous production of valuable biogas. Other types of treatment, such as aerobic, do not provide this benefit."

Closed anaerobic reactors generate large quantities of methane (CH<sub>4</sub>) from the organic materials in the wastewater that can diminish or even completely replace the use of fossil fuels in the production process. Industries with high organic loads can generate enough biogas to fully cover a factory's energy needs and still have a biogas surplus to feed it into power generators or sell electricity to the national grid.

Besides the economic advantage of anaerobic wastewater treatment, there is clearly also an environmental advantage, significantly reducing factories' carbon footprints. Closed anaerobic process systems prevent large quantities of CH<sub>4</sub> being emitted into the atmosphere.

With CH<sub>4</sub> being 21 times more harmful to the atmosphere than carbon dioxide, anaerobic wastewater solutions can qualify for Emission Reduction certificates for projects in countries listed under the UN Kyoto Clean Development Mechanism (CDM) and Joint Implementation (JI) programs.

## SUITABILITY

Anaerobic wastewater treatment with biogas recovery is possible for a wide range of industries. The main criteria for energy-generating projects to become viable is the COD loading rate. The higher the organic load, the more biogas and renewable energy can be generated from it.

Cost of fuel also plays a significant role. As energy prices increase, choosing anaerobic technology holds the key to immediate and future safeguarding of power supply for many industries.

Suitable industries for anaerobic wastewater treatment include food processing, canning, abattoirs, dairy, beverages and alcohol fermentation.