Media Release – GWE/CST – July 2015

(Attn media including beef, pork, poultry, dairy, cropping and agribusiness (including fruit, cane, grain, maize, yams, sorghum, potatoes, beans and cassava), rendering, fertilizer, agriculture, food and beverage manufacturing, paper and packaging, environmental, energy, process engineering, safety and water and wastewater. High-res pictures from whyte@bigpond.com)

Many regions are increasingly affected by drought and climate change, including South-Western USA, Australia, Africa, Southern Europe and South-Eastern and Eastern Asia

Waste technologies transform problems to profit as water innovators combat the twin impact of drought and pollution

Anaerobic digestion processes that radically improve the quality of waste water while delivering green energy extracted from biological waste streams

are emerging as a profitable way for agricultural and food processing industries to cope with the twin impact of drought and pollution challenges.

High-temperature thermophilic anaerobic digestion technologies, typically operating at 55 deg C, are part of a combination of processes that digest waste water's organic content to produce green energy (methane) while achieving outstanding waste water effluent qualities.

Post-anaerobic treatment steps can also further increase water quality for extensive recycling, which is also becoming particularly relevant to countries and entire regions suffering drought or increasing affected by climate change, including South-Western USA, Australia, Africa, Southern Europe and South-Eastern and Eastern Asia.

The technologies are particularly effective for industries such as red meat, poultry, dairy, brewery, canning, paper and packaging, food processing and agribusiness processing including many of the world's most important crops, including fruit, cane, grain, maize, yams, sorghum, potatoes, beans and cassava

Results achieved over hundreds of plants globally have achieved removal of organic waste from discharge water of between 70-99 per cent, with many of the plants installed by Global Water Engineering also capturing the organic waste converted to methane and using it to power boilers and electricity generators. The further treatment steps for recycling of water after anaerobic processing can also result in up to 75 percent of the treated water being available for re-use.

GWE's latest success in a drought-prone area was by the leading Japanese meat processor NH Foods at Oakey Beef Exports in Australia, where CST Wastewater Solutions employed Global Water Engineering anaerobic digestion technology to convert organic waste in from discharge water into green energy (methane) representing 40 per cent of the plant's natural gas needs. The cost of construction is expected to be repaid inside five years, then add profitability to the bottom line in perpetuity, says Oakey Beef Exports General Manager Mr Pat Gleeson.

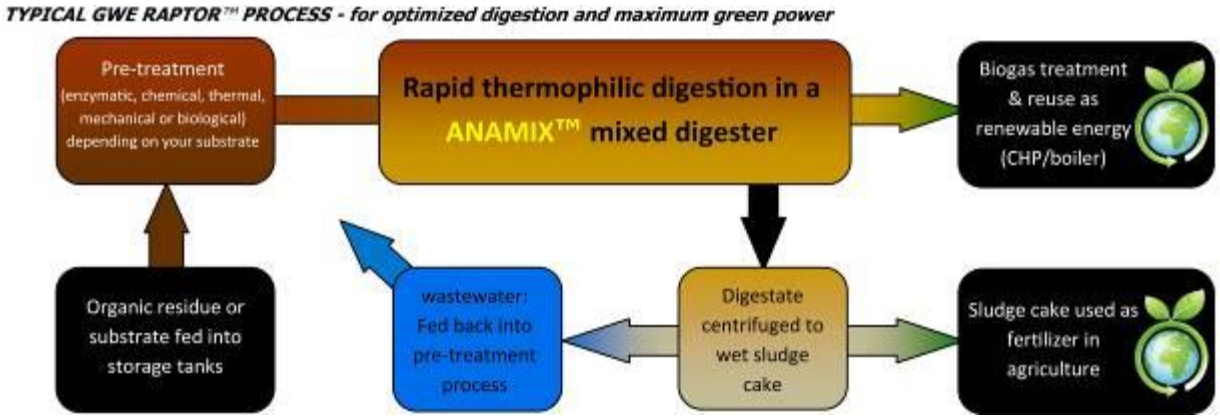
Oakey's COHRAL™ plant – the largest GWE Covered High Rate Anaerobic Lagoon in the world – will produce 183.3 gigajoules of energy a day when it reaches design capacity through the combustion of methane produced, says the Managing Director of CST Wastewater Solutions, Mr Michael Bambridge, whose company represents GWE technologies in Australia. GWE is headed by green Global Water Engineering CEO and Chairman Mr Jean Pierre Ombregt, who has been a world leader in anaerobic digestion of industrial effluents and green energy solutions for more than 35 years and whose company has been involved in more than 300 water and waste water projects in Asia, Africa, North and South America, Australia, China, Europe (including Eastern Europe) and Russia.

Many of these projects have attained outstanding waste water processing efficiencies of up to and exceeding 99 per cent organic load removal by further steps in the anaerobic process. Good solutions do not have to be extortionately expensive for the wide variety of industries that can employ them. Such industries include red meat, poultry, dairy, brewery, canning, paper and packaging, food processing and agribusiness processing including many of the world's most important crops, including fruit, cane, grain, maize, yams, sorghum, potatoes, beans and cassava.

- **An excellent first step in many instances can be taken by covering and lining lagoons and incorporating anaerobic processes with properly engineered feed and recycle systems, such as those in the COHRAL™ process.**
- **A second progressive option can involve the use of tanks to containing anaerobic and other processes, minimising land use, reducing plant footprints and providing high security against leaks and groundwater contamination. Anaerobic processes can also be more closely efficiently controlled in such close environments, optimising water purification and green energy production.**

- **A third optimum stage can be the eventual incorporation of the most advanced anaerobic technologies into sealed tank environments, such as GWE's RAPTOR™ treatment system for organic residues, for example, which can convert almost any organic residue or energy crop into biogas, valuable electricity or heat.**

The efficiency and versatility of the RAPTOR™ process was demonstrated recently by a ground-breaking GWE installation which won GWE a major international chemical engineering award from the Institute of Chemical Engineers (IChemE), which represents more than 40,000 chemical engineers worldwide. This latest, 2014, Energy Award involved a world first with Chok Chai Starch in Thailand, where a GWE RAPTOR™ system is used to convert wet pulp waste product from the processing of cassava roots into biogas.



Green energy generators powered by biogas (methane) from waste water and wet pulp, transforming a problem to a profit. The Chok Chai project (right) won a global award for GWE

The technology installed at Chok Chai Starch helps the factory achieve a minimum of 80 per cent conversion of the organics present in the pulp to biogas (methane), treating a maximum of 370 tons a day of wet pulp containing 68,700kg a day COD (chemical oxygen demand).
Daily biogas production exceeds 30,000 Nm^3 at 60 per cent CH_4 content. The Chok Chai Starch RAPTOR™ starch plant produces enough biogas to generate 3.3-3.4 MW of renewable electricity for sale to the local grid, while the biogas produced by previously installed ANUBIX™ B reactors is heating the factory's two thermal oil boilers using green energy produced from digestion of organic matter in its waste water.

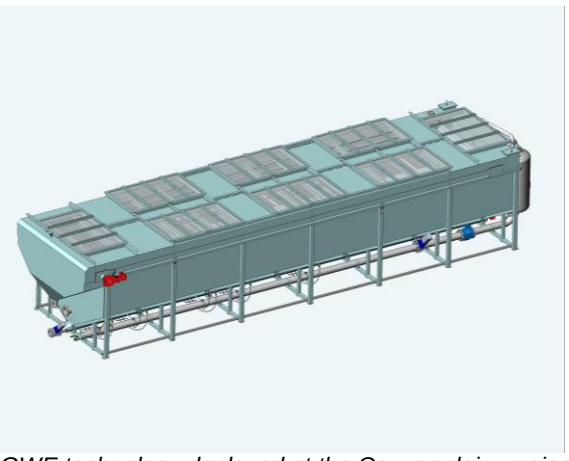
Anaerobic digestion facilities have been recognised by the United Nations Development programme as one of the most useful decentralised sources of energy supply, as they are less capital-intensive than large power plants. They can also benefit local communities by providing local energy supplies and eliminate the need for large and often smelly and environmentally challenging settling lagoons.

Removing climate change gases by burning the methane generated at Oakey Beef Exports in Australia will save the equivalent of 12,000 tonnes of CO_2 in the atmosphere, equivalent to removing 2700 cars from the road, says the General Manager of Nippon Meat Packers' Oakey Beef Exports Mr Pat Gleeson, left. He is seen here at the plant's opening ceremony with (from left) Australian Federal Industry Minister for Industry and Science, Mr Ian Macfarlane, congratulating the Managing Director of NH foods Australia Mr Takeo Kudo and (right) the General Manager, Overseas Operations Department, Fresh Meat Business Division, NH Foods Mr Norio Itazaki.

Anaerobic technology is particularly applicable to countries suffering drought, where treated waste water not only provides green energy to substitute for fossil fuels emitting climate change gases, but also processes waste streams to high recycling standards.

Thermophilic anaerobic/anaerobic systems have been proven internationally on slaughterhouse wastes, including digestion of wastes such as manure, stomach contents, blood and excess biosludge, which are transformed into biogas (methane), fertilizer and environmentally outstanding waste water effluent.

"The quantities of methane produced by anaerobic digestion can diminish or even completely replace the use of fossil fuels in the production process," says Mike Bambridge.



GWE technology deployed at the Cayuga dairy project in the USA, left, and the Vina Kraft paper plant in Vietnam. Cayuga features a completely enclosed SUPERFLOT-BIOGAS™ system for high efficiency removal of anaerobic biomass. Vina Kraft was a joint venture between the Siam Cement Group and the Japanese Regno Co Ltd, constructed to achieve world's best environmental standards

One ton of COD (chemical oxygen demand) digested anaerobically generates 350Nm^3 of methane, equivalent to approximately 312 litres of fuel oil, or generates about 1,400 kWh of green electricity. Multiplied over a plant over a year, this output can and does add up to millions of dollars saved on fossil fuels, says Mr Bambridge.

Profit in perpetuity

Depending of the scale of the anaerobic plant employed, the green energy generated can repay the cost of the anaerobic plant within as little as two years – and go on generating profit virtually in perpetuity.

GWE Chairman and CEO Mr Jean Pierre Ombregt says advanced anaerobic technology is strongly applicable to any factory or process with one or more digestible solid waste streams.

"Green energy alternatives such as wind power and solar power get most of the headlines for their achievements, but anaerobic processes are even more suited to industry in many instances, given that it provides reliable base load power and simultaneously treats wastewater to high discharge standards.

"Biogas from waste water is an outstanding source of base load power. As part of a renewable energy mix – complementing wind and solar generation, for example – electricity generated with biogas is highly reliable and consistent. As the major component of natural gas, methane is an environmentally attractive alternative to fossil fuels."

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