

# Environmental initiative banks on biogas to secure a greener future

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An environmental initiative that will deliver greater energy security and a cleaner, greener future at one of Australia's largest beef processing plants was recently launched by Australian Federal Industry Minister and MP for Groom Hon Ian Macfarlane.

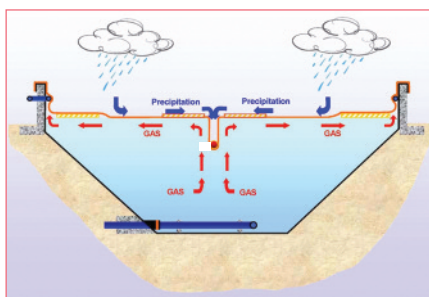
The Global Water Engineering COHRAL Covered High Rate Anaerobic Lagoon at Oakey Abattoir on Queensland's Darling Downs will extract green energy biogas from its waste water streams to replace millions of dollars worth of natural gas currently consumed at the abattoir.

In addition to lowering the plant's dependence on increasingly expensive supplies of natural gas, the Global Water Engineering anaerobic digestion plant will simultaneously reduce the plant's carbon footprint and produce waste water far cleaner than typical waste lagoons. The plant is expected to repay its cost of construction inside five years through gas purchase savings amounting to many millions of dollars – then continue to deliver benefits and profitability virtually in perpetuity.

The installation of the GWE COHRAL technology by Australian environmental engineering and green energy authority CST Wastewater solutions is the first GWE COHRAL installation in the world, deploying for the first time in a covered lagoon GWE anaerobic technology proven in more than 300 reactor (tank) installations worldwide.

COHRAL technology – which is applicable to both livestock and cropping operations – uses concentrated anaerobic bacteria to digest 70% of the organic matter (COD, or Chemical Oxygen Demand) in Oakey Abattoir's waste water to produce effluent of far high quality than typical open lagoons.

Adoption of the technology is the result of an exhaustive selection process and the committed alliance to the environment of Oakey Abattoir and its owners Nippon Meat Packers. The Oakey Abattoir, which employs 750 people, adheres to Nippon Meat Packers' strict environmental guidelines and corporate responsibility ethic as a



**GWE COHRAL technology – also applicable to livestock and cropping operations.**

major operator across Australia and an exporter to 34 countries. It is an initiative that sets an outstanding precedent for agribusiness in Australia because the cost-effective technology can turn an environmental problem into profit by simultaneously enhancing water quality and lowering fuel bills. Importantly, it helps to guard against future price rises in the cost of energy and imposts such as a carbon tax.

## Problem to profit

Another major benefit of covered anaerobic lagoons is that the methane biogas produced within them is not only prevented from escaping into the atmosphere (where it is many times more damaging than carbon dioxide emissions) but is also harnessed to generate energy – rather than waste water being heavy consumers of energy in processing and oxygenation.

Oakey Abattoir's plant will feature reuse of the biogas in its boilers, where it is initially expected to replace usage of about 50,000 gigajoules natural gas a year.

GWE anaerobic waste water green energy plants have been demonstrated in many applications worldwide to transform wastewater from a problematic expense to a profitable resource. While GWE's anaerobic waste water technology has been proved worldwide at more than 300 installations of totally enclosed tanks, or reactors, this is the first time it has been applied to a covered lagoon, an application where it has enormous further potential in countries with strong agribusiness sectors.

In addition to the obvious waste-to-energy benefits, the process also helps curb odours that emanate from open lagoons in processing plants. This is becoming a much bigger issue in Australia as urban encroachment means agribusiness and expanding communities are located much closer to each other than previously. So instead of open lagoons being potential dumping grounds for environmental problems, closed installations such as Oakey Creek's represent an outstanding contribution to good community relations.

Yet another outstanding benefit is that anaerobic digestion produces reliable and predictable base load power – unlike some other green energy technologies, it is not dependent on the wind blowing or the sun shining. The environmental and cost benefits of COHRAL technology as deployed by Oakey Abattoir are outstanding and something we expect to attract world attention for agribusiness, including meat, dairy and crop waste processing. CST Wastewater Solutions represents GWE anaerobic wastewater technologies in Australasia. Global Water Engineering has been a world leader in clean water and green energy solutions for more than 35 years.

## COHRAL covered lagoons

COHRAL installations represent a major advance over open lagoons and are suitable for solutions involving less technology intensive applications that allow a long process residence time and where adequate space is available.

COHRAL anaerobic lagoons consist of two zones, with the complete surface of the lagoon being covered with an influent distribution system.

The first and largest zone receives the major part of the incoming wastewater. This reaction zone is where the anaerobic digestion occurs.

The second, smaller part of the lagoon serves as a post-digestion and pre-settling zone where a partial clarification of the effluent wastewater takes place. Settled sludge collected in this zone is pumped back to the inlet of the lagoon.

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Part of the anaerobic effluent is recycled back to the lagoon. The remaining effluent of the lagoon flows by gravity towards complementary technology such as the GWE proprietary SuperSep-CFS separation technology being used in the first Australian installation.

Simplicity and energy efficiency are keynotes of the COHRAL system, with no additional mixing facilities required in the anaerobic lagoon. The influent distribution system acts as a hydraulic mixing system, converting a standard low load/low efficiency lagoon into a COHRAL system with increased efficiency.

Safety is also integral to the COHRAL sys-

tem. Each anaerobic lagoon is covered by a special floating membrane to retain the methane produced. A typical feature of GWE's COHRAL system is the operation at zero biogas pressure (-1 to +1 mbar range).

A sensitive membrane level measurement system controls the speed of a biogas extraction fan bringing the gas at 20 mbar to go to the flare. Compared to 'inflated' single membrane covers, the risk for leaks is virtually zero.

Simplicity also extends to the Scada computer control system typically employed with COHRAL technology. All indications and alarms, as well as reporting on the daily operation of the plant, and 'trending' can be done. All motor start/stop as well as

auto/manual functions can also be controlled from the Scada computer. A simplified flow sheet can be displayed on the colour screen, featuring all measurements (continuously updated) and indicating operating motors. Alarms can be indicated by a colour change to red of the corresponding measurement or indication. An external acoustic alarm can also be incorporated.

## Green energy

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.

Good solutions do not have to be extortionately expensive and can be staged:

- A satisfactory first step in many instances can be taken by covering lagoons and incorporating anaerobic processes with properly engineered feed and recycle systems, such as those in the COHRAL process.
- A second progressive step can involve the use of tanks to contain 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. ■

***Australian Federal Industry Minister Ian Macfarlane, right, performs the launch ceremony, congratulating the general manager of Nippon Meat Packers' Oakey Abattoir Pat Gleeson, centre, and the managing director of CST Wastewater Solutions, Michael Bambridge whose company installed the GWE COHRAL technology.***

