Biogas Recovery project gives JBS environmental and financial edge

CLIENT

JBS Australia Pty Limited is a division of JBS, Brazil's largest multinational in the food sector, and the world's largest meat company. JBS Australia has an extensive presence along the eastern seaboard, with a number of domestic and globally recognised brand names including AMH, King Island Beef, Royal, Swift Premium, Tasman Meats and Tasmanian Premium Beef.

OBJECTIVES

Wiley were contracted to design, install and commission a more efficient effluent treatment system to capture and use biogas released by the anaerobic digestion from the new Covered Anaerobic Lagoon (CAL) system as an on-site renewable energy source.

The project included:

- Covering of Anaerobic Lagoons (AL) with high density polyethylene (HDPE) to capture biogas, then burn the gas through the boiler to provide energy for the plant
- Covering two existing ALs and construction of a new 20ML Covered Anaerobic Lagoon (CAL)
- Upgrade of Waste Water Treatment Plant (WWTP) with a new Dissolved Air Flotation (DAF) unit
- Installation of a biogas train to pipe biogas from the CALs to a central flare and then to the existing 10MW boiler

CHALLENGES

- JBS's Dinmore facility processes 1,675 beef cattle per shift and employs 1,950 staff. Processing such a large volume of meat and by-products requires a significant amount of energy. There are four natural gas-fired boilers on site producing steam for hot water production and rendering operations.
- Wastewater from the site is treated on-site through a biological wastewater treatment plant (WWTP) to a high level enabling 30% to be re-used within the plant.
- Prior to the project, the WWTP comprised of four Anaerobic Lagoons (ALs) whose primary function was the removal of organic material suspended in the wastewater. These Lagoons emit odourous and environmentally harmful gas.

SOLUTIONS

Innovation

The wastewater treatment system was dramatically improved through the installation of new pre-treatment equipment combined with Covered Anaerobic Lagoon (CAL) technology to optimise the generation of biogas for combustion in the existing natural gas-fired boiler plant which was modified to burn biogas.

The following benefits have been identified:

- Reduced expenditure on natural gas
- Reduced exposure under the Carbon Pricing Mechanism (for permit liable plants)
- Improved sustainability credentials owing to improved waste management and increased on-site renewable energy consumption, leading to a reduction in the carbon footprint of meat processing.

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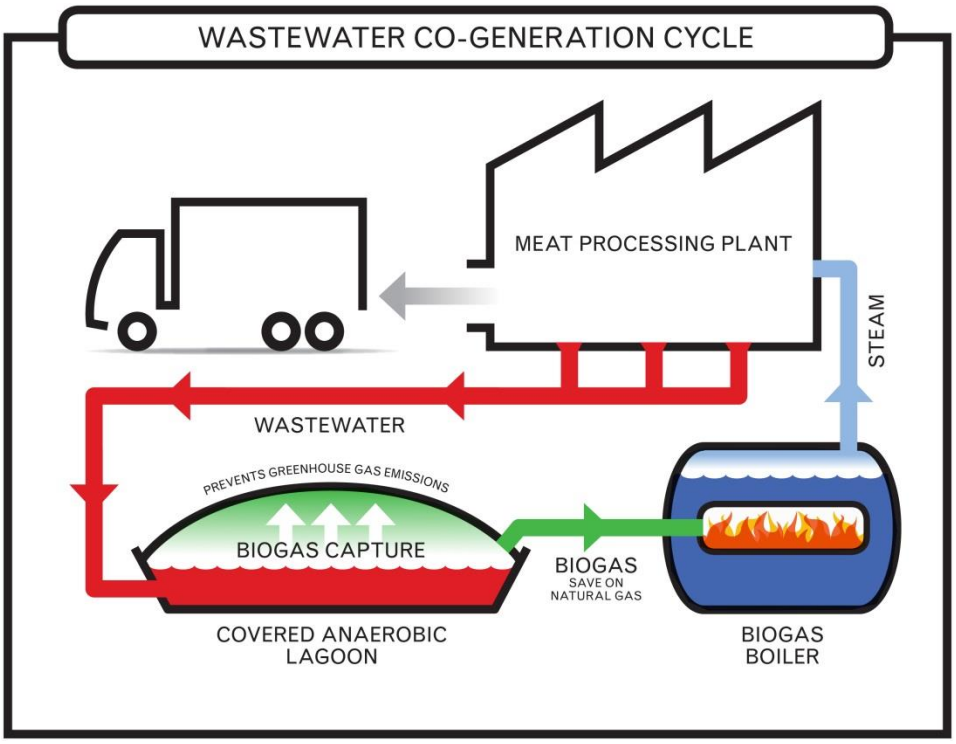

The existing WWTP pre-treatment system was also improved by installing a new Dissolved Air Flotation (DAF) unit. The DAF removes organic solids (waste fats, oils, and greases referred to as FOGs) which currently pass through the pre-treatment system and into the ALs.

The DAF unit regulates the inclusion of FOGs in the wastewater that passes into the new CALs. The ability to regulate FOGs inclusion rates is essential to optimising biogas generation from the CALs.
Two of the four existing ALs were fitted with high density polyethylene (HDPE) covers to enable the capture of biogas. The remaining two uncovered ALs were decommissioned and a new Covered Anaerobic Lagoon (CAL) with a capacity of 20ML, identified as 2C, was constructed.

Following construction of the CALs, a biogas train was installed to pipe biogas from the CALs to a central flare and the existing 10MW boiler for co-combustion with natural gas. This required a new burner and control system for the boiler that would automatically prioritise the use of biogas over natural gas.

PROJECT RESULT

Wiley delivered an innovative and future forward solution which will significantly offset annual expenditure on natural gas and the direct carbon price liability at JBS Dinmore in the first year.

The technology and processes deployed as part of this project will provide addition learnings that will be applied across other JBS meat processing facilities in Australia of similar scale and nature.
This project will be the first of its kind in the Australian Red Meat Processing Industry to retrofit an existing WWTP to move our industry forward toward a low carbon Australia. The project will be showcased by the Australian Meat Processor Corporation (AMPC) as part of its Industry-wide training and extension activities to disseminate information and findings to other organisations.

AMPC, through its involvement with the other RDCs will also facilitate transfer of information and knowledge gained throughout this project to other Industries such as Pork, Dairy, and Poultry.

This project is both replicable and scalable within the red meat processing industry and other food processing industries that have a biological waste stream and a need to offset on-site energy requirements for heat and/or power generation.