

CASE STUDY.
3MW MEGA DAIRY FARM .
WASTE TO ENERGY.



“—
| This 8000 head mega-dairy sought to take control of their energy supply by harnessing the power of their own manure. |
—”



WASTE TO ENERGY.

PROJECT BACKGROUND.

Facing **rising energy costs**, this Australian Mega Dairy sought a solution to use their **own herd's manure** as an **energy source** - supplying power to both run on-farm equipment and as a potential revenue stream, with surplus electricity capable of being returned to the main grid.



THE SOLUTION.

Eneraque **designed, engineered and manufactured a turn key system** to take the **methane gas** from the farm's digesters and convert this into **electricity** powering the farm, with any excess **exported** to the electricity grid network.



PROJECT TIMELINE.

33 weeks

The project was built in a modular arrangement so that site work was minimal. Equipment was transported to site in 10 simultaneous semi-trailer loads and assembled onto pre-constructed concrete slabs.



Australian Manufacturing ←

Our state of the art Australian manufacturing hub is capable of producing industrial equipment at full scale. Our seamless logistics service can transport entire plants to even the remotest parts of the Asia Pacific.



Asset Lifecycle Maintenance. ←

With site-ready, experienced maintenance teams located throughout the Asia Pacific, Eneraque is uniquely positioned to provide seamless ongoing management and maintenance for our clients' assets.

→ Planning & Design

Eneraque conducted on site planning, as well as offsite design and drafting, using our full suite, in house team.



→ Installation & Commissioning

Our containerised manufacturing simplifies the installation process. As a fully operating farm, it was critical that installation did not affect the farm's daily operations.



PROJECT SPECS.

The farm's intelligently engineered solution includes a **state-of-the-art Power Generation Plant** and **Biogas System**. The system was designed, engineered, manufactured, commissioned and receives ongoing maintenance from Eneraque.



Generator.

Two **MWM TCG2020v16 engines**, producing **1564 kWe each**, provide a **total output of 3128 kWe**. The **engine efficiency** when running on **Biogas is 42%**, being one of the **most efficient engines on the market** for this application. It is a **16 cylinder, 71L engine** and operates on gas as **low as 5 kpa**.



Biogas Conditioning System.

The **Gas Conditioning System** is comprised of a **primary blower, emergency flare, biological gas scrubber, dehumidification system** and **final blower**. This complete system is capable of handling up to **1500 m³/hr of saturated biogas** with **CH₄** content of **54%** and up to **4000ppm of H₂S**.



OUTSTANDING RESULTS.



High Performance, Renewable Energy.

Eneraque has achieved quantifiable, commercial excellence in biogas scrubbing. This Australian mega-dairy achieved Actual Gas Treatment results far exceeding the Design Data.

H2S Level	Quantity
Design Data. Max H ₂ S Raw Biogas	4000 PPM
Actual Data. Max H ₂ S Clean Biogas	7-10 PPM

Low Maintenance, Less Downtime.

Future proofing our clients' investments is part of our design process. Our thoughtfully designed and engineered solutions are optimised for performance, low maintenance and less interruptions.

THE WASTE TO ENERGY FLOW.



1. Renewable Energy.

The energy flow begins with the input of feed crops grown on-site, which are consumed by the dairy herd, initiating the energy transfer. The digestate from the biological biogas scrubbing process can be transformed into a high quality, high nutrient liquid fertiliser, this can be used to fertilise feed crops.



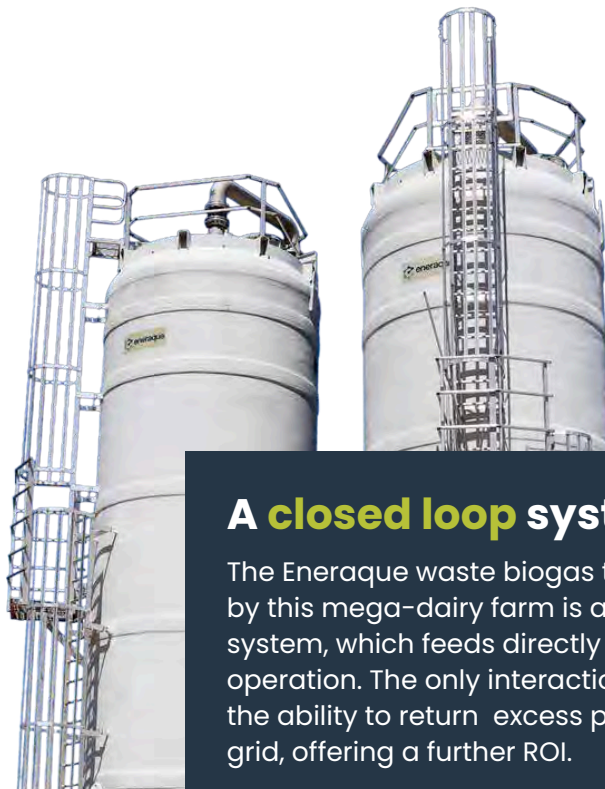
2. Dairy Herd.

The dairy herd consume the feed, digest and produce biomass (Manure). This biomass is channeled into the biological digestion pit. This is traditionally where the energy flow of a dairy operation would end, essentially wasting all potential energy stored in the waste.



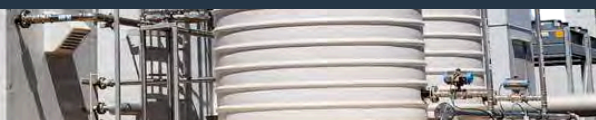
3. Anaerobic Digestion.

Raw biogas is produced as a result of the waste breakdown process. The gas produced is captured by the outlets on the roof of the pit and is pumped to the Biological Gas Scrubbing System. Any excess gas that cannot be used to generate power is disposed of through the installation of a biogas flare.



A closed loop system.

The Eneraque waste biogas to energy solution used by this mega-dairy farm is a completely closed loop system, which feeds directly back into the farm's operation. The only interaction with the outside grid is the ability to return excess power into the electricity grid, offering a further ROI.



THE WASTE TO ENERGY FLOW.



4. Scrubbing & dehumidification.

Raw biogas is then fed into the Biological Scrubber tanks. Hydrogen Sulfide (H₂S) is removed by injecting atmospheric air into the scrubber tank, which allows bacteria to naturally oxidise the compound to sulfate and elemental sulfur. From there, the biogas passes through an Eneraque Renewables dehumidifier to remove any moisture, resulting in the production of a clean burning, quality gas.



5. Power Generation Plant.

The cleaned, quality biogas is then used to fuel the on-site Eneraque 3MW Gas Power Generation Plant. The power plant produces more than enough electricity to provide power for the entire operation. Heat is also harvested from the generator, to heat the digester.



6. Farm & Grid Energy.

Electricity is used to power farm operations, while excess electricity is capable of being returned to grid. Our clients enjoy complete energy independence.



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