

CASE STUDY
PARKHAM FARM lagoonQUBE

Developed by QUBE Renewables Ltd, lagoonQUBE is a flexible, removable cover that operates as a digester, floating on a lagoon or open top tank to collect biogas and importantly rain water. LagoonQUBE has been designed to float on top to allow operating levels to vary, so as the stores are filled and emptied during the year the system will rise and fall.



Typical installation performance on a 80m by 80m lagoon

- Tessellating hexagonal lagoonQUBEs to cover area of slurry store required
- IRR of 21%
- Payback of 5 years
- Produces 157,855 kWh/yr of electricity plus the same amount of heat
- Rainwater saving 3840m³ per year
- Gas collection 112,001m³ per year
- Eligible for FiT and RHI
- Carbon saving of 145,060 kg CO₂e per annum

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Heating and mixing equipment is suspended from the floating lagoonQUBE to enhance the natural biogas production processes, which is captured in the dome and used for onsite heat and power generation. Rain water landing on the cover area is captured and pumped from the cover. The biogas from each lagoonQUBE can be collected and used in small scale CHPs, or in biogas boilers for hot water generation.

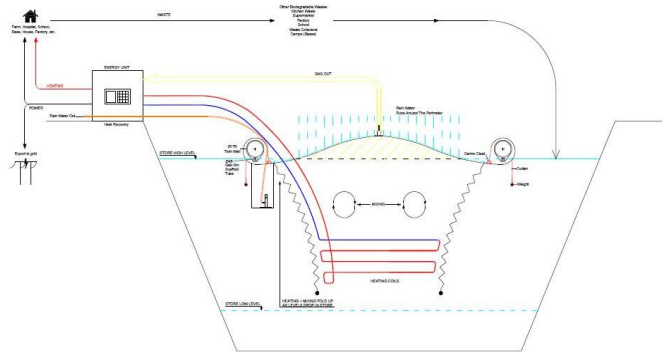
The lightweight modules are assembled on the side of the lagoon and then easily pulled on to the surface where they are floated into place and tethered. The natural processes of anaerobic digestion taking place in the slurry lagoon release methane and carbon dioxide (biogas) which are captured by the lagoonQUBE and piped away to be used. For lagoons that change in size and shape, lagoonQUBE comes in modular hexagonal units that can be interlinked together to form a cover across the whole of the lagoon. As the lagoon is emptied the covers “beach” themselves on the banks, as the lagoon is refilled the covers float up again.



Each lagoonQUBE is a hexagonal module measuring 94m² and has a diameter of 11.4 metres. The hexagonal design means that the lagoonQUBEs fit together in any number and can cover as much of the lagoon surface as required. For circular stores the diameter is made to suit the tank dimensions.

LagoonQUBE systems are offered in two ways:

- Passive – just the gas and rain water cover
- Active – with heating and mixing system under each cover to enhance the biogas production



Parkham Farms needed to prevent excessive amounts of rainwater from entering their existing slurry lagoon causing them to increase the volumes of slurry and dirty water to spread on the farm. Passive LagoonQUBE covers were installed on the lagoon in August 2015 and within hours were starting to inflate with the biogas naturally being created from the slurry which previously was being lost to the atmosphere. Rainwater falling on the surface of the lagoon was intercepted by the covers, where it was collected and pumped away. Typically in the summer one passive lagoonQUBE will capture up to 1m³ of biogas per hour; so for a 5000m³ lagoon this would equate to 18m³ of biogas per hour which is consistently about 59% methane. If connected to a CHP (Combined Heat and Power) generator or gas boiler the biogas can be used to produce electricity which is eligible for the FiT (Feed in Tariff) and provide the farm with hot water which is also eligible for the RHI (Renewable Heat Incentive) for wash down each day. The lightweight structures move with the level of the slurry tank as the levels change throughout the year and are removable to allow normal maintenance of the lagoon.



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