

## Parkham Farm-lagoonQUBE

Developed by QUBE Renewables Ltd, the lagoonQUBE is a flexible, removable cover that operates as a digester, floating on a lagoon or open top tank to collect biogas and, as important, rainwater.

The lagoonQUBE is designed to float and allow operating levels to vary, so as the stores are filled and emptied during the year the system can rise and fall.

## Performance On An 80m x 80m Lagoon

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 Highlights

- Tessellating hexagonal lagoonQUBEs to cover area of slurry store required
- Produces 157,855 kWh/yr electricity
- Produces an equal amount of heat
- Rainwater savings of 3,840 m<sup>3</sup> per year
- Gas collection 112,000 m<sup>3</sup> per year
- Carbon saving of 145,060 kg CO<sub>2</sub>e annually

## Flexible To Lagoon Changes

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 release methane and carbon dioxide (biogas) which are captured by the lagoonQUBE and piped away to be used.

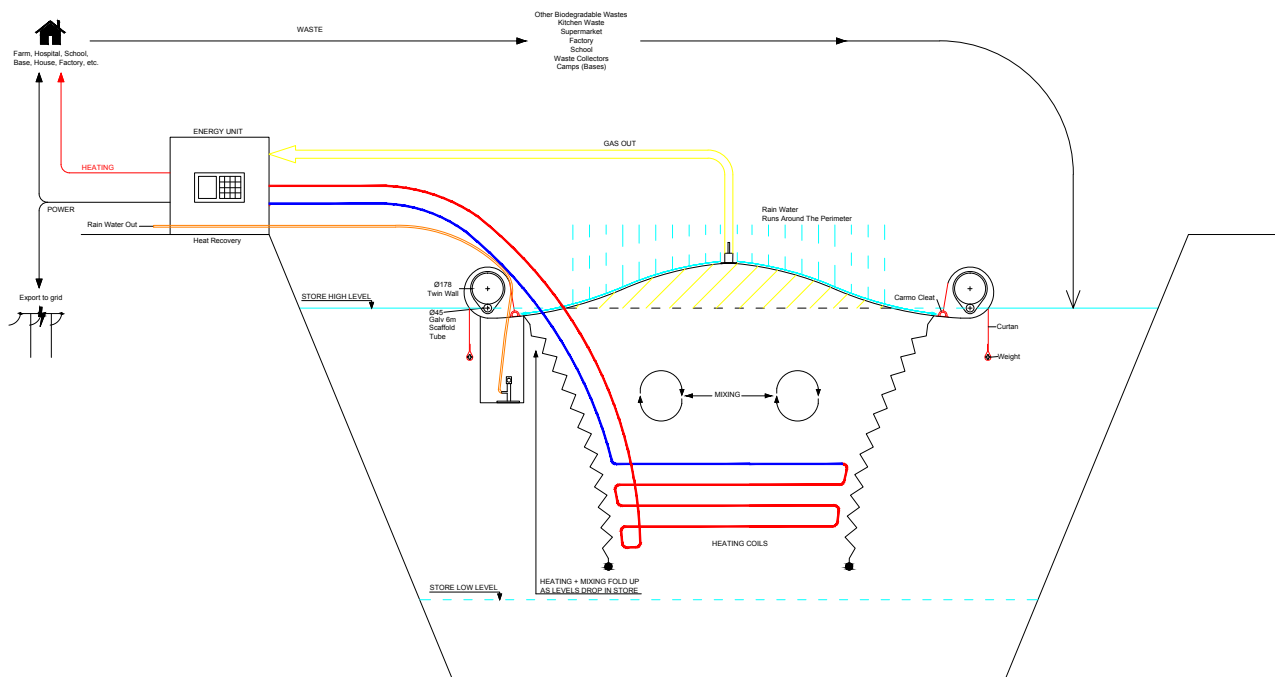
For lagoons that change in size and shape, lagoonQUBE comes in modular hexagonal units that can be interlinked to form a cover across the whole of the lagoon. As the lagoon is emptied the covers “beach” themselves on the banks. As the lagoon is refilled the covers float up again.

Each lagoonQUBE is a hexagonal module measuring 94m<sup>2</sup> and has a diameter of 11.6 metres. The hexagonal design means that multiple 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.

### Multiple System Design Options

The lagoonQUBE design can be tailored to the user needs and the slurry characteristics. The two options are:

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



### Innovative Solution Design

Parkham Farms needed to prevent excessive amounts of rainwater from entering their existing slurry lagoon to decrease land application needs. Passive lagoonQUBE covers were installed in August 2015 and within hours started to inflate with the biogas naturally created from the slurry. 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 1m<sup>3</sup> of biogas per hour; so for a 5,000m<sup>3</sup> lagoon this would equate to 18m<sup>3</sup> 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 and provide the farm with hot water for wash down needs each day.

### Who Is lagoonQUBE For?

- Livestock farms with slurry systems
- Waste Water Treatment Plants (WWTP's)
- Leachate collection lagoons
- Operators looking to prevent evaporation