



THE BENEFITS OF BIOGAS

Project Participants

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Problem

Biogas (methane) is produced naturally when pig manure decays in places where oxygen is absent, such as the bottom of a treatment lagoon. It is a source of renewable energy for a pork producer which can reduce or eliminate energy costs or earn income from export of electricity to the grid. However, if untapped, biogas contributes to 60 per cent of the total on-farm greenhouse gas emissions for Australian pork production. Producers should investigate capturing and burning biogas to improve the environmental and business performance of a piggery.

Project

The 4 *Talking Topic* manuals produced under the Bioenergy Support Program discuss the benefits of biogas, how to manage it safely, how covered lagoons work and how to clean piggery biogas for economic and environmental benefits.

Value for Producers

Producers can reduce their cost of production and greenhouse gas emissions by effectively capturing biogas. This can be achieved through on-site use of biogas or through income for electricity exports.

Recommendations

The simplest way to capture biogas is by placing a plastic cover made of low or high-density polyethylene over treatment lagoons to form a gas-tight seal. The manure then decays into biogas. The biogas produced by covered lagoons varies with seasonal temperature changes, with colder months providing 20 per cent less biogas than the average yearly flow. The biogas is collected through sealed pipework under the cover and through the pond bank.

Depending on the use of the biogas, it may be dried, cleaned of corrosive contaminants and then sent to a flare, boiler or a generator to recover useful energy.

Covered lagoons can substantially reduce piggery odour and greenhouse gas emissions. The impermeable plastic cover captures the odorants along with the biogas. The odorants are then destroyed when the biogas is burnt as fuel.

Sludge build-up can occur in covered lagoons and needs to be extracted without removing the cover. It can be pumped via sludge extraction pipes into a vacuum tanker for spreading on soil as a nutrient source. Larger piggeries can implement stirred in-ground lagoon technology which keeps the sludge suspended by intermittent mixing.

The cover needs to be flexible enough to accommodate movement but also rigid enough to minimise stormwater pooling. Pooled stormwater can damage the cover and stormwater run-off can also cause bank erosion, resulting in the release of biogas from the lagoon.

A deeper, narrower shaped lagoon can minimise the lagoon surface area to be covered, reducing cover costs and providing easier access for pumping of sludge. It is generally preferred to position covered lagoons below pig sheds and secondary storage lagoons below covered lagoons, utilising gravity flow.

Biogas can cause flash fires, explosions and poisoning by hydrogen sulphide. Piggery biogas can be made safer by preventing leaks, preventing people being exposed to raw biogas, preventing unwanted flammable biogas air mixtures from forming, keeping ignition sources well-distanced from areas where flammable biogas air mixtures may be present, minimising the amount of biogas present on-site and by providing adequate safety signage and equipment to those working in proximity.

Biogas is cleaned to remove moisture and hydrogen sulphide; moisture restricts the flow of biogas to a biogas appliance such as a hot water system or generator, while hydrogen sulphide is a dangerous gas and can cause wear and tear to the equipment. Moisture is removed by cooling the biogas with cold water. Hydrogen sulphide can be removed using biological oxidation followed by chemisorption.

More Information

- For a copy of the Bio-Energy Support Program resources, contact Rachael Bryant at rachael.bryant@australianpork.com.au
- For technical information, contact Gemma Wyburn at gemma.wyburn@australianpork.com.au