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CASE STUDY

Biogas and Power Generation from Wastewater Treatment

USAID helps bring innovative wastewater treatment technologies, including biogas waste-to-energy systems, to municipalities and agricultural operators throughout the Philippines

CASE STUDY

Welissa Farms -- Bantayan, Cebu

- Biodigester for wastewater from 6,000 pigs and 800,000 chickens
- System built in 2006 - Carbon credits will pay for system costs in 5 to 7 years



Modular Biogas Digester Tanks:

Mixed waste manure is fed into the central zone of the digester tank, 10 m in diameter and 10 m in height, with one-third buried underground. About 2500 cubic meters per day of biogas is produced, which contains 65% methane and 35% carbon dioxide.



Biogas Collection Tanks:

Biogas from the top of the digesters is fed into gas collection tanks or used to run a steam electric generator, or flared if not used. Anaerobic digestion for the pig and poultry wastes takes 15 to 18 days.

Treating wastewater is vital to safeguarding the health of communities. What is little known is that the treatment process can also bring economic advantages. Generating cash can ensure the long term sustainability of wastewater treatment projects. For large scale municipal or agricultural projects, generating biogas and the ability to sell carbon credits are important sources of income that can help recover the costs of construction.

- Biogas is produced by the fermentation of organic matter including manure, sewage sludge, and municipal solid waste, under anaerobic (having no oxygen) conditions. Biogas mainly contains methane and carbon dioxide, which contribute to global warming and climate change.
- Carbon Credits are can be obtained when biogas is captured and not released to the atmosphere. In exchange for capturing these emissions, credits are issued as part of an international emissions trading plan. Polluters from other countries can purchase these credits, which are sold on the open market.

Two common applications of this technology are for **septage treatment** and **animal waste treatment**. With over 100 million septic tanks generating countless truckloads of septage, and approximately 5 million farms generating 10.1 million tons of manure per year, the Philippines has a large supply of both septage and animal manure. Unfortunately, almost all of this waste is currently dumped with little or no treatment, or is treated in open ditches or ponds that allow the biogas to escape to the atmosphere. These discharges contaminate surface and groundwater and harm people's health. They also lead directly to global warming and climate change.

There are a number of benefits of biogas to energy wastewater systems:

- The treated wastewater meets government discharge standards
- Provides innovative financing using carbon credits
- Reduces or eliminates odor and groundwater pollution
- Provides employment, generate power
- Reduces reliance on wastewater lagoons and ponds
- Dewater the sludge to produce organic fertilizer for sale

In the Philippines, **C Trade Philippines** is partnering with the Philippine Sanitation Alliance to promote biogas systems for both septage management and the animal waste industry.



Sludge and Water Separator:
 Sludge from the bottom of the digester tanks is fed to a sludge collection system for dewatering. The supernatant water is fed back to the digester tank in the top zone. The dried sludge from the sludge tank is removed for fertilizer production.

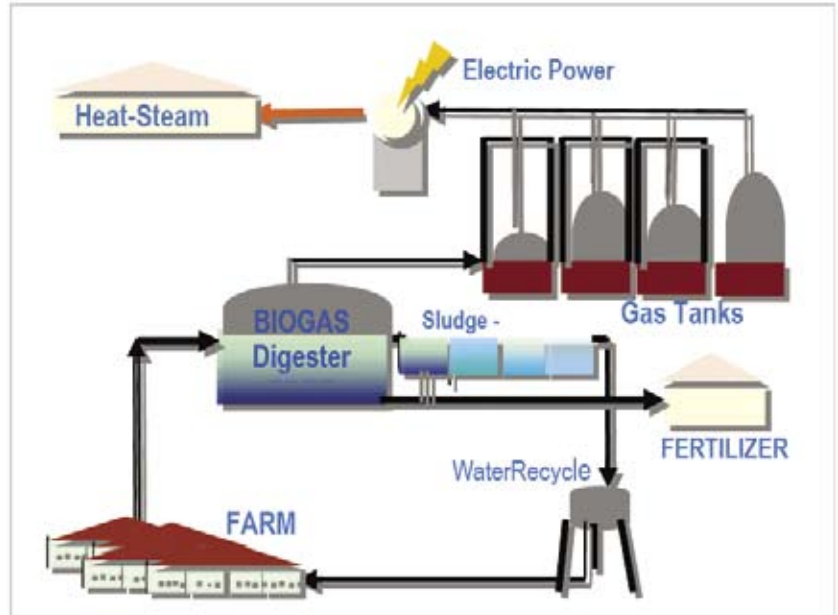


Biogas powered electric power generator:
 Collected biogas can be used as fuel to power electric generators (as shown above) or for direct use in cooking, lighting or heating.



Photos courtesy Wellisa Farms, Bantayan, Cebu.

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Biogas from waste-to-energy:

- *Mixing* – waste is collected and homogenized
- *Digesting* -- waste is digested in anaerobic tanks
- *Separation* – sludge and water are separated
- *Biogas generation* – gasses are collected in domed reactor tanks
- *Power generation* – biogas is burned directly as fuel or used to generate electricity

C Trade Philippines Joins Philippine Sanitation Alliance

C Trade is a renewable energy company that designs, finances, constructs the development of wastewater treatment projects in the Philippines to convert sewage, animal slaughterhouse and other wastes to biogas (methane) to generate electricity and treats the sludge to produce organic fertilizer.

C Trade develops carbon credits called Certified Emission Reductions (CER), to fund the project and transfers ownership through a build-operate-transfer (BOT) scheme using cost recovery payments for electric power used.

C Trade was established in 1998 as an international developer of renewable energy projects using solar, wind, biogas and other clean technologies to produce electricity and carbon credits. Carbon credits would have no value for trading or selling unless they are properly registered and certified.

C Trade is providing their expertise in carbon trading to the **Philippine Sanitation Alliance** and USAID to help advance this innovative finance mechanism through education, promotion, demonstration and project implementation.