

Biogas technology: A viable option for agricultural waste management

By Primrose Magama and Dr Idan Chiyanzu

The South African agricultural sector produces various forms of organic waste across the agricultural value chain, from primary production right up to the consumption of products such as crops, fruit and vegetables, meat and dairy products.

At farm level, waste generated includes crop residues (stalks, cobs, shells, leaves) and animal manure. Processing waste from the agricultural industry includes fruit and vegetable by-products (peel, stones, pulp), slaughter waste from the meat industry, oilseed cake from the oil industry, and spent grain from distilleries and breweries.

Solid waste value-adding

Open dumping, landfilling, incineration and composting are the most common solid waste disposal methods for agricultural waste. These methods are, however, problematic and are associated with environmental pollution, greenhouse gas emissions and space limitations. There is also the opportunity cost of producing value-added products from the waste. Current treatment methods do not fully exploit the value of waste before disposal.

Biogas technology is a promising and attractive solution for managing agricultural waste and generating renewable energy as it can convert a wide range of organic waste streams into biogas energy and organic fertiliser. Biogas, a methane-rich gas, can be transformed into multiple forms of energy, such as heat, electricity and fuel.

The use of biogas technology for agricultural waste management has already been successfully demonstrated in South Africa.

Biogas plants are fed by various agricultural waste streams, including cow manure, food waste, pig manure, abattoir waste, fruit and vegetable waste and grass. Apart from the use of organic waste to feed the digesters, biogas plants offset energy costs and increase the energy security of plant owners. They also reduce the country's greenhouse gas emissions.

The right business environment

Biogas technology will only be able to make a meaningful contribution to agricultural waste management, renewable energy production and climate change mitigation and adaptation in the country if more biogas digesters are

installed. This will happen through new, incentivised government schemes.

There are many barriers to the adoption of biogas technology that need to be addressed. Such hurdles range from socio-economic factors to policy and regulatory hindrances and include:

- A lack of clear policy and regulatory frameworks.
- Protracted and expensive licensing processes.
- Difficulties in accessing finance.
- Poor awareness levels.
- Low feed-in tariffs.

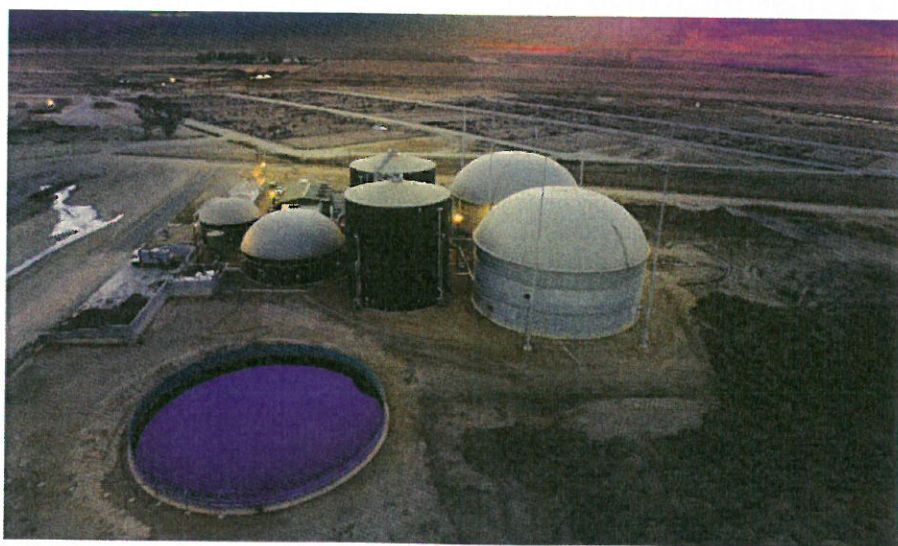
Figure 1: Map highlighting the biogas development footprint in South Africa. (Source: Southern African Biogas Industry Association)



Other technical factors, such as limited local technical capacity, little or no technical data specific to South African conditions, insufficient operation and maintenance plans and the absence of quality control standards, are widespread.

ARC Agricultural Engineering, in collaboration with other organisations such as specialised United Nations agencies, municipalities, and international entities and bodies are working to clear these barriers and promote biogas technology in the country and beyond. 📧

For more information, email Primrose Magama at magamap@arc.agric.za or Dr Idan Chiyanzu at chiyanzui@arc.agric.za.



The Bio2watt Biogas Plant in Bronkhorstspuit, Gauteng. (Photo: www.bio2watt.com)