



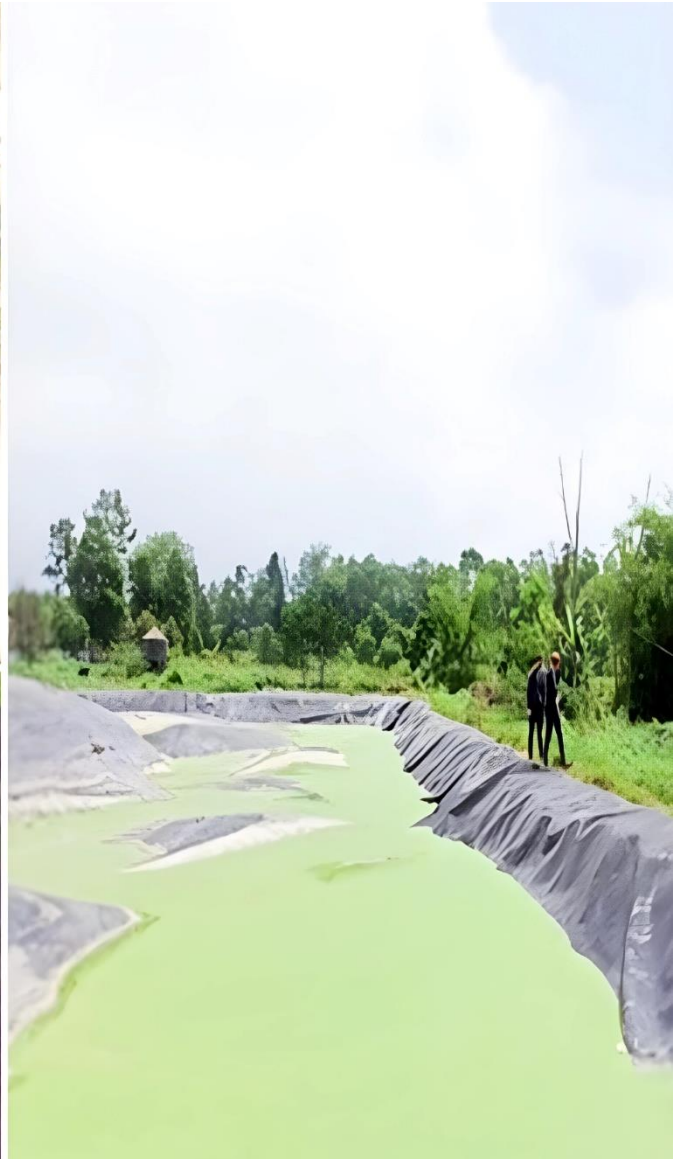
Biogas technology in Vietnam: prospect within our hand

Authors:

Digging into the background of the research topic of Van Hau Duong, PhD student at the Biogas Research Team under the guidance of Assoc. Prof. Dr. Hynek Roubík.

The young researchers of the Biogas Research Team (BRT) are diligently working to increase the visibility of the success and potential of bioenergy sources. From Indonesia to Vietnam to Ethiopia and beyond, their efforts to highlight the impact and importance of incorporating renewable energy technologies are creating change worldwide.

With this popularization series, we aim to showcase the impact of our research on renewable energy in strategic countries around the globe.



1. THE HISTORICAL BACKGROUND OF BIOGAS IN VIETNAM

Vietnam has a relatively long historical background in biogas technology, dating back to the 1960s, following the publication of documents on “how to make artificial methane and collect gas” from the Ministry of Industry. At this time, there were some initial explorations of biogas production from animal manure in the North and South of Vietnam. The first biogas plant was constructed in Bac Thai, Ha Noi, and Ha Nam Ninh in 1964, while the first small-scale biogas plant was built in 2003 in Thua Thien Hue in Vietnam. A research program on renewable energy was a priority twice established in the five-year national plan (1981 – 1985 and 1986 – 1990). The Ministry of Health initiated a biogas plant program to meet sanitation demands.

In 1987, the Renewable Energy Center at Can Tho University studied and introduced a biogas plant model of a cylinder with a fixed gasholder, namely CT1, to farmers in the Mekong Delta. Around 1992, a project of the Ministry of Agriculture and Rural Development (MARD)

supported by [FAO](#) and [SIDA](#), the National Institute of Animal Husbandry (NIAH), College of Agriculture and Forestry, in Ho Chi Minh City launched a plastic digester model.

In 2003, a large-scale project collaboration between Vietnam and the Netherlands, named “*Support to the biogas program for the livestock industry in some provinces of Vietnam*”, was established. In this project, different types of biogas models were widely used, including KT1, KT2 and KT3. Currently, the total number of biogas digester plants installed is more than 500,000 units.



Solid biogas digestate sampling at a large-scale biogas plant at the University of Agriculture and Forestry, Hue University, Huong Tra, Thua Thien Hue, Vietnam.

2. CHALLENGES TO BIOGAS DEVELOPMENT IN VIETNAM

In Vietnam, biogas digester plants bring more benefits to both households and livestock farms by addressing animal manure waste issues and fulfilling the demand for cooking and lighting. More than 500,000 farmers were funded by different supporting projects to install their biogas plants in parallel. Being aware of the benefits of a biogas digester, farmers currently construct their biogas plants on their own budget. However, the number of biogas digesters installed in Vietnam is limited compared to the actual demand for treating livestock manure waste. There are still 4 main issues that slow the development of biogas digesters in Vietnam: technical capacity, social perspective, financial aspect, and policy.



Biogas plant in Huong An, Hue City, Vietnam.



Functional biogas stove used by farmers for cooking.

3. STRATEGY FOR BIOGAS DEVELOPMENT

Vietnam has a relatively long history of using biogas since the 1960s; however, considerable expansion occurred in the 1990s and subsequent years. Many types of biogas plants have been installed, such as CT1, KT1, KT2, KT3, PE, composite, etc. However, the number of biogas digesters is slightly reduced while the actual demand is increasing.

The lack of biogas plants is supposed to be the main reason for accumulating unprocessed manure waste that is freely disposed of into the environment, including open air and water sources in suburban and rural regions where most farmers rely on animal husbandry for their livelihoods.

The Vietnamese Biogas Association (VBA) plays a vital role in building a network of scientists, technical staff, mason groups, and biogas users for biogas technologies in national and local communities. Through this network, they can share their experiences in relevant biogas topics. MARD and other authorities regularly hold programmes to increase farmers' awareness.

The production and utilization of biogas technology provide public health (waste and wastewater treatment), rural electricity supply, poverty elimination (opening animal husbandry), sustainable agriculture activities, safeguards jobs in rural areas, gender equality, etc. The government policy system should have attracted more domestic and international investors. Preferential loans should be offered to farmers who are in actual demand for biogas plant investment. Furthermore, a broadcasting media programme should be geared toward the national, predominantly rural and remote areas, for biogas technology and the benefits of using biogas digesters.



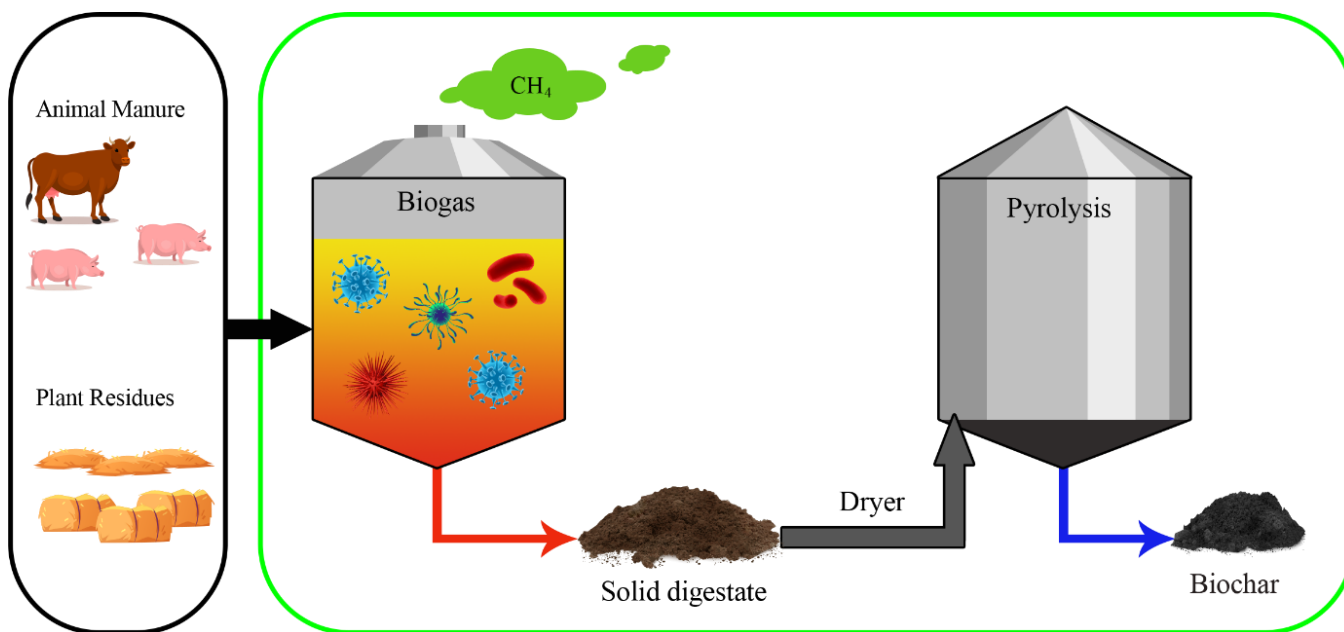
Methane measuring at daytime and nighttime in Huong An, Hue City, Vietnam.

4. BIOGAS VIETNAM DEVELOPMENT OUTLOOK

According to the Ministry of Agriculture and Rural Development (MARD), most small-scale biogas plants for household farms are supported by NGOs, while large-scale biogas plants were initially funded by The Asian Development Bank ADB and The World Bank. The World Bank has supported 8 large farms in 8 provinces in Vietnam for biogas production. The ADB and Vietnam governments aim to produce biogas and a less carbon agriculture programme; a portion of the capital will be used to fund 600 small- and average-scale biogas digesters. In Vietnam, there are 3 main sources for biogas production:

- 1) every year, Vietnam amounts approximately 8 million cattle (buffaloes and cows) and over 27 million pigs; this is an enormous potential feedstock for biogas production.
- 2) forestry and agriculture waste (wood, sawdust, rice husk, straw, and sugarcane waste): every year, Vietnam has around 27,1 million tons of wood waste and 56,2 million tons of agriculture waste.
- 3) household organic waste: The average year is 28 million tons.

The government is encouraging both Vietnamese private companies and international companies to invest in renewable energy, including biogas production and biomass energy. The potential demand in Vietnam is for an integrated biogas system, including a garbage collection system, gas production, a power generator, fertiliser production equipment, and biochar.



Schematic of derived biochar from solid biogas digestate in Hue City, Vietnam.



Solid biogas digestate.



Biochar derived from solid biogas digestate in Hue City, Vietnam.

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