

TOPIC: The housing industry in Ghana and the domestic waste management issues.
HOW DOES BIOGAS TECHNOLOGY SOLVE THE PROBLEM?

Mr. Chairman, Minister of State, Executive Director (EPA), our High International Gurus in Biogas technology that is Dr. John Idan, Dr. Elias Aklaku and others whom we are all confidently learning from, I wish to express my appreciation and also to the Ghana National Cleaner Production Center, Environmental Protection Agency and the Energy Commission.

Mr. Chairman, it has been concluded that biogas technology is a clean energy (renewable) source with little or no negative effect on the environment as it reduces the emission of Greenhouse Gases, deforestation and indirectly soil erosion.

Population growth in Ghana over the years is increasing rapidly culminating into increasing housing projects and developments contributing to augment in bad environmental practice such as the creation and irresponsible dumping of organic wastes into the environment in drains, road sides and on beaches. Biogas technology takes an in depth look at how to solve the sanitation problems and prevent the emission of greenhouse gases into the atmosphere to prevent global warming and to improve our health needs. Our forest reserve is depleting at a faster rate due to over dependence for fuel, wood, and charcoal which contributes to increase in climate change and global warming. This technology is a clean energy source that rid the environment of waste, greenhouse gases and protect the forest for the benefit of man.

In view of the above, although strategies are being discussed and implemented to meet our basic energy needs on short, medium and long term basis, we need to recognize that Petroleum reserves cannot last indefinitely but if even so we need to think about the associated cost implications therefore to participate in developing non-conventional sources of energy (renewable source of energy) such as biogas which can be harvested in the form of biomass through the use of waste, biodegradable, organic materials generated from domestic, industrial, and municipal set ups as a result of population growth. Biogas generation and production is made possible through the use of micro-organisms, which convert macro-molecules found in organic wastes into methane (CH₄) and carbon dioxide (CO₂) through anaerobic fermentation process or digestion in an enclosed environment called Biodigester. These gases are captured and converted into heat energy and used for cooking and electrical energy for the generation of electricity in rural, urban and municipal areas to meet our energy needs.

This energy source is renewable and offer less polluting alternatives, since petroleum consumption and production of varied organic substances by fermentation lead to environmental pollution.

Biogas is a term used to represent a mixture of different gases (in varied composition) produced as a result of action of anaerobic microorganisms on domestic and agricultural wastes, and during anaerobic decomposition of sewage and other organic wastes by methanogenic bacteria that produces methane which is collected or captured and used as fuel (biogas) for cooking.

The first biogas plant in Ghana was built at Appolonia in Accra by an Indian Company in 1980's, later in 1994, a Ghanaian company embarked on its first biogas project at Akwatia, ST Dominic Hospital, in the Eastern Region which proved success and generated gas for cooking. Subsequent projects on biogas are being undertaken today by Dr. John Idan, example at Valley View University, Central University etc. which produces gas for cooking and recycling the liquid waste for flushing in the water closets and gardening thereby increasing public awareness.

BIOMASS PRODUCTION AND ITS UTILIZATION FOR ENERGY

Much research has been done for increasing the production and utilization of biomass as a source of renewable energy.

Biomass is defined as living matter or its residues, which is a renewable resource.

Common examples of biomass are wood, grass, herbage, grains etc.

The main sources of biomass can be classified into municipal, forestry and agricultural wastes.

WASTE MATERIALS FOR ENERGY

The waste materials include a variety of wastes originating from plants, animals and domestic or municipal wastes, plants wastes include wood, green plant matter, saw dust, rice bran etc.

All the mentioned waste materials can be converted into efficient energy source through anaerobic digestion. Animal domestic and municipal wastes are potential energy source whose energy generated through anaerobic digestion used for biogas production. These wastes certainly prove significant in developing countries such as Ghana as a result of population growth.

For domestic/commercial biogas production in Ghana, cattle waste (dung), human solid waste (faeces), poultry, pig, goat and sheep droppings are the prime source. Other sources include plant products and their residues such as yam, cassava, banana, plantain peels, rice bran, etc.

MATERIALS INVOLVE IN BUILDING BIOGAS PLANT

Materials require in building depends on the environment, locality, atmospheric conditions of the area in question. For example, temperate regions may require materials different from that of tropic regions. In Ghana materials such as clayed bricks, cement blocks, cement, lime, water proofed cement, sand, wire mesh, gas pipes, plastic pipes, etc. are needed in the building of biogas plants.

PURE OR FUEL CELLS AS ENERGY DEVICE TO BE POWERED BY METHANE GAS (BIOGAS) TO GENERATE ELECTRICITY.

A fuel cell is an electrochemical device that combines hydrogen and oxygen to produce electricity, with water and useful heat as its by-products.

- **Fuel Cells Reliability, Resiliency, and Savings.**

The list is by no means exhaustive over the past two decades, tens of thousands of fuel cells have been installed around the world, for primary or back-up power.

- Outside of the business world, fuel cells are operating at wastewater treatment plant, government buildings, universities, military bases, homes, hospitals and other sites
- Corporate customers have discovered that investing in fuel cells pays off-saving money on fuel and labour costs, reduces emissions and yielding substantial savings through increased efficiency and reliability.

Fuel cell Benefits

- High quality, reliable power
- Can operate independent of the grid
- Extremely quiet
- Light weight
- Can partner with solar, wind and other renewable (biogas) technologies
- Increased productivity
- Cost savings via high electrical and overall efficiency

- Fuel cells operating on natural gas and renewable biogas have earned a prominent position within the Renewable Portfolio Standard (RPS) pricing mechanism due to their efficient and reliable generation of clean power
- Currently 75-80 percent of the fuel used by the fuel cells is biogas
- Advantage of a fuel cells are so unique
- No other technology offers the combination of benefits fuel cells allow.
- Fuel cells are Reliable, Resilient, and save cost.

ENVIRONMENTAL BENEFIT DERIVED FROM BIOGAS PLANT

- Prevention of Greenhouse Gas emission of methane, carbon dioxide and nitrous oxide from septic tank into the atmosphere
- Improve the environmental performance of homes, schools, hospitals and institutions.
- Contribution to mitigation of climate change
- Measurement of pollution control, improvement of health and sanitation conditions
- Provision of highly enriched organic fertilizer
- Avoidance of off-site disposal and contamination of beaches with untreated sewage into the sea.

ECONOMICAL BENEFITS DERIVED FROM BIOGAS PLANTS

- Minimum of 50 years biogas generation and utilization for cooking, lighting, refrigeration and possible electricity generation.
- Recovery of about 30% water used for water closets to recycle for re-use as nitrogen rich effluent for landscaping and irrigation
- Supply of electricity at cheap rate
- Reduction in cost of water used for landscaping and irrigation
- About 50% reduction of water used for flushing water closets
- Avoidance of cesspool emptying costs.
- Avoidance of septic tank installation cost for new development

RECOMMENDATION

Considering the overall benefits of using a biogas plant into house hold and housing industry is of a greater importance and cost effective and need to be recommended for its implementation.

The biogas with the fuel cell device will provide electricity and cost effective as well as using the methane gas for cooking. A very high tremendous advantages over our gas and electricity problems in our households.

CONCLUSION

- Early bird catches the worm
- Don't delay in implementation and avoid the proverbial vulture sayings, "tomorrow I will build my house"

Thank you.

BY REV. DR. ERIC ANKRAH.