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**ARTIFICIAL INTELLIGENCE (AI) AND BIOGAS PROJECT**

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*In a biogas plant, organic matter is converted into biogas under anaerobic conditions through physical and biochemical processes. From the supply of raw materials to the arrival of the products to the customers, there are sequential processes which should be adequately monitored to optimize overall process efficiency. In particular, anaerobic digestion processes, which consist of sequential complex biological reactions, require improved monitoring to avoid inhibition. Conventional applied methods in biogas plants are not sufficient to monitor operational parameters and find correlations between them. As artificial intelligence has been integrated into various areas of life, its integration into the biogas production process will be indispensable for the future of biogas plant operations. This review paper first examines the monitoring requirements of biogas plants and also the process and process monitoring.*

*A biogas plant is a system for generating and storing gas from organic waste (e.g. dung, food waste). It is also called biogas plant or go bar gas plant in Marathi.*

**• What is biogas?**

*Biogas is a combustible gas produced by the anaerobic decomposition of organic matter with the help of bacteria without oxygen.*

*In the following sections, the current state of implementation of artificial intelligence in biogas plant operation and similar industries will be presented. Furthermore, taking into account all information gathered from literature and operational requirements, an implementation model will be presented.*

**Keywords:** artificial intelligence (AI), biogas project

**PREFACE**

Biogas is the gas released from biological processes. If a biological process takes place in an oxygen-free (anaerobic) environment, biogas is produced. A device designed to store the gas produced after the decomposition of organic matter by bacteria in an anaerobic state is called a biogas plant. It produces methane and carbon dioxide. Methane is a gas that aids in combustion. Producer gas from biogas gasifiers is used for pumping water, generating electricity, and also for cooking. Biogas gasifier plants are available in various capacities and can be used as per requirement. Biogas generally contains 55 to 60 percent methane while the rest is carbon dioxide. Since methane is flammable, biogas is also flammable. But carbon dioxide is a non-flammable gas, so its heat of combustion is lower than that of pure methane. Biogas, as mentioned, is produced from biological processes that we call decomposition. Most of the decomposition processes produce biogas. Biogas can be compressed and filled in iron cylinders.

**RESEARCH OBJECTIVES**

1. Chemical use in daily life is always leading to shortening of life span, so using artificial intelligence to use biogas as natural fuel is beneficial - to inculcate in humans.
2. Baggs is a natural source of energy and it is obtained at no cost and to explore the measures to preserve and conserve this gas throughout the entire Vasundhara.
3. Due to the use of biogas, there is no side effect on nature, human life and living organisms and it is beneficial in terms of health. And what are its benefits and uses for human life with the help of artificial intelligence.

**HYPOTHESIS**

1. Biogas is a beautiful way to balance the Vasundhara. So all living beings are protected, there is a simple and easy way to avoid any kind of natural and financial loss. The transition from waste to sustainable fuels will be a key factor in global competition. Convincing this in terms of artificial intelligence.
2. By collecting waste excreta, dirty waste and using it in daily life through biogas project in an easy and simple way, there is no adverse effect on human life on the environment and it is beneficial. Convincing this in terms of artificial intelligence.

**RESEARCH METHODS**

While conducting the research, is any information available so far regarding the problem that each researcher has taken up for research? Searches for it and uses those sources. He mainly reviews three methods of sources.

- g) **Direct Sources:** Home visits, interviews, narratives/lectures, counselling, observation, during school and college visits, medical rooms, surveys, group discussions, parades, rallies, street plays, rod shows, puppet shows, plays etc.
- h) **Indirect sources:** encyclopaedias, abstracts, indexes, research papers, journals, periodicals, books, government and non-government monthly reports, posters, banners, information books etc.
- i) **Electronic Source:** Internet. Air (Radio), Door darshan, Mega Phone etc.

## LITERATURE REVIEW

"Biogas is a gas produced by the decomposition of organic matter, usually in the absence of oxygen. It is a renewable energy source such as solar and wind energy. Furthermore, biogas can be produced from regionally available raw materials and recycled waste and is environmentally friendly and CO<sub>2</sub> neutral"

Biodegradable materials such as manure (animal dung, poultry/pig litter, night soil, sewage manure, MSW and waste, water hyacinth, sugarcane press mud and cotton mill microdots), Biogas is produced by fermentation of biodegradable materials such as sewage, municipal, kitchen materials, green matter. Biogas consists primarily of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) and may contain small amounts of hydrogen sulphide (H<sub>2</sub>S), moisture, and siloxanes.

Gases, methane, hydrogen and carbon monoxide (CO) can be burned or oxidized with oxygen. By releasing this energy, biogas can be used as fuel. It can also be used for domestic or large-scale community cooking. A gas engine converts the energy in the gas into electricity and heat. Biogas can be compressed like natural gas and can be used to power motor vehicles. In the UK, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel Biogas is a renewable fuel and therefore qualifies for renewable energy subsidies in some parts of the world. When biogas becomes bio methane, it can be upgraded to clean and natural gas standards.

## BIOGAS GENERATION FROM KITCHEN WASTE

Animal dung is being used as the main raw feed material for biogas production and insufficient availability of animal dung necessitates scaling up of biogas technology by tapping other alternative feedstocks such as poultry waste, pig waste.

Like Mumbai, hundreds of solid wastes, household waste, fruit peels, vegetable peels, rotting waste, food etc. are generated every day.

There are problems not only in storage but also in transportation and disposal of waste. Collection is usually done outside buildings, on roads affected by general sanitation. He first smells the bode, Fish breed on it and during monsoons. Truly only 'God can save the situation. Waste sold includes hotels, canteens, vegetable markets etc. All these are biodegradable materials. When these waste materials are digested by associated bacteria in a biogas plant, the combustible gas mixture yields about 50 - 60% methane.

A biodegradable waste based biogas plant working entirely on kitchen waste was designed and installed by Larsen & Toubro Limited in December 2000. Mogh (Mumbai) Virar based Brito Energy Engineers. The plant consumes about 60 kg of canteen waste per day. It was started by using cow dung mixed with a specific amount of water to cultivate methane producing bacteria. Which are available in canteen food in abundance in dung.

## DATA ANALYSIS

### □ Role of Government in Biogas:

The Ministry has been supporting Research, Design and Development (RD&D) in new and renewable energy since 1982. Realizing that the market will largely drive the renewable energy sector, a scheme has been developed to associate and support industry-driven RD&D. The scheme provides guidelines for project identification, formulation evaluation, accreditation and financial support. Research headed by the Secretary of MNRE aimed at guiding the overall direction of RD&D efforts in new and renewable energy, A Design and Development Project Appraisal Committee (RDPAC) has been constituted. This committee also receives RD&D proposals, evaluates them and recommends financial assistance where necessary.

## OBJECTIVES

There is a need to refocus on research, design and development (RD&D). The basic objective of RD&D efforts is to make the industry competitive. A comprehensive statistic that measures competitiveness is net foreign exchange earnings. Accordingly, RD&D endeavours to make the country a net foreign exchange earner in the new and renewable energy sector, Apart from this, the share of indigenously designed, developed and

manufactured new and renewable energy system equipment has also increased and consequently a dominant position should be monitored for its ultimate growth.

#### □ Socio Economic Impact of Biogas:

The socio-economic background of households, among other things, is considered to be an important factor in influencing decisions to adopt biogas. While the financial assistance provided by the government to the beneficiaries is limited to 25-40% of the cost of the plant for various categories of beneficiaries in the form of subsidy, A large part of the expenditure is raised from own resources or through private institutional loans, the financial background of the beneficiaries is always referred to before making the final selection. The high subsidy rate sanctioned by MNES to reduce the financial burden of the poor and vulnerable sections of the society and encourage the use of biogas among them is undoubtedly a good step in this direction.

When considering plant ownership across social categories, SC and ST families were found to claim a larger share of about 52% compared to 14% and 10% respectively for other caste families, however, most trees, about 55%, 6% of the beneficiaries were found during work in these plantations established by SC beneficiaries. Due to non-availability of dung in sufficient quantity to run these plants, they have been demolished. Most of these plants are reported to have been built due to the attraction of high subsidy from the Centre and State Pools.

Almost all biogas plant owners are well-to-do families, basically farmers with an annual income of Rs. Out of 49,640, 21 families are in the income bracket of less than Rs.12,000 per annum. The survey result highlights the inverse relationship between income level and adoption of biogas. The increase in annual income levels has led to an increase in the number of biogas plants.

The survey team also found an inverse relationship between acquisition of biogas plants and household land holdings. Although farmland is not required to qualify for a plant, Households with requisite number of milch animals and no cultivable land can opt for biogas plant till dung supply is assured. There are 28 families who have no agricultural land but have taken up biogas plants, Most of them (57%) are found not working at the time of survey. About 70% adoption of biogas plants has been shown to have a positive effect of land tenure.

Among small and medium farmers with up to 3 hectares of cultivable land, education of head of biogas households has been found to have no role in installing biogas plants. There are 76 households whose heads are illiterate but have adopted biogas due to the attraction of subsidy and other benefits under the programme. However, at the time of the survey, a large number of plants belonging to this category were found to be non-functioning, similarly, those whose heads were literate and educated up to primary level. Majority (more than 50%) of such plants are non-functional. An improvement in the level of efficiency is noted only in cases where the head of the household is studied up to the middle class.

Agriculture is the major occupation in 65% of biogas households, followed by 12% services and 10% trade/business. More than 73% of the plants headed by 19 households whose occupation is animal husbandry are operating and about 49% are operating against biogas household heads.

### IMPORTANCE OF RESEARCH

#### • How does a biogas project work?

In this project, organic waste is placed in a closed tank (digester), where bacteria decompose it without oxygen and produce gas.

#### • Uses of Biogas:

This gas is used for cooking, power generation and lights.

#### • Advantages of biogas

- o Good for the environment
- o Waste management
- o Sustainable energy
- o Use as fertilizer

#### • Use of biogas plant –

- To reduce the suffering of women from smoking, cooking on inefficient fuel.
- Avoid deforestation
- Improving ecological balance.

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- Improving rural sanitation.
  - Saving of limited fossil fuel.
  - Decentralized electricity generation.
  - Improving sanitary conditions for rural women.

**LIMITATION OF THE RESEARCH**

1. The information obtained from the research is limited to all urban and rural areas.
2. Due to the different geographical conditions, there are different problems in choosing a biogas project in each place. Health and In order to maintain health and environment in each place in the built-up area, different types of planning with the help of artificial intelligence to implement biogas projects may be different, so the criteria and research may be different.

**Important Findings of the Study:**

Due to the development and evolution of new technologies to enter the global competitions, today all the chemical substances, electricity, fertilizers are excessive, and its effects are seen on all human beings and the environment. And a great threat to health has arisen and modern life is in danger due to the impossibility of providing all the resources to the increasing population and for that once again the east has to use its natural resources. And it is going to be very beneficial and necessary to take a farsighted look at the important natural resources that are beneficial to health. By implementing the concept of 'waste to sustainable' the concept of biogas will be fruitful without disturbing the environment in any way.

**RECOMMENDATIONS**

1. Considering the health benefits of biogas projects in urban and rural areas and its multiple benefits, creating biogas projects for the purpose of conservation and making accurate predictions based on the environment with the help of artificial intelligence.
2. Artificial intelligence-based exploration of social determinants of biogas projects in urban and rural areas and ignorance about the multiple benefits of biogas use.
3. To explore various schemes with artificial intelligence guidance, operation system for biogas project in urban and rural areas and to develop environmentally friendly aspects.

**CONCLUSION**

Using biogas and awakening people to save environment and health with the help of artificial intelligence is very important only if the entire environment can be saved from potential threats.

**REFERENCE LIST**

- 'NANO BRITTO BIOGAS PLANT – AN INNOVATIVE TECHNOLOGY ' – BY B. J. BRITTO .
- <https://mr.wikipedia.org/wiki/%E0%A4%AC%E0%A4%BE%E0%A4%AF%E0%A5%8B%E0%A4%97%E0%A5%85%E0%A4%B8>