

# Solid Waste Management and Biogas plant design

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**Abstract**—In our project “solid waste management and biogas plant design” we are aiming to clean the rural area and put biogas plant for solid waste , were we can store the waste and convert it into the gas for natural resources aim to keep village clean The biogas generating method involves filling the digester with cow dung and some house waste and is left to ferment for days: the result of the formation produce biogas in the digester. The compositions of the gases are mainly methane and carbon dioxide. The plant is manually operated and does not require high skilled manpower.

This will cut down on environmental pollution global warming and reduce the rate of cutting down trees in rural areas.

**Index Terms**—biogas, Fermentation, Digester, Biological Waste, solid waste

## I. INTRODUCTION

Biogas is combustible mixture of gases produced by micro-organisms when livestock manure and other biological waste are allowed to ferment in a close system.

Biogas can be produced by fermenting organic materials in absence of air (or oxygen) with the help of bacteria (microorganisms) to break down materials to intermediates such as alcohols and fatty acids and finally to methane, carbon dioxide and water. This process is called anaerobic fermentation and was known to exist from quite long time back. Biogas has also been known as the swamp gas, sewer gas, fuel gas, marsh gas, wet gas, and in India more commonly as gober gas.

Natural gas is also produced by the action of anaerobic bacteria on plants that grew thousands of years ago. Biogas and natural gas are therefore very similar to one another. The main fuel component in both is methane gas However, over the years, pressure and temperature of underground rocks have converted part of methane in natural gas to other gases such as ethane, propane, butane and condensate.

To selecting location for the biogas plant Nandgaon Bk is a medium size village located in Igatpuri Taluka of Nashik district, Maharashtra with total 364 families residing. The Nandgaon Bk village has population of 1952 of which 968

are males while 984 are females as per Population Census 2024 -2025.

Key objectives:

- 1) Waste control.
- 2) Environmental pollution global warming and reduce the rate of cutting down trees in rural area.
- 3) Economical and sustainability
- 4) Long term durability
- 5) Prevention of indiscriminate cutting of trees as a source of energy.

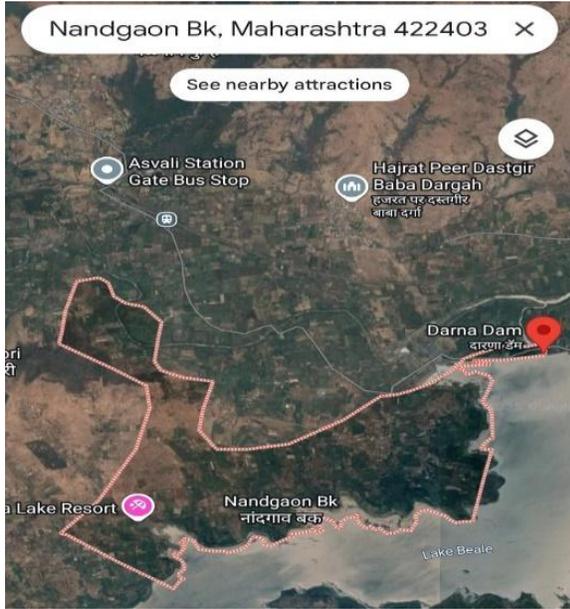
## II. LITERATURE REVIEW

Biogas has been used on a small scale for heating, cooking, and lighting in low-tech environments around the world for centuries. Indeed, the World Biogas Association says biogas was used to heat Assyrian bath waters in 900 BC1 However, the discovery of methane is generally attributed to an Italian scientist, Alessandro Volta, in the 1770s reportedly, his research was inspired by reading a paper by the American Benjamin Franklin on "flammable air". Scientists found that methane was generated in swamps and rotting organic matter, a realization that led to the construction of the world's first biogas digester in 1859 in Bombay, India. Soon after, sewer gases were being captured and used in Victorian England to provide street lighting.

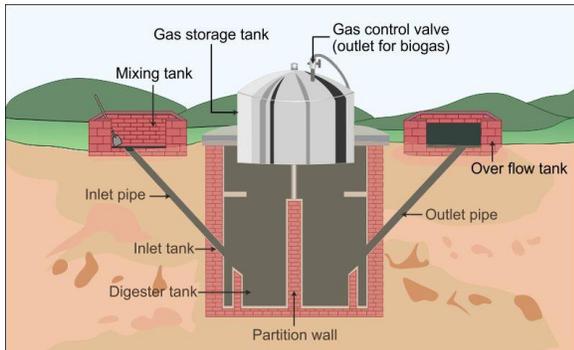
## III. METHODOLOGY

Nandgaon Bk is a village in Igatpuri taluka of the Nashik district in Maharashtra. Nandgaon is located near Darna dam on the Nashik -Maharashtra. The village consists around 364 families (Population- around 1952). The rest being considerably far and scattered. Figure shows the satellite map of the village. Biogas are 5 parts divided and each part small scale of capacity.

IV. RESULT



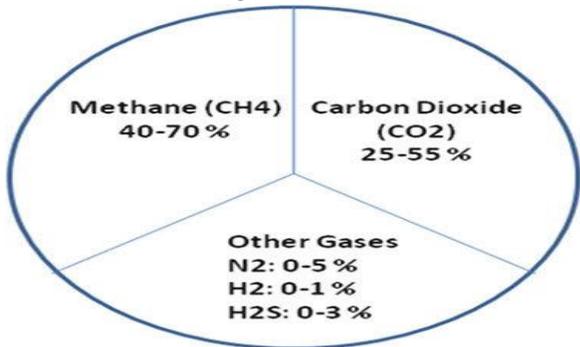
V. PHOTOGRAPH AND STRUCTURE



Biogas plant

Favourable temperature, P H value & C/N ratio for good fermentation-

1. Temperature: Mesophilic; 200 c to 35 o c.
2. PH value: Neutral PH and ranges 6.8 to 7.2.
3. C/N ration Ranges from 20:1 to 30:1. A.



VI. CONCLUSION

Biogas provides effective, solution to non-availability of fossil fuels, and environmentally harmful burning of dung-cakes. Biomethanation reduces fuelwood consumption and helps to conserve continually depleting forest resources which if not checked may cause soil-erosion, flash floods, landslides and river-siltation in plains. In the context of controlling deforestation. renewable energy sources like biogas assume considerable significance. In few decades the fluid hydrocarbons, oil and gas will no longer be available in unlimited amount as energy sources. To constituent's biogas plant classifying particular area categories 5 parts of taken in that rural area. Biomethanation which is a non-conventional energy technology not only augments energy supplies in energy-deficient rural areas but also saves the environment from degradation.

VII. REFERENCES

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