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Production of bio-gas (In urban areas using different types of wastes)

Chandramani Patel, Gaurav Kumar and Arun Kumar Upadhyay

LCIT Bilaspur, CSVTU Bhilai (C.G), India.

Abstract
The focus of the research paper is to investigate the importance of biogas as an alternative energy sources in urban area. Urban waste, including wastewater treatment plants, food waste from households and businesses, yard clippings, human wastes, vegetable market wastes, and non-recyclable paper, will create biogas under the right conditions. Food waste from grocery stores, restaurants, cafeterias and homes contains energy and valuable nutrients. These wastes of specific area should collect in single tank and use them in bio-gas production.

Keywords: Bio-gas, Urban wastes, Human waste, Yard clipping.

INTRODUCTION

Biogas typically refers to a gas produced by the breakdown of organic matter in the absence of oxygen. It is a renewable energy source, like solar and wind energy. Furthermore, biogas can be produced from regionally available raw materials and recycled waste and is environmentally friendly. These plants can be fed with energy crops such as maize silage or biodegradable wastes including sewage sludge and food waste. During the process, an air-tight tank transforms biomass waste into methane producing renewable energy.

World status

Different countries in world are developing techniques for bio-gas generation. In North America, utilization of biogas would generate enough electricity to meet up to three percent of the continent's electricity expenditure. There is currently around 60 non-sewage bio-gas plants in the UK, most are on-farm, but some larger facilities exist off-farm, which are taking food and consumer wastes.

In Germany Governmental support of renewable energies started at the beginning of the 1990s with the Law on Electricity Feed (StrEG). This law guaranteed the producers of energy from renewable sources the feed into the public power grid, thus the power companies were forced to take all produced energy from independent private producers of green energy.

If concentrated and compressed, it can also be used in vehicle transportation. Compressed biogas is becoming widely used in Sweden, Switzerland, and Germany. A biogas-powered train, named Biogaståget (In fig. 1) Amanda, has been in service in Sweden since 2005.

Fig1. Biogas-train-amanda

Indian status of production

In order to create awareness and associate the people interested in biogas, an association "Indian Biogas Association" was formed. The “Indian Biogas Association” aspires to be a unique blend of; nationwide operators, manufacturers and planners of biogas plants, and representatives from science and research. The association was founded in 2010.

The model biogas plant that uses wet waste to generate biogas/electricity on the University of Agricultural Sciences-Bangalore campus has been functioning well for nearly a year. The plant generates 90 kg of cooking gas a day that is used to generate around 320 units of power a day. This takes care of 25 per cent of the university’s electricity requirement. Vikram Sarabhai Space Centre (VSSC) has commissioned two biogas plants for solid-waste management. The first plant treats the organic waste from canteens on the premises and a larger second plant was installed at the housing colony. With four canteens servicing more than 5,000 employees, the VSSC generates a large volume of food waste. The new waste-treatment plant can produce biogas equivalent to 17 kg of LPG. The plant was opened by K.M. Nair, Chief Controller, VSSC. Electricity generated by processing organic household waste is being used to light up the streets of Maharashtra’s Pune city’s many as 225 streetlamps have been lit up by power generated by biogas plants. Delhi Transport Corporation (DTC) buses will soon be running on fuel derived from vegetable waste and sludge from treated sewage. The Centre has struck a deal with the Swedish government to set up

*Corresponding Author
Chandramani Patel
LCIT Bilaspur, CSVTU Bhilai (C.G), India.

Email: chandramanipatel01@gmail.com

a compressed biofuel plant at Delhi Jal Board's Keshopur sewage treatment plant (STP). The GTZ Project Indo-German Energy Programme (IGEN) recently started a rural electrification programme with biogas plants of around 60 kWel output.

Economical view

Most of the commercially run biogas power plants in developing countries are of medium size and are installed in industrial contexts, primarily using organic waste material from agro-industrial production processes such as cow, pig and chicken manure, slaughterhouse waste, or residues from sisal and coffee processing.

Total cost for a biogas plant, including all essential installations but not including land, is between 50-75 US Dollar per m^3 capacity. 35 - 40% of the total costs are for the digester. The specific cost of gas production in community plants or large plants is generally lower compared with small family plants. The cost for the gas distribution (mainly piping) usually increases with the size of the plant. For communal plants with several end-users of biogas, the piping costs are high and compensate the digression by 'economics of size' partly or wholly. In regions where plant heating is necessary, large-scale plants would be more economical.

To keep the construction costs low, labor provided by the future biogas users is desirable. Often, the whole excavation work is done without hired labor. On the whole, a reduction of up to 15% of the wages can be effected by user-labor. If periods of low farm activities are chosen for the construction of the biogas plant, opportunity costs for labor can be kept low.

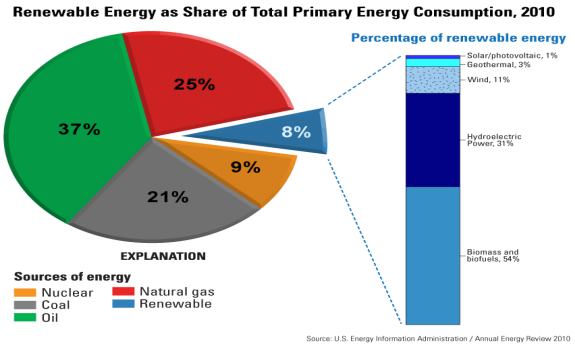

Fig 2. Pie chart

Project theme

Theme of this project is to use urban waste for bio gas production and use gas for cooking and other social works like street lightening etc. In urban area human wastes are not used because they use separate tank for each home and hotels. If all hotel and home waste tank of individual area are join and collect them in single bio gas plant. Kitchen waste and other bio-degradable waste also used in this plant.

CONCLUSION

Biogas could potentially help reduce global climate change. Normally, manure that is left to decompose releases two main gases that cause global climate change: nitrogen dioxide and methane. Nitrogen dioxide (NO2) warms the atmosphere 310 times more than carbon dioxide and methane 21 times more than carbon dioxide.

As many as 550 families living in the colony generate about 650 kg organic waste every day. The plant is equipped with a pulveriser to crush the waste into small particles, in order to accelerate biodegradation. The energy produced from the plant will be used to power the streetlights in the colony.

REFERENCES

[1]G.D. Rai, 2010. Non-conventional energy source, Khanna Publications, Delhi.

[2]www.google.co.in

[3]Wikipedia.com

[4]Govt. of India Ministry of New And Renewable Energy

[5]https://energypedia.info