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A Study on Sustainable Electricity Generation from Biogas

Malhar Kulkarni, Prathamesh Patil
Vivekanand College, Kolhapur
(Autonomous)

Abstract

In this modern world electricity has become a necessity of life. The current methods of electricity generation are majorly based on fossil fuels which are not sustainable and also harm the environment.

India still being an agrarian economy has a surplus of cattle which has till date been under-utilized. This natural renewable resource can be used to generate electricity for specific purposes or in some cases power entire villages. Biogas has a distinct advantage over other types of renewable sources as it can be used for generation as and when needed. Electricity generation is not dependent on the outside environment. With the right approach and govt. push this can be a cheap alternative for electricity generation.

Keywords: Biogas, Sustainable, Cost-effective, Aatmanirbhar, Carbon Credit.

Objectives: 1) To study Sustainable Electricity Generation through Biogas.

2) To know about Biogas Electricity Generation Plants in Other Countries.

Research Methodology:

This present study is descriptive in nature and fully based on secondary data. Data has been collected from various research articles, books and various published sources to make this study more understandable and simple.

Introduction:

In India there are many types of renewable electricity generation methods like solar, hydro, wind etc. but each one of them has a certain drawback which makes them unsuitable for being our primary source of power. Biogas Plants on the other hand overcome many of the problems faced by these types and gives extra advantages too. The following table illustrates the comparison between other renewable energies and Biogas Plants:

The Process:

Electricity is generated from Biogas which is generated through cattle waste. At first cattle waste like cow dung is collected from farms and is then dumped in a Biogas Digester, this digester then produces the Biogas through process of anaerobic digestion thus the gas generated is then used for generation of electricity. This electricity can then be sold to the grid or used within the facility.

Benefits:

- Reduction in Methane gas (a GHG gas) as it is burned for electricity purposes
- Potential for revenue generation for farmers as their cattle dung is not wasted
- It is also feasible for private players.
- The Plant owner can obtain Carbon Credits for this project and thus generate another revenue stream
- Availability of cheap organic fertilizer

Estimated Daily Production for a 5 MW Plant:

Particulars	Daily Production
Electricity	5,000 KW
Solid Fertilizer	10,000 Kg
Liquid Fertilizer/Slurry	87,500 L
Carbon Credits	27 credits

Biogas development in various parts of the world:

Among different countries throughout the world, Europe plays a pivotal role in biogas electricity generation. In 2017, Europe contributed to over 70% of the world biogas generation representing 64 TWh, followed by North America accounting for 15 TWh (in which the US participation was over 85% in entire North America). Asia produced 4 TWh followed by Eurasia with 1.7 TWh, South America with 953 GWh, and Africa biogas production accounted for 89 GWh (Scarlat et al. [2018](#); Agency [2019](#)).

In India, around majority of the Biogas digester are medium digesters of volume 3–10 m³. Based on the circumstances, the plants produce 3–10 m³ biogas daily, adequate to deliver a regular farmer family with energy for food preparation, heating, and lighting. Also, more than 1.2 million households employ small-scaled AD and 100,000 family-sized AD units have been installed between 2016 and 2017. Over 35,000 biogas plants have been constructed with governmental investments (MNER [2016](#)). (Last Name, Year)

Conclusion:

Thus India has a huge potential for generation of electricity through Biogas. This technology will make the villages self-reliant in terms of power and also help to reduce the carbon footprint.

The use of domestically produced power sources will help reduce the import cost needed to pay for current fossil fuel powered plant. It will also ensure that the prices are stable despite any turmoil in the international market. Thus with a bit of market sentiment and government push Biogas Electricity generation can be a huge opportunity.

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