ISSN (Online) 2456 -1304

International Journal of Science, Engineering and Management (IJSEM)
Vol 3, Issue 4, April 2018

Impact of Energy Farming: Addressing limitations of Biogas Plant In terms of Source as a Fuel

[1] Hansika Ringe
[1] 1st Year PGDM-Agri Business Management, Vaikunth Mehta National Institute of Co-operative Management, Pune

Abstract- **Indian agriculture has been able to deliver a unique and diversified produces, mainly due to different topologies and climate variation that help to grow and a special quality yield. The key link between to have a sustainable way of farming and satisfactory yield is the energy source being utilised for the farming. The world is moving from non- renewable to renewable sources, energy farming will help to achieve that goal. The overall image after reading the articles indicates that Renewable sources subject has largely been unexplored because the expensive technology and difficulty of being replicated in some geographical area. One of the ways, for making farming clean and green is through small scale biogas plant. Even though it serves both domestic (cooking) and agricultural use (supply motive power, pump water and drive machinery). This study will attempt to offer some suggestions to the limitations of biogas plant which are standing as an obstacle for use in full capacity.**

Key words: - **Agriculture, Sustainable, Renewable Sources, Biogas Plant.**

I. INTRODUCTION

Presently the world is facing the consequences of the global warming in one or the other way. In the Paris agreement under UN Framework Convention on Climate Change, it was decided that the aim should to be keep the global temperature in this century below 2 degree Celsius and further to reduce to 1.5 degree Celsius. Accordingly the countries have to line up their objectives to achieve the goals. Energy farming as a concept came into being, so that to reduce the air pollution that plays significant part in the increasing the temperature of the world. Energy farming can be defined as use of sustainable and environmental friendly source of fuel that could be harnessed to generate desired output. As the non -renewables would insufficient to fulfil to satisfy our increasing needs, it has led to situation where the exploring other sources has become the need of the hour. Renewable sources of energy like solar, wind, geo-thermal and biomass etc can become a solution. In this research paper, the alternative renewable source is chosen is biomass energy. This biomass energy is derived through the biogas plant. Basically, the raw materials required for the formation of biogas is animal dung, poultry wastes, plant wastes, human excreta, industrial waste, and domestic wastes. The principle on which the biogas is working is result of anaerobic fermentation of bio mass in the presence of water. In addition to this biogas plant is made five main components:

- Mixing tank
- Inlet chamber
- Digester
- Outlet chamber
- Overflow tank

The process of biogas formation starts from the mixing tank where the biomass and water are mixed in the equal quantity. This mixture now goes through inlet chamber into digester present underground. With digester filled with the partially with the slurry, it is left un- touched for two months. The anaerobic bacteria present in slurry decompose the biomass. Over the time, the biogas starts forming and exerts pressure on the used slurry to outlet chamber. From, the slurry flows to overflow tank. This slurry can be used as manure for plants. This gas that has been collected can now be controlled through a gas value. Lastly it can be used as per requirement. There are advantages of using biogas as a fuel. It is environment friendly, helps to have cleanliness in surrounding areas, slurry can be used for agriculture and gardens, cheaper and reliable source, takes into consideration of recycling of waste and reduce in the occurrence of diseases.

OBJECTIVES

- To study the limitations of biogas as a source of fuel.
- To find out possible remedies for limitations of biogas as a source of fuel.

II. METHODOLOGY

For this research the data has been collected from the secondary sources. The researcher looked upon articles related to the limitation of biogas as fuel in agriculture as well as industrial sector. Subsequently, suggest some ways so that biogas can be used sustainably and transported over

long distance. In the beginning, the paper describes the formation of gas, advantages and then moves on to the disadvantages and difficulty for using it as a source of fuel.

III. LITERATURE REVIEW

Initial investment in the biogas plant is high. It is in terms of building of the structure and components that have to be purchased. People are hesitant to invest money in this kind of technology and are sceptical about whether it will provide the positive and satisfactory returns or not. Under Ministry of New and Renewable Energy, there is a centre sector scheme called National Biogas and Manure Management Programme. Basically it promotes setting up of family type Biogas Plants for the rural and semi urban/ households. There is around 47.5 lakh biogas plant present in India (upto 2014). Government has introduced the scheme with aim for making residents of village to become self-dependent for cooking gas and bio manure. It has different subsidies for different states like

Subsidy for setting up of Biogas Plants under National Biogas and Manure Management Programme

S. No.	Particulars of Central Financial Assistance (CFA) & States / Regions and Categories	Family Type Biogas Plants under NBMMP (1 to 6 cubic metre capacity per day)	
A.	Central Subsidy Rates Applicable (In Rs.)	1 Cubic Metre	2- 6 Cubic Metre
1.	NER States, Sikkim (except plain areas of Assam) and including SC & ST Categories of NE Region States.	15,000	17,000
2.	Plain areas of Assam.	10,000	11,000
3.	Jammu & Kashmir, Himachal Pradesh, Uttrakhand, Niligiri of Tamil Nadu, Sadar Kurseong & Kalimpong Sub-Divisions of Darjeeling, Sunderbans (W.B.) and Andaman & Nicobar Islands.	7,000	11,000
4.	Scheduled castes / Scheduled Tribes of all other States except NE Region States (including Sikkim).	7,000	11,000
5.	All Others	5,500	9,000
B.	Turn-Key Job Fee including warranty for five years and quality control (in Rs. per plant).	Rs.1500/- per plant for fixed dome Deenbandhu type and floating gasholder KVIC type brick masonry models. Turn Key Job Fee also provided for biogas plants with prefabricated material involving part construction work either for digester or dome. No fee is provided for completely prefabricated / manufactured plants such as Bag type plants with rubberized material or plants made of HDPE / PVC / fabric materials, as and when approved.	
C.	Additional subsidy (CFA) for toilet linked Biogas Plants (in Rs. per plant).	1,200/-	

For the biogas plant there should be continuous supply of biomass. Satish lele has presented in his website, mentioned about the amount of materials required for the production of 1 cubic meter of biogas. It is equivalent to 400 grams of LPG and can sufficiently provide fuel for 3 to 4 people. The composition of bio gas materials is stale, left over food:5kgs, animal dung:25 kgs, Chicken dung 2 kgs+ animal dung 10 kgs, spoiled flour of wheat/corn:1.5 kgs. The infrastructure required for setting up a bio gas pant for 1 ton/day of cow dung cake. The area of plot needed is 300m2, manpower-two unskilled persons, power supply-1 KW. Water supply -1200 litres, cost-Rs 5,00,000. Clearly the subsidy given by the government does not sufficient for the building of plant. Residents of the rural people do not prefer using biogas for cooking because of it bad odour. One of the major components of the biogas is that human excreta. The concern taken into consideration is that to cook food on the gas derived from undesired material is not unhygienic The gas generated within digester can though be controlled through gas valve but still as it cannot be stored for the future use and transported for long distance.

IV. RESULT AND CONCLUSION

- Here, there are some of the suggestions that can be used for making biogas used as fuel for motors, tractors and other instruments required by farming. It also includes suggestions that can use for making it standardized source of fuel that can be used in industrial sector.

- Bio-methane is available in liquid form, creating a product Liquid Bio-Methane (LBM). There are two main advantages like transported easily and can be distributed to either LNG vehicles or CNG. We have sign a contract with the other pipeline providers. It has been contradicted by the poor quality of gas potential devastating effect have on gas equipment.

- Bio-Methane can be derived after removing H2S, moisture and CO2 from biogas. It can be used as vehicular fuel. Bio methane can be stored for future use. There are three systems for different kind of pressure (low, medium and high).

- At Low pressure, floating gas holders can be used for storage and can be operated on pressure up to (less than 2 psi) 10 inch water columns. These Floating holders are made up of steel, fibre glass or flexible fabric.

- For Medium –pressure storage of cleaned biogas- it should be between 2 and 200 psi

- (Pounds per Inch) so that to prevent corrosion of tank components and to ensure safe operation. At fixed intervals biogas should be cleaned of removing H2S

- High-pressure storage of compressed bio-methane-gas scrubbing because impurities H2S and water

are likely to condense and corrosion. It can be stored steel cylinder

- The distribution can be done through the pipeline providing natural gas for access to gas appliances, commercial/industrial gas equipment. A contract can be established with the LNG provider to pump bio-methane.

- If there is problem for pipeline, over the road (technique) can be used because infrastructure and market already exists. As mentioned for it can be stored in steel cylinder can transported for desired place by road. In California, till now the LNG has been imported from the other stares and this LBM will give an edge over LNG because it will be locally produced.

- As for the promotion of biogas plant in the rural areas, community awareness and mobilization can be used to spread knowledge and break taboos related to use of the biogas plant. It will also provide integrity within the village as a community whole by selecting the community based biogas plant which will benefit the all the people in similar manner.

- Other than the limitations that can be taken care of is a safe disposal of the human excreta, which is huge concern for the water bodies and environment.

Lastly, the researcher would like to conclude by mentioning that limitation of biogas as a source of fuel can be addressed with proper use of technology, which help in the segregating the components of gas that will harm the internal process of machines and along with that fuller utilization of biogas for different sectors. This technology can only be achieved its peak with co-operation available from the people. It is the people who have to understand and work up as a unit to make Agriculture and support the industrial sector with the renewable source of energy helping the world as a one.

BIBLIOGRAPHY

1. Chungyalpa, D. (2016, 12 05). Working of Biogas Plants. Retrieved from http://hello.khoryug.info: http://hello.khoryug.info/wpcontent/uploads/2017/07/Working-of-Biogas-Plants.pdf

2. Conservation, S. (1997). Storage and Transportation of. San Francisco: SUSCON.ORG.

3. Lele, S. (2011, 12 24). BIO-GAS PLANT. Retrieved from http://www.svlele.com: http://www.svlele.com/biogas.htm

4. PERFECT PRIVACY, L. (2017, 06 14). BIOMASS ENERGY: ADVANTAGES. Retrieved from

5. http://www.idc-online.com: http://www.idc-

6. online.com/technical_references/pdfs/civil_engineering/Biomass_Energy_Advantages_and_Disadvantages.pdf

7. Subramanian, V. (2017, 11 09). Ministry of New and Renewable Energy. Retrieved from http://mnre.gov.in:http://mnre.gov.in/schemes/decentralized-systems/schems-2/