



A Review Paper on Biogas Plant System

Subhash Prajapat¹, Mohammed Fejan¹, Pankaj Kumar²

¹Department Of Mechanical Engineering, Arya Institute of Engineering & Technology, Jaipur, Rajasthan, India rishujay36@gmail.com

²Department Of Mechanical Engineering, Arya Institute Of Engineering & Technology, Jaipur Rajasthan, India feju302@gmail.com

³Assistant Professor Department of Mechanical Engineering, Arya institute of engineering and technology, Jaipur, India Pkumar925246@gmail.com

ABSTRACT-

In the today's era as we know we are facing various types of problems day by day. In that one thing is that our fossil fuels are very limited so we have to go on another type of fuel which will be not limited like fossil fuel. So we can use the biofuel instead of fossil fuel. Another thing which we are facing is the storage of the daily wastages/sludge or we also have to manage the waste water treatment. So we can manage these all things by the production of biogas. In which we will utilize all the sludge, waste water, cow dung etc. with the help of anaerobic digestion to stabilize the sludge and produce some kind of renewable energy.[1][3][4]

Keywords- Fossil, Sludge, Biogas, Anaerobic Digestion, Renewable Energy.

1. Introduction:

The need of the today's populated countries or city's in which the population is increasing day by day, so it is so necessary to have a digestion system because population is in huge amount. so the amount of wastages also will be increased because there will be large amount of production sector or industries will opened and directly proportional they will produce much amount of wastages, sludge, waste water that must be digested or well treated because we can't store it otherwise it will produce a large numbers of dangerous bacteria and all .[4][11]

We are also having the problem of fossil fuel that will be lost soon because there is large or huge amount of utilization so it's urgently needed a replacement which should be cheap in cost and also have some reliability in uses and as well as in emission.[5][10]

So here the production of the biogas is the best thing which can be replaced the fossil fuel use and as well as can treat the waste water and sludge type things. So by the use of biogas our environmental will be green and now we don't need to save or store the sludge or wastewater now we can utilize this thin. There is one major use of biogas as well and that is we can use the biogas as an LPG in our kitchen so it will also helpful in our daily life. It can be categorized in a large area or in a small area according to the budget or need.[6][11]

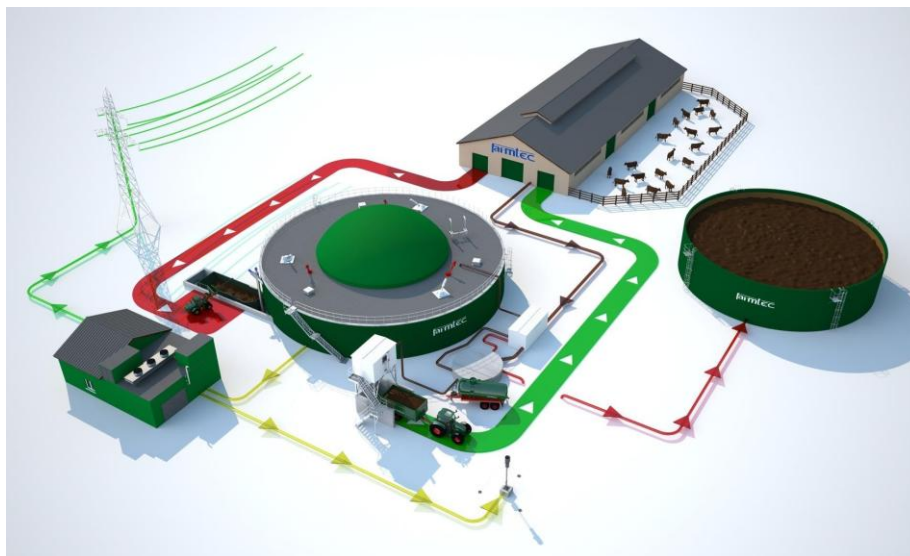
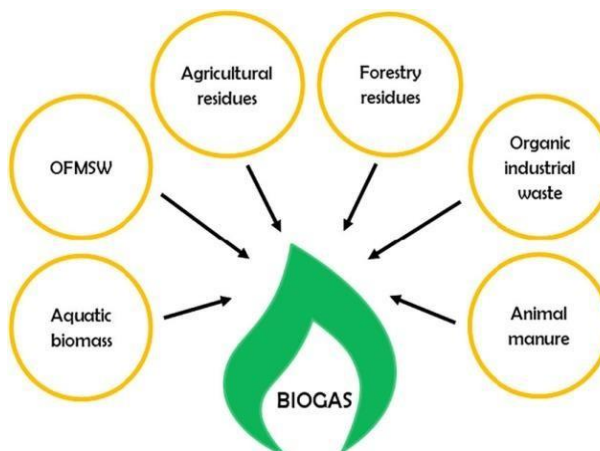


Fig. 1 A realistic flow of Process of Biogas Plant [1] [3]

2 Material and Component

So, basically the raw material is can be of various types of wastages that can be-[6][8][9]

- (1) Cow dung
- (2) Waste water
- (3) Sewage
- (4) Green waste
- (5) Food waste\plant residues
- (6) Sludge
- (7) Biodegradable waste
- (8) Intermediate fruits
- (9) Kitchen\mess waste



Component can be of various type that can be vary according to the type of biogas plant so the types of biogas digester and plants-[9][11]

- (1) Fixed dome biogas plants.
- (2) Floating drum plants.
- (3) Low cost polyethylene tube digester.
- (4) Balloon plants
- (5) Horizontal plants
- (6) Earth pit plants
- (7) Ferro cement plants

The main component which is common in all the type of biogas plant is the storage tank and after this we can include the pipelines for the flow of gases.

So the storage tank is considered according to the need or requirement of the biogas quantity. Like if we want to produce the biogas in small quantity we can use the digester bag which is having the starting capacity of about cm^3 and if we want to produce it on the large scale then it will require the storage tank is made up of concrete cement which can store the gas more than 10 cubic centimeters.[6][7][9][11]

3 Methodology or Process:

We can easily understand the whole process with the help of following steps-

- (1) Primarily we have to collect all the wastages which can be of various types like cow dung, kitchen waste, mess wastages, plant residue etc.
- (2) After the collection of the wastages we have to mix it with water or we also can use waste water by virtue of which we can treat the waste water into a good utilization. So when it will mix together it will be known as sludge.
- (3) After the proper formation of the sludge it will be taken down through the digester bag or the storage area where the gas will form after a specific period of time through the anaerobic digestion process in which the sludge is well digested by the bacteria which is present in the sludge in the absence of oxygen. The time can differ according to the sludge or the area temperature.
- (4) The optimum temperature is about of 40 degree centigrade. So after the collection process in the storage tank it will be kept in this for about 2 to 3 months for better digestion of the sludge.

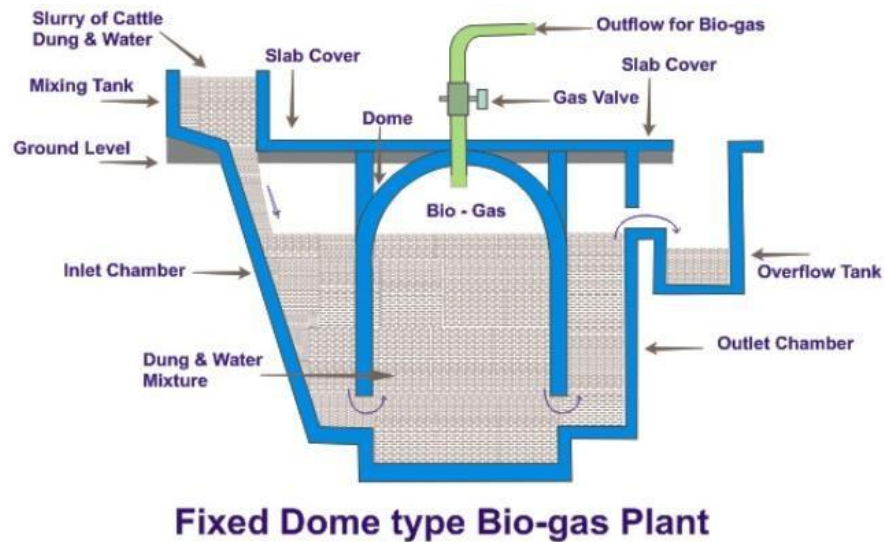


Fig. 3 Process Diagram[3]

So after the specific time period the gas will flow from the gas holder to the pipeline by which the biogas can be used for the burning purposes or cooking purposes and the sludge which is completely digested can be removed from the outlet chamber for the cleaning purposes. [1][5][6][9][11]

4 Applications Over Conventional:

It can be used in many type of work like-

- we can use it as a fuel which can be named as biofuel and its having a great advantage that is will not provide harmful gases or emission to the environment.
- it can also provide the LPG gases which can be used for our kitchen and cooking purposes.
- the sludge which we will get after the full digestion can be used as a bio fertilizer so the growth of our plants will be enhanced because we don't need to use chemical.
- the waste water can be treated by this method or system so we can control the reuse of that waste water and the sludge which produced from the different type of firms.
- Biogas can be utilize in lamps for lighting purposes as well.[4][9][10]

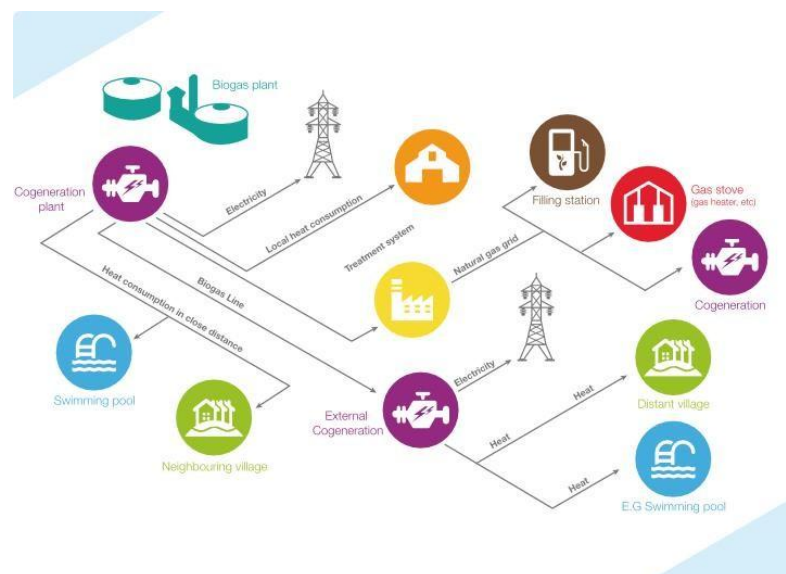


Fig. 4 Different Applications of Biogas[1][3][8]

5 Advantages:

- The power can be obtained at a low cost because anyone can get the biogas plant according to their area of financial status like at a big pattern or small pattern.
- pollution can be controlled by adapting biogas as a fuel due to which the vehicles will not produce harmful gases to our nature.
- It will also provide the time economy because now we do not need to collect firewood and all for the power generation.
- Now we do not need to depend on the fossil fuels standards in rural areas.
- It will reduce the global warming as well.
- The sludge which will be formed after this process can be used as a fertilizer for the plants.
- This is the best way for the disposal of organic wastes, waste water etc.[3][6][7][8]

6 Disadvantage:

- The process is not very efficient economically on a large area of industrial scale. Because we have to maintain the good amount of supply of the sludge regularly.
- We can't enhance the efficiency of biogas systems so easily because all the parameters or process of the biogas is limited and we can't make large changes to that otherwise the result will be not good.
- If we are using biogas as a fuel then because of the use of this kind of fuel in the internal combustion engine the metal parts which are existing into the engine get corrosion instantly because biogas within itself includes some kind of gases as impurities which are corrosive to the metal parts.
- Can't be used at all types of locations. because we have to consider the temperature and pressure factors in this system.
- It can be exploded if it will not be properly stored.[4][5][11]

7 Conclusion:

In this paper we have done a review on biogas plants and found that it is sometimes become so hard to use because we have to use it properly and it should be well maintained. The biogas plant needs a proper functioning and process planning to execute it and then and only then it will give proper production of biogas.

It can be formed on any kind of level which everyone can afford financially like for example if someone is having a low rate of the sludge then the plant can be made of a little digester bag and in the alternative of this if we are having a large amount of sludge then we can make it on a big dome type structure which can store more in comparison of that little digester bag.

This plant will provide us many things by which our environment can be protected for example we can use the fertilizer which will replace chemical which were used for plants. As well as the biofuel does not produce harmful gases so it can be used in a wide platform as a vehicle fuel. And one more main example of this biogas is that it can be used as a LPG.

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