BIO-GAS:- A GREEN RENEWABLE ENERGY TO BOOST UP THE INCOME OF RURAL FARMERS

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Abstract

Bio-gas can be generated from bio-waste materials; hence, the waste will become wealth. Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels and rural (off-grid) energy services. India was the first country in the world to set up a Ministry of Non-Renewable Resources in early 1980s. In India, the realised potential of renewable energy is only 12.5 per cent of the total estimated potential of 2,49,188 MW. More than 87 per cent of the potential of renewable energy source is remaining untapped. One of the largest bio-gas plants in the world is currently being built in North West Jutland, is one of Denmark's most agricultural areas. The first place of achievement in India, the state is Andhra, the second place is Maharashtra and Tamil Nadu is very less level of bio-gas generation. Environmental benefits on a globe scale: Bio-gas plants significantly lower the greenhouse effects on the earth's atmosphere. The plants lower methane emissions by entrapping the harmful gas and using it is as fuel. Bio-gas is one of the green energy items, which can pave the way for sustainable development. The slurry will definitely reduce or replace the chemical fertilizers because it has more NPK (Nitrogen, Phosphorous, and Potassium) than raw dung.

***Keyword**: Bio-gas, Renewable Energy, Anaerobic Digestion, Sustainable Development, Slurry.*

Introduction

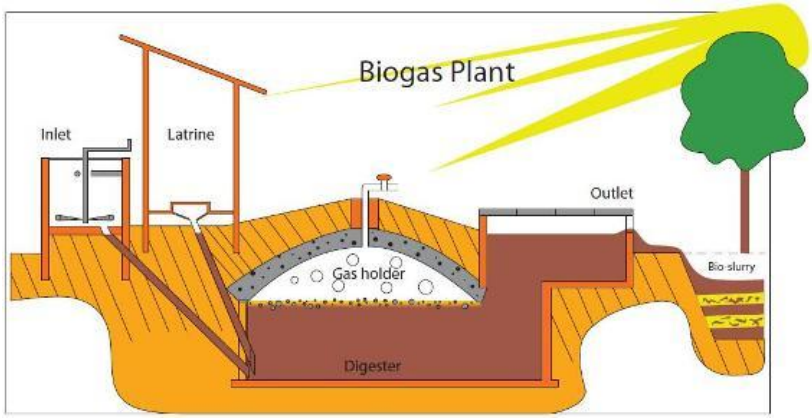
Bio-gas can be generated from bio-waste materials; hence, the waste will become wealth. It is one of the renewable resources and many countries in the world are giving importance to this resource to meet out the energy crisis. The renewable energy is generally defined as energy that comes from resources which are naturally replenished on a human timescale such as sunlight, wind, rain, tides, and geo-thermal heat. Renewable energy replaces conventional fuels in four distinct areas: electricity generation, hot water/space heating, motor fuels and rural (off-grid) energy services. Renewable energy in India comes under the purview of the Ministry of New and Renewable Energy (MNRE).

Concepts

Bio-gas typically refers to a mixture of different gases produced by the breakdown of many organic matters in the absence of some oxygen.

Bio-gas is the recycling of animal dung, human excreta and agricultural and industrial wastes through bio-gas plants. That would help to protect the environment and also provides clean fuel and organic fertilizer.

Bio-gas technology provides fuel for cooking, high value manures and power for running farm machinery. In addition, bio-gas technology helps in maintaining proper sanitation in rural areas and makes indiscriminate felling of trees for fuel wood unnecessary.



Bio-gas, in other words methane can be generated by anaerobic digestion with anaerobic bacteria or fermentation of biodegradable materials such as manure, sewage municipal waste, green waste, crops and plant materials, animal's excretion etc.

Utilisation of Bio-gas Around the Globe

India was the first country in the world to set up a Ministry of Non-Renewable Resources in early 1980s. In India, the realised potential of renewable energy is only 12.5 per cent of the total estimated potential of 2,49,188 MW. More than 87 per cent of the potential of renewable energy source is remaining untapped. Hence, the problems of energy crisis can be solved through renewable energy sources. The non-renewable resources like oil, coal and natural resources are getting depleted very fast; hence there is a prototype shift towards the renewable resources of bio-gas, solar, wind and bio- fuel in recent years. One of the largest bio-gas plants in the world is currently being built in North West Jutland, is one of Denmark's most agricultural areas. The world's largest bio-gas plant was inaugurated recently on Finland's western coast as the country seeks to limit its use of foreign coal built near an existing coal fired power plant in Vaasa, Central Finland: -

The 140 MW biomass gasification factory is expected to save coal use upto 40 per cent in Finland.

Benefits and Achievements

The following are the important benefits and achievements of the bio-gas plant.

- Bio-gas system makes clean energy for household use.
- After an initial investment in the system, there is no need to spend money on fuel. And do not emit smoke like wood or charcoal.
- Cooking is quicker and easier than cooking with firewood.
- Bio-gas systems kill the harmful bacteria in livestock manure.
- A farm with a bio-gas system is a cleaner and safer place.
- Bio-gas systems produce excellent safer fertilizers (slurry) for use on the farm.
- Bio-gas system can help in the fight against Global Warming by allowing us to burn methane from organic waste, instead of letting it escape into the atmosphere where it adds to the green house effect.
- It also helps by letting us to leave more trees standing.
- More income earnings from bio-gas slurry in rural areas especially to the rural farmers.
- The Ministry of New and Renewable Energy (MNRE) has also implemented a National Bio-gas and Manure Management Programme (NBMMP) for setting up a family type bio-gas plant mainly in rural areas including remote villages. Under this programme, a target of setting up 1.06 lakh bio-gas plants has been fixed under NBMMP for the year 2013-14. The first place of achievement in India, the state is Andhra, the second place is Maharashtra and Tamil Nadu is very less level of bio-gas generation.
- Bio-gas provides a non-polluting and renewable source of energy.
- Efficient way of energy conversion (saves fuel wood).
- Saves women and children from drudgery of collection and carrying of firewood, exposure to smoke in the kitchen, and time consumed for cooking and cleaning of utensils.
- Produce enriched organic manure, which can supplement or even replace chemical fertilizers.
- Leads to improvement in the environment, and sanitation and hygiene.
- Provides a source for decentralised power generation.
- Leads to employment generation in rural areas.
- Household wastes and bio-wastes can be disposed usefully and in a healthy manner.

- The technology is cheaper and much simple than those for other bio-fuels and it is ideal for small scale application.[7]
- Dilute waste materials (2-10 per cent solids) can be used as in feed materials.
- Any biodegradable matter can be used as substrate.
- Anaerobic digestion inactivates pathogens and parasites, and is quite effective in reducing the incidence of water born diseases.
- Environmental benefits on a globe scale: Bio-gas plants significantly lower the greenhouse effects on the earth's atmosphere. The plants lower methane emissions by entrapping the harmful gas and using it is as fuel.

Disadvantages

The following are the disadvantages of bio-gas.

- Bio-gas leaks smell like rotten eggs (Hydrogen Sulphide). If someone enters a bio-gas digester the person should always have another one with him, in case any breathing problem due to low oxygen in take.
- Frequent smell checks must be performed on a bio-gas system. If bio-gas is smelled anywhere windows and doors should be opened immediately. If there is a fire, the gas should be shut off at the gate valve of the bio-gas system.
- Bio-gas can be explosive when mixed one part bio-gas to 8-20 parts air. When the tank is open for cleaning or repairing work is being done open flames, sparks and smoking should be avoided. If light is needed a flashlight or sunlight reflected off a mirror should be used.
- The process is not very attractive economically (as compared to other bio fuels) on a large industrial scale.
- It is very difficult to enhance the efficiency of bio-gas systems.
- Bio-gas contains some gases as impurities, which are corrosive to the metal parts of internal combustion engines.
- Not feasible to locate at all the places.
- Not attractive on a large scale.

Suggestions

The following are the few suggestions for the better utilisation of bio-gas.

- In village level community plants may be installed. Establishing a plant in a larger scale would enable to have gas connections to many households.
- Bio-gas should be filled up in cylinders, then all the people will like to utilise it.

- When bio-gas plants get faults, mechanics to mend the plants are not easily available; Government should solve this problem by creating more number of mechanics.
- Government and media should make the people, especially the rural farmers about the importance to utilise bio-gas.

Conclusion

Bio-gas is one of the green energy items, which can pave the way for sustainable development. Around the world, plenty of agricultural and vegetative wastes are available and that should be utilised judiciously to generate bio-gas. Gobar-gas plant is the best one to boost up the income of rural farmers, because it gives two benefits, i.e., one is bio-gas for cooking and the other is slurry. The slurry will definitely reduce or replace the chemical fertilizers because it has more NPK (Nitrogen, Phosphorous, and Potassium) than raw dung. Hence, every nation should take keen initiatives for the widespread utilisation of bio-gas.

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