

# RAW MATERIAL MIXING SYSTEM FOR BIO GAS PLANT

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**Abstract** - Biogas is an environmentally-friendly, renewable energy source. It's produced when organic matter, such as food or animal waste, is broken down by microorganisms in the absence of oxygen, in a process called anaerobic digestion. For this to take place, the waste material needs to be enclosed in an environment where there is no oxygen. It can occur naturally or as part of an industrial process to intentionally create biogas as a fuel. Organic matter fed into this process range from livestock waste, crop leftovers, waste water and food waste. The brilliance of Biogas is that it is generated from waste materials, which would have otherwise been discarded of, and the by-products of the process also have value.

Types of bio gas plants. New method of mixing of raw material in bio gas plant.

We designed a final prototype that help to work easily and efficiently. Work in less time. It helps to give more productivity.

**Key Words:** Biogas, Bio gas plant, scope, mixing method, Bevel Gear, Pedestal

## INTRODUCTION

Biogas is a mixture of [gases](#), primarily consisting of [methane](#), [carbon dioxide](#) and [hydrogen sulphide](#), produced from raw materials such as [agricultural waste](#), [manure](#), [municipal waste](#), [plant material](#), [sewage](#), [green waste](#) and [food waste](#). It is a [renewable energy](#) source. Biogas is produced by [anaerobic digestion](#) with [anaerobic organisms](#) or [methanogen](#) inside an [anaerobic digester](#), [biodigester](#) or a [bioreactor](#).<sup>[2]</sup>

Biogas is primarily methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) and may have small amounts of [hydrogen sulfide](#) (H<sub>2</sub>S), moisture and [siloxanes](#). The gases methane, [hydrogen](#), and [carbon monoxide](#) (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a [fuel](#); it can be used in [fuel cells](#) and for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.<sup>[3]</sup>

Biogas can be compressed after removal of carbon dioxide and hydrogen sulphide, the same way as [natural gas](#) is

compressed to [CNG](#), and used to power [motor vehicles](#). In the United Kingdom, for example, biogas is estimated to have the potential to replace around 17% of vehicle fuel.<sup>[4]</sup> It qualifies for renewable [energy subsidies](#) in some parts of the world. Biogas can be cleaned and upgraded to natural gas standards, when it becomes bio-methane.

Biogas is considered to be a renewable resource because its production-and-use cycle is continuous, and it generates no net carbon dioxide. As the organic material grows, it is converted and used. It then regrows in a continually repeating cycle. From a carbon perspective, as much carbon dioxide is absorbed from the atmosphere in the growth of the primary bio-resource as is released, when the material is ultimately converted to energy.

## Types of Bio Gas Plant

### 1. Types of Small-Scale Digesters

#### 1.1\_Fixed Dome Biogas Plants

#### 1.2\_Floating Drum Plants

#### 1.3\_Low-Cost Polyethylene Tube Digester

#### 1.4\_Balloon Plants

#### 1.5\_Horizontal Plants

#### 1.6\_Earth-pit Plants

#### 1.7\_Ferro-cement Plants

### 2. Industrial Digester Types

#### 2.1\_Batch plants

##### 2.1.1\_Continuous plants

##### 2.1.2\_Semi-batch basis

### 3. Dry Fermentation Plants

## Biogas Plant

The biogas production is carried out in anaerobic digesters known as Biogas plant. These have five components:

- An inlet to feed the slurry
- The fermentation chamber where the biogas is produced with the activity of microorganisms,
- The gas storage tank to store the gas produced,
- The outlet for the used slurry,
- The exit pipe for removing the gas produced.

The organic matter if fed into the digesters which are completely submerged in water to provide it with an anaerobic environment. These digesters are hence called anaerobic digesters. The microorganism's breakdown the organic matter and convert it into biogas.

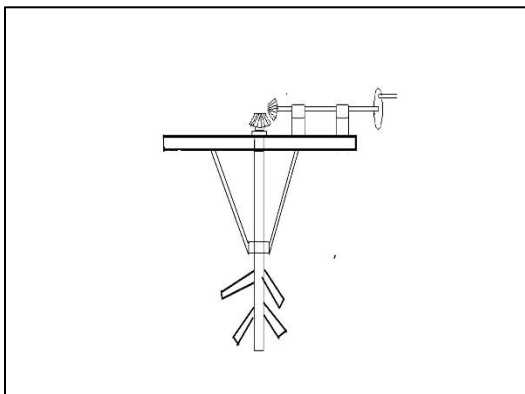
## Capacity of bio gas plant

The size of the biogas plant depends on the quantity, quality and kind of available biomass and on the digesting temperature. The following points should be considered.

The gas demand can be defined on the basis of energy consumed previously. For example, 1 kg firewood then corresponds to 200 l biogas, 1 kg dried cow dung corresponds to 100 l biogas and 1 kg charcoal corresponds to 500 l biogas.

The gas demand can also be defined using the daily cooking times. The gas consumption per person and meal lies between 150 and 300 liter biogas. For one liter water to be cooked 30-40 l biogas, for 1/2 kg rice 120-140 l and for 1/2 kg legumes 160-190 l are required.

## Purposed Design for Upgrading Mixing Method



## Glimpse of Fabrication of Upgraded Mixing Method



### Advantages of Upgraded Mixing Method

- ❖ The updated mixing method helps to finish work at less time with the help of the mechanical mechanism made.
- ❖ It required some cost at initial level to set the mixing method but it works more efficiently as compare to current mixing methods.
- ❖ There will be less labor needed to work within a less time.
- ❖ It will not affect the human and it is safe and secure work with the upgraded mixing methods.
- ❖ It can also run through the electric motor with the help of pulley.
- ❖ It works more efficiently as compare current mixing methods.
- ❖ enhanced operator safety; shorter, more efficient run times; and the flexibility to clean components quickly and effectively.

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### Scope of upgradation of Upgraded Mixing Method

- There is a vast potential for the production of biogas in the country.
- In addition to the energy production, biogas plants also provide bio-manure and are helpful in dealing with the problems of waste management, providing clean environment and mitigating pollution in urban, industrial and rural areas.
- There is a vast scope to convert these energy sources into biogas.
- Biogas production is a clean low carbon technology for efficient management and conversion of fermentable organic wastes into clean cheap & versatile fuel and bio/organic manure.
- Upgraded mixing system helps to work in large scale.
- Upgraded mixing system works faster and efficiently.

### References

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