

Environmental & Social Benefits of Biogas Technology

What is Biomethane?

Biomethane is naturally generated gas which is produced by anaerobic digestion of organic matter such as food waste, vegetable waste, animal dung, sewage, municipal solid waste etc. Chemically, it is identical to natural gas which is produced from the dead animals and the buried plant materials - stored deep under the ground level. Despite the fact that both are produced from organic matter, there are several significant differences between biomethane and methane derived from fossil fuels.

Environmental Impacts:

The below mentioned table shows relative climatic change potential caused through different greenhouse gases after their emission, data mass equivalent to CO₂.

Gases	Relative global warming potential (20 years after emission)	Relative global warming potential (100 years after emission)
CH ₄ (Methane)	63	24.5
N ₂ O (Nitrous Oxide)	270	320

Table – 1.1 Methane & Nitrous Oxide Potential in causing global warming

Note: The reduction of 1 kg methane is equivalent to the reduction of 25 kg CO₂. The reduction of greenhouse gases with a high global warming potential can be more efficient compared with the reduction of CO₂.

- ❖ The use of Biogas technology reduces the CO₂ emission through the reduction of the demand for fossil fuels.
- ❖ At the same time, by capturing uncontrolled methane emission, the second most important greenhouse gas emission is reduced.

- ❖ The amount of worldwide methane emissions from agricultural production comprises about 33 % of the global anthropogenic methane release. Animal husbandry alone comprises 16 %, followed by rice fields of 12 % and animal manure of 5 %. While methane released through digestion of ruminants (about 80 Mil t CH4 per year) can rarely be reduced, methane emissions from other sources like animal manure, etc can be captured and energetically used through anaerobic treatment.
- ❖ The methane emission potential from dairy cattle in industrialized countries is about 0.24 m3 CH4/kg volatile solids.
- ❖ Through anaerobic treatment of animal waste, which means through controlled capture of methane and its energetic use, about 13,24 Mil t CH4/year can be eliminated worldwide. This figure includes methane emissions resulting from incomplete burning of dung for cooking purposes. By replacing dung through biogas, these emissions can be avoided. In total, about 4 % of the global anthropogenic methane emissions could be reduced by biogas technology.
- ❖ The relative climatic change potential of nitrous oxide is up to 320 times higher as that of CO2 as mentioned in the table 1.1. Anaerobic digestion of animal waste significantly reduces nitrous oxide emissions by avoiding emissions during the storage/disposal of animal waste.

Social Impacts:

- ❖ The processing of animal and human excrement in biogas system obviously improves sanitary conditions in the locality. The initial pathogenic capacity of the starting materials is greatly reduced by the fermentation process since most of the diseases causing microbes are aerobic in nature.
- ❖ Since biogas slurry does not attract flies or other vermin, the vectors for contagious diseases, for humans and animals alike, are minimised.
- ❖ Biogas system leads to permanent availability of cooking energy in a household as long as the organic waste is available.

- ❖ In rural areas the use of fire wood for cooking can be replaced by biogas and thereby reducing deforestation.

Over all Benefits of Biomethane:

A large, stylized graphic of a leaf or flower is positioned in the center-right of the page. It has a central orange circle with a flame-like shape, surrounded by several green, petal-like or leaf-like shapes that radiate outwards, all set against a white background.

- In contrary to fossil fuel, derived methane which is available only in limited amount, biomethane is a renewable source of energy available endlessly. It is produced from organic waste like sewage, manure, slurry, etc. which will never run out as long as there will be life on this planet.
- In addition to providing a renewable source of energy, biomethane can be produced just about everywhere in the world. The access to natural gas and other fossil fuels, on the other hand, is available only in a few parts of the world because the deposits are distributed very unevenly.
- Another great advantage of biomethane over fossil fuels is the fact that it does not harm the environment in any way. In contrary to fossil fuel extraction, production of biomethane does not require any dramatic interventions into nature and does not pose any significant risk of pollution or biodiversity loss.
- In comparison to other environmentally friendly and renewable sources of energy such as wind power, solar power, tidal power, etc., biomethane has two important advantages – availability and usability.
- Lowers water, soil and air pollution.
- Biogas plants require a minimal or no intervention into nature which cannot be claimed for coal mining, oil and natural gas extraction, and even few other renewable sources of energy.

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