



Current and Potential Biogas Production

Biogas is produced from organic waste using a natural process called anaerobic digestion (AD). Biogas can be used to make renewable electricity and is a renewable substitute for traditional natural gas. What counts as organic waste? Manure from dairies, sludge filtered from wastewater, municipal solid waste, food waste, yard clippings and more. Biogas can fuel vehicles and power plants, making electricity for homes and businesses. Bonus: making biogas creates these useful byproducts: pathogen-free fertilizer, animal bedding and compost.



US Operational Biogas Systems

The U.S. has about 2,000 sites producing biogas: 293¹ anaerobic digesters on farms, 1,241² wastewater treatment plants using an anaerobic digester (~860 currently use the biogas they produce) and 636³ landfill gas projects. The potential for U.S growth is huge. We count almost 12,000 sites ripe for development: 8,241 dairy and swine farms, 4,000 wastewater treatment plants (including ~531 who are making biogas but not using it) and 450 landfill gas projects which could support a digester today. For comparison, Europe has over 10,000 operating digesters; some communities are essentially fossil fuel free because of them.



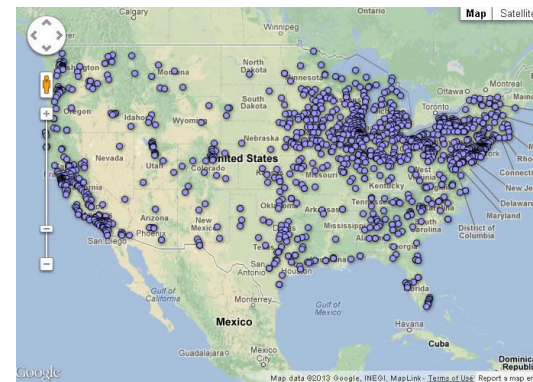
Potential Methane Production from Landfills

536 billion scf-enough for 5.5 million homes or to make 54 billion kWh of electricity (NREL)



Potential Methane Production from Manure Management

88 billion scf-enough for 894,000 homes or to make 8.8 billion kWh of electricity (NREL)
8,241 farms, 1,667 MW of power, 13.1 million MWh/year of electricity (AgSTAR)



Potential Methane Production from Wastewater

20 billion scf - enough for 200,000 homes or to make 2 billion kWh of electricity (NREL)

www.americanbiogasCouncil.org 202/640-6595

¹ <http://www.epa.gov/agstar/projects/index.html>

² www.biogasdata.org

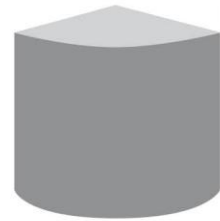
³ <http://www.epa.gov/lmop/projects-candidates/index.html>



Organic material is delivered to the digester system

This may include animal manure, food scraps, agricultural residues, or wastewater solids.

Digested material may be returned for livestock, agricultural and gardening uses.



Organic material is broken down in a digester

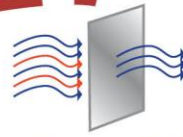
The digester uses a natural biological process under controlled conditions to break down organic material into products for beneficial use or disposal.

Some biogas can be used to heat the digester.

BIOGAS

DIGESTED MATERIAL

Liquids and solids may be separated.



Raw biogas is processed

Typically, water, carbon dioxide and other trace compounds are removed, depending on the end use, leaving mostly methane.

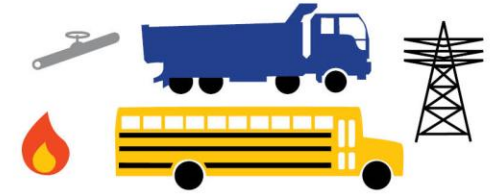
SOLIDS

LIQUIDS



Digested material is processed and distributed

Solids and liquids from the digester may be used to produce marketable products, like fertilizer, compost, soil amendments or animal bedding.



Processed biogas is distributed and used

The gas may be used to produce heat, electricity, vehicle fuel or injected into natural gas pipelines.

organic material

Organic materials are the "input" or "feedstock" for a biogas system. Some organic materials will digest more readily than others. Restaurant fats, oils and grease; animal manures; wastewater solids; food scraps; and by-products from food and beverage production are some of the most commonly-digested materials. A single anaerobic digester may be built for a single material or a combination of them.

the digester

An anaerobic digester is one or more airtight tanks that can be equipped for mixing and warming organic material. Naturally occurring microorganisms thrive in the zero-oxygen environment and break down (digest) organic matter into usable products such as biogas and digested materials. The system will continuously produce biogas and digested material as long as the supply of organic material is continuous, and the microorganisms inside the system remain alive.

biogas processing

Biogas is mostly methane, the primary component of natural gas, and carbon dioxide, plus water vapor, and other trace compounds (e.g. siloxanes and hydrogen sulfide). Biogas can replace natural gas in almost any application, but first it must be processed to remove non-methane compounds. The level of processing varies depending on the final application.

biogas distribution

Processed biogas, often called "biomethane" or "renewable natural gas," can be used the same way you use fossil natural gas: to produce heat, electricity, or vehicle fuel, or to inject into natural gas pipelines. The decision to choose one use over another is largely driven by local markets.

digested material

In addition to biogas, digesters produce solid and liquid digested material, containing valuable nutrients (nitrogen, phosphorus and potassium) and organic carbon. Typically, raw digested material, or "digestate," is processed into a wide variety of products like fertilizer, compost, soil amendments, or animal bedding, depending on the initial feedstock and local markets. These "co-products" can be sold to agricultural, commercial and residential customers.