What is Biogas?

the current and potential biogas market

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May 23, 2017: "Powering Businesses, Homes and Vehicles with Waste"


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Pioneer Air Systems
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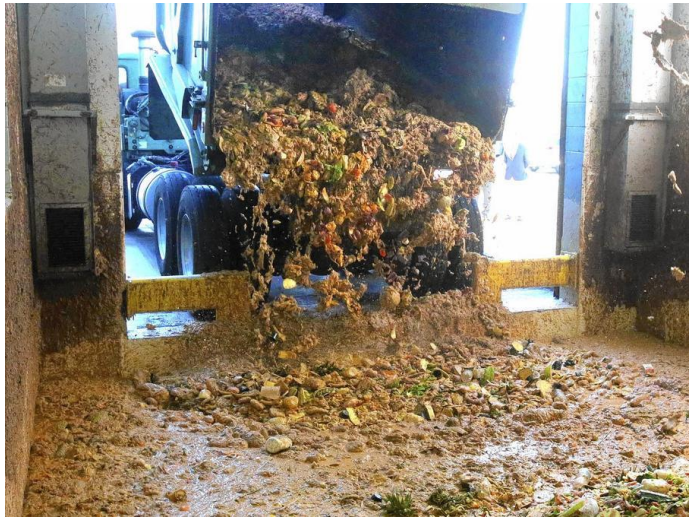
Overview

- How Biogas is Made (Feedstocks & how systems work)
- How Biogas is Used (including digestate)
- Biogas Market Today & its Potential

Food Scraps



Wastewater Solids

Manure

USDA United States Department of Agriculture

EPA United States Environmental Protection Agency

American biogas Council

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.

Some biogas can be used to heat the digester.

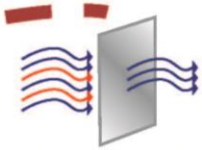
BIOGAS

DIGESTED MATERIAL

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.

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.

Processed biogas is distributed and used

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

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.

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 [illegible] system [illegible]

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.

http://www.americanbiogascouncil.org/biogas_howSystemsWork.asp

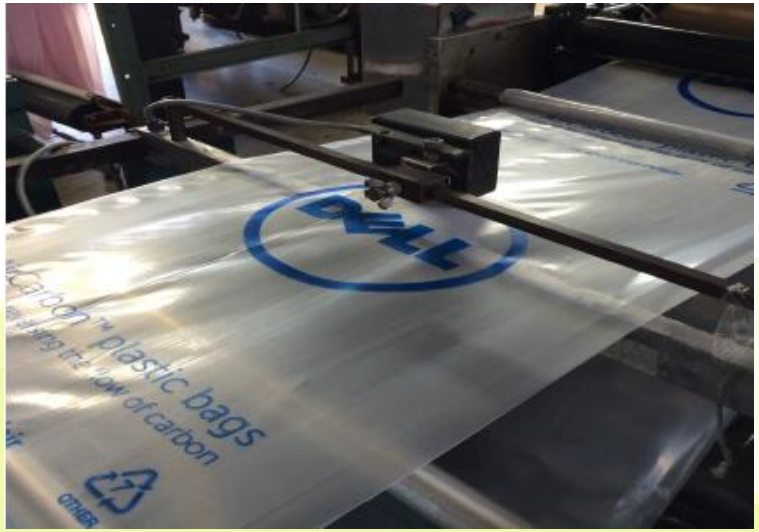
Digesters

Energy (gas)


Jenbacher
gas engines

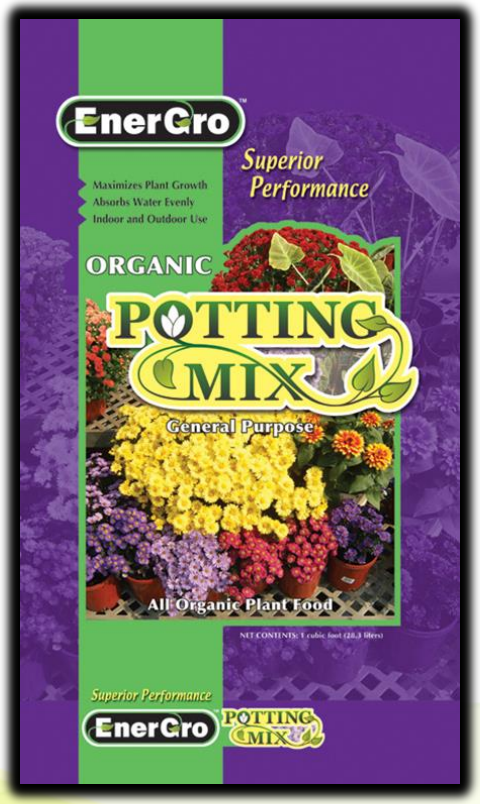

BioCNG
F-150
80728
WISCONSIN


KEEPING IT GREEN
ATLAS RECYCLING
916-455-2800


DELL
plastic bags
of carbon

Digestate (liquid+ Solids)

Digestate Products



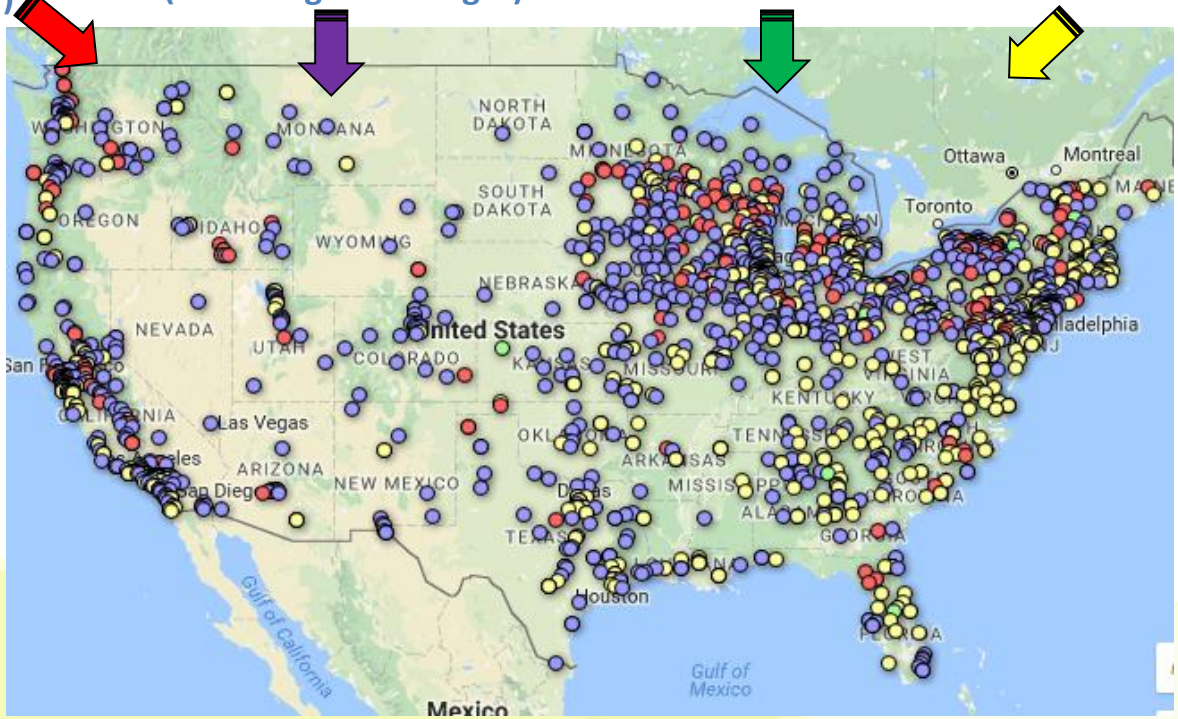
U.S. Biogas Market – Current and Potential

247
on Farm
(dairy, swine only)

1,269
Water
(860 using their biogas)

39
Food Scrap

652
at Landfills



2,200+
Operational
Biogas Systems

13,500+
Potential
New Biogas Systems

8,241
on Farm
(dairy, swine only)

3,888
Water
(incl. 380 not using their biogas)

931
Food Scrap

415
at Landfills