ORGANIC FUEL: LIQUID OR GAS?

WHAT IS IT?

Organic-based fuels are used in combustion to create heat or power. Methane and petroleum products were formed naturally over millennia from the decomposition of organic fossils (called fossil fuels). Fresh organic wastes can also be used to create new liquid or gas fuels for new industrial symbiosis projects.

MOST COMMON USES?

Corn ethanal is an example of an organic fuel that is used as an additive for transportation fuels. Biodiesel and renewable natural gas (RNG) are other transport fuels. Other common organic fuels are burned to provide thermal comfort, heat domestic hot water, drive transportation, and generate electricity.

CSI Center for Sustainable Infrastructure

PDF POPUP FROM IED TOOL

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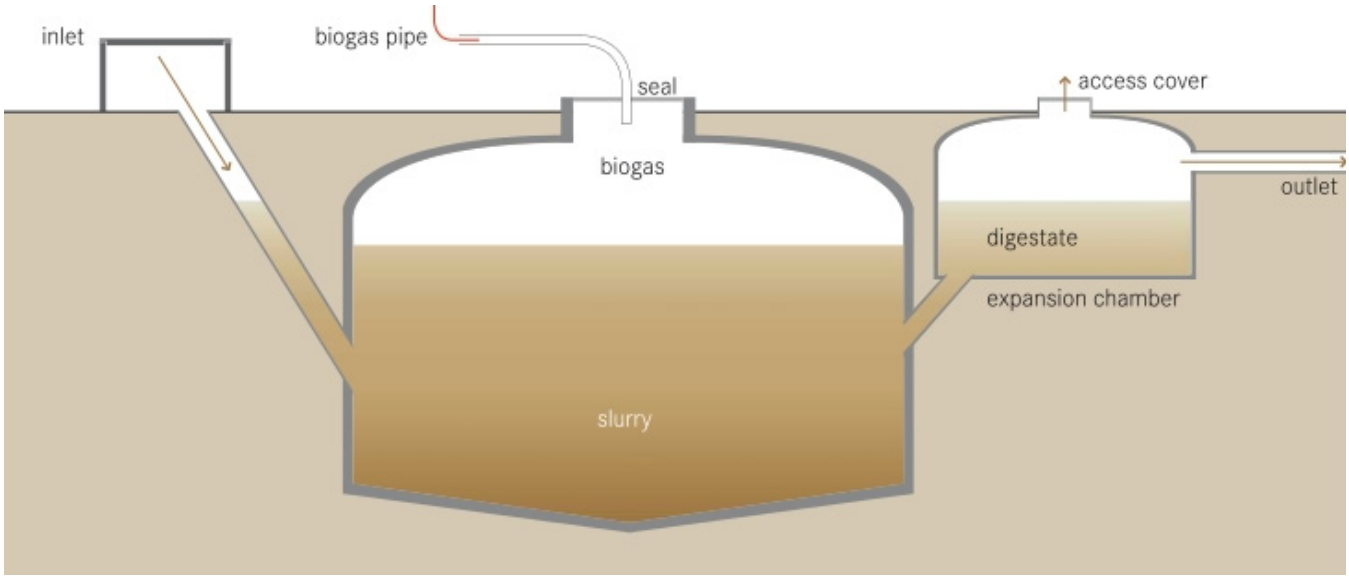

HOW IS IT MADE?

- While compost is made from aerobic processes (with air), plant-based fuels are made from anaerobic processes (without air). Anaerobic digesters nurture bacteria that prefer anaerobic conditions. These bacteria can create methane from volatile organic solids such as manure, fats, carbohydrates, proteins, and other nutrients.
- Bacteria that create methane from organic solids require an oxygen-free environment and prefer temperatures of about 95 degrees Fahrenheit. The acid balance is important in anaerobic digesters and the introduction of salts, heavy metals, ammonia or antibiotics can also negatively impact the bacteria that produce combustible gases from organic wastes.
- Biodiesel is made from vegetable oils, especially soybean. The residual meal is used as animal feed.
- Sugar containing biomass can be converted to alcohols via hydrolysis and fermentation.
- Lignocellulosic materials are converted to synthetic gases which are converted to liquid fuels including jet fuel.

OPPORTUNITES FOR INTEGRATION

- Convert waste fats, oil, grease and wastes to renewable natural gas or power.
- Convert solid residues to liquid fuels and biochar.

TECHNOLOGIES

- Anaerobic digestion occurs naturally, but for production several different configurations are in the marketplace. Simple enchilada-shaped rubberized bags are common in developing countries. Small-scale mechanical digesters are available for dairies. Depending on the operation's financing and intended scale the facilities can consist of large tanks and monitoring equipment at industrial scales.
- In an industrial symbiosis model, the organic fuels that are generated from one process are then used onsite to power other value-creating processes such as heat or electricity.

DESTINATION/FATE

Organic wastes that go to landfills cause methane emissions that many landfills must manage. Many municipalities convert landfill gas to heat and power. Diverting organics for local use can avoid the release of these molecules to the environment.

CONCERNS

These fuels such as methane are greenhouse gases that play a key role in climate change. It is estimated that uncontrolled methane are responsible for about one-fifth of the enhanced greenhouse effect and is 30 times more effective at trapping heat in the atmosphere than CO2 over a 100-year period.