



Biogas: A huge potential

US biogas potential surpasses RFS2 advanced biofuel requirements

The United States produces enough organic waste to exceed EPA’s volume requirements for advanced biofuels every year for the next decade. The Renewable Fuel Standard (RFS) mandates the use billions of gallons of advanced biofuel every year, from 2.75 billion in 2013 to 21 billion in 2022. The US could potentially produce as much as 29 billion equivalent gallons of biogas made from organic waste each year.

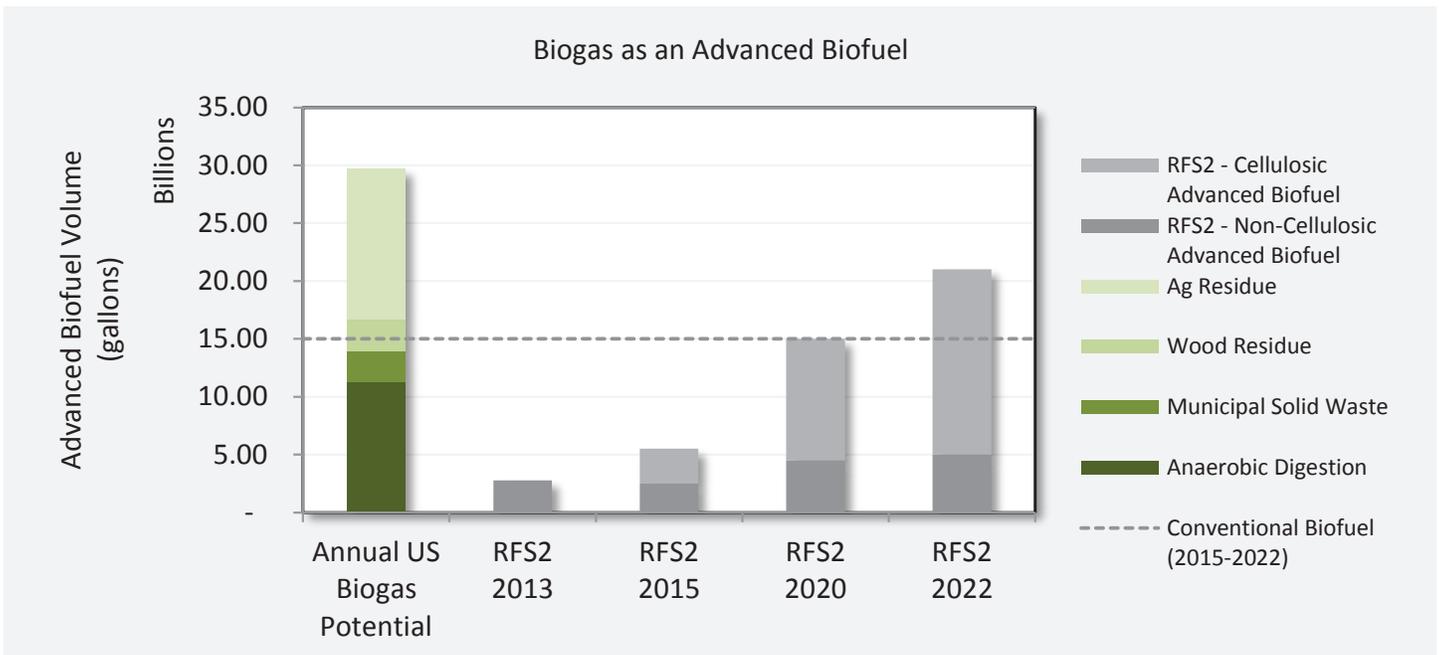
Biogas can be made from organic waste materials, food processing byproducts, and wastewater. It can produce renewable electricity or heat, and be used as a replacement for natural gas or transportation fuel. Biogas also provides economic benefits to producers and users, and has a better environmental performance than conventional natural gas and transportation fuels. Above all else, biogas is a steady, reliable and versatile renewable energy resource.

Table: Annual US Biogas Potential ¹

Source	Biogas Potential million mmBtu/year	Advanced Biofuel Equiv. billion gallons/year
Anaerobic Digestion	871	11.31
Municipal Solid Waste	206.53	2.68
Wood Residue	205.36	2.67
Agriculture Residue	1,001.96	13.01
Total	2,284.85 million	29.67 billion

¹Based on 77,00 Btu/gal conversion factor determined by the EPA in 40 CFR Part 80, March 26, 2010.

Despite the massive potential and multiple benefits of using biogas as a renewable energy source, the United States’ biogas resource is drastically underutilized.



The above figure portrays the potential for organic waste-derived biogas to fulfill the RFS advanced biofuel volume requirement. The estimate is based on an aggressive scenario analysis by the American Gas Foundation and the Gas Technology Institute, and does not account for economic feasibility. Estimates assumed feedstock utilization rates of 40-75% for anaerobic digestion and 15-25% for other sources. The Great Plains Institute used EPA’s conversion factor of 77,000 Btu/gal to determine the gallon equivalency.

The report is available at: <http://www.gasfoundation.org/ResearchStudies/renewable-gas-2011.htm>

Project Examples: Biogas as a transportation fuel

A few positive steps have already been taken that begin to access the potential for biogas as a transportation fuel. The US EPA has an approved pathway under the Renewable Fuel Standard program and commercial technologies exist for the cleaning and compressing of raw biogas. There are several projects across the US using readily available technology to collect, clean and compress biogas to supply compressed natural gas (CNG) refueling stations. Below are examples of three operational projects:

Columbus BioEnergy Digester

Ohio

Quasar Energy Group partnered with the Solid Waste Authority of Central Ohio and Kurtz Bros., Inc. to construct a mixed feedstock anaerobic digestion project that supplies biogas as a transportation fuel. Municipal wastewater biosolids, food/beverage waste and fats, oils and greases are combined to produce biogas that is cleaned and compressed to supply approximately 3,600 gallons of gasoline equivalent fuel per day. A bio CNG fueling station is available on site and a public refueling station is located in Columbus. Quasar Energy group is an approved Renewable Fuel Producer under the RFS2 program, operates four digester projects and currently has an additional four under construction. Each project is built and designed for the CNG market.

For more information visit: quasarenergygroup.com

Rodefeld Landfill

Wisconsin

Rodefeld landfill is one of 33 US landfill gas projects that have been cleaning and upgrading biogas to natural gas grade. The Rodefeld project cleans and compresses biogas from municipal solid waste to fuel 10-15 light and heavy duty vehicles. In addition to the bioCNG fueling station at the landfill, part of the renewable natural gas stream is piped to a renewable natural gas refueling station in Madison. Annual fuel capacity is approximately equivalent to 39,000 gallons of diesel. This system was designed for smaller applications and represents the smallest commercial system available on the market today.

For more information visit: biocng.us/projects

Fair Oaks Dairy

Indiana

11 thousand dairy cows feed a modified plug-flow anaerobic digester at Fair Oaks Dairy, producing 1.5 million standard cubic feet of biogas per day. Most of the biogas is cleaned and compressed to supply 865 mmBtu of renewable natural gas (RNG) per day, which fuels a fleet of milk delivery trucks and additional fleet vehicles at a CNG fueling station in Sellersburg, Indiana. The project displaces 1.5 million gallons of diesel fuel per year and also uses a portion of its biogas in a CHP system that heats the digester and generates electricity for the cleanup and compression equipment, making the Fair Oaks operation a closed-loop system.

For more information visit: usdairy.com/sustainability

About the estimate

The US biogas potential estimate includes the following feedstocks:

Anaerobic Digestion

Livestock manure from dairy cows, beef cattle, hogs and pigs, sheep, broiler chickens, turkeys and horses. Wastewater treatment facilities with a capacity of at least 17 million gallons per day. Landfills designated by EPA as operational, potential, candidate, construction or shutdown.

Does not include food or dairy processing waste, non-municipal wastewater sources, green waste or source separated organics (partially included in the MSW estimate).

Municipal Solid Waste (MSW)

Only MSW that is currently disposed of in landfills and not MSW that is already used in energy projects.

Wood Residue

Forest residues, mill residues and urban wood residues.

Agricultural Residues

Corn, wheat, soybeans, sorghum, barley, oats, rice, rye, canola, beans, peas, peanuts, potatoes, safflower, sunflower, sugarcane and flaxseed.