



Report Overview

Waste-Derived Biogas: Global Markets for Anaerobic Digestion Equipment

Feb 2014 • EGY076B

Use this report to:

- Receive an in-depth analysis of the world market for the anaerobic digestion equipment used to transform waste materials into sustainable energy.
- Receive detailed evaluations of four waste types (sewage, industrial wastewater, agricultural wastes and landfill gas) as feed materials for the waste-to energy process.
- Receive information on three different end uses for the gas: municipal electricity production, on-site electricity (and heat) production and transportation fuel.
- Receive information on global biogas production potential and factors influencing the biogas industry.

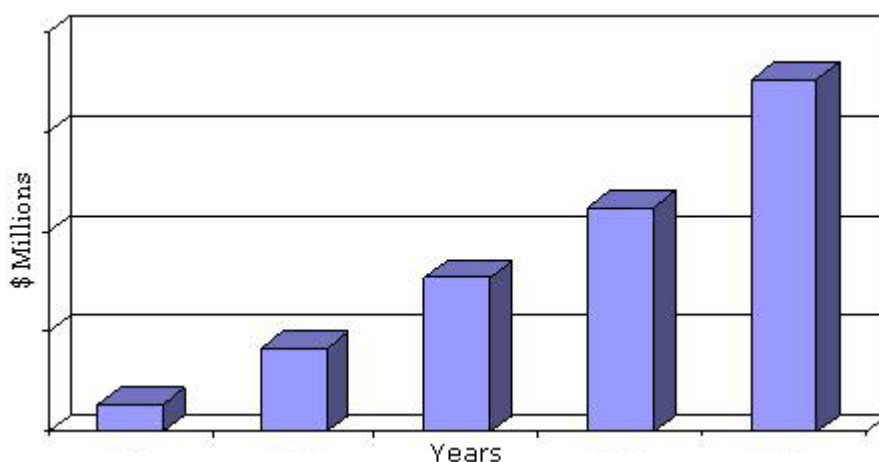
Highlights


The value of the global market for anaerobic digesters and landfill gas equipment is estimated at nearly \$4.5 billion for 2013. The market is projected to reach \$7 billion by 2018 growing at a compound annual growth rate (CAGR) of 9.4% over the five-year period from 2013 to 2018.

This report provides:

- An overview of the world market for the anaerobic digestion equipment used to transform waste materials into sustainable energy
- Analyses of global market trends, with data for 2013, and projections of compound annual growth rates (CAGRs) through 2018.
- Information on the best strategies used by governments responsible for sustainable waste handling and energy supply solutions
- An examination of current as well as future trends in the market for industry players and technology developers to understand and strategize their investments

SAMPLE FIGURE
VALUE OF THE GLOBAL MARKET FOR BIOGAS AND LANDFILL GAS EQUIPMENT FOR
WASTE-DERIVED ENERGY, 2000-2018
(\$ MILLIONS)



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Source: BCC Research

Introduction & Scope

INTRODUCTION

STUDY GOALS AND OBJECTIVES

Renewable, sustainable energy generation is expected to be the fastest-growing energy sector over the next two decades. Price volatility, supply concerns and the environmental aspects of fossil fuels are expected to accelerate the pace of all nonfossil fuel development. Experts predict that the future price of oil will not drop below \$80 per barrel, even for resources from unconventional oil reserves. Renewable domestic energy supplies are seen as a means of overcoming these problems. Biogas, a clean fuel derived primarily from waste materials, is an important alternative to conventional fossil energy.

This BCC Research report provides an in-depth analysis of the world market for the anaerobic digestion equipment used to transform waste materials into sustainable energy. Although energy crops are utilized widely in Germany and some other countries for biogas production, this study will only cover gas recovered from wastes. The study also examines the equipment needed to collect landfill gas (LFG), biogas formed naturally at landfill sites.

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Four waste types are evaluated as feed materials for the waste-to energy process: sewage, industrial wastewater, agricultural wastes (crop residuals and manure) and landfill gas. Three different end uses for the gas are also examined: municipal electricity production, on-site electricity (and heat) production and transportation fuel.

The biogas industry is better developed in other parts of the world than in North America. In addition to the U.S. and Canada, this report will cover Europe, where the industry is best developed; Asia, where the largest number of plants are operating; Africa, where the anaerobic process is rapidly gaining popularity and other world regions where biogas recovery is emerging.

REASONS FOR DOING THE STUDY

The need to responsibly dispose of mounting volumes of waste and the requirement to procure sustainable, secure energy supplies are two of the most important issues facing governments and industries around the globe. The production of energy from a number of waste streams (i.e., municipal and domestic sewage, industrial wastewater, landfills, livestock manure, and agricultural residues) is a process that addresses both of these challenges.

In the current waste-to-energy market, anaerobic digestion offers the most sustainable conversion process. Because the technology can be tailored to suit waste streams of all volumes, systems may be sized for use in households, commercial enterprises, utilities and industry.

In this context, it is important to have an overview of the market and the drivers that support adoption of the best strategies by governments responsible for sustainable waste handling and energy supply solutions. It is also important for industry players and technology developers to understand current as well as future trends in order to strategize their investments. BCC Research has published reports that provide broad overviews of waste-to-energy markets. This is an update of the first to focus exclusively on anaerobic digestion as an enabling technology.

INTENDED AUDIENCE

This study intended to be useful to a broad audience. Because they stand to see the greatest profit from expansion of the biogas industry, manufacturers and suppliers of anaerobic digesters and providers of anaerobic digestion technology would likely benefit the most from the data contained in this study. Companies with plant components, ancillary equipment and related products also might profit from the information collected here.

These include manufacturers and suppliers of biogas condensation and upgrading equipment and technology, biogas distributors, water and power engineering firms, suppliers of power plants and electricity generating equipment, environmental management firms, companies specializing in anaerobic digestion equipment and other water and wastewater treatment equipment, and companies developing additives (chemicals, enzymes, etc.) to enhance gas production yields and process efficiencies.

SCOPE AND FORMAT

The scope of this report includes the market for biogas to energy for four different feed sources: municipal and domestic sewage, industrial wastewater, landfill gas, and agricultural wastes, a category that includes animal manures and crop residues. In countries where energy crops are codigested with manure and other organic farm wastes, they are considered to be part of the market. The biogas market also is broken down by end use: municipal power generation, on-site heat and power production, and transportation applications.

A discussion of the market by world region includes overviews of North America, Europe, Asia, Africa and Latin America and individual profiles for countries most active in each region. Present market status, biogas production potential, and policies and incentives that support the industry are given for each country. All market valuations and projections cover the years from 2000 to 2018. Market figures are based on the

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revenues derived from equipment sales and are projected in 2013 constant dollars (i.e., inflation is not computed into the projection figures). The revenue figures are derived from estimated revenues of the key players in a particular year.

A technology overview, presentation on the structure of the industry and brief profiles for major participating companies also are included.

For the purposes of the report, biogas equipment will be limited to anaerobic digesters and the gas collection equipment needed in landfill gas recovery projects. The machinery used to transform the gas to electricity—reciprocating and other types of gas engines, turbine and microturbines, and fuel cells—are not included in the analysis. Systems for biogas upgrading also are not included in the study.

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. A comprehensive literature, patent and Internet search was undertaken and key industry players were queried. Research methodology was both quantitative and qualitative. Growth rates were calculated based on existing and proposed equipment sales during the forecast period. Key tables in the report present an overview of average capital costs for digesters of various sizes and for different applications. These figures then were multiplied by anticipated biogas recovery capacity additions during the survey period.

INFORMATION SOURCES

Information in this report was gleaned from many different sources. Securities and Exchange Commission (SEC) filings; annual reports; patent literature; business, scientific, and industry journals; government reports, census information, conference literature, patent documents, online resources, and industry participants have all been researched.

ANALYST CREDENTIALS

During the past 17 years, Susan Hanft has authored more than 35 market research reports for BCC Research in the fields of membrane technology, water and wastewater treatment, and separations used in food and beverage manufacture, medicine, biotechnology, and energy.

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