



Introduction

The *LFG Energy Project Development Handbook* provides an overview of landfill gas (LFG) energy project development guidance and presents the technological, economic and regulatory considerations that affect the feasibility and success of LFG energy projects. Landfill owners, energy service providers, end users, representatives of state agencies and local government, community members and other interested stakeholders will benefit from information provided in this handbook as they work together to develop successful LFG energy projects.

The handbook is organized into six chapters:

- Chapter 1 – Landfill Gas Energy Basics
- Chapter 2 – Landfill Gas Modeling
- Chapter 3 – Project Technology Options
- Chapter 4 – Project Economics and Financing
- Chapter 5 – Landfill Gas Contracts and Permitting
- Chapter 6 – Evaluating and Working with Project Partners

This handbook presents national statistics that reflect LMOP's Landfill and LFG Energy Project Database as of July 2016. Energy cost estimates presented in this handbook were calculated using Version 2.2 of the Landfill Gas Energy Cost Model (*LFGcost-Web*).

Using the Project Development Handbook

The handbook provides basic information that relates to all LFG energy projects and presents a more detailed overview of project-specific considerations.

The handbook discusses the status of LFG energy in the United States and presents the basic steps of developing an LFG energy project. Throughout the handbook, readers will find references to online resources that contain more comprehensive details, examples and helpful tools. Readers are encouraged to visit these resources to find information that may be relevant to individual projects and topics.

Disclaimer

The handbook is not an official guidance document. Instead, this document provides general information regarding LFG energy projects. It does not address all information, factors, applicable regulations or considerations that may be relevant or required. Any references to private entities, products or services are strictly for informational purposes and do not constitute an endorsement of that entity, product or service.

About LMOP

The Landfill Methane Outreach Program (LMOP) is a voluntary technical assistance and partnership program created by the U.S. Environmental Protection Agency (EPA) in 1994 to reduce methane emissions by encouraging the recovery and use of LFG as a renewable energy resource. LMOP has developed many publications and tools to assist those wishing to develop LFG energy projects or to promote LFG to various audiences. This handbook advances the purpose and mission of LMOP by providing the tools and necessary information to stakeholders for the development of successful LFG energy projects.

LMOP's website has become one of the main methods of providing LMOP Partners, others in the industry and the public with information about the latest LFG energy-related advances, opportunities, models and tools.

Visit www.epa.gov/lmop/ for complete details about LMOP.

Direct Assistance for Developing LFG Energy Projects. LMOP offers direct assistance throughout the development of a project, from providing basic information about LFG energy in the early stages of project consideration, to preliminary analyses of project feasibility, to providing media support when the project reaches the construction or commercial operation phase. Services LMOP offers include:

- Matching landfills and end users using the *LMOP Locator*, a tool that can help a landfill owner, operator or project developer identify potential end users. Potential end users also can use the *LMOP Locator* to search for nearby landfills that are good candidates for project development.
- Making preliminary estimates of recoverable methane using LFG models such as the *Landfill Gas Emissions Model (LandGEM)* and site-specific information on landfill waste acceptance.
- Assisting with preliminary technical and economic feasibility assessments for LFG energy project options using tools such as *LFGcost-Web*.
- Helping to locate project partners through networking opportunities and by distributing Requests for Proposals (RFPs) through listserv messages.
- Answering technical questions and providing information to help overcome technical barriers to LFG energy projects. LMOP can also address questions about LFG energy and foster positive interactions among landfill owners, developers, end users, regulatory agencies, community groups and other stakeholders.
- Providing positive publicity for LFG energy projects by developing outreach materials for project ribbon cuttings.

Landfill and LFG Energy Project Database. LMOP's Landfill and LFG Energy Project Database is the most comprehensive data repository in the country for information about LFG energy projects and landfills with potential for energy recovery. It is updated with information from LMOP Partners and other organizations in the industry. LMOP posts Excel files with landfill data on the LMOP website for viewing and downloading. Users can view data for a specific project type of interest, for landfills that are good candidates for energy project development, or for all projects and landfills in a single state. In addition to posted data, the master LMOP Database contains some additional fields and LMOP can provide information to address specific questions. See www.epa.gov/lmop/landfill-gas-energy-project-data-and-landfill-technical-data.

Frequent Questions. LMOP's website provides answers to questions frequently asked about the program itself, and LFG and LFG energy projects in general. See www.epa.gov/lmop/frequent-questions-about-landfill-gas.