



# LANDFILL GAS TO ENERGY SYSTEM DESIGN

## Office Locations:

### Hershey, PA

1129 West Governor Road  
P.O. Box 797  
Hershey, PA 17033-0797  
**Phone:** (717) 533-8600  
**Fax:** (717) 533-8605

### Columbia, MD

8965 Guilford Road  
Suite 100  
Columbia, MD 21046  
**Phone:** (410) 290-7775  
**Fax:** (410) 290-7776

### State College, PA

197 Egg Hill Road  
Spring Mills, PA 16875  
**Phone:** (814) 364-1888  
**Fax:** (814) 364-2826

Visit us on the web at:

[www.armgroup.net](http://www.armgroup.net)



**ARM Group Inc.**

Earth Resource Engineers  
and Consultants

Landfill gas, composed of about 50% methane, is created when microorganisms cause organic waste, such as food wastes and paper, to decompose in landfills. Unless it is collected and burned, landfill gas escapes into the atmosphere. In landfill gas to energy projects, landfill gas is burned in boilers, reciprocating engines, and combustion turbines to produce electricity. The landfill size and age, quantity of organic waste, and the local climate help determine how much gas a landfill can produce (EPA website).

One of the cornerstones of the Pennsylvania Government's "PennSecurity Fuels Initiative" is to fully develop the State's indigenous energy resources while enhancing environmental protection. Landfill methane gas emitted from decomposing garbage is considered by the State of Pennsylvania to be a "reliable and renewable fuel." Rather than simply venting or flaring this methane gas, one that is considered an important global warming gas, ARM is helping its landfill clients to harness the energy contained in this gas to use it for heating purposes or for electricity generation.

ARM has an experienced staff of engineers with extensive experience in landfill gas management, design, conveyance, and utilization. Our personnel have provided design and construction-phase related services for numerous landfill gas to energy projects throughout the Mid-Atlantic Region. ARM's landfill gas utilization services specialize in providing the following:

- Landfill Gas Generation Assessment
- Engineering Design Services including
  - Landfill Gas Resources Analysis and Optimization Assessment
  - Gas Conveyance Pipeline Design
  - Vacuum Pressure Evaluation and Exhauster/Blower Selection
  - Condensate Management System
- Permit Application Preparation including
  - Title V Air Permit
  - Bureau of Air Quality Permit
  - Minor Landfill Permit Modification (if applicable)
- Preparation of Construction Drawings and Specifications
- CQA and Construction Certification Services

ARM's goal is to help you maximize your renewable energy resources to promote increased energy independence and a cleaner environment.

Please contact William S. Tafuto, PE at 717-533-8600 or [tauto@armgroup.net](mailto:tauto@armgroup.net) for more information.

# LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY LANDFILL GAS COLLECTION AND CONTROL SYSTEM DESIGN LANCASTER COUNTY, PA

In 2005, ARM provided engineering design services, permit acquisition assistance, construction document preparation, along with CQA and construction certification services for a landfill gas collection and control system for the Frey Farm and Creswell Landfills for the Lancaster County Solid Waste Management Authority (LCSWMA). ARM designed and optimized the collection and conveyance piping network to convey the landfill gas (LFG) from the capped portions of the landfills to the location of the LFG Utilization equipment. The LFG Utilization equipment generally consisted of internal combustion engines that converted the LFG into electrical power or steam for industrial purposes. Additionally, ARM selected a blower to generate the necessary vacuum pressure to the LFG collection wells, an enclosed ground flare to destroy the excess gas or gas generated during times when the LFG is not being utilized, and a LFG condensate management system.

The Landfill-Gas-To-Energy Project at LCSWMA's Frey Farm and Creswell Landfills was dedicated by the Pennsylvania Department of Environmental Protection (PADEP) in early 2006. The venture was funded in part by a \$650,000 grant from the Pennsylvania Energy Deployment Authority (PEDA). The two Caterpillar engines fueled by landfill gas will produce 3,200 kilowatts of electricity, or about enough to power 4,000 homes. A PADEP spokesperson stated that "on an annual basis, enough landfill gas will be used through the landfill authority project to save 400,000 barrels of oil, offset the use of 800 railcars of coal and provide greenhouse gas reduction benefits equal to planting 48,000 acres of forest" (Desmond, 2006).



