

# APPLICATION BRIEF

Sage Metering Application Brief

April 2015

## Landfill Gas Monitoring, Recovery, and Flaring

Accurate measurement of landfill gas flow throughout the system is needed, whether the objective is landfill gas to energy projects, monitor the process for optimization or GHG emissions reporting.

### What is a Landfill?

A landfill is a terrain that has been carefully engineered to deposit trash where it will remain. Landfilling is an obsolete way of handling waste though remains a primary way to dispose of trash and garbage. Modern landfilling is often referred to as “municipal solid waste.” Landfills are known to contribute to enormous environmental problems such as climate change, toxic air emissions, and groundwater contamination.

### Landfill Gas Composition

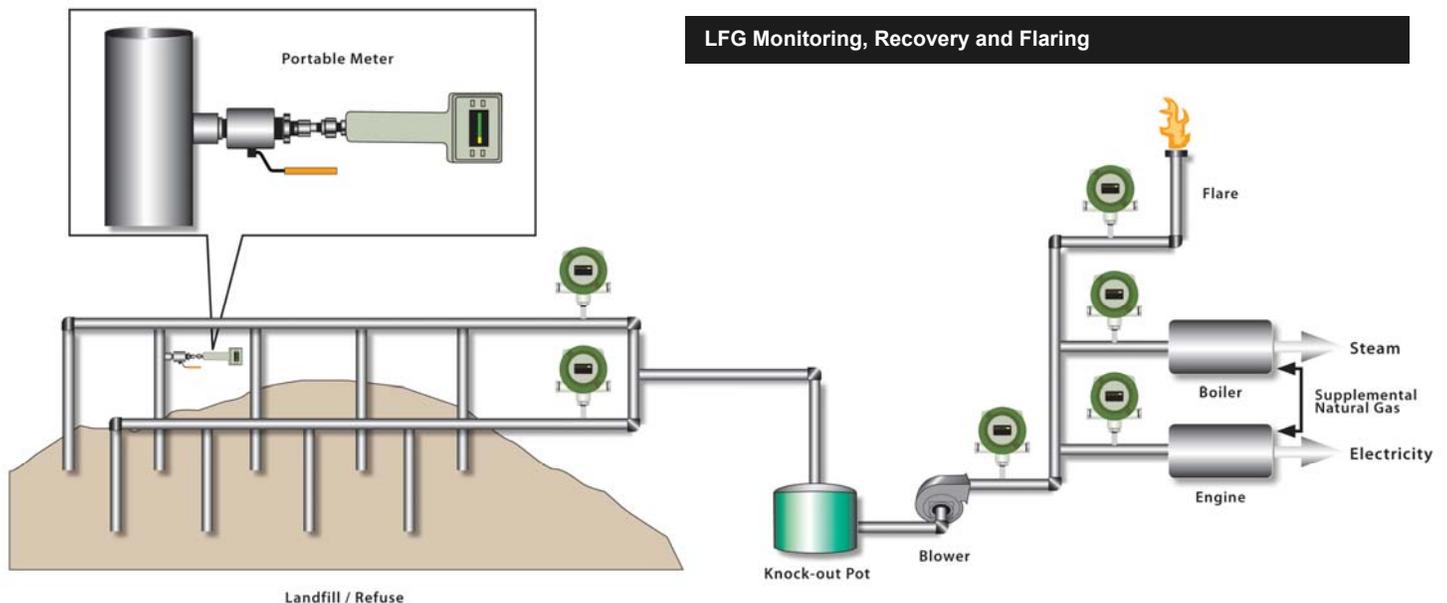
Landfill gas is generated through the natural bacterial breakdown of organic waste at municipal solid waste (MSW) landfills. It contains approximately 50% methane with the remainder being mostly CO<sub>2</sub>, with smaller amounts of water vapor, nitrogen, oxygen, and trace amounts of other contaminants. The gas is wet and also considered dirty.

## Flare LFG and/or Landfill to Energy

Gas is removed from the ground at individual wells and collected through a series of headers or manifolds. Equipment, such as sumps, knock-out pots, compressors, are used to bring the landfill gas to flare, and/or recover it for landfill-to-energy projects.

While measuring the flow from each well may be desirable, it is cost prohibitive. Comparable information can be achieved, however, when using a portable thermal mass flow meter and periodically sample the flow from the wellhead.

Throughout the processes, accurate gas flow measurement is needed from the landfill extraction to the destruction or cogeneration, whether for optimizing the process or GHG emissions reporting to environmental agencies.



## Considerations for Flow Meter Selection

Consider the following standards when selecting a flow meter to measure LFG:

- Calibrated for landfill gas composition, mixed methane, and carbon dioxide
- Mass flow measurement without the need for temperature and pressure correction
- No moving parts reduce maintenance; advantageous over positive displacement flow meters or turbine meters
- Temperature compensation for accuracy and repeatability with changing process and ambient temperatures
- Wide turndown for precision measurement at low or high flow
- Excellent low flow sensitivity
- Approved for use in hazardous areas
- Graphical displays of flow rate, totalized flow and temperature
- Easy in-situ calibration verification method to verify the accuracy, and operation of the sensor and transmitter to comply with environmental regulations

The Sage thermal mass flow meter, whether in-line or insertion body style are ideal for landfill gas collection or flare gas systems. The Sage meters meet and exceed the selection considerations for measuring landfill gas flow in flare and landfill gas to energy applications. Sage Metering is the only manufacturer offering an easy, in-the-pipe method to verify that the meter is accurate and that both the sensor and transmitter are clean and operational. The Sage meter is compliant with EPA strict calibration requirements when measuring greenhouse gases.

## Recommended Models for Landfill Gas

- **Sage Prime** (When CI I Div 2 is needed)
- **Sage Prism** (When measuring LFG at individual wells)
- **Sage Rio** (When CI I Div 1 classification is needed)

## Local Municipality

Some local municipality landfills do not have the ability to implement landfill-to-energy projects. In these cases, often, the landfill gas is collected and delivered to a privately held co-gen facility that is often located on the property and used to produce electricity. During periods when the co-gen facility does not need the gas, it is flared. In either case, gas flow meters are required to measure LFG flow to the co-gen or the flare.

The measurement of landfill gas demands performance from any flow meter due to inherent challenging conditions:

- Gas and ambient temperatures variations
- Gas flow rates vary
- Potentially hazardous/explosive locations
- Landfill gas consists of varying gas compositions
- Landfill gas is wet and dirty



Pictured above is the Sage Prime

## Contact Us

Sage Metering, Inc.  
8 Harris Court  
Building D1  
Monterey, CA 93940

866-677-7243  
831-242-2030  
sales@sagemetering.com  
www.SageMetering.com

For more information on the use of thermal mass flow meters in applications of landfill gas, read our white paper on greenhouse gas emissions in the website knowledge base.