

Landfill operator generates revenue from recovered methane gas

Result

- Previously wasted landfill gas is captured and compressed for energy production
- Facility converts landfill gas to pipeline quality natural gas
- At full capacity, the plant will deliver 5.5 million cubic feet of gas per day, enough to power about 24,000 homes
- Generates the equivalent of 350,000 barrels of imported oil annually
- Reduced carbon equivalent of taking 22,000 cars off the road
- \$80,000 per year expense turned into \$1 million annual revenue



Application

Municipalities are looking at their solid waste landfills as a source of additional revenue. Landfill gas can be purified and compressed before sending to the pipeline.

Customer

One of the largest landfills in the country, located about 20 miles southeast of Seattle, receives nearly 1 million tons of solid waste a year.

Challenge

In 2008, the local Solid Waste Division began to explore the possibility of generating usable energy from methane gas produced by decomposing garbage at the landfill. Landfill gas was collected through a network of pipes and was burned off. All the landfill gas produced at the site (up to 11,000 cfm) was treated by combustion using five landfill gas flares.



The county spent \$80,000 a year to collect and burn off methane. A landfill gas processing facility was proposed to capture, purify, and compress the gas for useful purposes. The landfill gas processing facility must comply with state and local regulations, including but not limited to the air quality standards established and enforced by the Puget Sound Clean Air Agency (PSCAA).

Solution

A landfill gas processing facility was designed and built on site utilizing 17 Vilter single screw compressors. The gas processing facility is designed to pass the collected landfill gas through several stages of compression to separate out methane gas and to remove other constituents like carbon dioxide, moisture, sulfur compounds, nitrogen, oxygen, non-methane organic compounds, and other trace gases. The Vilter single screw compressor has the unique capability to accept high pressure suction gas (400 psi) and the ability to handle high differential pressures, thus achieving a final discharge pressure of 900 psi. This expanded pressure range makes the Vilter single screw compressor the best economical choice for an end user.

The facility will produce 4,000 cfm of gas for pipeline distribution containing about 97% methane and 3% nitrogen. The side stream of gases will be used for producing electric power at the facility. Any non-useful gases will be burned using the thermal oxidizer and a secondary flare.

Because the converted methane gas from the landfill replaces an equal amount of nonrenewable natural gas, the landfill gas-to-energy project will result in a 63% overall reduction of emissions, including greenhouse-gas emissions. Revenue from the sale of the gas will help keep solid waste disposal rates low. What had formally been an expense to manage will become a significant revenue source - projected to provide approximately \$1 million annually - for the county's Solid Waste Division.

A connecting line that runs between the landfill and the adjacent major pipeline will transport the methane gas to natural gas-fired power plants. The power utility will use the methane to generate 287,000 megawatt-hours of electricity annually, on average, enough to meet the entire power needs of 24,000 homes.

The gas processing plant will process and deliver at least 4.5 million cubic feet of methane daily from the county landfill. Deliveries are expected to average about 5.5 million cubic feet per day over 20 years.

Resources

Learn more about the Vilter single screw compressors at:
EmersonClimate.com

