

LANDFILL GAS

The same anaerobic digestion process that produces biogas occurs naturally underground in landfills.

Most landfill gas results from the decomposition of cellulose contained in municipal and industrial solid waste.

Unlike above motioned anaerobic digesters, which control the anaerobic digestion process, the digestion occurring in landfills is an uncontrolled process of biomass decay.

Experience has shown that every ton of household waste contains approximately 150 to 250 kg organic matter which is biologically decomposable.

Under oxygen restricted conditions, bacterial degradation of the organic matter takes place through four phases (aerobic biodegradation-acid fermentation-start of landfill gas production-continuous landfill gas production) yielding landfill gas with constant composition.

The efficiency of the process depends on the waste composition and moisture content of the landfill, cover material, temperature and other factors.

The biogas released from landfills, commonly called "landfill gas," is typically 50% CH₄ and 45% CO₂. Remaining 5% are usually other gases like H₂S, N, H₂ and O.

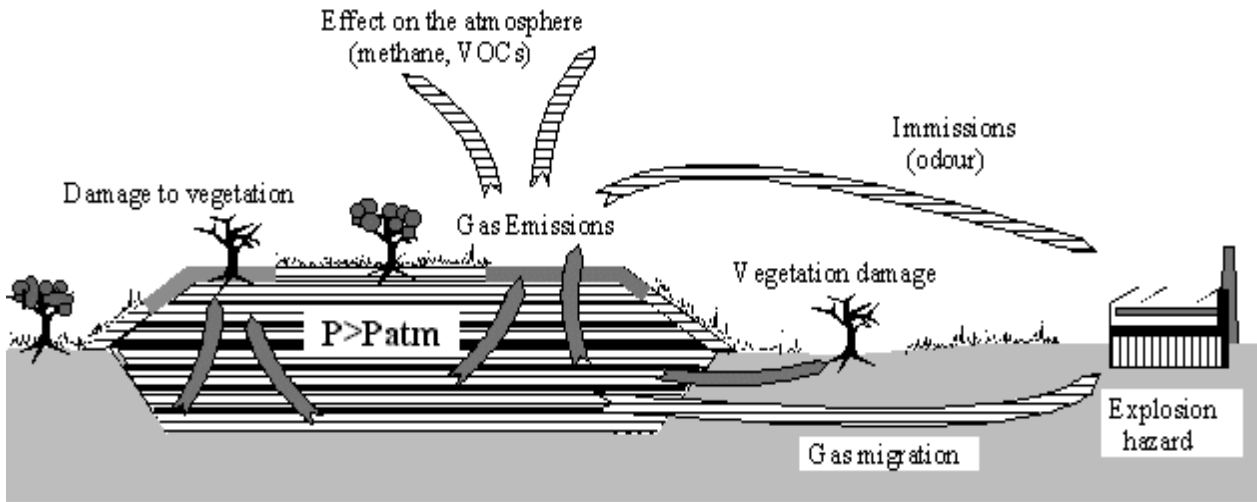
One Nm³ of landfill gas has an energy value of 4 to 5 kWh, which corresponds to approximately 0.5 litres of diesel oil. If it is assumed that a ton of household waste has a gas production potential of 150 - 300 Nm³ over a period of 15 - 20 years, then the energy potential hidden in a sanitary landfill becomes clear.

Capturing landfill gas before it escapes to the atmosphere allows for conversion to useful energy. The gas is collected by an array of interconnected perforated pipes buried at depths up to 20 metres in the waste.

In new sites this pipe system is constructed before the wastes start to arrive, and in a large well-established landfill there can be several miles of pipes, with as much as 1000 Nm³ an hour of gas being pumped out.

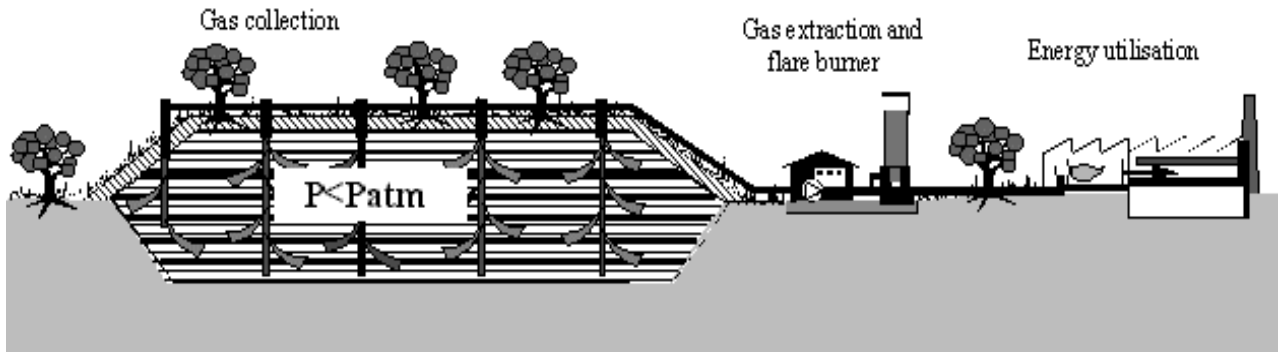
A landfill must be at least 12m deep and have at least one million tons of waste in place for landfill gas collection and power production to be technically feasible.

Combination of landfill gas capturing with power generation, landfill gas to energy system, is shown in the attached picture.



AS LONG AS THE INTERNAL GAS PRESSURE IN THE LANDFILL REMAINS HIGHER THAN THE AMBIENT ATMOSPHERIC PRESSURE, LANDFILL GAS WILL CONTINUE TO ESCAPE INTO THE ENVIRONMENT.

LANDFILL WITH GAS COLLECTION



BY PUMPING GAS OUT OF THE LANDFILL THE GAS PRESSURE IN THE LANDFILL WILL BE LOWER THAN THE AMBIENT ATMOSPHERIC PRESSURE, LANDFILL GAS WILL NOT ESCAPE INTO THE ENVIRONMENT AND CAN BE UTILIZED FOR POWER, HEAT OR COMBINED POWER/HEAT PRODUCTION