

# New Technology to Enhance Methane Oxidation at Landfills

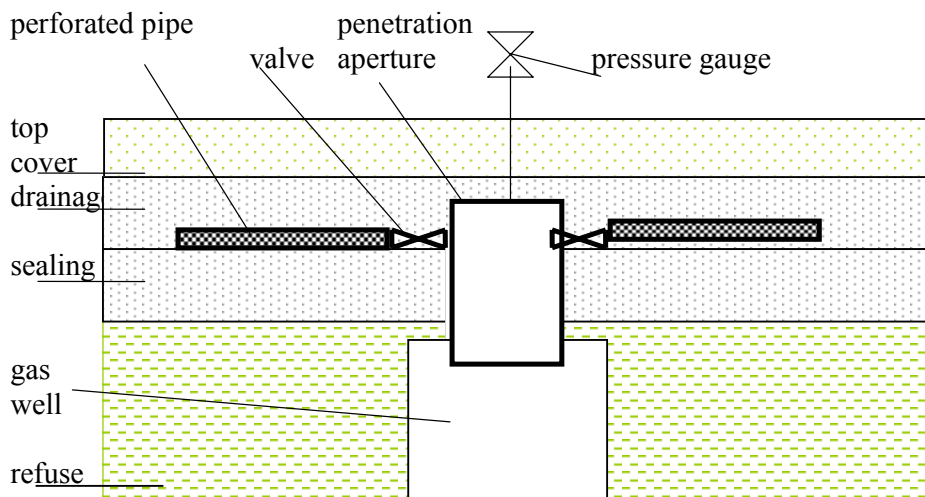
Matti Ettala, [matti.ettala@co.inet.fi](mailto:matti.ettala@co.inet.fi), Kuopio University, Finland &

Petri Väisänen, [petri.vaisanen@poyry.fi](mailto:petri.vaisanen@poyry.fi), Elektrowatt-Ekono Oy, Finland

## Introduction

The aim of this study and technology is to utilize methane oxidation capacity of the landfill cover also at the sites where infiltration is avoided with sealing top cover. The key idea of the technology is to discharge landfill gas through the sealing layer via landfill gas wells not directly to the atmosphere but to the drainage layer. In the experimental field 1 simply impermeable plastic film was installed above the gas well in order to prevent gas flow directly to the atmosphere. In the experimental field 2 (Fig) landfill gas is delivered all over the field and through the oxidising top cover layer via plastic well and radial perforated pipes. No pumps are needed.

Fig. Schematic picture of the new landfill gas oxidation system. Patent pending.



Seven measuring periods were carried out in 2000-2002. Methane concentrations were measured from 121 sampling points with a flame ionization detector (FID). In addition, the gas concentration in the landfill cover was measured from four locations at the surface, 30 cm, 50 cm, 70 cm and 100 cm below the surface.

### **Results and discussion**

Homogeneity of the top cover has to be taken care of in order to avoid shortcuts of the gas. 747 FID measurements were made and only in 15 cases methane concentration in the gas flow through the top cover was higher than 100 ppm. Based on the methane and carbon dioxide measurements at different depths effective methane oxidation was found also in December with low temperature in the landfill cover. Cost 5.000-10.000 \$/ ha of the gas oxidation system includes doubling the amount of the wells and structures to deliver gas in the drainage layer.

### **Conclusions**

The new landfill gas distribution system via drainage layer can be effectively used to utilize methane oxidation capacity of the topsoil also at the site equipped with impermeable cover sealing. The cost of the system is low compared to separate biofilters and flares. The new landfill gas oxidation system can be applied at small landfill sites equipped with impermeable sealing when the landfill gas amount is small or methane concentration is too low for active gas recovery and combustion.