THE USING OF BIOGAS AS AN ALTERNATIVE FUEL FOR REDUCING GREENHOUSE GAS EMISSIONS

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In Ukraine, annually produce 14 million tons of waste [1] (about 300-400 kg / year per person).

Unsanitary landfills occupy large areas that become unsuitable for agricultural activities or stay near them because they are a source of harmful and toxic substances which pollute air, water and ground. The main component, which is released from landfills is methane, emissions by the atmosphere are one of the main factors of the greenhouse effect.

As a result of capturing landfill gas and its use as a fuel produced large amounts of energy, reduced dependence on energy imports and create new jobs. Implementation of projects for energy recovery of landfill gas to improving the environmental situation: reduction of greenhouse gases and pollutants, which has a positive impact on air quality and reduce the potential risk to human health. At international level there are significant opportunities to expand the use energy of landfill gas.

Objective: Substantiation of expediency of production and utilization biogas from municipal solid waste of landfill number 5 in the village Pidhirtsi, Kiev region.

The results:

• Calculated the potential of areas of municipal solid waste using methods recommended by the International Panel on Climate Change (IPSS). Estimated potential for gas trapping efficiency of 58% is about 3000 m3/h.

• Calculated values of emissions of biogas from MSW areas by a computer program RETScreen [2], which results in the form of a graph shown in Figure 1.3

• Established that without human intervention, biogas will emit to the atmosphere at 6000 m3/h until the waste will be supplied to MSW areas, and after its closure for another 20-30 years with reducing emissions of biogas from exponentially.

• Considered the basic technologies for utilization of biogas, including direct combustion in a power generating facilities with capacity of 5 MW and estimated abroad experience in creating similar projects.

Conclusions:

1. One of the most effective ways to supplement and replace conventional energy resources is the production and use of biogas, which is formed by the use of methane fermentation technology of organic waste.

2. In well-designed landfills can achieve biogas utilization to 75%, which in turn will not get into the atmosphere, which significantly reduces emissions.

3. The use of biogas for the production of useful forms of energy reduces greenhouse gases emissions, which are formed in large Heat and Power station using coal. Amount of reduction of emission is taken into account by using the emission factor, which for power production is 1.355 $mCO_2/MW \cdot h$ [3] and for heat production is 0.0983 mCO_2/MJ [4].

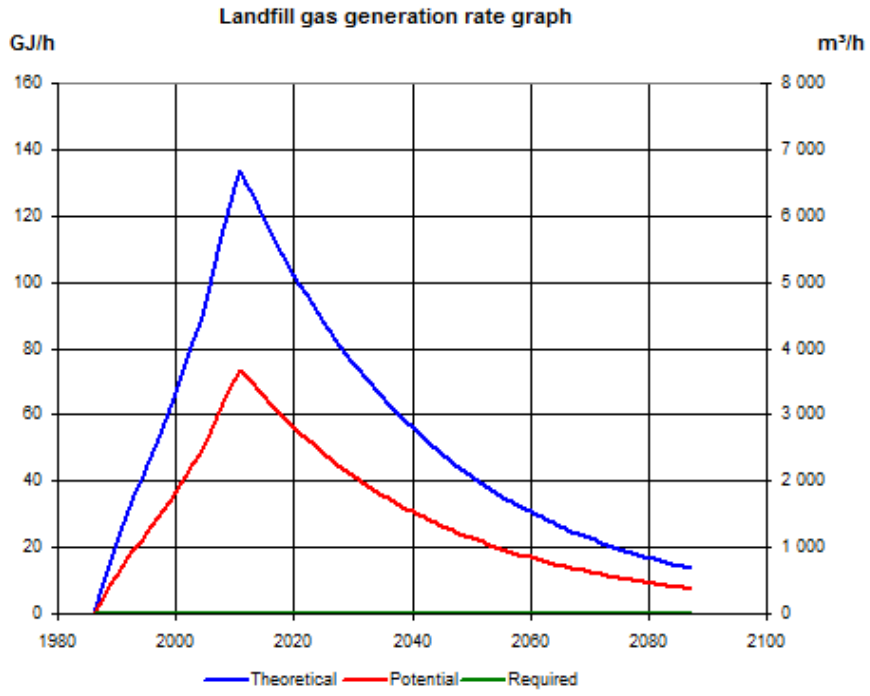

Figure 1. Calculation of the biogas potential by a computer program RETScreen

Refernces:

1. Energy efficiency and renewable energy/A.K. Shidlovskiy. - Kyiv.: Ukrainian encyclopedic knowledge, 2007. – 560 p.
2. Clean energy project analysis. RETScreen engineering & cases Textbook. 3rd edition (http://www.retscreen.net/)
3. US Energy Information Administration, 2007
4. IPCC Guidelines, Vol.2, 2006