



B2 Local Green Energy

The use of methane from landfill as fuel for waste collection trucks

Guðmundur B. Friðriksson

Head of Office

Department of Environment and Transport
City of Reykjavik
Borgartúni 12 - 14
IS 105, Reykjavik
ICELAND

Tel: +354 411 1111

Fax: +354 411 8505

e-mail: gudmundur.b.fridriksson@reykjavik.is

www: www.reykjavik.is

Organisation : City of Reykjavik

Short description: Reykjavík City is the capital of Iceland, founded in 1786. The city is located in southwest Iceland at the shores of Faxaflói Bay. The greater capital area has 200,000 inhabitants, about 60% of the country's total population of 315,000 people. The population of Reykjavík was 119,500 inhabitants as of January 2009.

Reykjavik has had a strong and growing economy in the last decade. Technology is advanced, and level of education is high. The largest employment sector by far is the service sector with around 80% of the capital-region's workforce. Nineteen percent of the capital's workforce is employed in manufacturing and about one percent in agriculture and fishing.

Despite its northerly location, Reykjavík has a relatively mild climate due to the Gulf Stream. Easy access to diverse outdoor and recreational activities, e.g coastal paths, woodland areas, thermal beaches and salmon rivers, is one of the main characteristics of the city. The City of Reykjavík has policies in place to maintain the natural diversity found within the city and to promote a more sustainable society.

Executive Summary of your Abstract

The City of Reykjavik has in the last 3 years renewed 90% of its waste collection trucks with trucks running on methane produced from landfill gas. In the presentation, problems faced e.g. regarding securing gas delivery, reliability of the new trucks etc., will be discussed. The process of renewing the trucks and tendering will also be discussed.

Abstract

The Reykjavik City Council decided in 2001 to renew all its waste collection trucks, collecting household waste, with trucks running on methane. Landfill gas, containing 55% methane, was at that time collected at the Alfsnes Landfill, the landfill serving the greater capital area. Before the decision was made a feasibility study was done.

In the year 2001 the investment and operating cost of methane trucks was a little higher than of diesel trucks but the environmental benefits were obvious. Emission of particulate matter (PM10)

from methane trucks is 80% less compared to diesel trucks, noise is 50% less and by using methane locally produced from landfill gas, the waste collection is CO2 neutralised. Moreover, methane captured at the landfill is used by the same waste collection trucks which collected the landfilled waste – i.e. the “circle” is closed.

But there were some obstacles to overcome. Collection of household waste is an important service which may not come to a halt. Therefore, the collection and refining of methane gas had to be secured and the trucks had to be reliable. Iceland has no natural gas resources nor is it imported. The weakest link in the methane gas production was the scrubbing of the landfill gas. If the delivery of the gas to the filling station or the filling station itself would fail, there was always the possibility of filling the tanks of the trucks at the landfill side. After a few meetings with Metan Ltd.¹ it was decided to double the scrubber system to make it more reliable. Waste collection companies in Sweden, who had experience of using methane trucks, were visited to learn from their experience of different trucks, the frequency of break down, effect of different weather conditions on the gas system etc. Another obstacle was the small size of the Icelandic market and limited number of truck dealers willing to import, set up a spare part stock and train staff in maintaining/repairing methane trucks.

The waste collection truck fleet was renewed in three steps so that experience could be gained and the gas production and distribution system could be improved in steps. Metan Ltd. was keen on improving the production and distribution system for the methane gas, but new investments had to come parallel to increased demand. The first truck was bought in 2005 after informal search for tender and companies willing to take service the truck. Just over a year later a call for tender for two additional trucks was performed and three years later another call for six more trucks. Technical part of the specifications e.g. size of engine, the cab, electric system etc. were drafted by specialists in that field. The engines had to be certified as meeting the EEV standard for emissions, according to EC Directive 1999/96/EC.

Environmental benefit of using landfill gas for heating or electrical production is not high in Iceland as these energy forms are mainly produced from green resources in Iceland. However, the benefit from using the gas for transport is high as fuel for transport is all imported fossil fuel. The CO2 emission, particulate matter, NOx and noise are reduced substantially. Financial benefit is not as obvious as it depends on the oil price and the exchange rate of the local currency. Methane trucks are more expensive than regular diesel trucks but at the moment the “energy” price of the gas is approximately 38% lower than of diesel.

Resumé

Gudmundur B. Fridriksson serves as the head of Office for Waste Management and Consumption in the Department of the Environment and Transport of Reykjavik City. He holds a BSc degree in Chemistry from the University of Iceland and a MSc. degree in Environmental Engineering from the Technical University of Denmark.

Recommended reading: <http://www.metan.is>

¹ Metan Ltd. is a marketing and development company for alternative fuel in the form of methane produced at the landfill in Alfarnes.

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Conference organisers: ICLEI – Local Governments for Sustainability in cooperation with the City of Reykjavik

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