



# Major investment in biogas and public transport in Örebro, Sweden

On 1 October 2009 the Municipality of Örebro put into action, in conjunction with other public sector organisations, local trade and industry, and local farmers, several parts of a widespread scheme to increase the production and use of biogas (methane). On the same day, new buses using biogas began to appear on the streets of the town.

## LOCAL ECO-CYCLE AND EMPLOYMENT OPPORTUNITY

An investment in biogas and improved public transport provides plenty of benefit to society, both locally and globally. Locally it means that public transport is both cleaner and more attractive. At the same time new jobs are created as the fuel is produced locally. Among the advantages on a wider scale are the reduction in oil dependency and lower greenhouse gas emissions.

## NEW BIOGAS PLANT

The Municipality of Örebro has been delivering biogas to the University Hospital of Örebro and various local food manufacturing companies for many years. This biogas came from the anaerobic digestion of slurry at the sewage treatment plant and from collecting gas that would otherwise have leaked out of waste depots.

Since 2007 there has also been a plant that upgrades the biogas from the sewage treatment plant to vehicle fuel. This is achieved by cleaning and concentrating the gas. Vehicles can be refuelled with this locally-produced biogas at three filling stations, which receive the gas via a pipeline from the sewage treatment plant.

Starting in October 2009, local biogas production was

quadrupled. A private company started up a new production plant which is the biggest in Sweden. This plant chiefly uses energy crops from agricultural companies, but substandard crops, bi-products from the food manufacturing industry and wetland grass are also used. The farming industry has shown great interest in cultivating biogas crops as a part of crop rotation planning.

Around half of the volume produced is delivered to a newly-built bus depot, where the municipality's new biogas buses are refuelled. The rest is delivered to the three biogas filling stations in Örebro and to Stockholm, to support the growing biogas market there.

The total production capability of vehicle gas is 60 GWh from the new biogas production plant and 25 GWh from the sewage treatment plant when both are operating at full capacity. This is the equivalent of 8,5 million cubic metres of vehicle gas, which is being used instead of around 8,5 million litres of fossil fuel.

Emissions of carbon dioxide are thereby being reduced by approximately 24,000 tons per year. Just changing from diesel to biogas in the city's bus traffic will reduce emissions of greenhouse gases by 3,000 tons per year. The residue from the anaerobic digestion process is returned to the farmers to be used as fertiliser.



### **NEW BIOGAS BUSES IN CITY TRAFFIC**

The diesel-powered city buses in Örebro were replaced with 61 new biogas-driven buses on 1 October 2009. In addition to the overall climate benefits, the air quality in the city has improved since biogas replaced diesel. Within the next few years regional buses will also be powered by biogas.

In April 2010 a new bus route network came into force for the city buses, which dramatically improved the level of service and increased the possibility for people to leave the car behind and travel on public transport instead.

### **NEW BUS DEPOT FOR URBAN AND RURAL TRAFFIC**

It was not enough to just provide some new buses. A new bus depot, providing for both urban and rural bus traffic, was inaugurated on 1 October 2009. There is room in the depot for over 100 buses, with the possibility to increase this even more if necessary. A compressor station was built adjacent to the depot, and also a storage facility from which the gas can be delivered to the buses or sold to other places via road transport.

A total of € 54 million (SEK 500 million) was invested in the biogas production plant, the upgrading plant, pipelines, the compression station, the bus depot and the biogas buses. Biogas-related investments amounted to over € 15 million. The Swedish state contributed € 2.5 million as a climate investment subsidy.

#### *Facts:*

### **WHAT IS BIOGAS?**

Biogas (methane) is produced naturally when organic material decomposes in an oxygen-free environment. The same process can be created in a controlled form in a digestion chamber. The gas can then be collected, cleaned, and used for energy purposes.

Vehicle gas is biogas that has been cleaned and concentrated so that it can be used as fuel in vehicles.

Natural gas, which ought really to be called fossil gas, is methane that has been produced in the same process described above, but millions of years ago. When it is extracted and burnt the net result is additional carbon dioxide in the atmosphere.

### **HOW THE CLIMATE BENEFITS FROM THE USE OF BIOGAS**

When biogas is produced from slurry and waste, the effect on the climate is approximately 0.12 kg of carbon dioxide per cubic metre of gas. When agricultural crops are used instead, the average figure is 0.39 kg. From a lifecycle perspective, petrol and diesel give rise to 2.7 and 3.0 kg of carbon dioxide per litre respectively.