

Fossil fuel free Växjö

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A beautifully situated city deserves clean air. A total ban on fossil fuels by the year 2050 must do the trick for the Swedish city of Växjö. Twelve years into the project, the city is already more than halfway.

At the heart of a densely forested Swedish area lies the city of Växjö, at a place where, of old, roads meet water – hence the name of the place, which combines the words for 'road' and 'lake'. Up until 1970 Swedish lakes were severely polluted, but water quality has been restored. Now it is time to clean the air.

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It seems ambitious, yet fitting that the main aim of the city of Växjö in relation to energy, is to stop using fossil fuels. The city set itself this goal back in 1996, to be reached by 2050. For this programme, Växjö was elected Europe's greenest town by BBC London and ICLEI Local Governments for Sustainability in 2007, and won the European Commission's Sustainable Energy Award in that same year. Time to evaluate with municipal project leader Steve Karlsson.

Heavy transport

Växjö has already come a long way since 1996, especially when it comes to heating homes. The city owns an energy company that procures CHP from biomass and housing companies with energy efficient houses.

Sustainable mobility proved a more difficult task, but a very necessary one as Växjö is one of southern Sweden's logistic centres. It has to cope with much heavy transport, and therefore high levels of diesel use. The city currently has eleven ethanol filling stations and a biogas fuel station. But these do not suffice.

Växjö wants to introduce more biofuels, optimise transport and find out if some of the heavy transport can take place by railway instead of trucks. Getting politicians on the European Union level to accept a higher blend of biofuels into gasoline and diesel is also on the wish list.

Waste not

Two plants are key to Växjö's biofuels ambitions. The first is a sewage water purification plant where biological waste can be co-digested with the sewage sludge. Anaerobic bacteria do the job. This first project is part of a European Union project called Sustainable Energy Systems in

Advanced Cities.

Karlsson explains: “Up until now only small amounts are being processed, collected from large-scale kitchens and very large restaurants. The grinding takes place in the kitchens, before the waste is taken to the plant. But we're in the midst of the start-up phase of a large increase: we will be collecting from smaller kitchens and households as well. It will then no longer be economic to collect the waste as we do now. We'll have to set up a conventional system with separate bins.”

Will the waste of 78,000 inhabitants suffice? “We hope it will suffice,” Steve answers dryly, “but the focus

[F030 Image 1](#)

in the first stage of the project will be first and foremost on the quality, not on the quantity. If there is, for instance, too much plastic in the waste, it is useless.”

Golden eggs

Then how will the city ensure the quantities of biomass needed? This is where the second plant comes in. Fortunately, Växjö is in possession of a hen that lays golden eggs: with woods all around, bioenergy can be won in massive quantities from wood chips. A thermal gasification plant is planned in which wood chips will be heated to high temperatures without enough oxygen to start burning.

In a neighbouring municipality academic research has been done in a similar gasification plant. That research serves as a test for Växjö's future production. This second project is still in the demonstration stage, testing on a larger scale is now needed. Steve: “With a plant the size we have discussed, we would have a negative outlet of CO₂! However, this project is so big that we need financial help from government and/or other investors. The municipality cannot carry all investment costs and economic risks by themselves.”

Passing through

If Växjö wants to be fossil fuel free, how about trucks passing through? “As for compatibility: which kinds of biofuel the plant will be producing, dimethyl ether or other kinds as well, is yet to be decided,” says Steve. “Anyhow, we will first be producing enough biofuel for Växjö's bus fleet and private cars. The next generation, with the large-scale gasification fully functioning, will produce enough for all trucks in the city and those passing through as well.”

Figures

The city's clean-fuel policies were not instated over night. As of 1993 the municipality has been monitoring energy use and CO2 emissions. Its various departments have all been monitoring their own contribution to the greenhouse effect since 1997. The level of carbon emissions per person per year in Växjö has come down by 32 per cent to a mere 3.1 tonnes – lower than in any other urban area within Europe. The average in the whole of Sweden is 5.6 tonnes, compared to four world-wide, eight in the whole of Europe, and twenty in the United States.

In the year 2007 as much as 54.1 per cent of Växjö's energy supply was renewable, which is a very high percentage even for Sweden. So the city is already past halfway its ambitions. But the impressive figure stems mainly from the large share of biomass in the heating sector. In total, biomass supplied 38.4 per cent of the energy, while fossil fuels delivered 35 per cent, mainly in the transport sector.