

# PELLET HEATING IN KRISTIANSTAD, SWEDEN

## Framework

In 1999 the executive committee of Kristianstad municipality unanimously decided to declare its will to become a Fossil Fuel Free Municipality, this vision is included in the municipal Climate Strategy since 2005.

The objective of a Fossil Fuel Free Municipality is to replace consumption of fossil fuels for electricity, heat and transport by renewable fuels and also strive for improved energy efficiency and lower energy consumption. The municipality also tries to influence others to use renewable fuels. Pellet heating creates local jobs and a secure fuel supply chain (reduces import of fossil fuels).

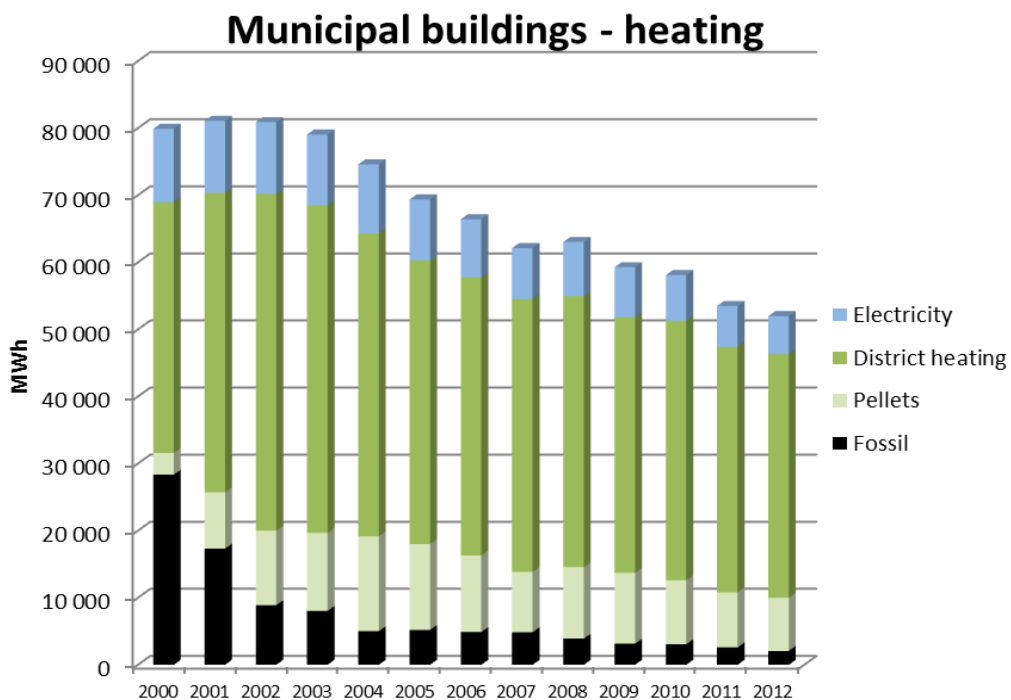
The reduction of fossil fuels has been achieved primarily by the use of bio fuels. Biomass has been used for heating and the production of electricity and biogas as fuel for local buses and other vehicles. The introduction of pellets has been an important step towards a Fossil Fuel Free Municipality. Wood pellets are used, in several public buildings as well as in detached houses. In district heating areas conversion to district heating is given priority but outside these areas oil is preferably converted to pellets.

## Pellets in municipal buildings

Within the work with Fossil Fuel Free Municipality there has been a project with the aim to convert public buildings from oil and electricity for heating during 1998 – 2002. If possible the buildings were converted to district heating, otherwise to pellets.

## Converted buildings

The municipality has converted 43 burners in public buildings (schools etc) from oil to pellets firing. The proportion of fossil fuels and electricity needed for heating in public buildings has been significantly reduced, see figures below.



## Procedure

The installation of pellets burners in municipal buildings were done without assistance from consultants. The community took advantage of the knowledge within its own organisation, a successively developed experience. At an early stage it was discussed to entrust private companies with the operation of the pellets burners. The municipality, however, chose to train its own staff to operate the plants.

## Environmental benefits

Within the project the reduction of oil has been about 3 200 m<sup>3</sup> oil per year and about 4 500 MWh electricity per year. The oil reduction represents about 8 600 tonnes of carbon dioxide per year and the reduction of electricity another 144 tonnes – 3 150 tonnes depending on which emission factor that is used.

## Economical benefits

An investment of 45 million SEK, (approx. 5 million €) was needed to carry out the conversion from oil and electricity to district heating and pellets. However, the project has a good effect on municipal economy as the pellets fuel costs 2 500 SEK per MWh (270 € per MWh) and district heating cost 3 500 SEK per MWh (380 € per MWh) and oil and electricity are much more expensive and also, the overall tendency of rising oil and electricity prices.

The pellets burners need frequent supervision and collection of ashes. Instead of investing in expensive stationary ash removing systems the municipality has an employee that visits the burners regularly to remove the ashes. He can then also check the general condition of the burner. Since the number of burners in the municipality is rather high, this approach is favourable. The vacuum cleaner with trailer that is used to collect the ashes costs 7 000-8 000 € and is transported by a car using biogas as fuel.

## Technology and practicalities

The 43 pellets burners are in the range of 50-350 kW. Burners with a capacity over 100 kW are supervised by a computer system that measures temperature etc. The systems vary between very simple and fully automated ones.

Bulk vehicles deliver the pellets. In some locations it has been difficult to obtain building permits for silos. Today the municipality always uses architects to design the silos properly. Experience has taught us that silos don't have to be situated next to the burner room. At an Åhus site the pellets are stored as far as 40 meters from the burner house. The fuel is fed to the burner with a screw.



*Inside and outside pellet storage installations.*

There have not been any problems with local opinion concerning transports and storage of pellets. It is however important to adapt transports to the specific situations. For example, deliveries to schools are not done during

school hours. Pellets for school heating also set a good example for the promotion of conversion among private house owners.

### **Ash handling**

The amount of ash from the 43 pellets burners is rather small (10 - 15 ton/year) but must of course be handled. As mentioned above an employee visits the plants according to a timetable to vacuum clean the burners. Then the ashes have to be put in landfills since there is no simple logistics to return it to the forest. The amount is too small to be treated and made into ash pellets and the structure is too coarse for the ashes to be treated together with the fine ashes from the district heating plant.

### **Effects on the market**

The conversion project has created local jobs, within manufacturing of burners and other equipment. The project also means creation of local jobs supplying wood chips and pellets for both district heating and local burners. Estimation is that about 50 -70 jobs has been created due to the Fossil Fuel Free programme.

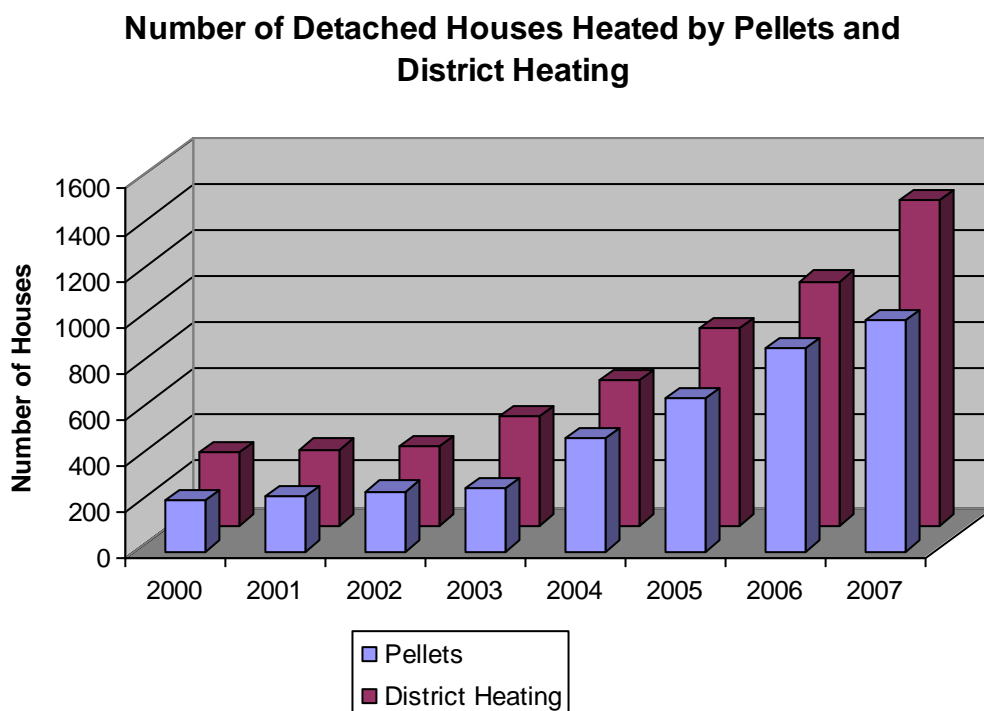
### **The future**

Three more public buildings will be converted from oil to pellets and together with the conversion to district heating, all public buildings will then be heated by renewable energy. Oil burners complement the pellets burners, and they start running if the pellets burners shut down. To replace this oil and make the heating process completely fossil fuel free, the municipality has plans to convert the oil to bio diesel.



## Pellets in single family houses

Many households have also converted their heating system from oil to pellets, partly because of a municipal grant. The number of detached houses heated with pellets and district heating is increasing continually while the number of houses heated with oil is decreasing. See the diagram below.



*Number of detached houses heated by pellets.*

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