Cardboard mill heats Lindesberg

In Lindesberg, in Sweden, the waste heat from the Korsnäs Frövi cardboard mill is distributed via the municipal district heating network. This has resulted in the replacement of fossil energy use totalling around 95,000 MWh/year by waste heat and bioenergy, and CO₂ emissions have fallen by around 16,000 tonnes/year.

The Lindesberg waste-heat project is a good example of energy efficiency and the energy switch, where waste heat replaces fossil fuels. The managements of the Lindesberg energy company Linde Energi and the Korsnäs Frövi paper mill (formerly AssiDomän Frövi) have been heavily involved in the project. The result shows that a small energy company and large industrial firm can cooperate and attain joint benefits. The successful cooperation saves energy for the municipality of Lindesberg, as well as reducing its CO₂ emissions.

In 1998 the municipality received grants from the local investment programmes (LIP) to utilise the waste heat at Korsnäs Frövi and distribute it via the district heating network. At present around 86,000 MWh/year of waste heat is supplied, equivalent to 92% of the production needs of the district heating system. The district heating is supplied to around 4,500 apartments, schools, industrial sites and public buildings. Around 40–60 properties have been connected to the district heating network each year.

Since the waste heat initiative began in 1998 consumption of fossil fuels has fallen by 2,900 tonnes of LPG and 2,500 cubic metres of oil which used to be supplied as fuel to the district heating network. It was estimated at the start that the plant would be capable of delivering up to 85 GWh/year. Ten years later 100 GWh/year is being supplied.

**Positive environmental and economic impacts**

- Around 40–60 properties a year have been connected to the district heating network.
- Around 100–150 m² of oil and 400,000 kWh of electricity have been replaced by waste heat and bioenergy annually.
• CO₂ emissions have fallen by around 16,000 tonnes/year
• The district heating meant that a large heat pump in Lindesberg could be phased out, so that 5 tonnes of freons could be destroyed.
• When the heat pump was shut down, electricity consumption fell by 11 GWh (equivalent to the power consumption of 550 detached houses).
• The operating costs of the thermal plant and district heating network are low, consisting solely of electricity for a few pumps.

ENERGY COOPERATION WITH MANY BENEFITS
Efficient energy use also means economic benefits for both the paper industry and the thermal plant and improves their competitiveness. The project was cheaper than expected due to successful procurements of culvert pipes and welding. On the other hand, the expansion of district heating in the areas of detached houses was smaller than planned as the home-owners’ association in Lindesberg advised its members against district heating. The association received commission on the oil its members bought. Today the situation is different and there is strong interest in joining.

POTENTIAL AND FUTURE BENEFIT
District heating systems reduce air pollution locally, allow waste heat from other activities to be used and allow combined heat and power to be produced. District heating systems that use waste heat utilise a resource that would otherwise go to waste, and offer major environmental and climate gains. As urbanisation increases globally, the prospects for expanding district heating are improving.

WHY BEST PRACTICE
Substantial environmental effects, greater than estimated at the beginning, have been attained in this plant by replacing oil and LPG consumption with district heating using waste heat. The use of waste heat is an energy efficiency improvement in itself. Equipment that consumes electricity has been taken out of service, saving 11 GWh. Implementation has been cheaper than anticipated. The project has attracted interest both in Sweden and in the EU. The plant has improved the competitiveness of both the paper mill and the thermal plant.