

# Stockholm / Yeast Factory project: 6 MW heat pump and industrial process cooling

This project was the first of its kind in the world using HFC134a as refrigerant. will be loaded with free cooling.

## Introduction

Termoekonomi delivered the plant as a turnkey contractor. This included the system design, all detailed design of building and installations, purchasing, co-ordinating the installation works, commissioning and initial operation.

The project was made possible when the nearby district heating network was to be connected to the factory. In 1988 we had already delivered a smaller heat pump system for internal use in the industry. With access to a larger heating demand a larger heat pump became feasible.

The Yeast Factory (Jästbolaget AB) and the Energy Company (Sollentuna Energi), founded a joint company (50/50) for this new project. The plant was taken into operation in 1992. At this time CFC refrigerants were being phased out. After discussions with manufacturers we finally found a way to use HFC134a on normal commercial conditions.

## The Yeast Factory

The factory is located 20 km north of Stockholm city nearby a lake. It is the only producer of yeast in Sweden.

The process of making yeast creates a lot of heat that has to be taken away in a very controlled way. It is vital for the quality of the yeast that the temperature is kept at a certain constant level.



### Facts: (the large heat pump only)

- Cooling capacity: 4.5 MW at 8 °C
- Heating capacity: 6 MW at 65 °C
- Max outlet temp.: 80 °C
- Total annual availability: ≈ 99 %
- Annual HP availability: 99.8 %
- Annual heating production: 37 GWh
- Annual HP COP: 2.9
- Cooling water production: 950,000 m<sup>3</sup>/y



Installing energy efficient systems in process industries are often very profitable and positive for nature.

Industry processes are however very sensitive for any disturbance. The design must be accurate and the installation must be performed very smooth, not to cause any problem in the industry's production.

Therefore, it is especially valuable that the design, installation and commissioning is performed by someone skilled in all phases of a project realization.

# The Yeast Factory Heat Pump System has saved money and served nature for more than 15 years

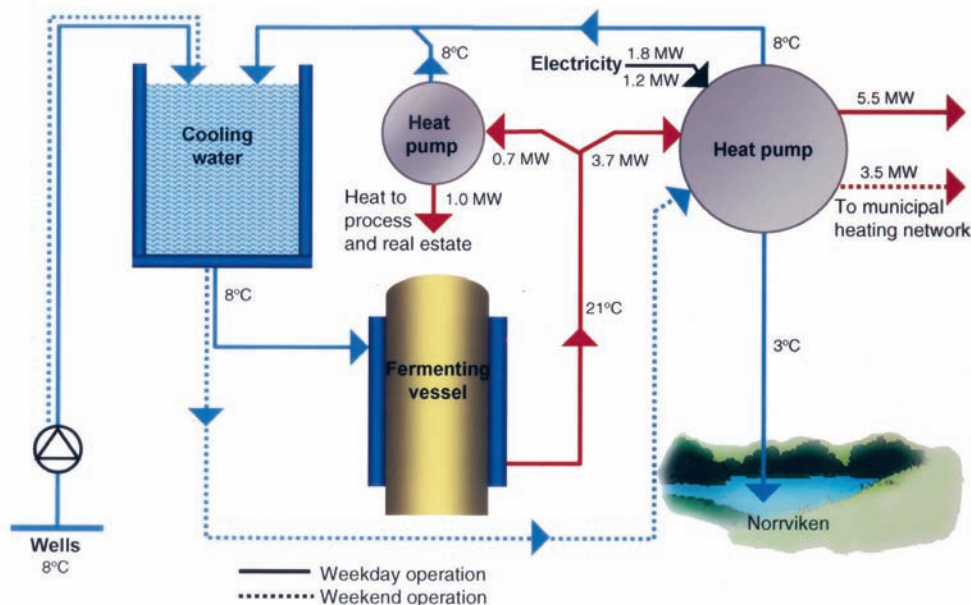
Each year 20,000 MWh of waste heat is used for district heating, the nearby lake is not affected any longer and the refrigerant is harmless for the ozone layer.

## Principles for design and operation

The yeast production process used to be cooled with ground water at 8 °C taken from wells. When cooling the process the water was heated to 20 –22 °C and dismissed to the lake. This is of course a waste of energy and also has some impact on the lake. In 1988 a heat pump system with two screw compressor units was installed. The total heating capacity was 750 kW, which was all the factory could use for the buildings and some process heating. It was not possible to make use of all process cooling until four years later when the district heating grid was connected.



### Heat pump system



The figure shows the system principle for the heat pump installations. Normally, when the industry is in full operation water of 20 – 22 °C is used as heat source for both the smaller heat pumps and for the large. If the industry is at stand still the large heat pump can instead use groundwater at 8 °C and cool it to about 2.5 °C In this way the heat pump can stay in operation regardless of the industry's operation.

The heat pumps have served the owner and the nature for 15 to 20 years now (2008). The availability and performance have been splendid over the years. This is a long-time example of a profitable and environmental friendly installation.

