

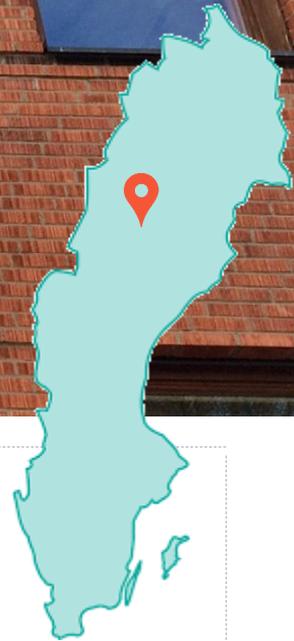


Northern Periphery and
Arctic Programme
2014–2020



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Vilhelmina kommun
Vuoltjeren tjielte



Waste heat recovery, Vilhelmina, Sweden

Vilhelmina is the largest municipality in Västerbotten County when it comes to the area. The number of inhabitants was 6,805 in 2016. More than half of the population lives in or near the main community Vilhelmina and the other half lives across a very large geographic area in many small and medium sized villages. The municipality has a total area of 8795 km². The land use plan mentions a development of an approximately 100 hectare area, in which a maximum of 350 residential properties are to be built. This rising number of inhabitants makes it necessary to build a new sewage plant, as the old one is designed for only 900 people. The new one will be able to deal with up to 4000 people. and should be highly flexible due to the high share of part-time inhabitants .

Energy use

The standard design for the wastewater treatment plan would be direct electric heating. Instead, a heat pump will be installed (23 kW), which is tested with good results in similar plants. It will deliver about 57 000 kWh per year and use about 12 000 kWh electricity.

Investment and payback time

The total investment is 47 250 €. The electricity price currently is 0,15 Euro / kWh on average. The electricity saved per year is 45 000 kWh, which equals 6 750 €. The payback time, therefore is 7 years. Considering the lifetime of heat pump, which is about 10 years, the investment is considered economically viable.

Heat recovery

Asset owner: Vilhelmina Municipality, Sweden

Used assets: Wastewater heat content

Technology: 23 kW heat pump

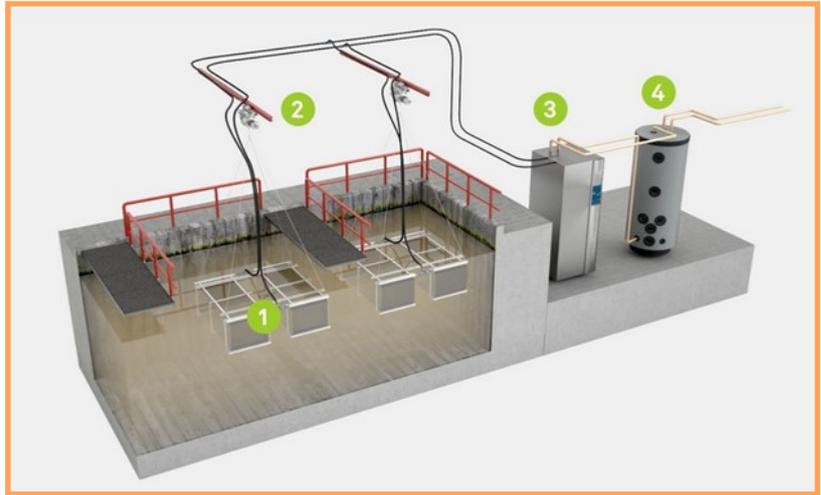
Electricity saving: 45 000 kWh/year

Investment costs: 47 250 €

Payback time: 7 years

Technology

A heat pump forces the transfer of heat energy from the ground, water or air to the application. Using motive power to run the heat pump's process effects the transfer of several times as much energy to the application, be it heating, hot water or even cooling. Hypothetically, the heat can be extracted from any source, no matter how cold, but a warmer source allows higher efficiency. The collectors use a polymeric special material to maximize the area to take up the heat from the water, which makes them more effective than standard ones. They are also compact, easy to install and to clean. An important environmental advantage is that these collectors use very little cooling liquid compared to standard solutions.

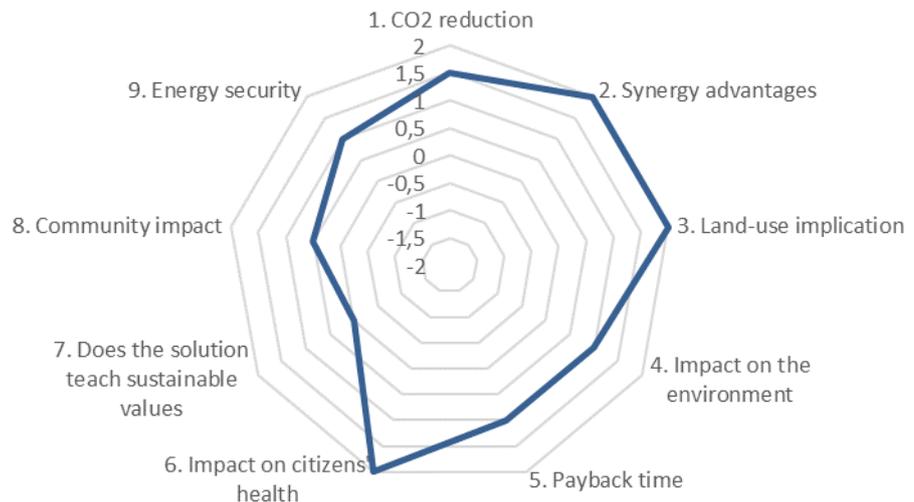


Waste Water Heat Pump System (Evertech), design chosen for Kittelfjäll pilot site. Legend:

1. Heat Collector, to be placed in the waste water
2. Possibility for hanging collectors in the water to avoid problems with operation
3. Heat Pump
4. Heat Boiler if necessary

Sustainability

Replacing direct electric heating is a priority for the Swedish government. Heat pump technology is proven technology, it utilizes the heat stored in waste water would otherwise be unused. There are specific challenges when it comes to make use of the heat of wastewater. One major issue is the harsh environment as the wastewater due to its nature fret at the heat collector. Fats, oils and grease floats on water surface and can encrust on pipe walls and mechanical equipment. Service for and cleaning of the appliance need to be easy as the process of wastewater treatment cannot be stopped for too long.



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