

27th April 2010, Jõhvi

Designing of heating system based on mining water in Mäetaguse Rural Municipality

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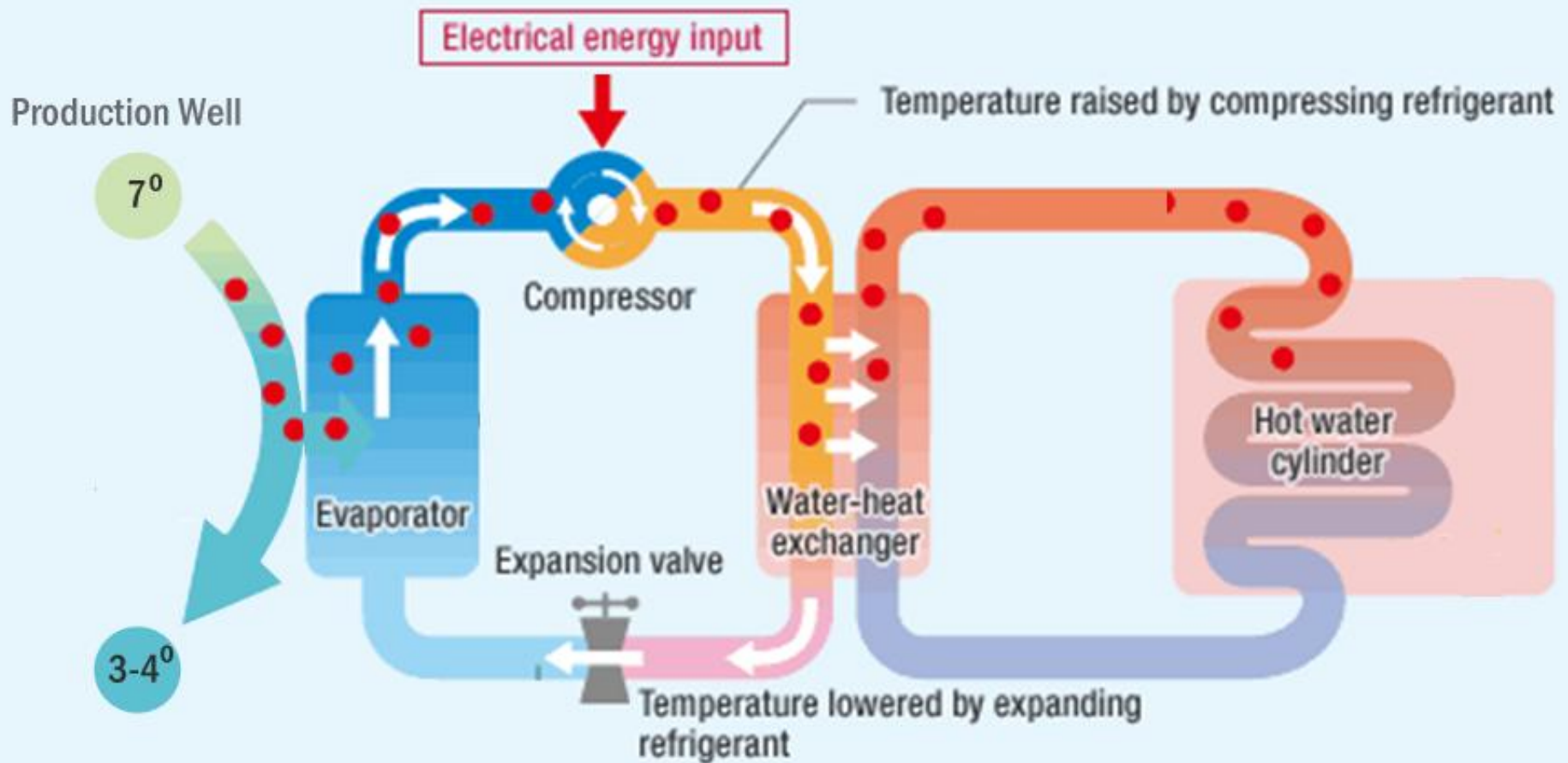
Mäetaguse Rural Municipality

Development advisor

Description and working principle

- Heat pumps transfer heat from man-made or natural heat sources
- An external energy is needed to drive the heat to the location
- Heat pumps work on either the principle of the vapour compression cycle or the absorption cycle

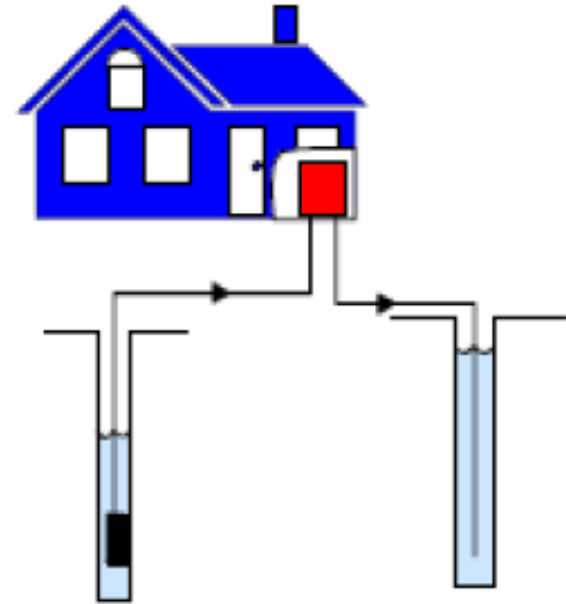
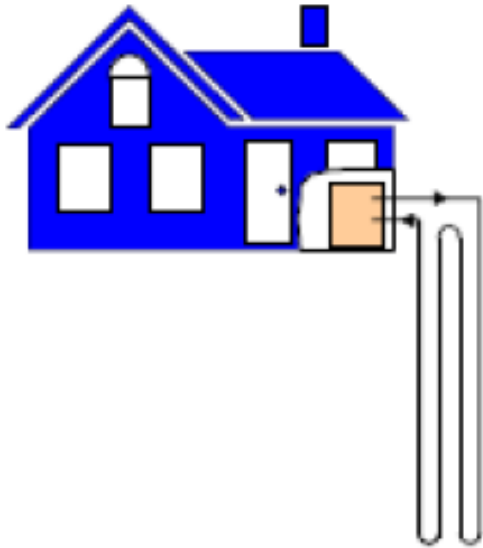
Ground-water based Heat Pump



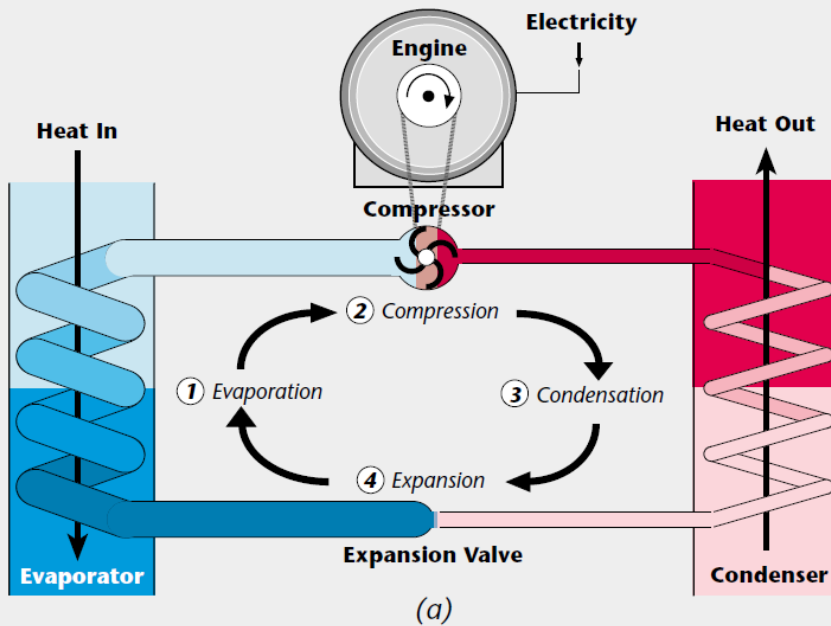
Project input data

- Energy-resource is 23 mln m³ mining-water
- Physicochemical characteristics
 - $t=7^{\circ}\text{C}$
 - Hydrochemical $\text{HCO}_3\text{-Ca-Mg}$ 300 – 700 mg/l
- Heat consumer is in 900 m from the heat-source
- Plastic heating main *versus* non-energy saving buildings
- Acceptable costs

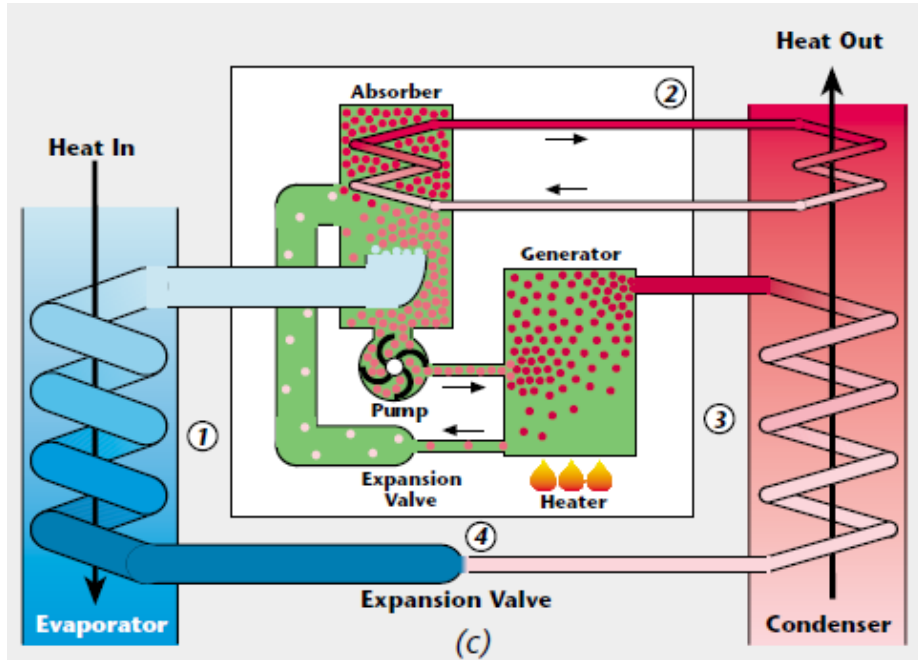
Decisions in order to succeed



The type of heat pump

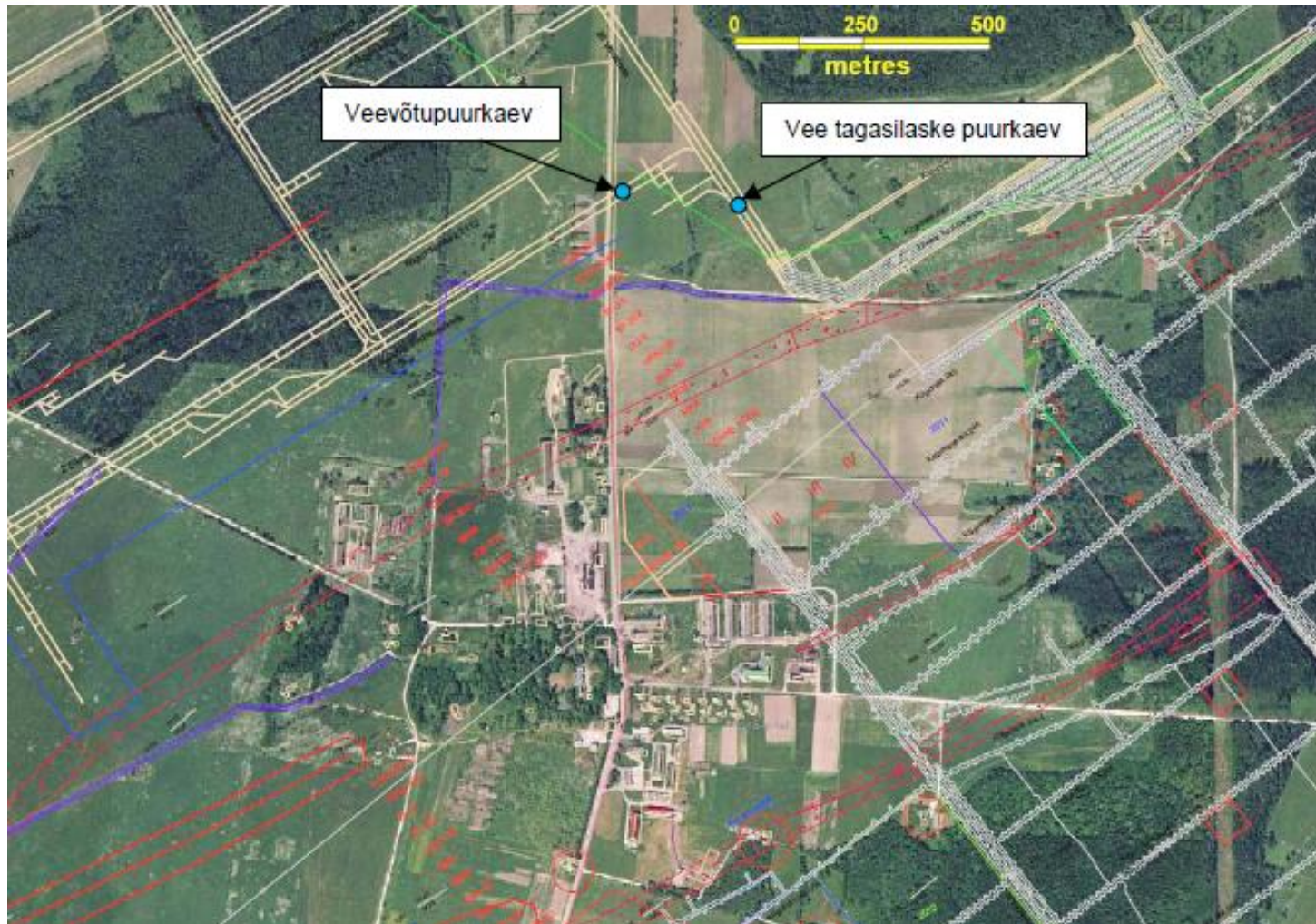


**Electric-motor-driven
compression heat pump**



Absorption heat pump

Geography of the system



Possible solutions

- I Mining water intake and discharge occur by the two wells. Heat pump and exchanger are located on the border of sompa mining
- II Mining water intake and discharge occur by the two wells. Heat pump and exchanger are located in Kiikla village
- III Mining water intake and discharge occur by the two wells. Heat exchanger is nearby wells and heat pump is located in Kiikla village

Risk management

- Heat Pump COP 3,5 ... 3,8
- Change of the mining water temperature
- Mining pillars erosion by the increased water velocity
- Ground water pollution
- Technical risks (electricity, construction, technical solution, settings)
- Closed mining risks (landscape deformation, water exposure, mining re-opening, hydro-impulse)
- Weather

We are piloting being succes-oriented

Thank you!

