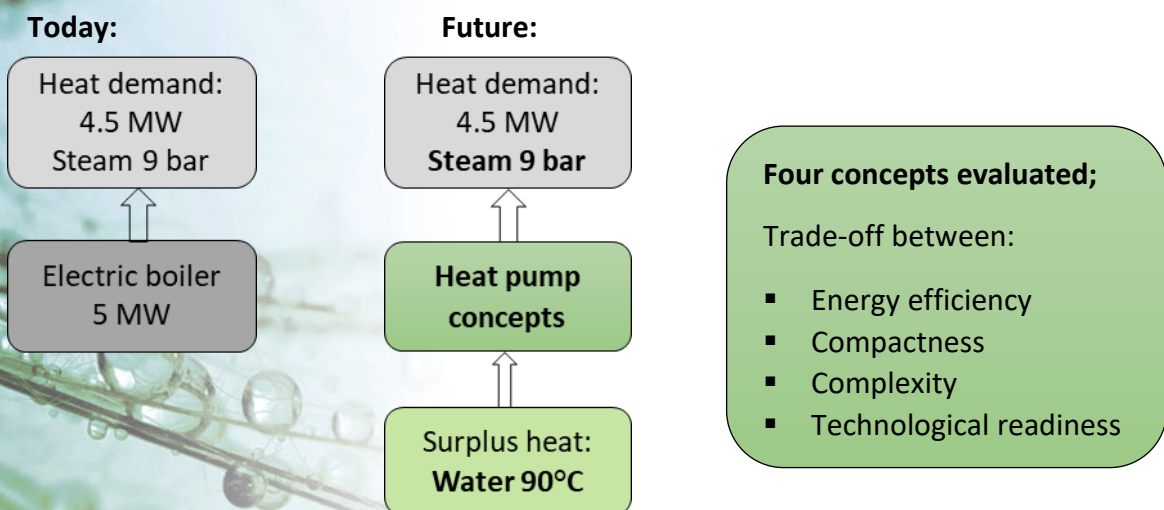


## Steam-producing heat pump

This one-pager summarizes the main findings of a case study targeting surplus heat upgrading for steam production in a nickel refinery plant. The objective is to perform an initial evaluation of several heat pumps concepts, with focus on energy efficiency, to form a basis for further work and discussions with vendors. Four environmentally friendly concepts are proposed, differing mainly in the refrigerant used and compressor technology applied. Potential savings in electricity demand, compared to the existing electric boiler, ranges between 50% and 75%. A concept using water as refrigerant and blowers as compression technology showed the highest saving. The lowest savings was seen for a gas refrigeration cycle (reversed Brayton) with CO<sub>2</sub> as refrigerant, but this concept offers instead the most compact and less complex system.



### Potential savings compared to electric boiler:

