NOT ONLY COLD, BUT WARM TOO.

The QUANTUM as a heat pump.

The QUANTUM as a heat pump is an interesting alternative to conventional heating systems and not just since the federal government has tried to expand the percentage of renewable energy used by promoting especially effective systems through the Renewable Energy/Heating Law (EEWärmeG). No matter where heat is needed, be it in facility management, industry or indoor or outdoor swimming pools, the energy costs are a significant factor and a convincing reason to change over to heat pump technology.

HEAT PUMP OPERATION

Simply put, the energy is withdrawn from a natural medium, such as water, air or the earth. This is then fed into the heating circuit and warms up the heating medium, i.e. the water in a heating system of a building or the air in air-conditioning. The source medium does not have to have the same temperature as the heating temperature later required. The soil or ground water, for example, normally has a constant temperature of about 10 °C and is best suited for energy recovery since they are not particularly affected by seasonal fluctuations. The required heating temperature level is much more significant for the total energy required. Additional energy can also be saved by using a low temperature heating system which operates between 30–40 °C.

Because the heating itself comes from recovered heat, it does not directly use any primary energy such as electricity or fossil fuel thus enormously sinking the total energy needs to operate the heat pump. The less primary energy that is used for the total process, the better the overall performance of the system. This value is known as the Coefficient of Performance (COP).

Outstanding Coefficients of Performance for the QUANTUM Heat Pump.

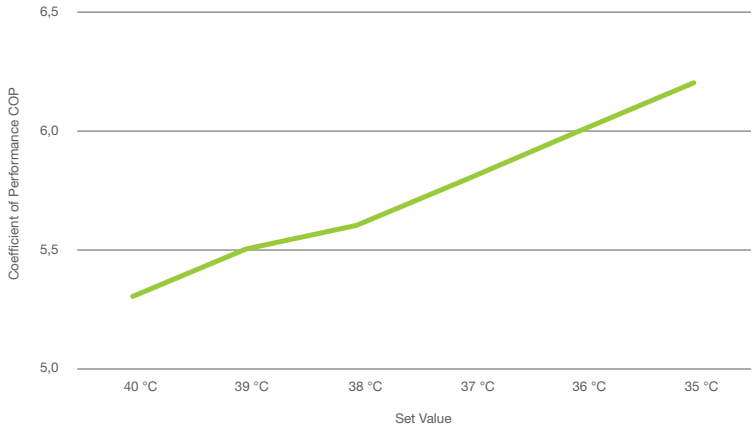

Figure 7: *QUANTUM heat pump's coefficient of performance (COP) in relation to different set heating temperature values.*

THE QUANTUM HEAT PUMP

COFELY Refrigeration presents a modern heat pump, the QUANTUM. Our compressor technology functions oil-free using a magnetic bearing – therefore, creating no danger of an oil leak so that further environmental precautions are not needed. In addition, the costs for maintenance are greatly reduced due to the non-wearing magnetic bearing. The QUANTUM heat pump achieves outstanding performance levels between 5.0 and 7.0 COP (see figure 7).

A REAL EXAMPLE

Since 2006, the communities Krumbach (Schwabia) and Ebermannstadt (Upper Franconia) have been heating their outdoor pools with heat pumps from COFELY Refrigeration. They were able to enormously reduce energy consumption for both pools. In order to supply a heat input of 686 KW, only 106 KW of electricity is needed. The remaining 580 KW come from a small river that flows near the outdoor pool (see figure 9). In the meantime, the comparison figures verify a reduction in energy costs of up to 60 % per year depending on the season.

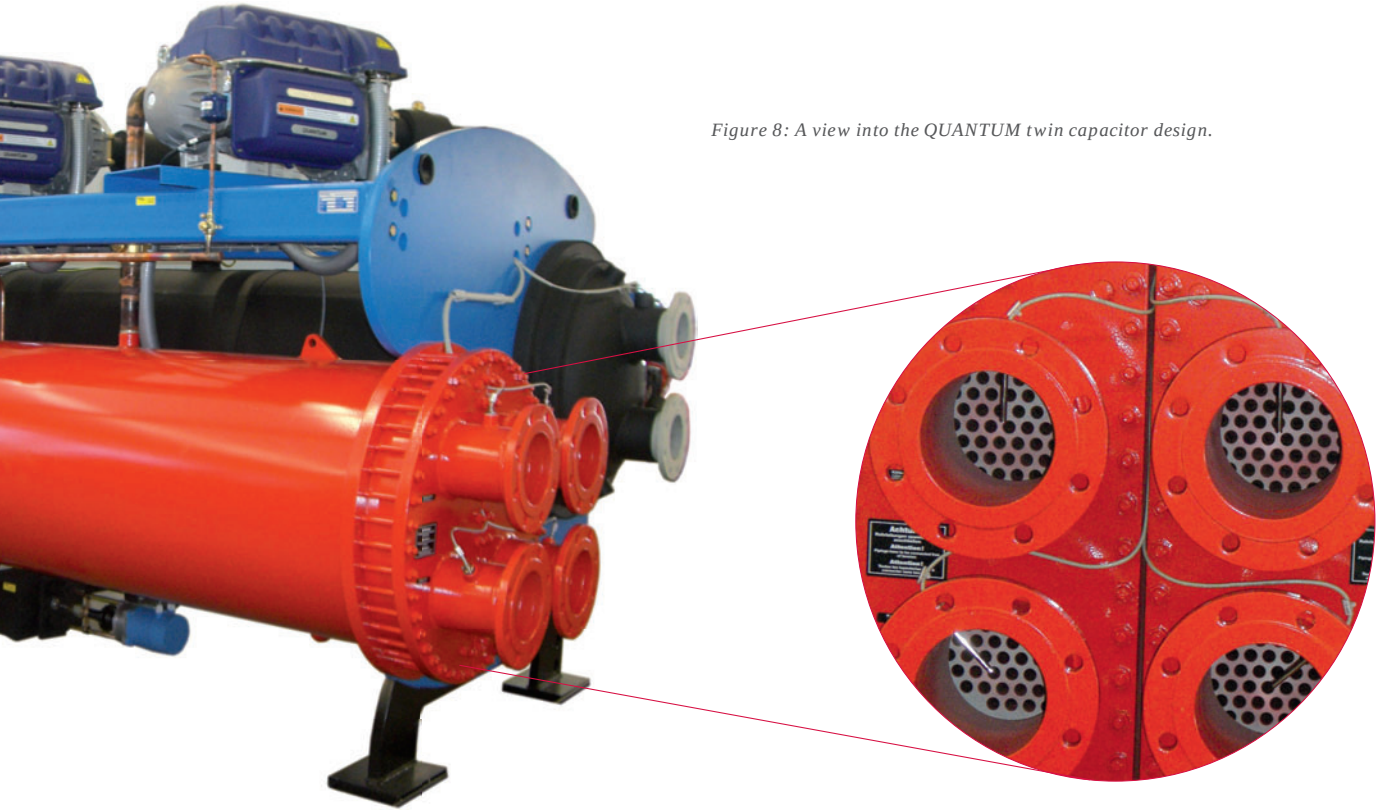

Figure 8: A view into the QUANTUM twin capacitor design.

HEAT PUMP WITH TWIN CAPACITOR

When using the QUANTUM to produce industrial refrigeration, the resulting waste heat can be cleverly used by the QUANTUM twin capacitor technology to heat buildings or to produce warm water. By separating the shell-and-tube heat exchanger, it can be run with two mediums: on the one hand, the so-called loss circuit (open cooling tower) and on the other hand, the closed circuit (for the waste heat recovery). The special appeal is in the direct use of heat transfer from the refrigerant to the application without a heat exchanger. The minimal additional costs for such a system are written off within a few years.

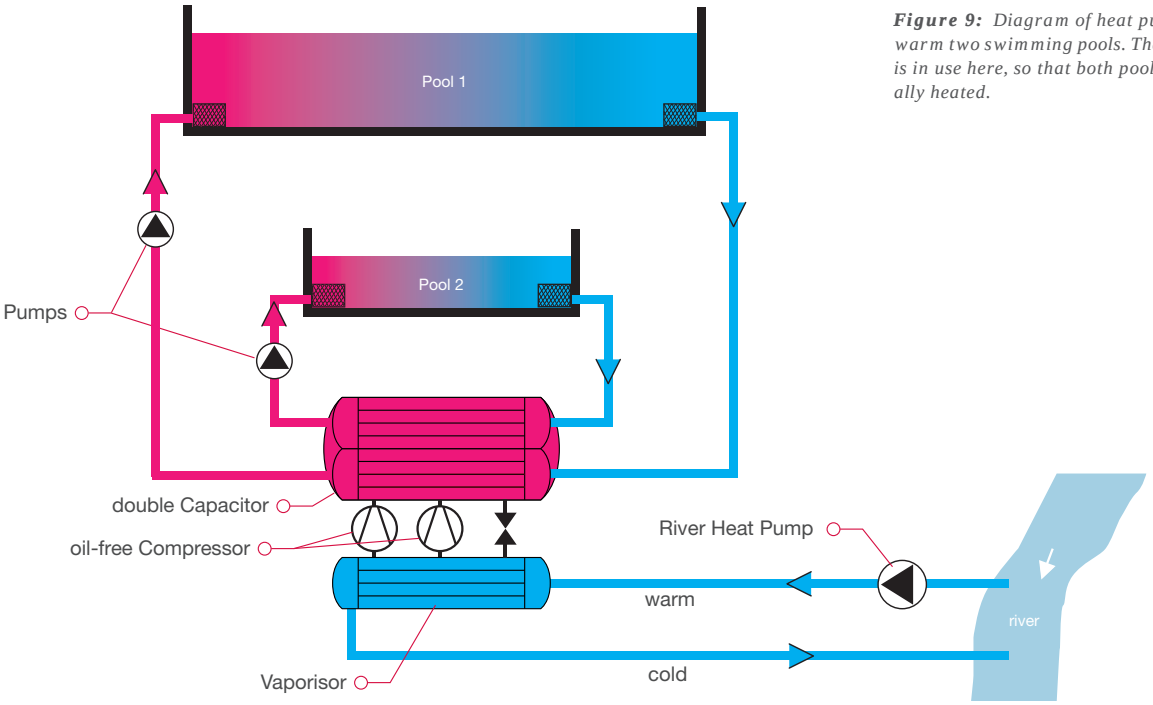

Figure 9: *Diagram of heat pump circulation to warm two swimming pools. The double capacitor is in use here, so that both pools can be individually heated.*