Space heating with waste heat from computer centre in the Vattenfall-head office

One of the installed (retrofitted) turbo heat pumps for heating and cooling application. The unit is speed-controlled between 16 000 - 48 000 rpm.

The EHA Energie-Handels-Gesellschaft and the Vattenfall Business Services GmbH rely on energy efficiency. These days, two ultra-modern heat pumps were installed and put into operation in the Hamburg head office of the Vattenfall Europe AG. The system uses the waste heat of the in-house IT server rooms and computer centres. The total basic thermal load of the 13-floored building with 50 000 square metres floor area can be covered with the heat transfer. This project reduces the negative impact on the environment by more than 600 tons of CO_2 per annum. System design and implementation into the existing heating and air conditioning system has been performed by OCHSNER Heat Pumps. The challenge was to meet the tight temperature tolerances and the combination with the existing district heating and district cooling system.

The energy is "pumped" to a temperature level of up to 45 degrees Celsius and fed into the heating system. Two highly efficient water-water heat pumps with each 300 kW of heating capacity of OCHSNER are used. Turbo compressors with magnetic bearings minimize friction loss and thus oil lubrification is no longer necessary. The drive shaft "floats" virtually in the magnetic field and reaches a speed of almost 40 000 revolutions per minute. An intelligent control technology continuously adapts the performance of the machines on the cold and the warm side to the respective demand. Approximately 8 kWh thermal energy (warmth and cold) are produced for each electrical kWh. This corresponds to a coefficient of performance (energy multiplier) of 8. This outstanding energy efficiency could be reached in an almost endless number of existing and newly built office buildings. The installation into the existing systems was carried out during the regular business. Also the sound insulation had to meet high requirements because the offices are located directly above the system.

The 50 000 square metres office building has been an architectural light-house project in its early years (1966-1969). Now it has been equipped with a light-house energy-saving system with highest energy efficiency.

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