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## ENGIE Refrigeration and Archimedes Make Data Centres Efficient and Secure

High potential for saving energy reliability due to QUANTUM chillers and free cooling.

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Security, availability and energy efficiency - these are three key terms when it comes to describing the current requirements faced within the area of data centres. This does not just apply to the server systems themselves, but also applies to the whole technical landscape of a data centre. In particular, refrigeration supplies are a matter of high priority for planners and operators, as overheating of sensitive electronic components is a danger in case of disturbances or even an outage. Consequences are: IT systems crash, customers are dissatisfied, operators of data centres are no longer able to adhere to service level agreements.

### Refrigeration know-how impresses

If you are a data centre operator who does not want to compromise on security, then rising energy costs mean that sooner or later it will be necessary to optimise the infrastructure in the data centre - and not just with the redundancy of the refrigeration supply in mind, but also aspects relating to energy efficiency above all. A data centre operator and IT service provider from east Westphalia decided to commission an external service provider for this purpose. Archimedes Facility Management GmbH provided an impressive

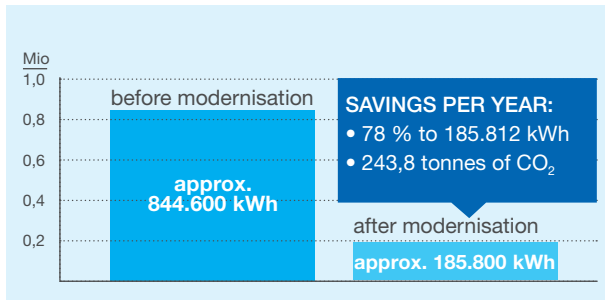
redundancy solution with energy-saving contracting which provided a new net connection point with a supplementary emergency power system. The primary focus of the energy-saving concept were the energy costs for the chillers in use, the pumps on the cold water circuit and the electrical output of the air-conditioning cabinets. ENGIE Refrigeration has the corresponding expertise, the required refrigeration know-how - and an extremely efficient new generation chiller: QUANTUM.

## Technical specifications

Cooling power [%]		100	75	50	46 [min]
Cooling power $Q_0$	kW	350	264	179	164
Condenser performance $Q_c$	kW	462	346	231	212
Electrical power consumption	kW	112	82	52	49

Turbo liquid chiller QUANTUM X060-P2C-LH

## Total energy consumption and carbon footprint



Annual savings in energy and in carbon footprint of a data centre modernised by Archimedes and ENGIE Refrigeration. An amortisation period of less than four years can be achieved due to the modernisation work.

## Always cool, always economical

ENGIE Refrigeration provided two water-cooled QUANTUM chillers in a redundant layout for the modernisation project, each with an output of 440 kW featuring innovative turbo compressor technology with oil-free magnetic bearings. These replaced two cold water units with outputs of 130 kW and 160 kW. These were not set up in a redundant layout and had an EER (Energy Efficiency Ratio) value of approximately 3.3. The data centre operator from east Westphalia was able to improve its EER value to approximately 4.5 and profit from energy savings of about 20 % with the new chillers. The flow and return flow temperatures were adjusted from 6 and 12 °C to 12 and 18 °C. In addition, the

wear-free magnetic bearing in QUANTUM chillers plays a part in reducing maintenance costs considerably. The air-conditioning cabinets were rearranged as well as both chillers. The system of only three air-conditioning cabinets, each with 10 kW connected load, has now been upgraded so that there are now nine modern air-conditioning cabinets with a total refrigeration output of approx. 900 kW. These are equipped with continuously controllable ventilators with EC direct current motors and offer additional energy saving potential of approximately 30 %.

## Free cooling lowers costs

As well as an energy-optimised method of operation, the new chillers offer an additional benefit: The QUANTUM chillers are suitable for efficient use with free cooling.

At an ambient temperature of 14 °C or below, the compressor performance of both machines is gradually reduced as both re-cooling systems use the cooler ambient air in the data centre to directly cool temperatures in the cold water circuit. This mixed operation of free cooling and the chiller further increases energy efficiency of the data centre. If the ambient temperature drops to 11 °C or below, then completely free cooling takes place without the compressors being used. Controlling of re-cooling systems with QUANTUM chillers was also set up by ENGIE Refrigeration.

## Double is simply better

Repetition is often an annoyance, but a modern data centre cannot avoid it: Redundancy protects against outages. Both QUANTUM chillers are not just set up in a redundant manner, but can also work autonomously for up to 24 hours if required due to a newly-installed emergency generator with 250 kilovolt-ampere. The various improvements to security does not just improve the availability of refrigeration, but the whole data centre as well.



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