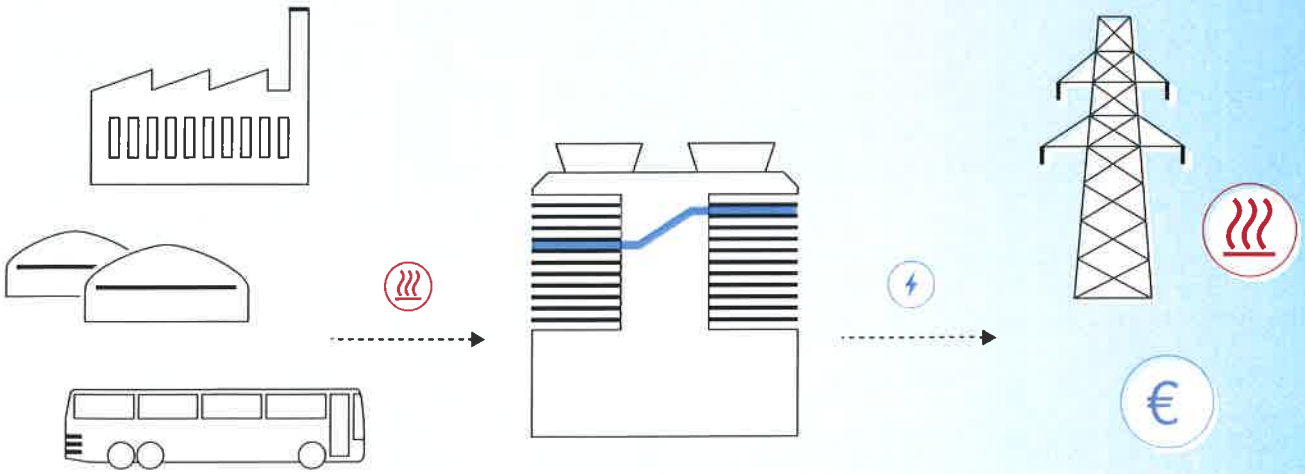
Recovering energy from waste heat
Mini power plant converts waste heat to electricity



Orcan Energy's mini power plant uses waste heat from industrial plants, biogas facilities and engines to generate CO_2-free power. Thanks to innovative control and regulation technology, waste heat sources with rapidly fluctuating temperatures can be harnessed efficiently even at frequent partial-load operation.

Orcan Energy aims to establish its second-generation ORC technology as a global standard. Dr. Andreas Sichert, one of the company's founders, feels they are on the right track.

"We have developed the second generation of ORC technology," declares Andreas Sichert, one of the three founders of Orcan Energy AG. The abbreviation ORC, which is also part of the company's name, stands for Organic Rankine Cycle. The innovation lies in shrinking the steam turbine technology by up to three orders of magnitude and delivering a standard plug-and-play product.

Instead of steam, the miniature power plant is driven by an organic fluid. It is designed for low-temperature operation from 60 °C and can generate up to 100 kilowatts of electricity. This means it can harness waste heat from industrial plants, power generation (biogas plants) or transport (ship engines) to generate not only greener but also more efficient electricity.

The cost squeeze

The miniaturized design was inspired by cost pressures. Steam power plant components are expensive. So when the three founders, Sichert and his colleagues Dr. Andreas Schuster and Richard Aumann, set out on their development journey in 2004, they quickly discovered that necessity is the mother of invention. The technology developed at TUM's Institute for Energy Systems reduces the head height of pumps from several meters to a few centimeters. "Every mistake we made during the development process helped us improve the product," points out the 36-year-old.

The company was spun off in 2008. "It took us three years to raise the investment capital for our startup. We were lucky enough to receive support along the way, however, including from the EXIST Transfer of Research program and from UnternehmerTUM. Top executives from major companies and successful entrepreneurs also provided us with advice and helped us find an investor. We learned that asking for help really pays off," stresses the doctor of physics.

140 patents filed

With support from TUM's patent and licensing office and Bayerische Patentallianz, Orcan's founders were able to file a patent for their first invention in 2009. The number of patents they hold has since risen to 140. At the outset, however, some of the patents originally belonged to TUM. The founders used their investment capital to buy the patents back from their alma mater and get their company ready to enter the market.

Orcan Energy's portfolio includes a series-ready solution whereby the ORC modules can be directly integrated into the waste heat source, as well as electricity generation modules that can be deployed and commissioned straight away. In 2016, the trio received the TUM Presidential Entrepreneurship Award and were ranked among the top 100 innovators in Germany.

"With a current headcount of 60 employees, we are scaling up to become an innovative mid-sized enterprise," enthuses Andreas Sichert. His company wants to establish its ORC technology as the global standard in low-temperature power generation from waste heat. There are plans to install several thousand plants in the coming five years. There is even a possibility that one day private households will be able to harness the ORC innovation with their own heating systems.

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