

RANK.

Utilizing Low-Grade Heat That Otherwise Would Be Wasted

The European Union has ambitions to become a competitive low-carbon economy by 2050 by lowering greenhouse gas emissions and increasing the use of renewables in the energy mix. To achieve this, among other actions, the EU recommends industrial players to recover waste heat, using it to generate electricity or mechanical power. But, according to estimations, most industrial heat loss is qualified as low-grade (under 200°C), which is exceptionally difficult to utilize.

One of the companies that focuses on developing solutions for recovering low-temperature heat waste is Rank. The startup was founded by Roberto Collado Puig, Joaquín Navarro-Esbrí, José Pascual Martí Mata, and Manuel González Piquer, in 2010 as a spin-off from the Universitat Jaume I in Valencia, Spain.

Utilizing the Rankine Organic Cycles (ORC) technology, the company focuses

on the energy revalorization of thermal sources above 90°C. Covering various industries and applications, the team of engineers, designers, technicians, and researchers develops micro-power and micro-cogeneration equipment.

WIDE RANGE OF MICROGENERATION AND MICRO-COGENERATION MACHINES

Rank designs and assembles a variety of micro-power and micro-cogeneration equipment (micro CHP) based on the Organic Rankine Cycle (ORC) technology. According to the team and multiple case studies, the machines are adaptable to a variety of sectors and applications, including industrial, agricultural, renewable energy, and building. Additionally, the ORC machines are applicable to biomass boilers in rural areas that could benefit from feed-in tariffs or premiums.



The company's line of micro-power machines are available in three series (LT, MT, and HT) and can produce up to 140 kWe electricity from renewable and waste heat sources from 85°C and hot water up to 50°C. On the other hand, their micro-cogeneration machines utilize renewable and waste heat sources above 180°C. They can produce electricity from 7.5 kWe to 140 kWe and useful heat in the form of hot water in temperatures up to 80°C and 1 MWt.

Besides low-grade heat source recovery, the company also upgrades systems based on Rankine cycle variations in low power applications. Additionally, it also offers turnkey installations and specific designs adapted to the needed technology and projects.

Rank's technology promises to deliver operation at low revolutions, minimize maintenance, and increase electrical efficiency through the use of a direct drive. Furthermore, the solutions promise to eliminate the leakage of the working fluid and reduce maintenance costs and downtime.

The company has self-developed technology for turbines, pumps, and remote control systems that provide magnetic transmission, electronics-free connection, operation under different

temperature levels, digitalization, security, and real-time remote monitoring.

Along with their product offering, Rank has substantial experience in research and development focusing on heat recovery and its own developed volumetric systems. The volumetric systems are used for compression and expansion processes applied to the company's ORC units. The same concept is also applicable to vapor compression systems in high-temperature heat pumps.

A variety of applications for energy saving and efficiency allow Rank to promise significant energy, environmental, and economic savings. Some of the solutions' application cases include biomass cogeneration in tertiary buildings, biomass cogeneration in the agri-food industry, biomass trigeneration in supermarkets, waste heat recovery from engines, and in solar electric generation.

THE ORC MARKET IS
EXPECTED TO REACH

\$954.1 MILLION

BY 2025



Rank has 220 m² of technical offices equipped with hardware and software for R&D. The company's studies, projects, and preindustrial prototypes are developed in the technical department and are assembled and tested in their laboratories. The final equipment assembling is made in workshops located in two industrial buildings of 1.440 m².

Alongside achieving national success, Rank also works with international clients, collaborating with companies from the United Kingdom, Italy, Turkey, Belgium, and Nigeria, where in May 2020, the company delivered a RANK MICRO module to the Enugu State University of Science and Technology.

In a case study about the equipment's application in industrial waste heat recovery, the company shares its success in improving the energy efficiency of a ceramics facility in Spain (Keros Cerámica). The ceramic flooring and tiling production facility has integrated a Rank® HT1 machine to recover heat from the exhaust gases of the kilns and use it for the generation of electricity. As a suitable solution for the generation of electricity from small-scale waste heat, the Rank® HT1 machine, in this case, generates electric power of up to 20 kWe.

According to a 2019 report by Grand View Research, the global organic Rankine cycle market is expected to reach \$954.1 million by 2025, expanding at a CAGR of 9.71% over the forecast period (2019-2025). The report points out that the geothermal application segment has dominated the market, largely because of the projects' large capacity as compared to other application segments.

According to research on the topic, the ORC market is influenced by the growing awareness of issues related to energy efficiency, particularly in the industrial sector. Furthermore, the market's growth is greatly influenced by the rising number of governments that are turning towards greener and cleaner technologies for power generation, as a response to the rise in climate change issues.

Consequently, governments are introducing supporting policies and financial measures that lead to the quicker implementation of renewable energy sources. This affects the global ORC market because of its applications in power generation technologies, such as geothermal, biomass, and concentrated solar power.