Abstract: Relating to heat recovery from different low and middle temperature “waste heat” sources, the paper presents some important theoretical optimization issues and results of the practical investigation carried out during the testing of the ORC plant using a screw engine as an expansion device.

In a previous study, a special tool was developed in order to compare the influence of different working fluids on the performance of an ORC heat recovery power plant installation. The tool chooses an optimal working fluid for special applications and becomes a part of a bigger optimization procedure applicable at different boundary conditions. The second optimization issue is minimization of exergy losses between the heat source and the cycle, through the use of special optimization procedures that not only select the working fluids, but also evaluate the possible types of processes under consideration of given boundary conditions and limitations. Based on these theoretical considerations, and in accordance with practical requirement, a special ORC test and demonstration plant has been developed and installed, especially for “waste heat” utilization from exhaust gas and cooling water of biogas installations. The biggest practical challenge was the application of the screw engine as the expansion machine. At the end, certain representative measurement results are presented in order to illustrate some practical possibilities and limitations of the tested installation as well as compare them with theoretical assumptions.