

Oil heating system

Experimentation with heat exchangers and power cycles

Background

The section of Thermal Energy at DTU Mechanical Engineering is one of the world-leading groups on the research of advanced thermodynamic cycles (power cycles, heat pumps, and refrigeration cycles) for sustainable power/heat/cold generation. In order to improve the performance of these cycles it is needed to do experiments.

Objective and scope

The grant from COWIfonden will cover the cost of a new oil heating system required for the detailed study of heat transfer in plate heat exchangers and as a heat source for experimentation with organic Rankine cycle power systems. An organic Rankine cycle is a thermodynamic cycle, which is suitable to use to generate electric power from low-temperature heat sources. The intention is to use the new oil heating system as a heat source alternately to a heat exchanger and an organic Rankine cycle test facility. The on-going research within the field of plate heat exchanger is aimed at designing more efficient heat exchangers using novel working fluids, while the on-going research within organic Rankine cycle power systems is aimed at designing innovative, low-cost expander for small-scale power generation. In addition, the new oil heating system will be used within teaching activities at DTU, both related to courses on heat transfer and power plant engineering, and thesis project.

Outcome

The outcome from these research activities is expected to have a significant impact in industry and academia, providing essential new knowledge. Overall, the research results will enable the design of more cost-efficient plate heat exchangers and expanders, leading to more efficient and economical thermodynamic cycles for sustainable power/heat/cold generation. Ultimately, the research work will contribute to the more effective utilization of energy resources, reducing carbon dioxide emissions and helping to attain socio-economic and environmental targets.