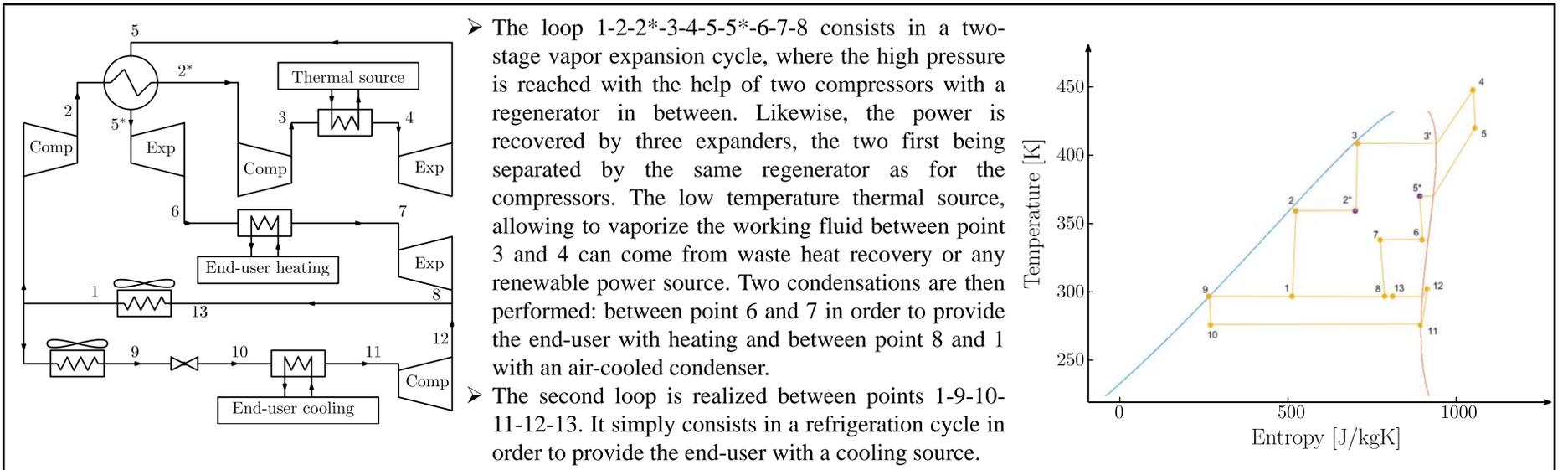


Regen-by-2

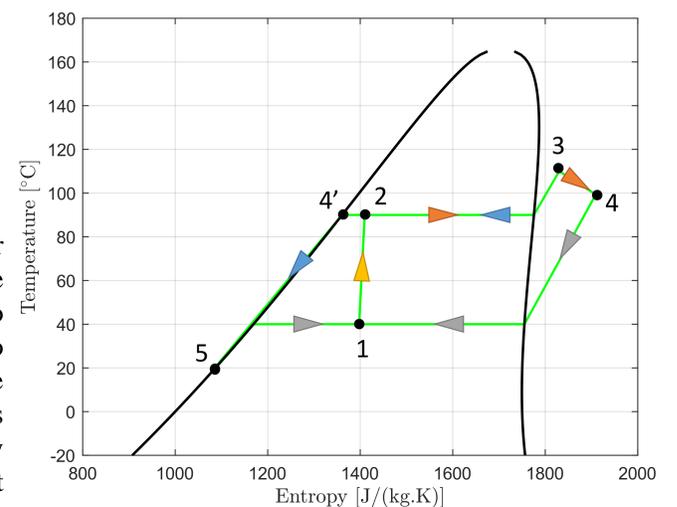
REGEN-BY-2 is a Horizon 2020 EU-funded project, that aims to develop a first-of-its-kind lab-scale prototype of a highly efficient thermodynamic cycle and related plant for the revalorisation of renewable thermal energy sources, unlocking their large potential to supply electric, heating and-or cooling energy vectors. The ideal investigated thermodynamic cycle, which will be described in the paper, is highly efficient as it is constituted by a proper combination of cycles close to the Carnot cycle operating with a two-phase fluid circulating in novel two-phase expanders and two-phase compressors.



Role of ULiege: Design of the Two-phase Scroll Compressors

- Development of a scroll compressor deterministic model working with two-phase flow in order to carry out a sensitivity analysis
- Optimization of the compressor geometry for the regen-by-2 prototype
- Experimental campaign on a test bench in order to test scroll compressors working with two-phase conditions and to validate the deterministic model

The compressor test bench is dedicated to compressor performance evaluation. The compressor power consumption is measured with a torquemeter. Moreover, an oil loop allows to regulate the oil circulation rate for the good lubrication of the compressor. The test bench should be able to reproduce the two-phase conditions met on the Regen-by-2 cycle at the compressor inlet-outlet. To achieve this goal, the two-phase oil-refrigerant mixture is vaporized by a heating resistor at the outlet of the compressor, the oil is thereby recovered in an independent loop. A part of the vapor is then condensed and subcooled while the remaining part is directed to a discharge valve. By playing on the opening of the three controlled discharge valves any conditions can be reached at the inlet of the compressor.



Test Bench P&ID

