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Tony Gimbernat, Teresa Botargues Giron**

# **INNOVA MicroSOLAR**

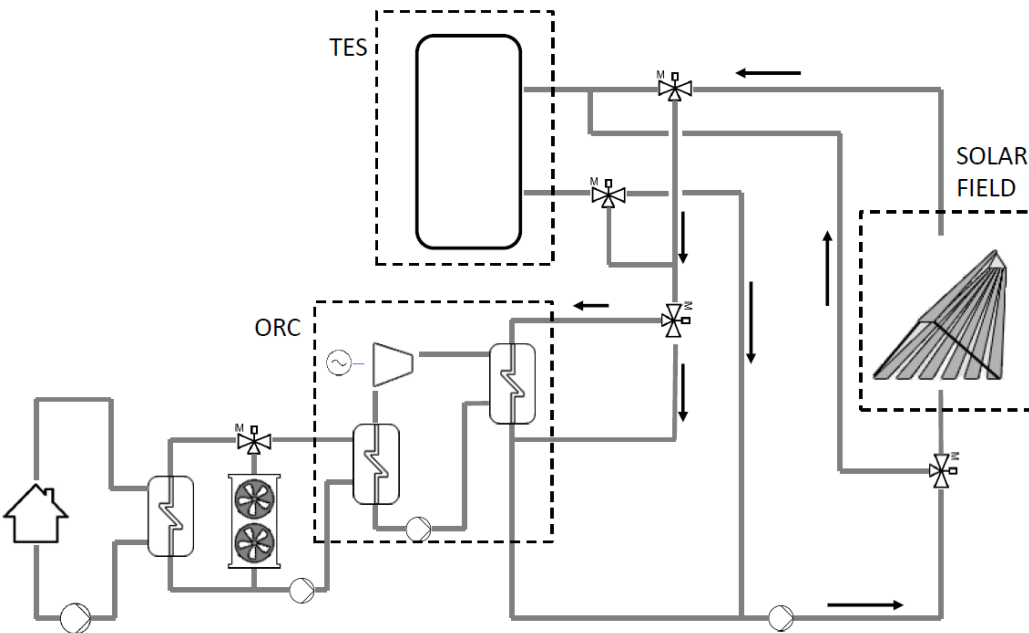
## **Innovative Micro Solar Heat and Power System for Domestic & Small Business Residential Buildings**

**SP20| Workshop on Renewable Heating and Cooling Solutions for Buildings and Industry  
29 October 2020, Aix-les-Bains, France**

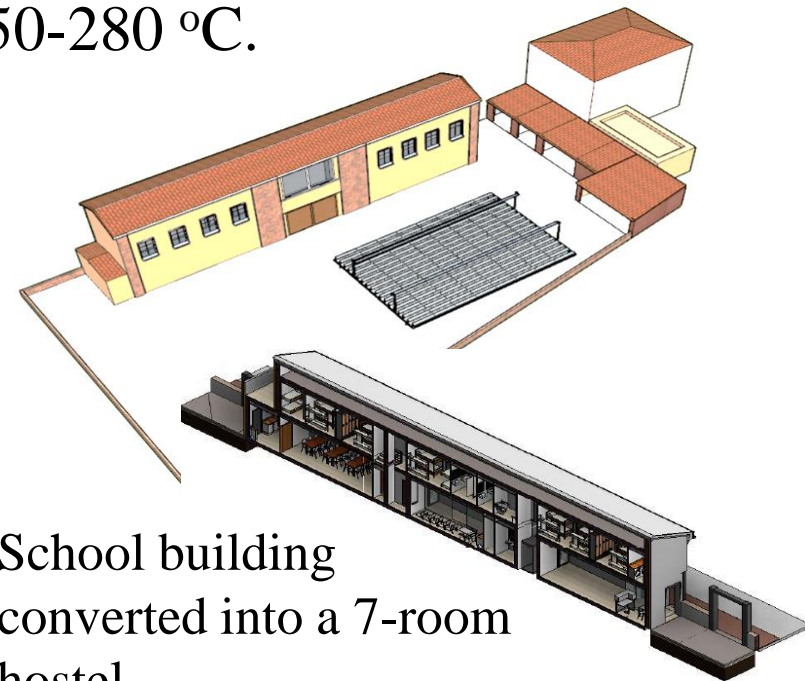


**Presenter:** Prof Khamid Mahkamov, Northumbria University, Newcastle upon Tyne, UK  
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*The overall objective* is to develop a 2-kWe/18-kWth solar CHP system for application in individual dwellings and small business residential buildings for onsite electricity and heat generation using solar thermal energy at temperature levels of 250-280 °C.

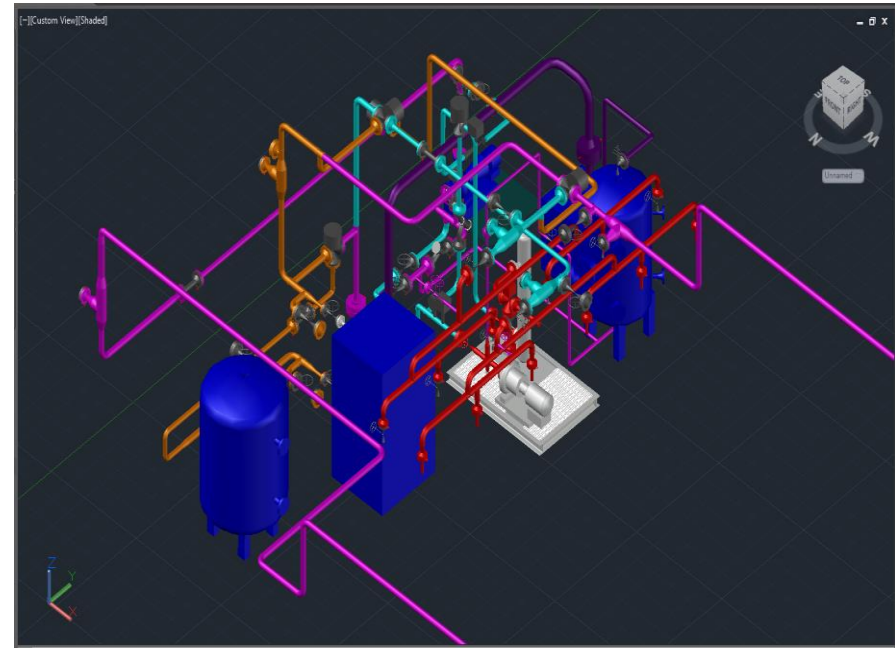
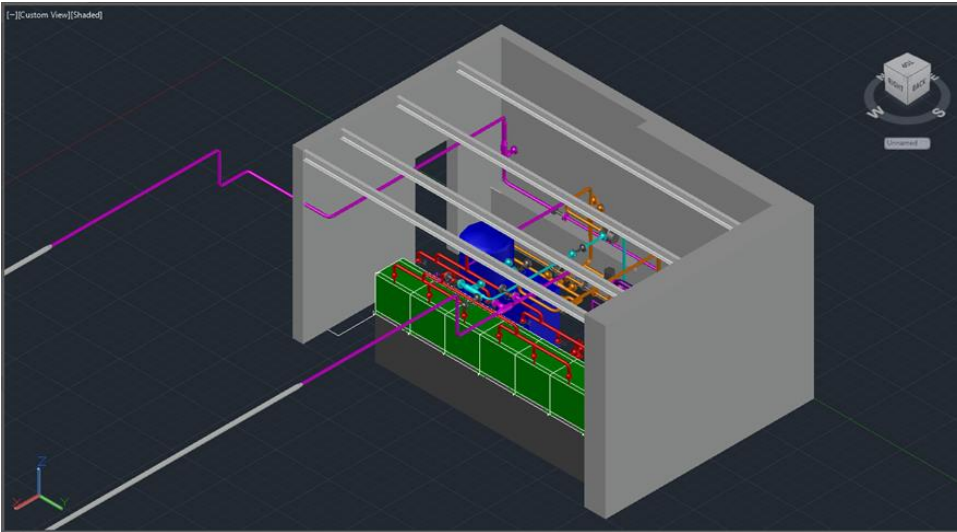


Schematic of the plant



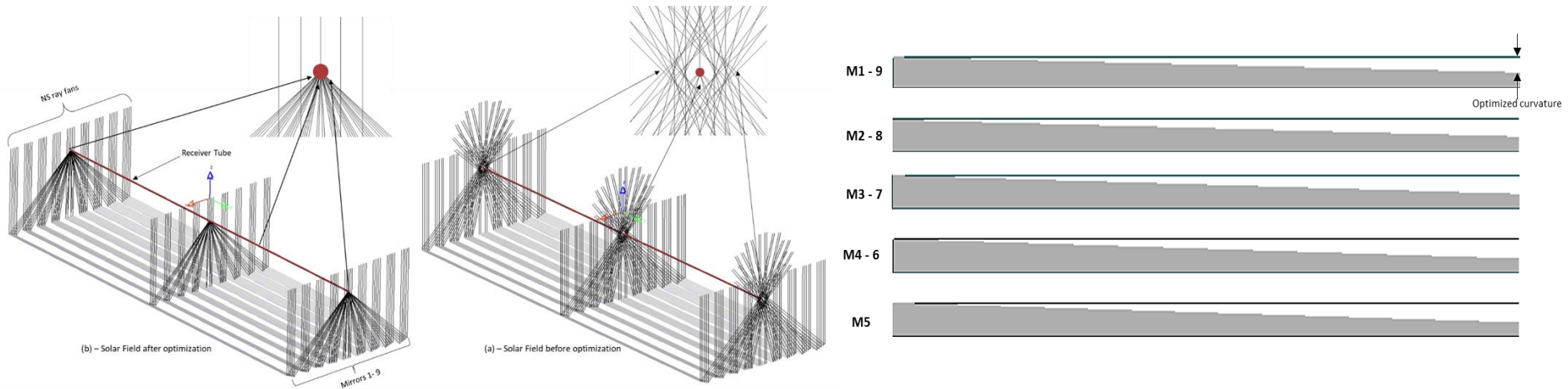
School building converted into a 7-room hostel

3-D plan of demo site

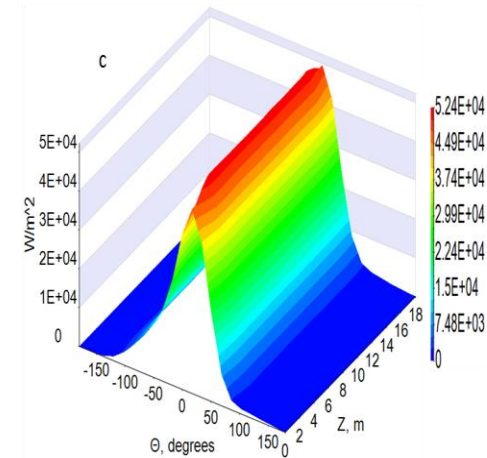
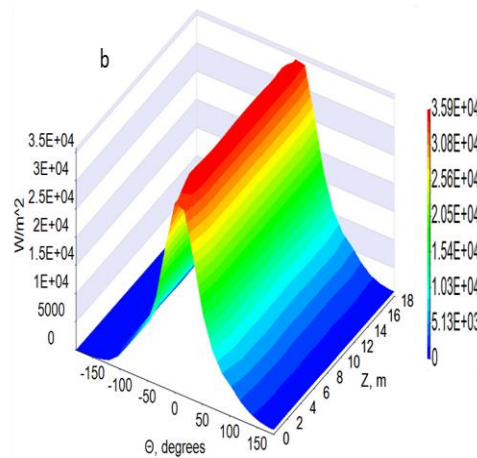
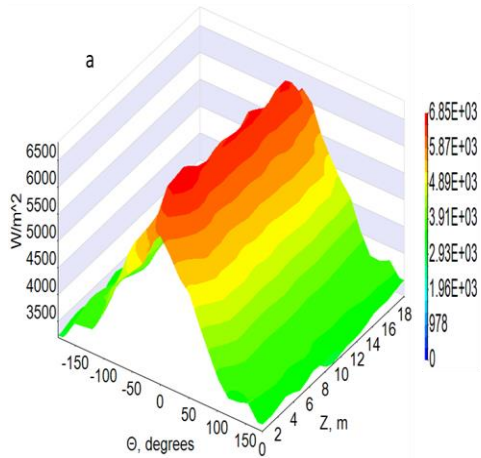


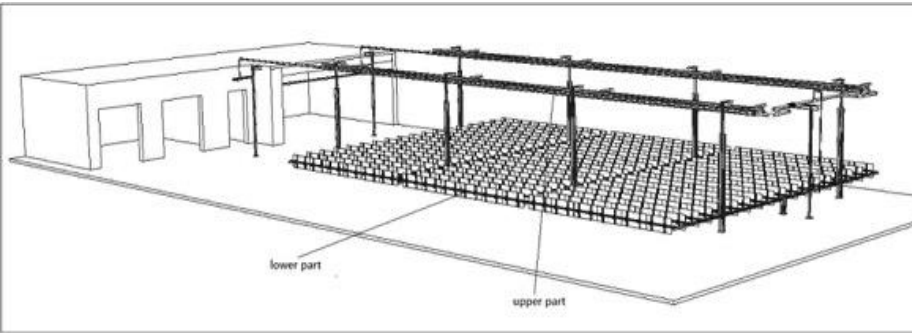
## 3-D design of complete engine room

# Solar Field – Linear Fresnel mirrors

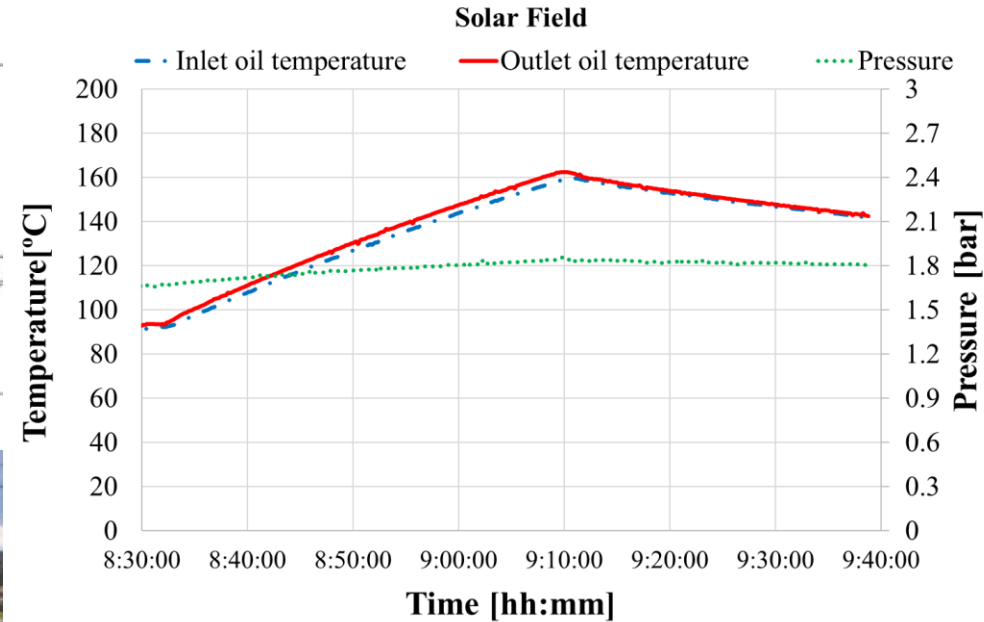


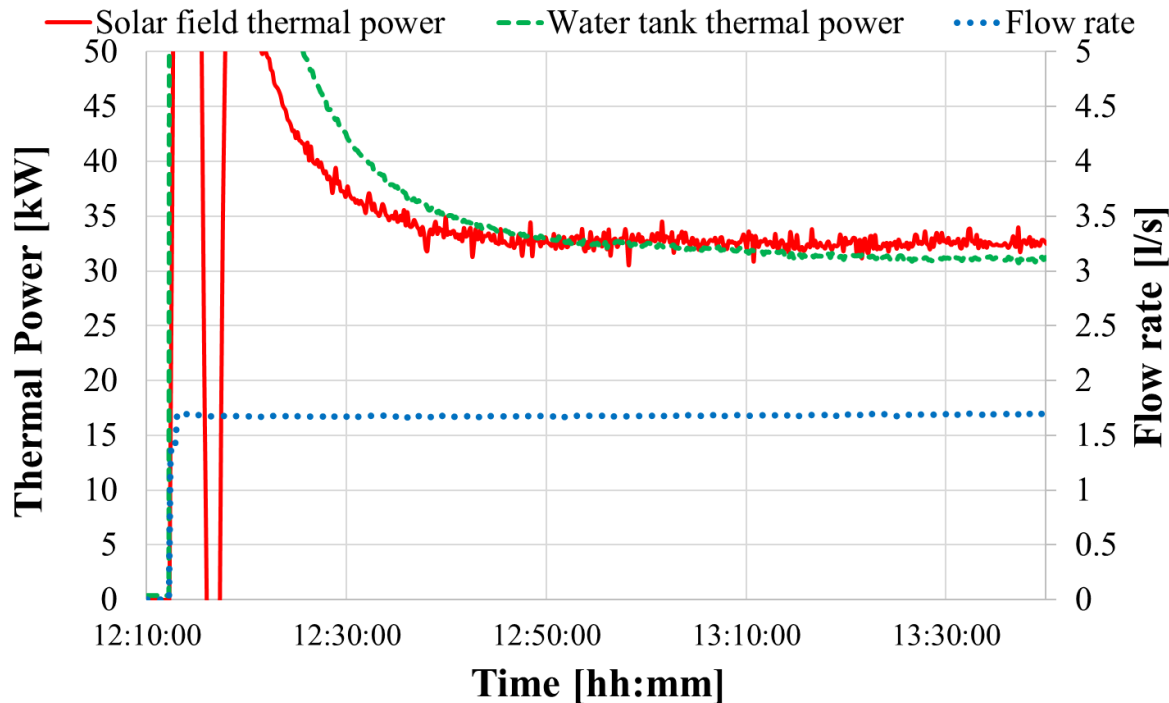
Record taken between 9 – 10 am





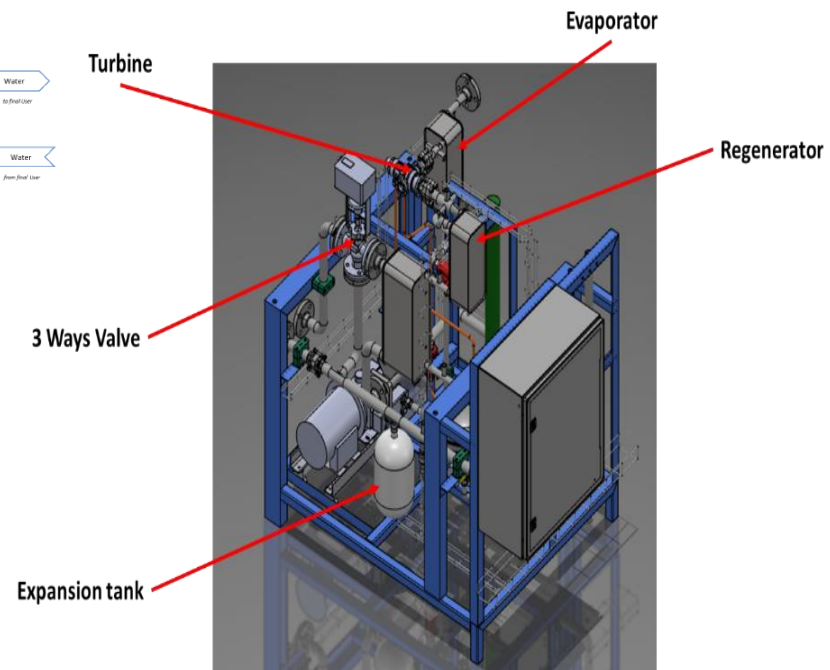
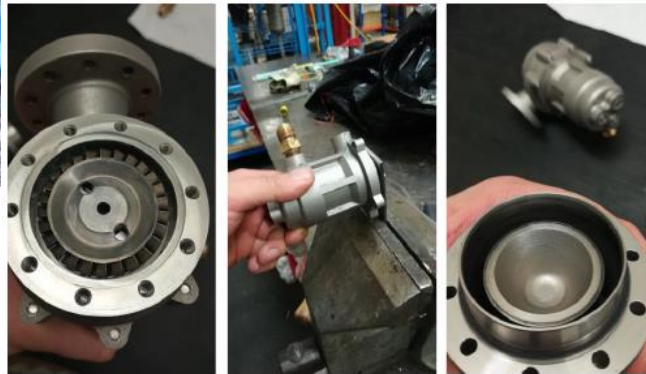
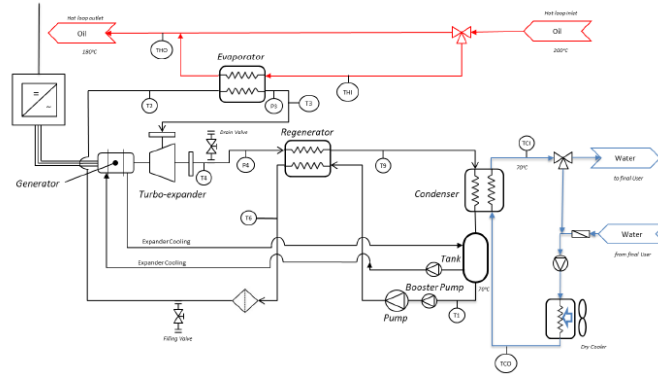
An appearance of the solar field on the demonstration site and its performance





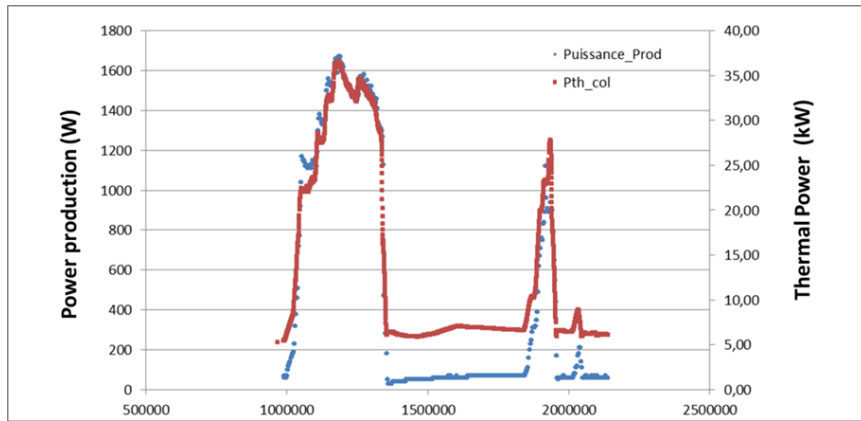
Thermal power supplied by the solar field and thermal power absorbed by the water tank. Tests performed on 6 May, 2019.

# ORC Unit

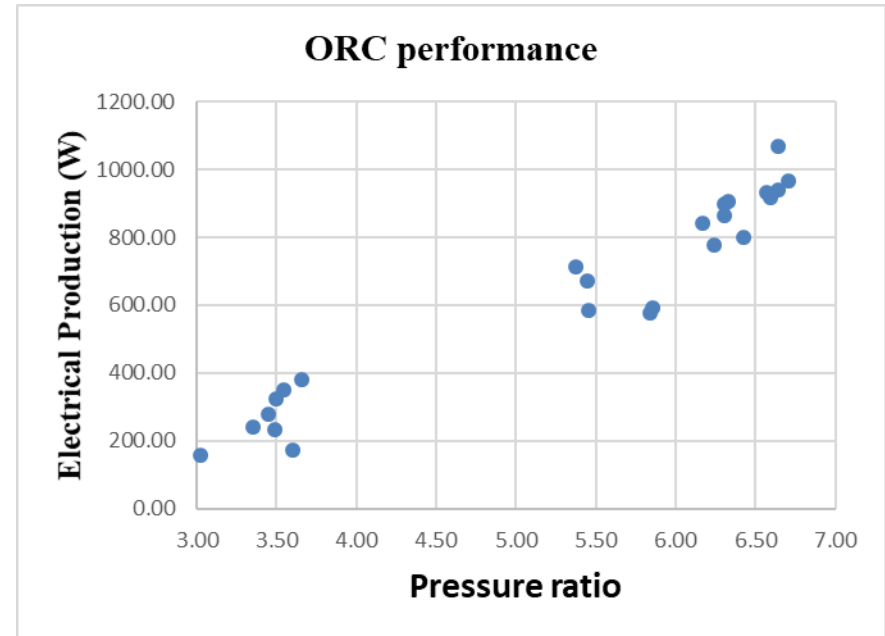


ORC turbine installed in the engine room and its schematic

# Experimental results with the operation of Organic Rankine Cycle turbine



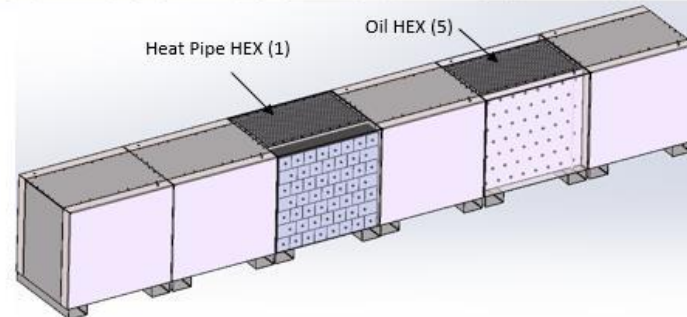
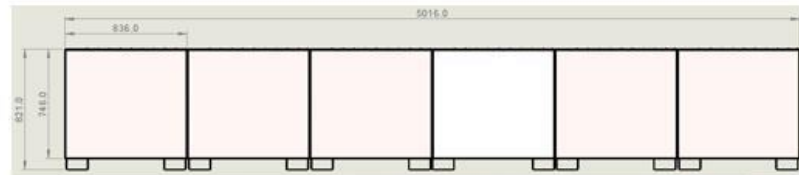
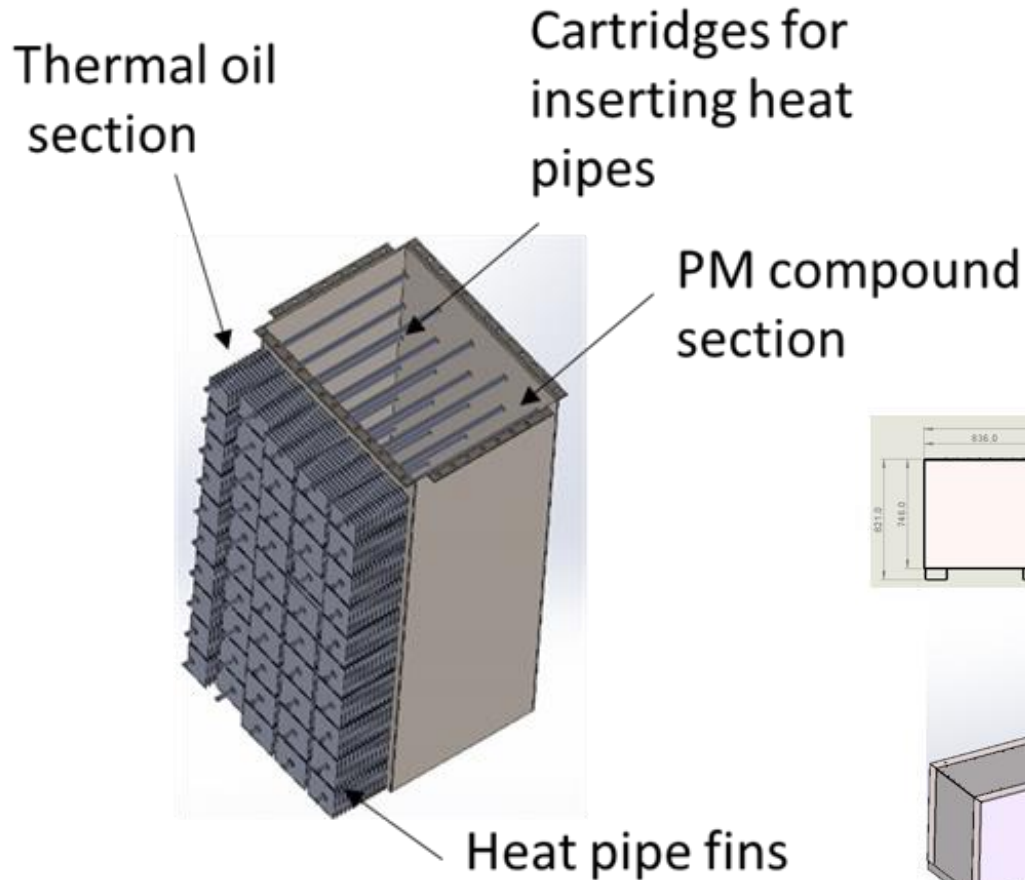
Laboratory tests

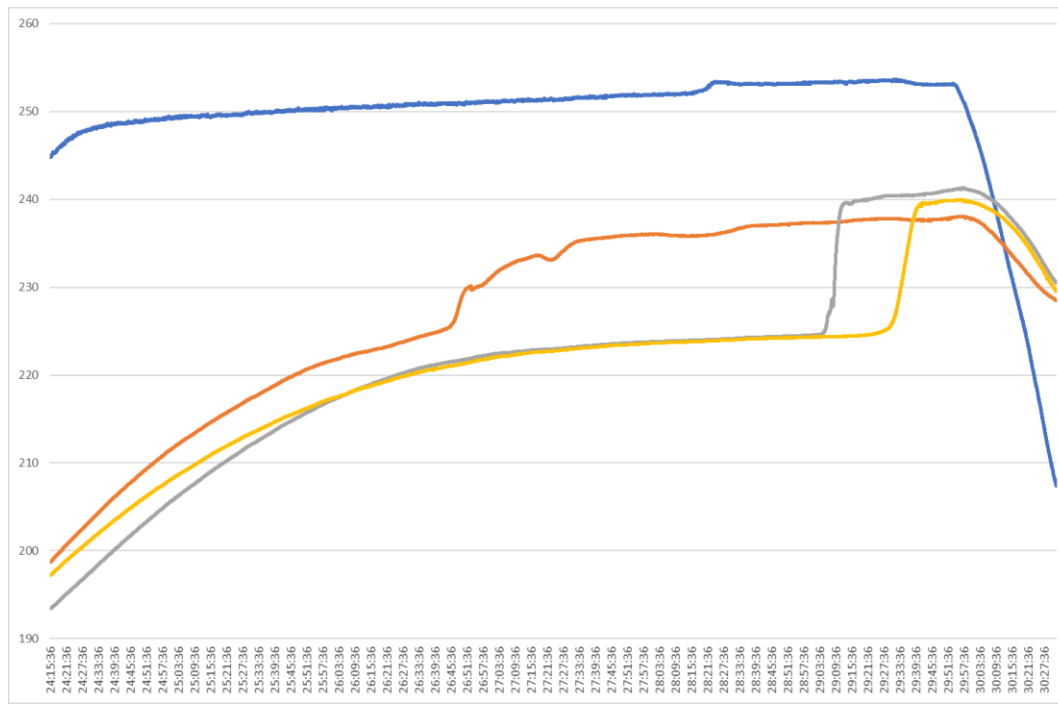


Field tests



# PCM Thermal Storage with reversible heat pipes



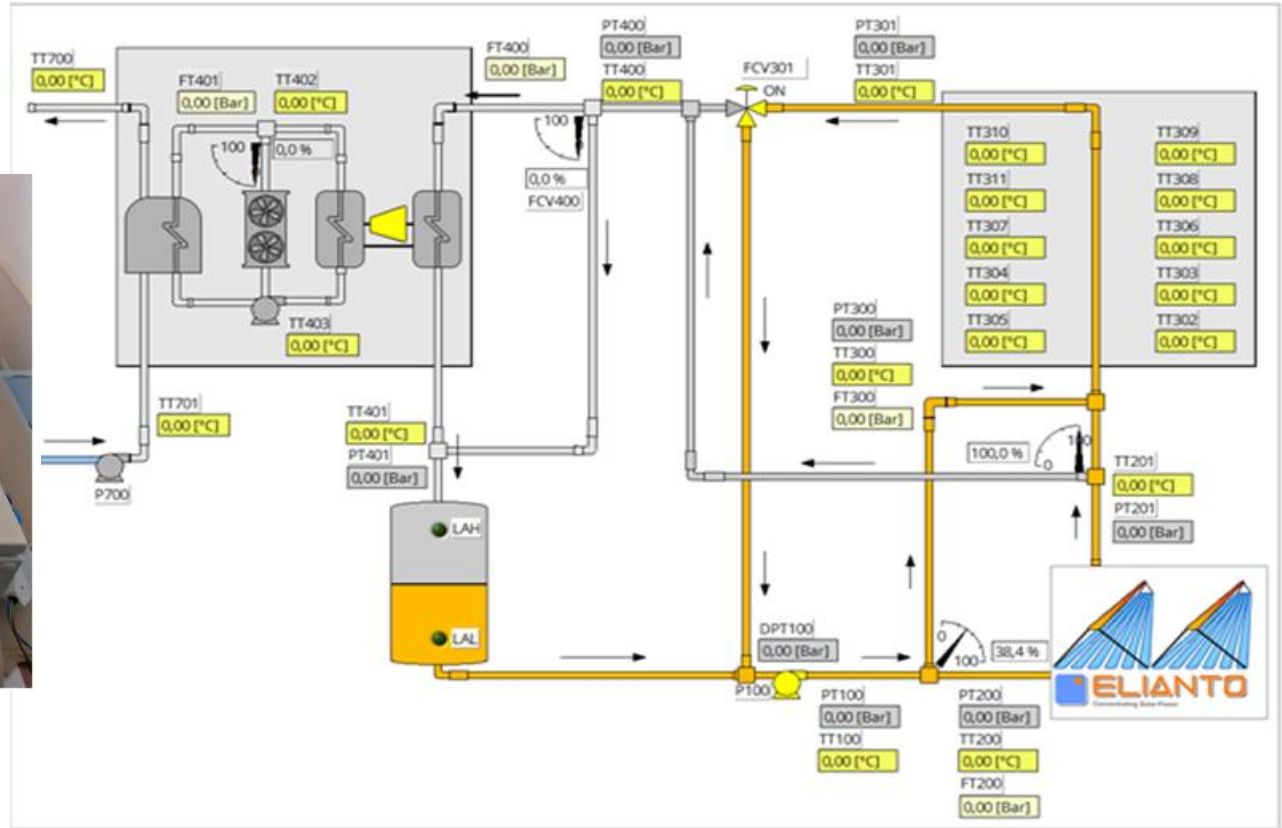


Testing a single module of TES with reversible heat pipes and selected PCM+5% wt T-graphite

# Central Control Unit



Electrical Cabinet



The operator's graphical interface for monitoring and controlling the plant