next-CSP

High Temperature concentrated solar thermal power plant with particle receiver and direct thermal storage

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Deliverable D5.4

WP5 – Testing of the complete high temperature solar and heat conversion loops including a gas turbine

Deliverable D5.4. Report on the complete loop characteristics and efficiency

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Introduction and objectives of D5.4

WP5 is devoted to the testing of the complete Next-CSP prototype that is composed of two loops coupled by a heat exchanger as illustrated in Figure 1. Consequently, the prototype can be tested sub-system by sub-system separately.

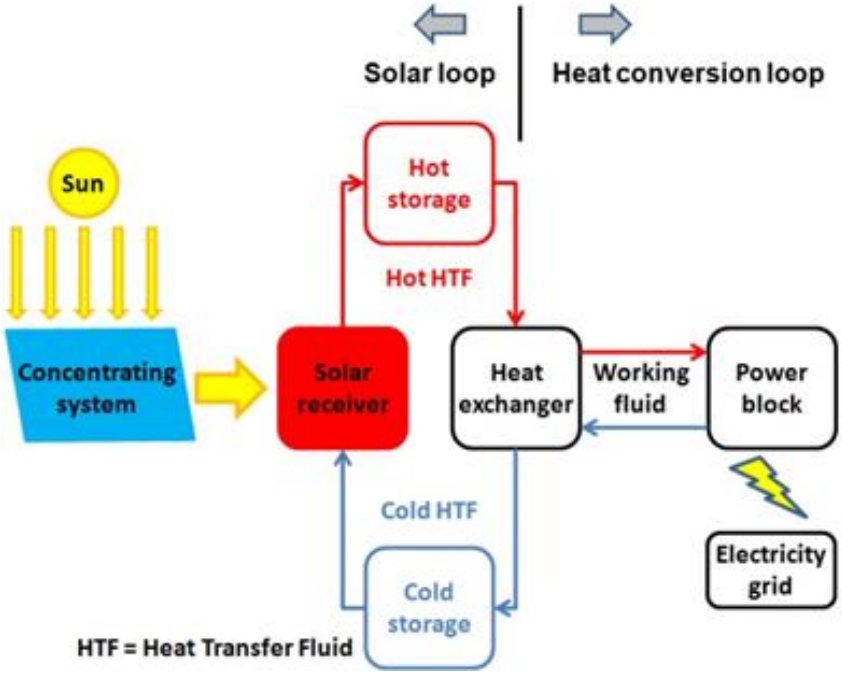

Figure 1. Schematic of the Next-CSP concept.

The test campaign was focused on the solar loop (the particle loop) sub-system due to the delay of the final assembly of the heat conversion loop (the gas turbine) caused by the Covid19 successive lockdowns and travel restrictions during the last 18-month period (More details in D5.3). Consequently, we had not the time to test the complete prototype before the end of the project. Accounting for this situation, this deliverable summarizes the critical steps of the prototype assembly, commissioning (steps linked to WP4) and testing that have been conducted under the responsibility of CNRS. The last paragraph describes the next steps envisioned.

Conclusion

Filling the unit with particles was long and fastidious due to the number of difficulties we faced. Solutions have been found, but CNRS was not able to perform all the necessary mechanical changes due to the size of the prototype. External suppliers and WEL did them. Execution delays imposed by the Covid pandemic restrictions resulted in the impossibility to achieve all the objectives of WP5. Nevertheless, the sum of experimental results and observations is unique and constitutes the basis for, (1) a first analysis of the system performance, (2) the definition of a future test campaign and demonstration project.