A Methodology to Identify the Most Promising Concentrating Solar Power Layouts to be Integrated with Supercritical CO_2 Power Cycles

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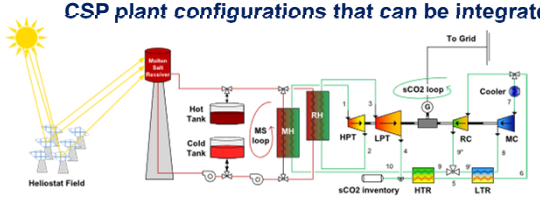
Introduction

The integration of compact and high-efficient sCO_2 power blocks has been identified as one of the key alternatives for enhancing the economic viability, and the flexibility of CSP plants.

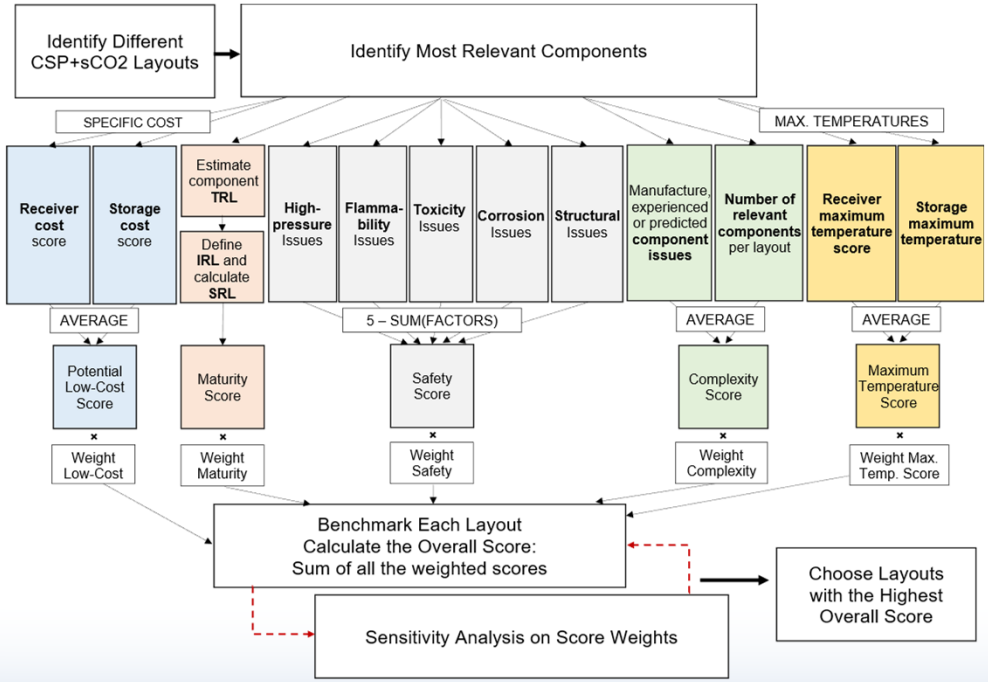
This work introduces a novel methodology to identify and select the most promising *CSP plant configurations that can be integrated with sCO2 power blocks.*



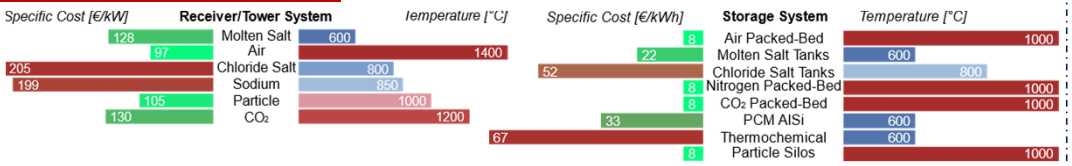
Several sCO2 – CSP connection layouts have been compared focusing on the following subsystems:

- Receiver/Tower Subsystem
- Thermal Energy Storage (TES)

Methodology

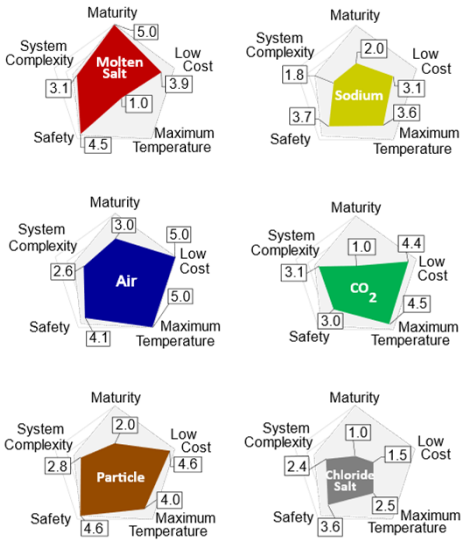


Assumptions

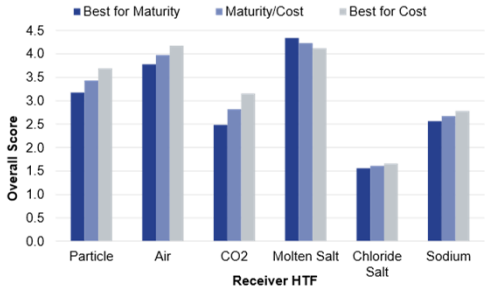


Results

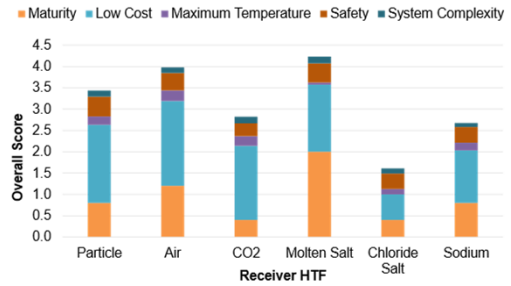
Intermediate scores of the layouts investigated classified by the receiver HTF



Sensitivity Analysis of the score weights



Overall score breakdown - Maturity/Cost



Conclusions

- **Molten salt**: best for maturity → first step towards a new generation of CSP plants
- **Air**/**Particle**: best for cost and temperature → can enhance the economic competitiveness of CSP plants thanks to their lower costs and better energy performances.
- Techno-economic models will be implemented for the most promising layouts here defined.

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