



SOLAR based sCO₂ Operating Low-cost Plants



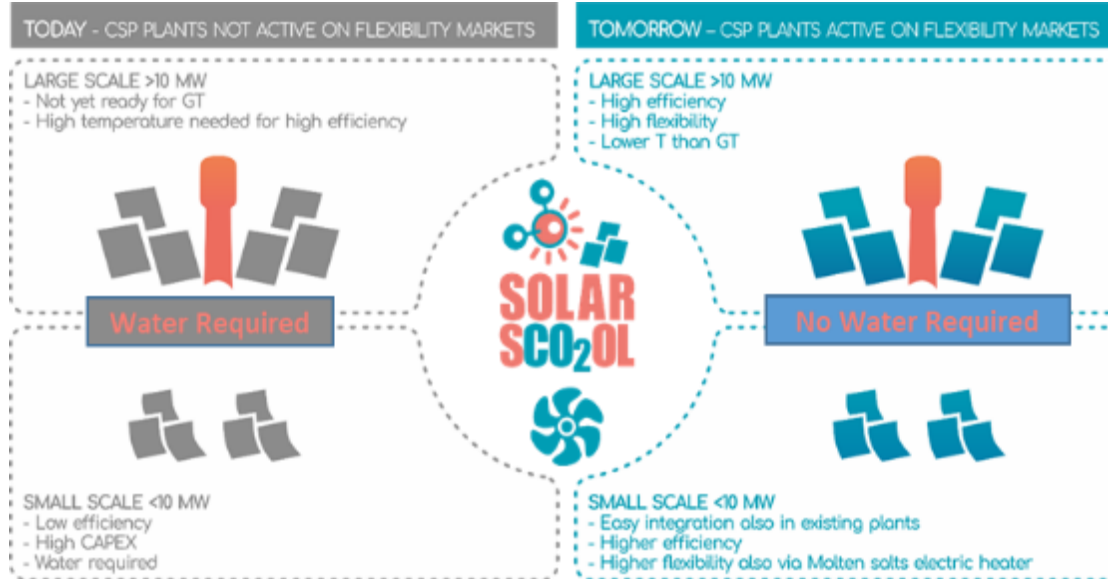
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No.952953

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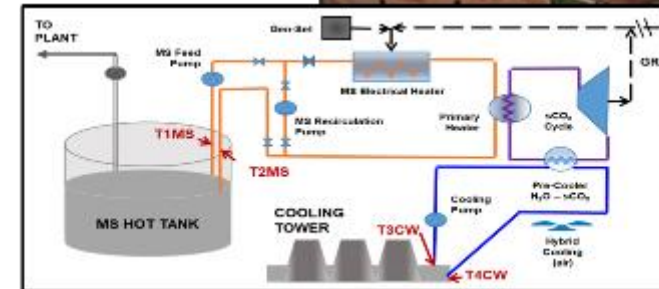


SOLAR based sCO₂ Operating Low-cost Plants

Tackling CSP and sCO₂ turbomachinery challenges in a demonstration to market project



Potential hybridization with PV too driving the electric heater



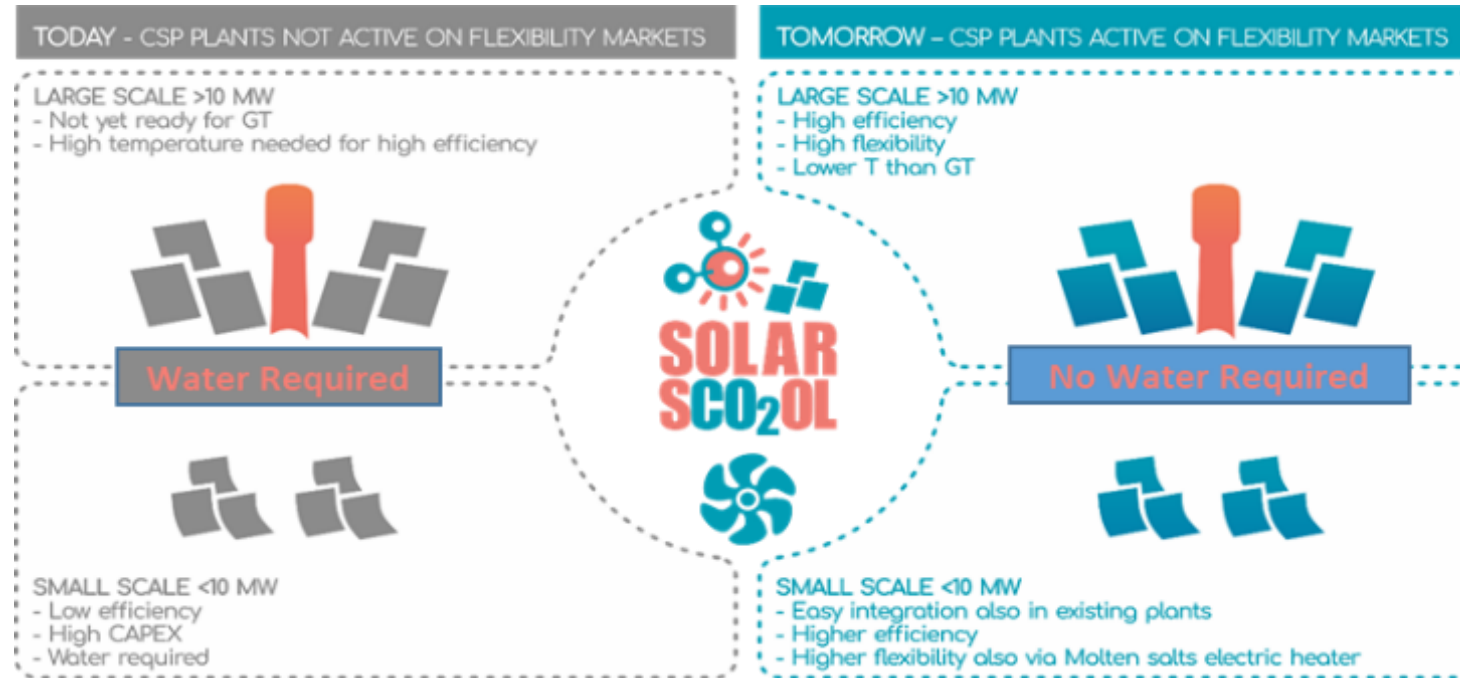
SOLARSCO2OL aims to become the EU MW scale FOAK CSP sCO₂ plant demonstrating sCO₂ potential for cheaper/more flexible CSP energy. In this way, the project will strengthen EU industrial leadership in both CSP and turbomachinery sectors.

TRL 8 – FOAK MW Scale – Reliable



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SOLARSCO2OL VISION



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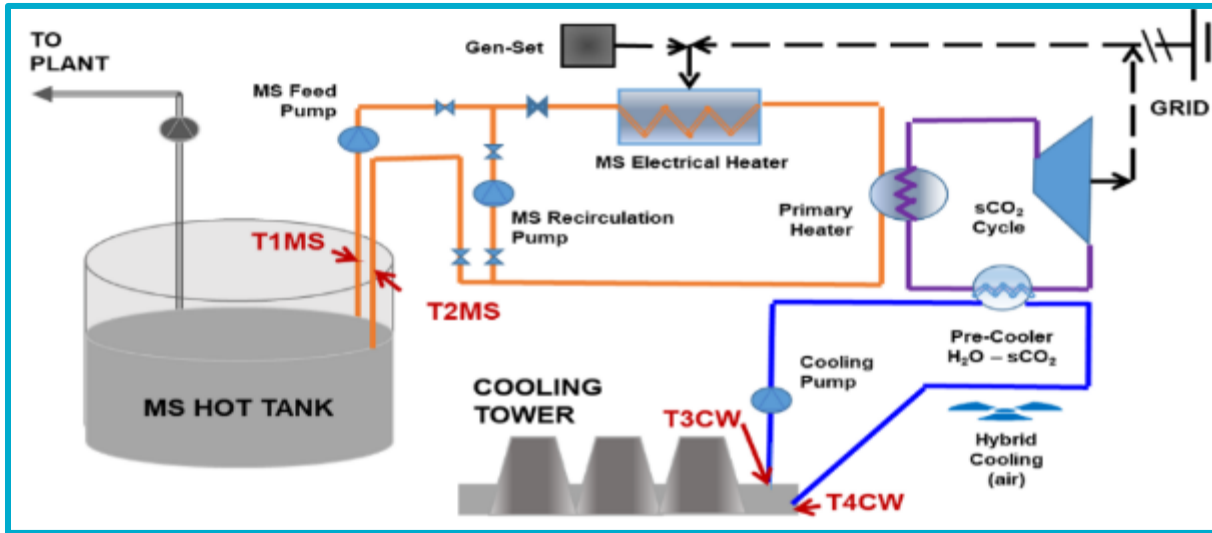
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SOLARSCO2OL DEMONSTRATION



Potential hybridization
with PV too driving the
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SOLARSCO2OL ABSTRACT AND KEYWORDS

SOLAR based sCO₂ Operating Low-cost Plants

According to JRC CSP platform, with an increased efficiency of component and price reduction, 11 % of EU electricity could be produced by CSP by 2050. In the EC energy strategy, CSP finds mention as a potential dispatchable RES thus increasing potential market/need for CSP if coupled with flexible, high performant and low CAPEX power conversion units. In this sense sCO₂ has been worldwide studied for several years as enabling technology to promote CSP widespread. SOLARSCO2OL presents sCO₂ cycles as key enabling technology to facilitate a larger deployment of CSP in EU panorama which is composed (also considering available surfaces and DNI) by medium temperature application (most of them Parabolic trough – T_{max} = 550°C) and small/medium size plants enhancing their performances (efficiency, flexibility, yearly production) and reducing their LCOE. Considering that compared to organic and steam based Rankine, sCO₂ cycles achieve high efficiencies over a wide temperature of range of heat sources with lower CAPEX, lower OPEX, no use of water as operating fluid (a plus for arid CSP plants area), smaller system footprint, higher operational flexibility, SOLARSCO2OL would like to demonstrate in Spanish La Africana parabolic trough CSP power plant, the first MW Scale EU sCO₂ power block operating in a real CSP plant. SOLARSCO2OL will capitalize previous EU expertise (SCARABEUS, sCO₂-flex, MUSTEC), bridging the gap with extra-EU countries R&D on these topics and studying different plant layouts also to enhance CSP plants flexibility to enable them to provide soon grid flexibility services. SOLARSCO2OL is driven by an industry oriented consortium which promotes the replication of this concept towards its complete marketability in 2030: this will be properly studied via scale up feasibility studies, environmental and social analysis encouraging business cases in EU (particularly in Italy and Spain as two of the most promising EU CSP countries) and Morocco thanks to MASEN.





SOLARSCO2OL OBJECTIVES



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SOLARSCO2OL OBJECTIVES

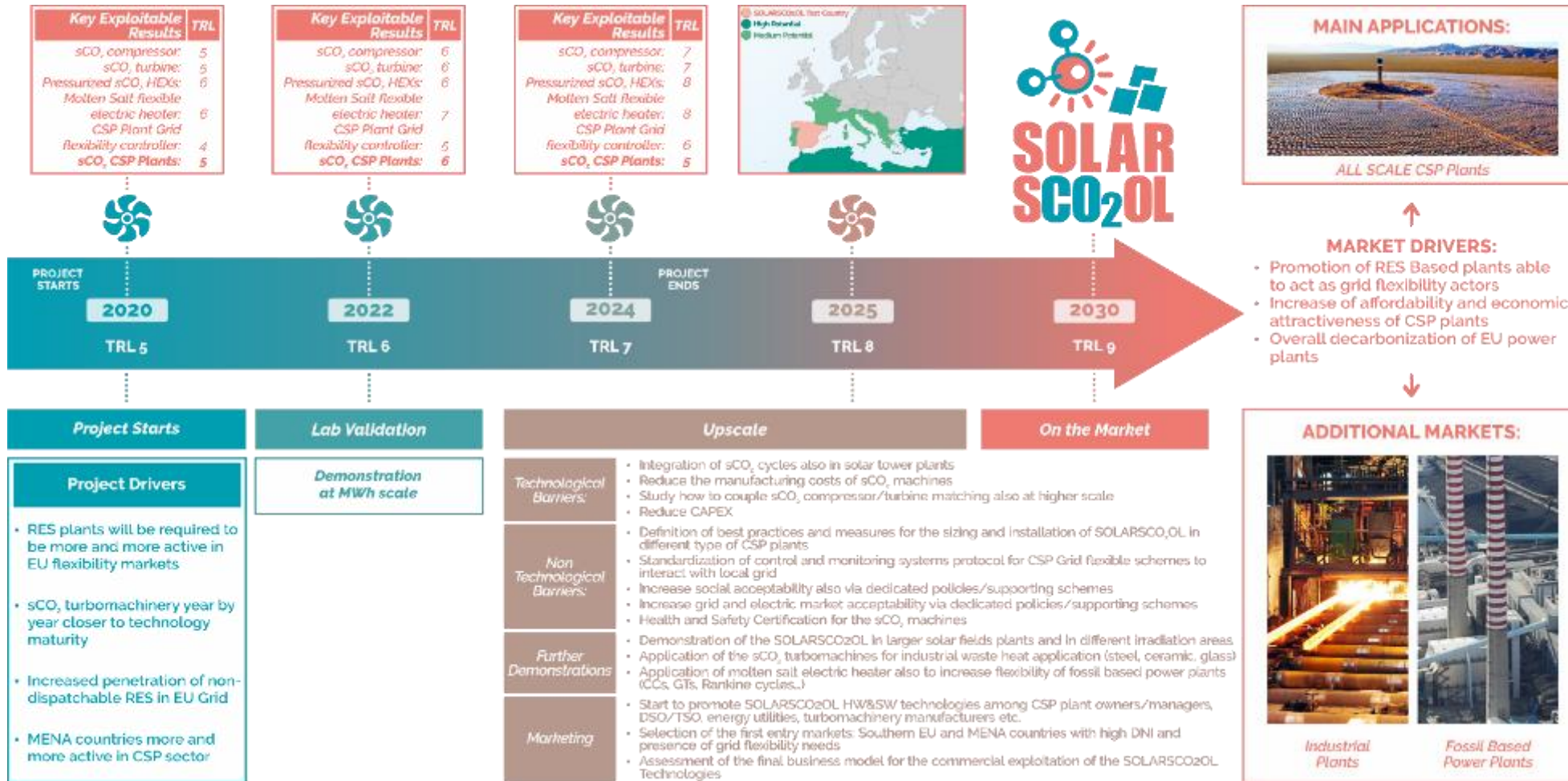
- **MO1:** Demonstrate at TRL8 a flexible FOAK sCO₂ CSP power plant (CAPEX, LCOE, Emission reduction and higher yearly efficiency): via experimental and thermoeconomics (WP1-WP4-WP6)
- **MO2:** Making sCO₂ turbomachinery able to operate with solar input (WP2-3)
- **MO3:** Integration of SOLARSCO2OL components via grid oriented advanced control systems (WP5)
- **MO4:** Demonstration of economic, safety and environmental sustainability of SOLARSCO2OL (WP6-WP7): multi impact assessment (socio-envi-economic) and replication studies
- **MO5:** Dissemination and Stakeholders Engagement at policy and industrial level (both “solar and turbomachinery sectors”)



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SOLARSCO2OL DEMONSTRATION TO MARKET



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SOLARSCO2OL CONSORTIUM



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An Industry Driven Consortium

This guarantees:

- Industrial and Market interest to project outcomes and marketability
- Facility to involve stakeholders
- Strong commitment to prototypes realization
- A common «project business» to be pursued made by «different actors' business»
- Ability to overcome contingencies





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