

SHARPsCO₂

Solar Hybrid Air-sCO₂ Power Plants



This project has received funding from the European Union's Horizon Europe research and innovation program under grant agreement No 101083899 and it is supported by UKRI with project No 10057823



Source: IMDEA energy

The Concept

SHARP-sCO₂ aims at developing a new generation of highly efficient and flexible concentrated solar power (CSP) plants. Keeping on working with CSP-sCO₂ cycles and investigating how to exploit air as operating fluid, SHARP-sCO₂ will enhance and validate novel enabling technologies in EU top level CSP labs, including receiver, thermal storage, sCO₂-air Heat Exchanger, electrical heater and piping and control system. SHARP-sCO₂ proposes a Multi-lab validation approach towards a more cost-efficient and flexible generation of hybrid CSP-PV plants leveraging on existing industrial/R&D partners' scientific and commercial know-how.



10 partners



36 months



7 countries

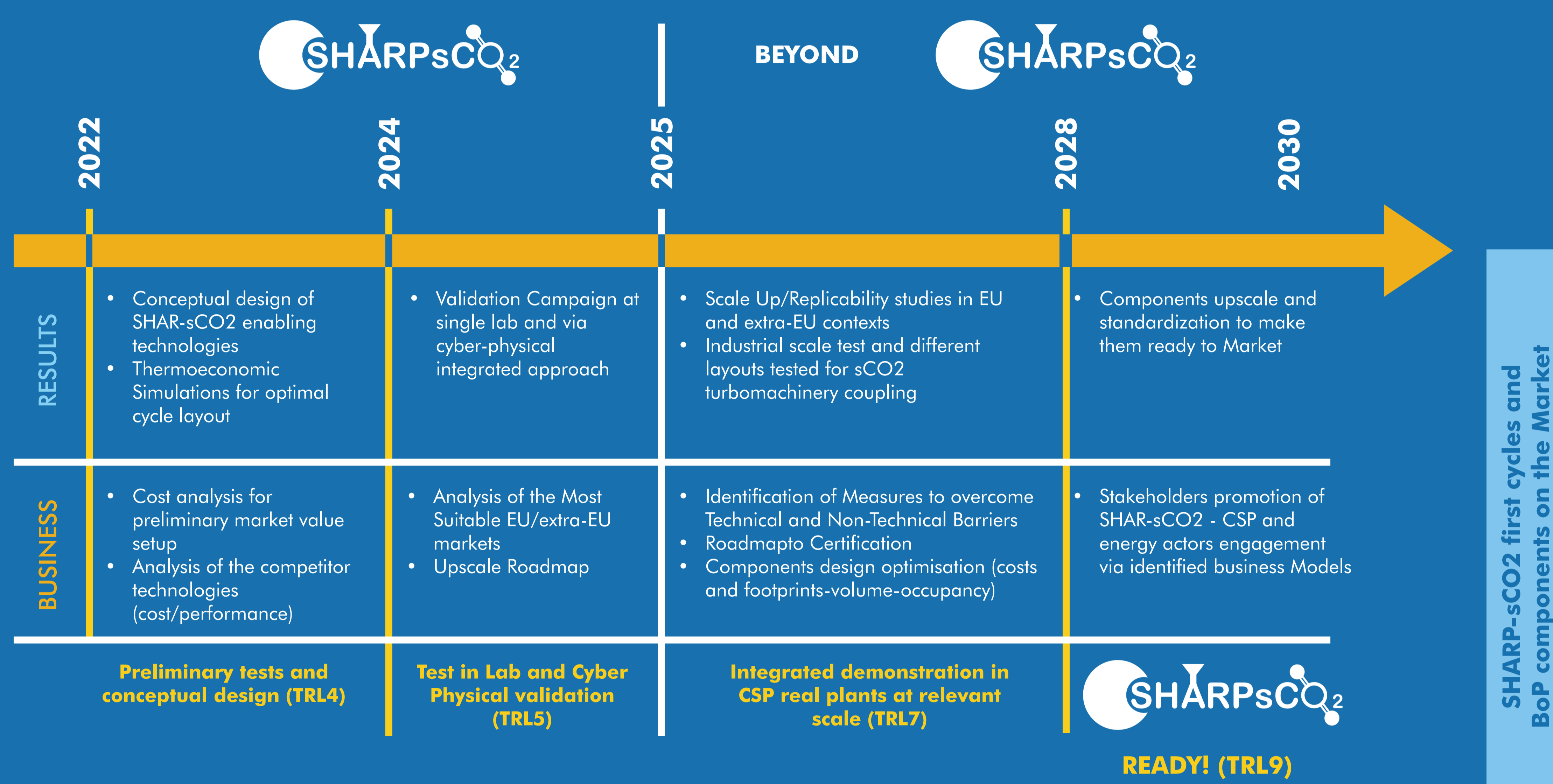


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Source: IMDEA energy

Timeline

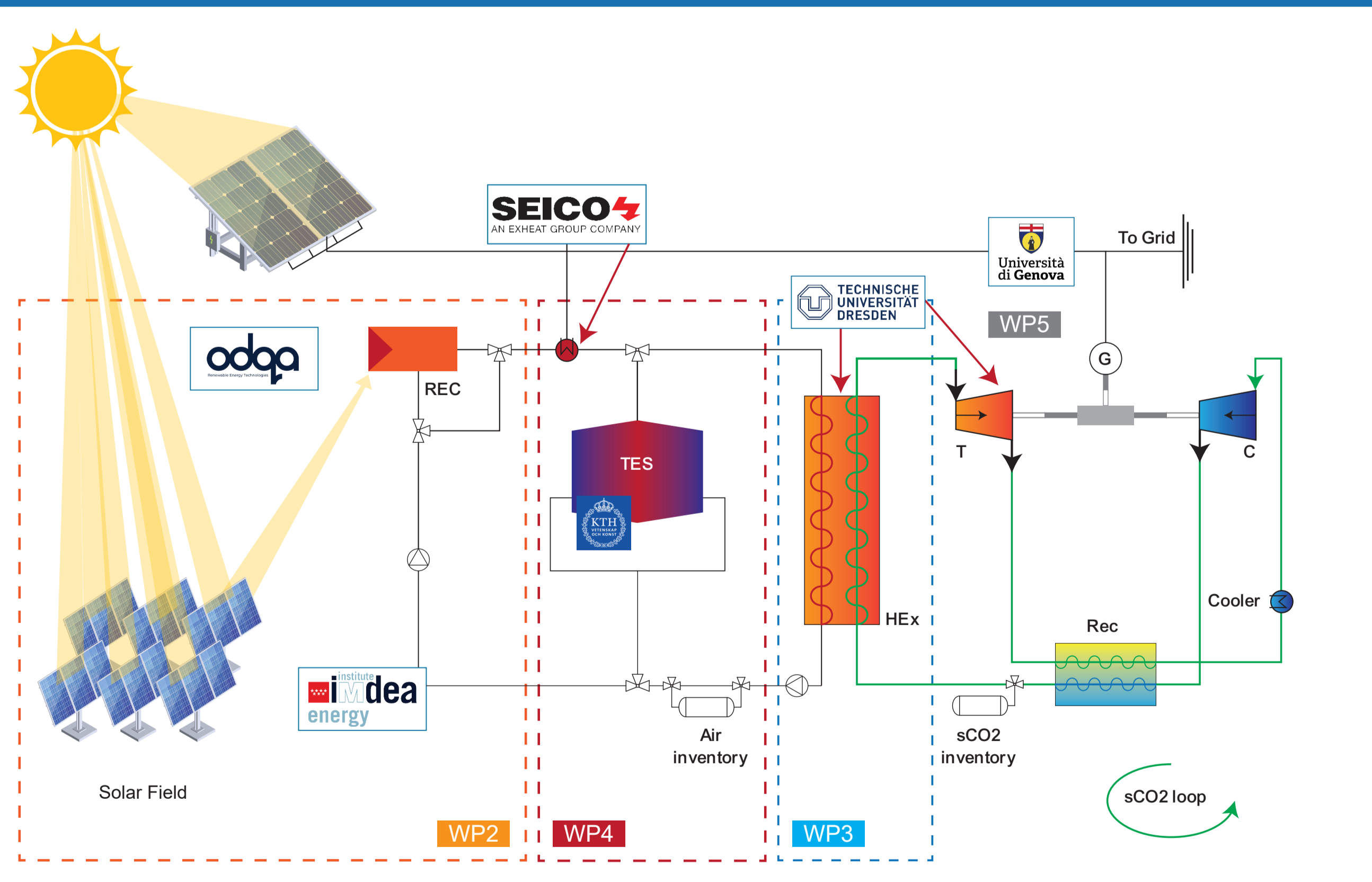


Technologies

Leveraging on a smart and integrated hybridization with PV, enabled by the development of an innovative electric heater, SHARP-sCO₂ will maximize the production, exploiting PV affordability while counting on the unique energy storage capabilities of CSP plants via thermal media.

KEY INNOVATIONS

- Novel air receiver able to reach 1000°C and 4 MW/m²
- Novel electric heater for packed beds/air systems
- Novel radial packed bed TES optimized for slag and waste
- New air to sCO₂ Heat Exchanger design for CSP and waste recovery
- Dynamic simulator of air-sCO₂ CSP plants
- Techno-economic model of new hybrid PV-air CSP plants



Expected Impact

SHARP-sCO₂ gives an innovative contribution to the evolving CSP technology aiming at:

- Fostering a higher shares of variable output renewables in the energy system
- Developing future, higher-efficiency CSP plants
- Reducing the levelized cost of electricity of future CSP plants
- Developing significant performance regarding start-up, shutdown and load variation of future CSP plants
- Improving environmental profile of future CSP plants



Source: IMDEA energy

The Consortium

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SHARP-sCO₂ Project

