

Solar Hybrid Air-sCO2 Power Plants



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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



2 385 240.75

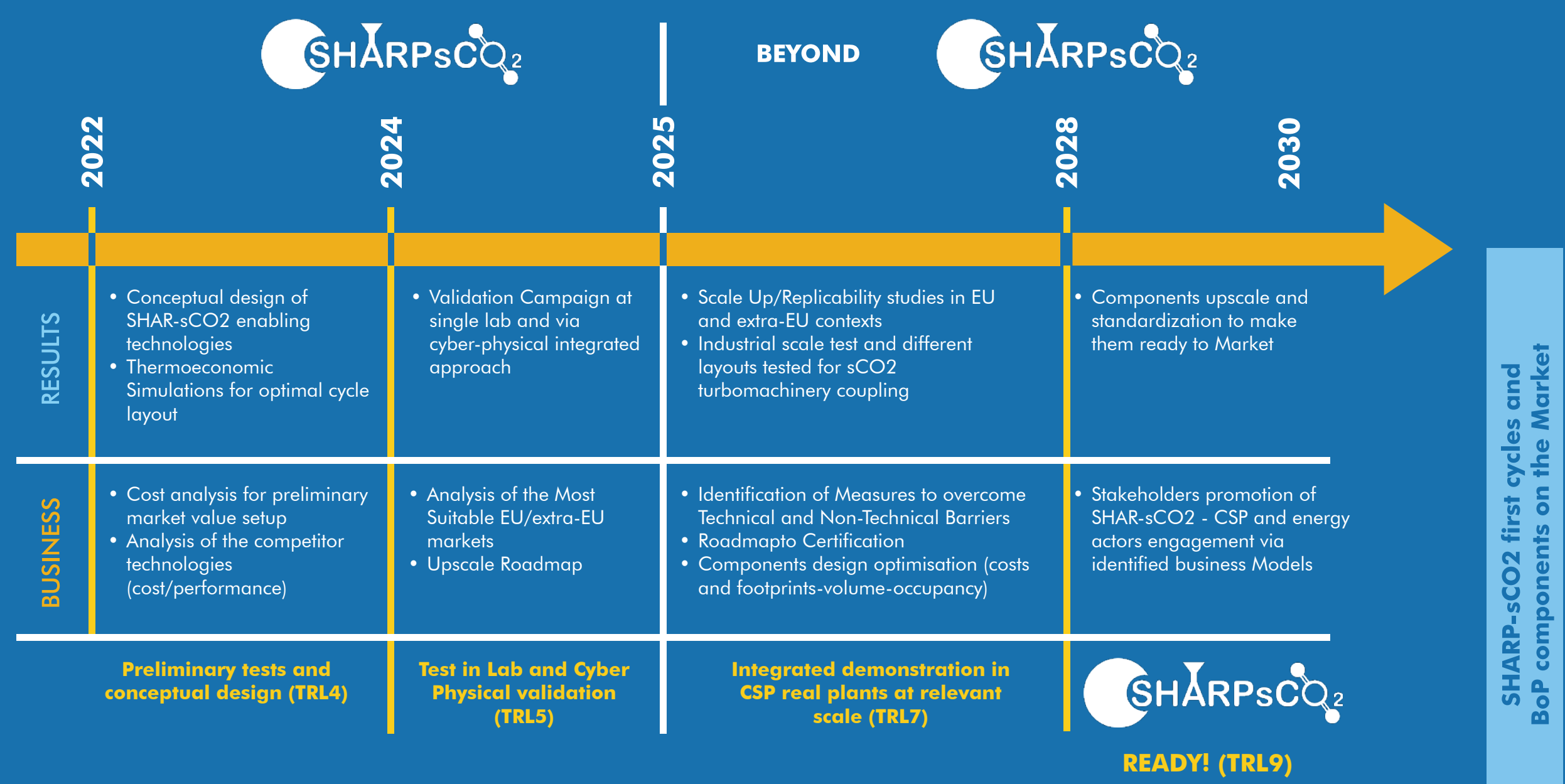


Source: IMDEA energy



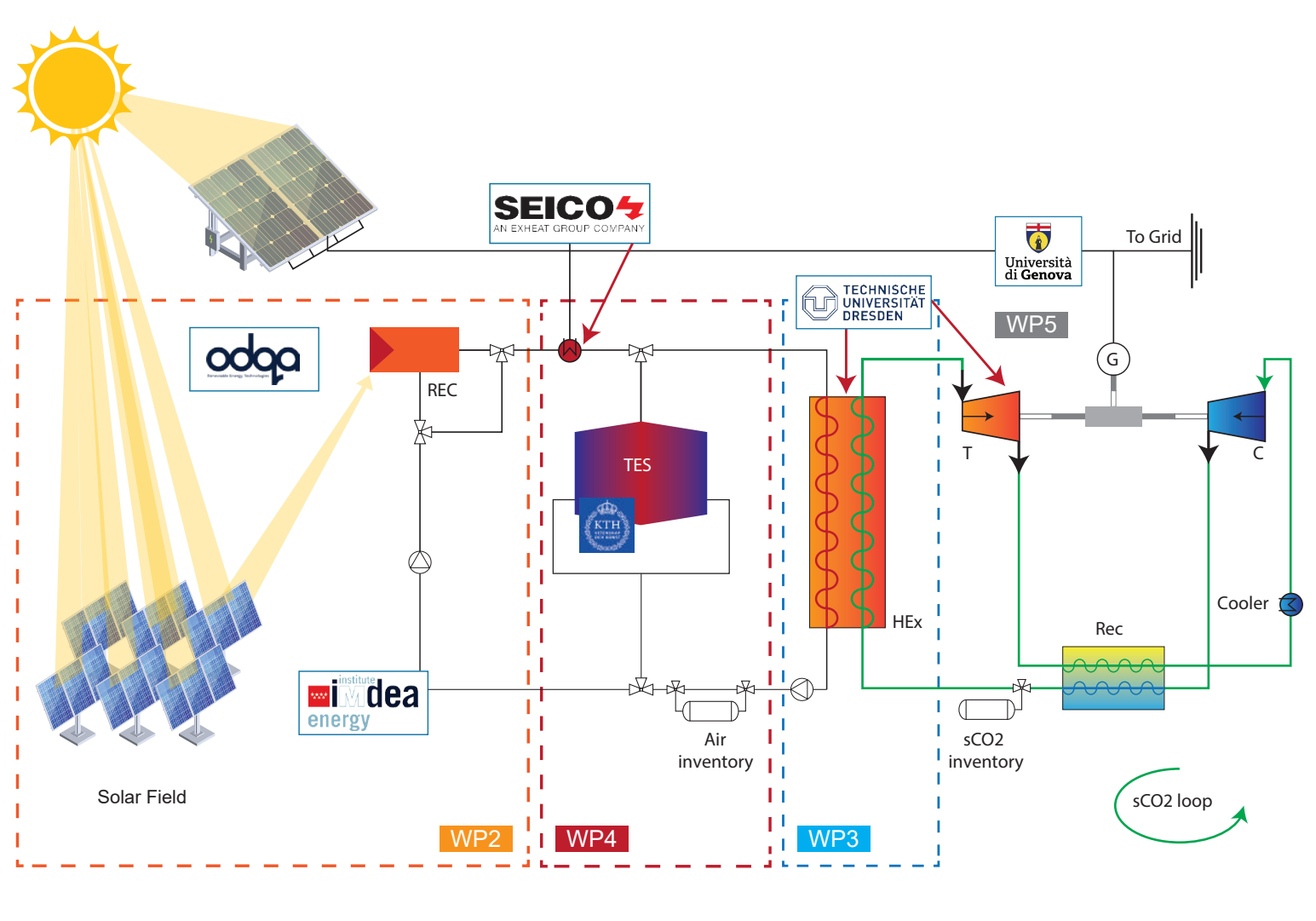
Source: IMDEA energy

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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