

# 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

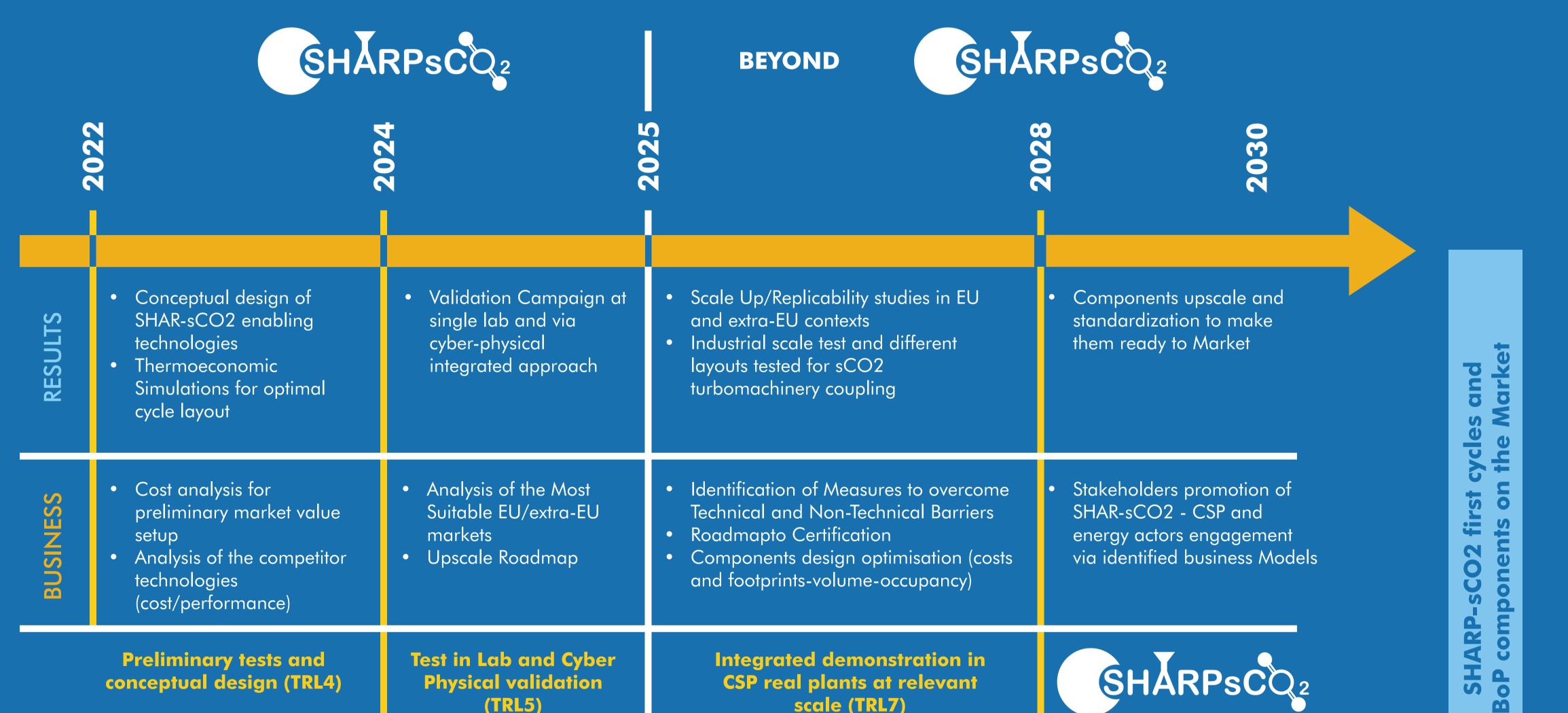


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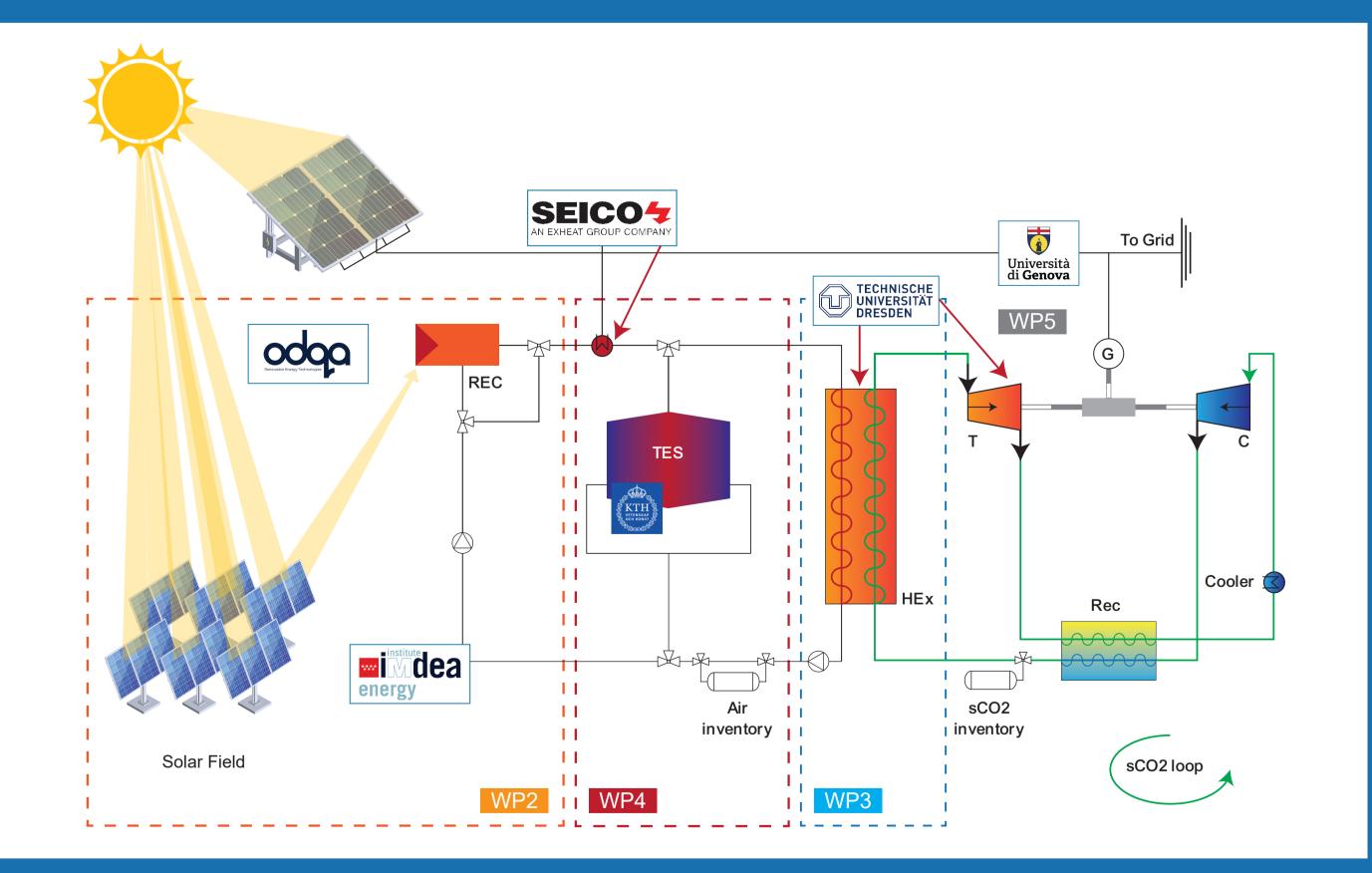
BUSINESS	<ul> <li>Cost analysis for preliminary market value setup</li> <li>Analysis of the competitor technologies (cost/performance)</li> </ul>	<ul> <li>Analysis of the Most Suitable EU/extra-EU markets</li> <li>Upscale Roadmap</li> </ul>	<ul> <li>Identification of Measures to overcome Technical and Non-Technical Barriers</li> <li>Roadmapto Certification</li> <li>Components design optimisation (costs and footprints-volume-occupancy)</li> </ul>	• Stakeholders promotion of SHAR-sCO2 - CSP and energy actors engagement via identified business Models
	Preliminary tests and conceptual design (TRL4)	Test in Lab and Cyber Physical validation (TRL5)	Integrated demonstration in CSP real plants at relevant scale (TRL7)	SHÅRPsCQ2
				READY! (TRL9)

### 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





### The Consortium

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