Project Duration: **4 years**
(Oct 2020 – Sept 2024)

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Project Coordinator:

RINA

Project Partners:

mas

lointek

Baker Hughes

SEICO AN EXHEAT GROUP COMPANY

ABENGOA

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KTH VETENSKAP OCH KONST

masen endless power for progress

FRANCO TOSI MECCANICA

Magtel

ikerlan MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

UNIVERSITÀ DEGLI STUDI DI GENOVA

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS

ESTELA European Solar Thermal Electricity Association

CONTACT COORDINATOR
RINA Consulting S.P.A.
VIA CECCHI 6
16129 GENOVA, Italy

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SOLAR sCO2OL

SOLAR BASED sCO_2 OPERATING LOW-COST PLANTS

INTRODUCING SOLARSCO2OL

SOLARSCO2OL is a EU H2020 funded project aiming at developing an innovative, economically viable and easily replicable supercritical CO_2 (sCO_2) power block for demonstrating the use of sCO_2 cycles as a potential key technology to increase the flexibility of concentrated solar power (CSP) plants. This will reduce their Levelised Cost of Electricity (LCOE) to values below 10 c€/kWh in Europe and promote an innovative power plant cycle layout not requiring water.

The innovative SOLARSCO2OL plant layout, coupled with fast-reactive electric heaters and efficient heat exchangers (HEXs), will enable the operation and design of novel integrated CSP plant layouts.

SOLARSCO2OL KEY OBJECTIVES

Flexibility & Efficiency

Increase the operational flexibility and efficiency of existing and future CSP plants by using sCO_2 power cycles able to be operated at temperature levels achievable by state-of-the-art concentrators, thereby also eliminating the use of water in the power cycle.

Cost-Competitiveness

Use novel sCO_2 plant designs for generating solar thermal electricity in a more cost-competitive way.

Sustainability

Help unlock the potential of CSP in Europe and worldwide to reach decarbonisation targets.

PROJECT GOALS

A first-of-a-kind, MW-scale sCO_2 cycle, operating in a real CSP plant

The SOLARSCO2OL project will realise a first-of-a-kind MW-scale sCO_2 power cycle operating with molten salts in an existing CSP plant facility. The project will also study its replication potential in solar tower plants, supported by MASEN and Abengoa, thus unlocking the strong replication potential in EU and worldwide.

Unlocking the potential of integrating sCO_2 in all kinds of CSP plants in EU and worldwide

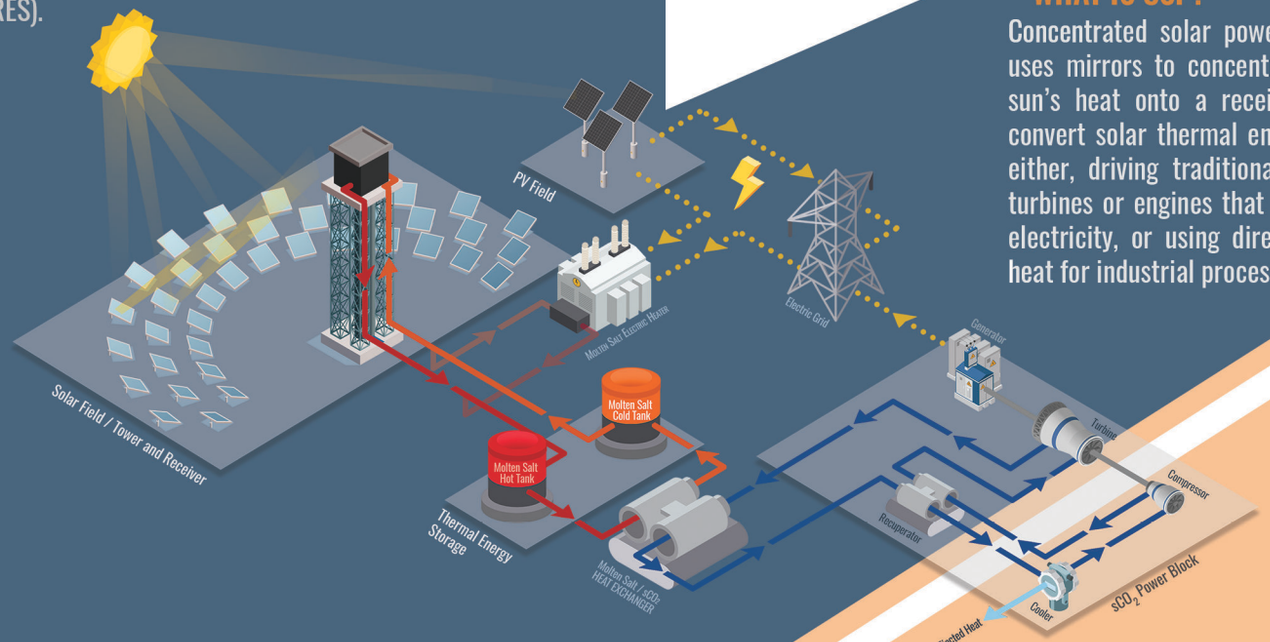
SOLARSCO2OL pursues unlocking the potential of integrating sCO_2 in all kinds of CSP plants, towards higher efficiency and higher responsiveness to grid flexibility requests, thus demonstrating them on the field and planning next steps towards technical maturity and marketability within 2030, also studying sCO_2 application in other market segments (industrial application, waste heat, other thermal RES).

WHY SCO_2?

Making next-generation CSP plants more cost-competitive

sCO_2 power cycles can perfectly operate CSP current temperatures, producing power with higher efficiency if compared with Rankine cycles traditionally used in CSP plants and without using water as operating fluid. sCO_2 power cycles have a large room for cost reduction and also considering their reduced required volume/size footprint.

In this sense, as heat exchangers can comprise up to 60%-70% of the total cost of a CSP sCO_2 power cycle, a relevant attention has to be put on this topic. So, a new design with fast-reactive electric heaters (that would also enable PV hybridization of the CSP plant) and efficient heat exchangers (HEXs), can help sCO_2-CSP plants become more cost-competitive.



WHAT IS CSP?

Concentrated solar power (CSP) uses mirrors to concentrate the sun's heat onto a receiver and convert solar thermal energy for either, driving traditional steam turbines or engines that produce electricity, or using directly the heat for industrial processes.