NEWSLETTER | N°1 | NOVEMBER 2023

Progress of the project over the initial 12 months

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Words from the coordinator

On behalf of the SUNSON consortium, I'm delighted to introduce our inaugural newsletter. Throughout our first year, the project partners have shown dynamic and productive collaboration. We've had the privilege of meeting in person on two occasions, first in Brussels, and later in Trondheim, Norway. In addition, we successfully organized our first workshop in collaboration with our sister project, THERMOBAT.

Over the past year, the project has achieved significant milestones. Notably, we've defined the technical demonstrator specifications, and completed the conceptual design and preliminary modeling of the overall system. These milestones serve as the foundation for our ongoing activities, which focus on developing innovative optics, phase change materials, and thermophotovoltaic devices, along with the development of an AI-integrated tool designed to predict the scalability of SUNSON innovations.
Our collective efforts are aimed at creating the world's highest-temperature concentrated solar power (CSP) unit, integrating thermal energy storage and solid-state energy conversion. With this breakthrough, we expect to contribute to the production of a environmentally friendly, cost-effective and efficient solution for dispatchable solar power generation.

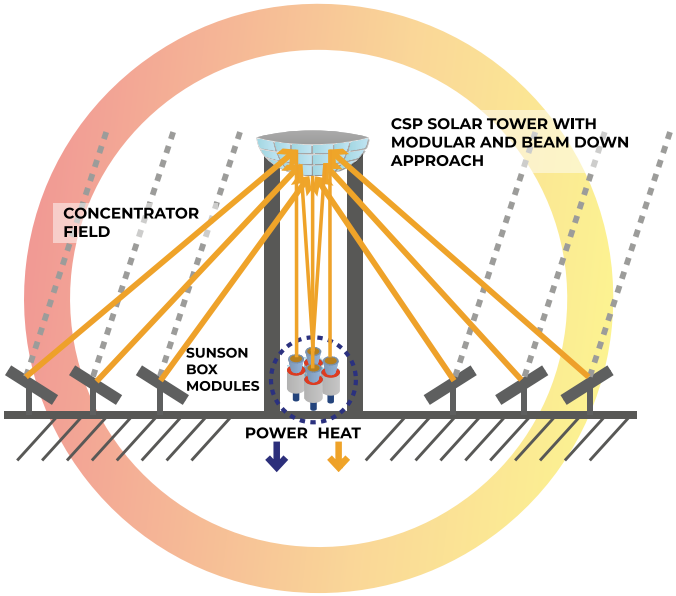
We sincerely appreciate your continued support and interest in the SUNSON project.

Warm regards.

Alejandro Datas

Follow us!

@SunsonProject **@sunson-project**

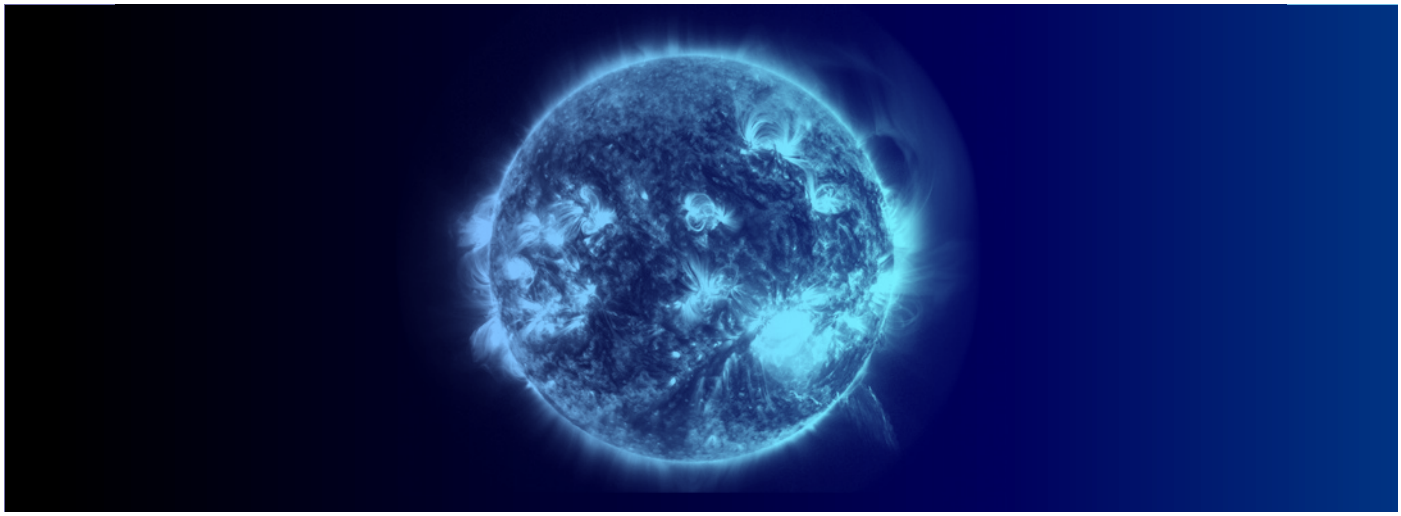


What is SUNSON?

"Sun's Son" aims to store solar energy with temperatures in excess of 1200ºC. This is more than twice the operating temperatures of current concentrated solar power (CSP) plants. The project aims to promote a new generation of highly compact and efficient CSP plants in order to create a more flexible renewable energy sector. To meet this challenge, the proposed solution combines solar concentrators with advanced optics, advanced phase change materials (PCMs) for thermal storage, and thermophotovoltaic converters for electricity generation in a single system.

Our mission

SUNSON outcomes pursue a technological breakthrough in compact Concentration solar power and Renewable Energy Sources conversion to generate electricity with a modular and scalable approach to increase its efficiency and cost-effectiveness. Operating at ultrahigh temperatures (>1200ºC) provides higher efficiency ratios in converters and it is of particular interest for latent heat storage systems, as they offer up to 10 times the storage capacity of current molten salt-based storages at arround 600ºC, resulting in a decrease of 10 times the overall system size and reducing the scale-size associated costs.



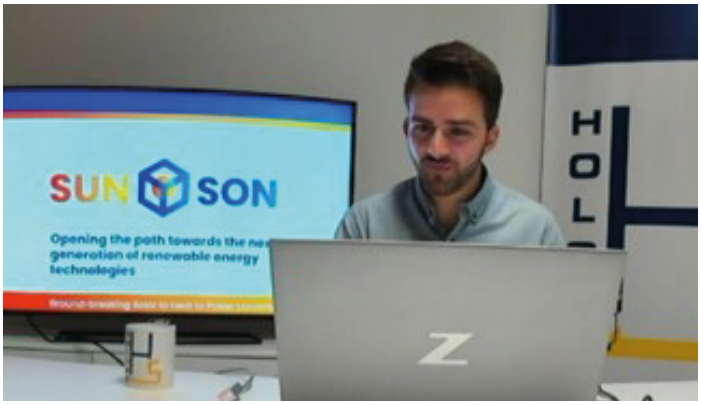
SUNSON´s progress this year

- 8 Deliverables submitted on time (3 of them Public and available on CORDIS platform).
- 2 consortium meetings (Brussels and Trondheim), including a workshop with our sister project THERMOBAT.
- SUNSON-BOX conceptual design, pre-dimensioning, CAD documentation, and preliminary operation assessment established by the technological partners (UPM, PSA, IONV).
- Simulation of the solar radiation in the solar furnace as well as in the absorbers of the SUNSON-BOX by PSA.
- Potential ternary and quaternary Fe-Si-B-X alloys identified to work as phase-change materials and pre-characterised for the storage system by NTNU.
- An innovative approach to the feasibility of protection of the novel PCM through pre-oxidation was conducted by NTNU.
- First modelling of the PCM-TES system assessed by multiphysics simulations performed by IDENER.
- Developing an innovative thin-film metal wrap through tested to fabricate thin film InGaAs cells for the TPV converter.
- Seminar with guidelines on Ethics and gender issues in research organised by HOLOSS.
- Literature review of updates LCA and LCC for potential use by a criteria scheme (based on ORIENTING approach and toolbox 'better regulation' guidelines defined by EC), by HOLOSS.
- Plan of Exploitation, Dissemination and Communication of the SUNSON project is set by IDENER and ready to follow up the project

Past & Upcoming events

Our KOM!
19th January 2023 , Brussels

Technical meeting of conceptual design and modelling of the SUNSON-BOX
15th May, Spain



Our First webminar Gender Equality and Ethics in research and innovation
30th May

QM2-Hybrid Consortium Meeting and Our First workshop in collaboration with the THERMOBAT project
7 - 8th, Norway

What´s next?

- **QM3-Hybrid Consortium Meeting** - *24th and 25th January, Spain*
- **TPV energy conversion conference** - *1th-3th October 2024, Spain*
- **Workshop: ultra-high-temperature energy storage and conversion** *2th October 2024, Spain*

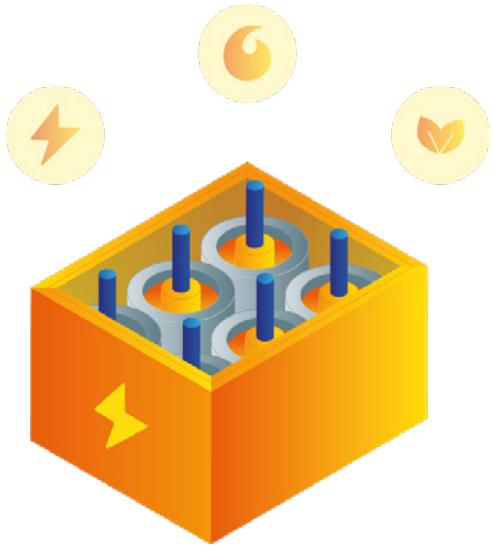
Sisterhood projects

THERMOBAT

www.thermobat.eu

Storing sunshine and wind to make cheap energy available at all times

The Thermobat project will develop the first latent heat thermophotovoltaic battery to store large amounts of renewable energy.



Clustered projects

DARE2X

www.dare2x.eu

Decentralised Ammonia production from Renewable Energy utilising novel sorption-enhanced plasma catalytic Power-to-X technology

DARE2X gathers will replace the centralized production Haber-Bosch process with a sustainable alternative for the production of NH3, contributing to decarbonising the European industry.

SolDAC

FULL SPECTRUM SOLAR DIRECT AIR CAPTURE & CONVERSION

www.soldac-project.eu

Full spectrum solar direct air capture & conversion

SolDAC's main ambition is to reinvent the ethylene industry, which is the chemical industry's primary building block, by proving an emerging breakthrough technology for producing technically and economically competitive and climate-neutral sustainable ethylene and co-product ethanol from solar energy and air.

Young talent in the SUNSON project

Paolo Lai Zhong Lo Biundo, NTNU.

During my master at NTNU, I had the privilege of writing my master's thesis on SUNSON´s sisterhood project: THERMOBAT. In the beginning it was a challenging to get into something so new to me. I confronted with a steep learning curve, often accompanied by numerous trials and errors. Later, I had an exciting opportunity to continue as a Ph.D. on SUNSON project . The transition felt like a natural progression in continuing to contribute to research and development of energy storages. Meanwhile, I got to know more of the people involved in the project: at NTNU I strengthened my relationship with Maria and Wojciech joined the SUNSON about at the same time as I did. I look up to them not solely for they knowledge, but I would strive to live work as they do.

Alfonso Hernández from IDENER

SUNSON allows me to delve into the complex interactions between thermophotovoltaics, phase-change materials and concentrated solar power. Thanks to it, I can learn about and improve upon novel thermal storage approaches to compensate for the intermittency of solar energy, one of the main challenges to address for ensuring a cleaner future. Furthermore, my role in SUNSON allows me to collaborate and stay in touch with international and experienced partners. This interdisciplinary and collaborative synergy broadens and deepens my professional network. And, of course, my colleagues at IDENER have been there for me throughout my journey, sharing their expertise and knowledge, believing in me and allowing me to grow as a researcher. Overall, working with diverse talents like those found at SUNSON fosters a collaborative spirit, resulting in a dynamic environment where ideas can flourish.

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