



SOLar HOrticulture

SOLHO Bio

A. Desideri & Emiliano I.M. Casati*

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* adriano@solho.eu & ecasati@solho.eu

Preamble

There will be 2.5 billion more people living on Earth by 2050, with over 90% of this growth concentrated in the so-called [sun-belt regions](#). How will food be provided to these people in a sustainable way? Agriculture will have to double food production, in areas typically characterized by abundant solar resource, severe [water scarcity](#), and [by poor infrastructure, i.e., with absent/unreliable electricity grid and/or gas network](#). There is a large demand for the deployment of greenhouse-based horticultural projects (GBHP's) in the sun-belt region, but this remains untapped as there is no existing technology capable of deploying economically attractive off-grid GBHP's.

In order to bridge this gap, we developed an innovative off-grid energy conversion unit called SPRHOUT, Solar PoweRed Horticultural Off-grid UniT, which, using the sun as its only source, can fulfil all the energy needs of a GBHP. The key components constituting the SPRHOUT technology are: a field of solar thermal collectors, a power unit, a thermal energy storage (TES) system, and modules for CO₂ capture and water treatment.

The SPRHOUT key features are:

- 90% reduction in CO₂ emission
- Off-grid, no need for electricity grid or gas network
- 24/7 operation thanks to unique storage capabilities
- 90% operational savings compared to current solutions

Solar energy is harvested through the collectors, stored in the TES system, and used to operate the other units on-demand: this allows fulfilling the requirements of a GBHP in terms of electricity, heat, water for irrigation, and CO₂ as growth enhancer. Despite the larger initial investment, the significant reduction in operational costs leads the SPRHOUT-GBHP's to a ROI (return on investment) similar to or higher than the one characterizing fossil fuelled off-grid GBHP's. Furthermore, the SPRHOUT technology brings the carbon footprint of food production close to zero in a LCA (life cycle analysis) perspective, making an important step towards a sustainable future for Humanity.

Our story

Adriano and Emiliano, the two co-founders of SOLHO, met during their academic studies at the [Technical University of Delft](#), The Netherlands in 2011. Since then, they have been collaborating on academic and business projects. In 2015, they started developing the novel concepts behind SOLHO technology. The main achievements of the past 2 years are listed hereunder:

- In October 2016, we joined the 3-months LaunchLab program at the [Yes!Delft incubator](#) in Delft, The Netherlands.
- In April 2017, we engaged with the first potential customers, the largest developers of high-tech semi-closed greenhouses.
- In June 2017, we joined the 5-years Yes!Delft incubation program.
- In August 2017, we incorporated SOLHO as a B.V. under the Dutch law.
- In September 2017, we entered the EU [Climate-KIC accelerator program phase I](#)
- In October 2017, we were selected among the 10 finalists at the [Shell NewEnergyChallenge](#).
- In November 2017, we were selected among the [EU top 50 Millennial Start-ups](#) and were awarded by [IEEE](#) organization.
- In December 2017, we secured the Dutch STW take-off grant in collaboration with the [Power and Propulsion group of the Aerospace faculty of TU Delft](#) to build and test our proprietary Thermal Energy Storage (TES) unit.
- In January 2018, we got awarded the MIT R&D grant by the [Zuid-Holland province](#) in collaboration with our partner, one of the largest Dutch greenhouse manufacturer, to build the SPRHOUT proof of concept (PoC) in France.
- In April 2018, we entered the EU [Climate-KIC accelerator program phase II](#)
- In April 2018, we were selected among the 18th finalist at the [SET Award 2018](#) as part of the Start-up Energy Transition festival, and were awarded with the first prize in the category Energy, Water and Food.

- In May 2018, we received funding from the European Union's Horizon 2020 SME Innovation Action phase I research and innovation programme under grant agreement No. 827952
- In October 2018, we were selected among the 10 finalist at the Accenture Innovation Award, category Cleantech

From January to August 2018, we have designed, built and tested the TES-MOD prototype. The unit demonstrated the technical feasibility of our novel thermal energy storage technology. We are currently commissioning the SPRHOUT proof of concept (PoC) in the south of France. The facility will be tested until October 2019, to assess the SPRHOUT performances under different weather conditions.

At SOLHO, we believe sustainable food provision is crucial and cannot be achieved with current technologies. We believe SOLHO has the potential to boost the transition towards low-carbon food production, ensuring a safer and better future for Humanity.