SHIP2FAIR

Solar Heat for Industrial Processes towards Food and Agro Industries commitment in Renewables

General Presentation

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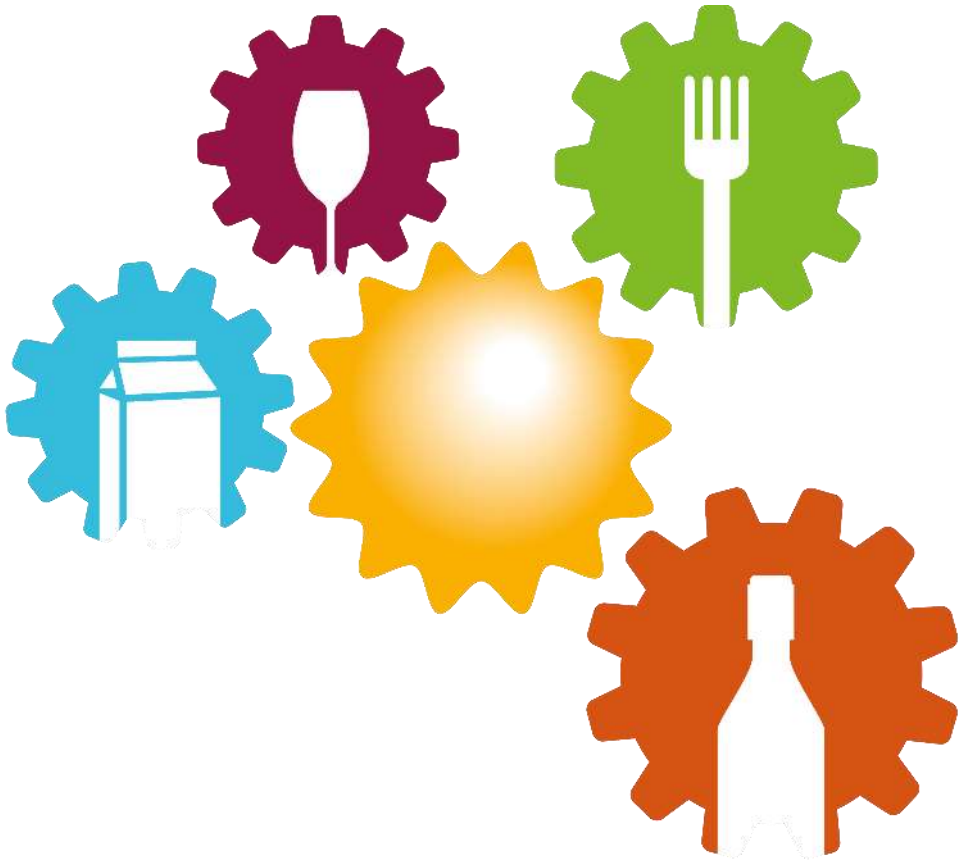
Guglielmo Cioni – VP Business Development

TVP SOLAR

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 792276.

SHIP2FAIR
Concept



Fostering the integration of solar heat in industrial processes - **SHIP** from agro-food sector, by developing and demonstrating a set of tools and methods for the development of industrial solar heat projects during its whole life-cycle.

BUDGET: 7.996.793,25 €
DURATION: 2018-2022

SHIP2FAIR Project

Challenges

Economic competitiveness

Integration of SHIP in existing industrial processes

Solutions

- **Development of easily replicable solutions** to increase energy efficiency and lower process heat temperature.
- Development of **suitable control strategies** taking into account inertia effects, delays, influence of radiation fluctuations and susceptibility to oscillations.
- Tools validation by continuous feedback from **real-operating systems**.
- Development of **training from a practical methodology**, making large use of ***use-cases***, letting users utilize the software directly within their local environment, thus achieving a **tailored solution to users' local challenges**.

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Partners

Coordination

Solar technologies providers

R&D and consulting

Agro-food field experts

Dissemination & Training

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Expected results

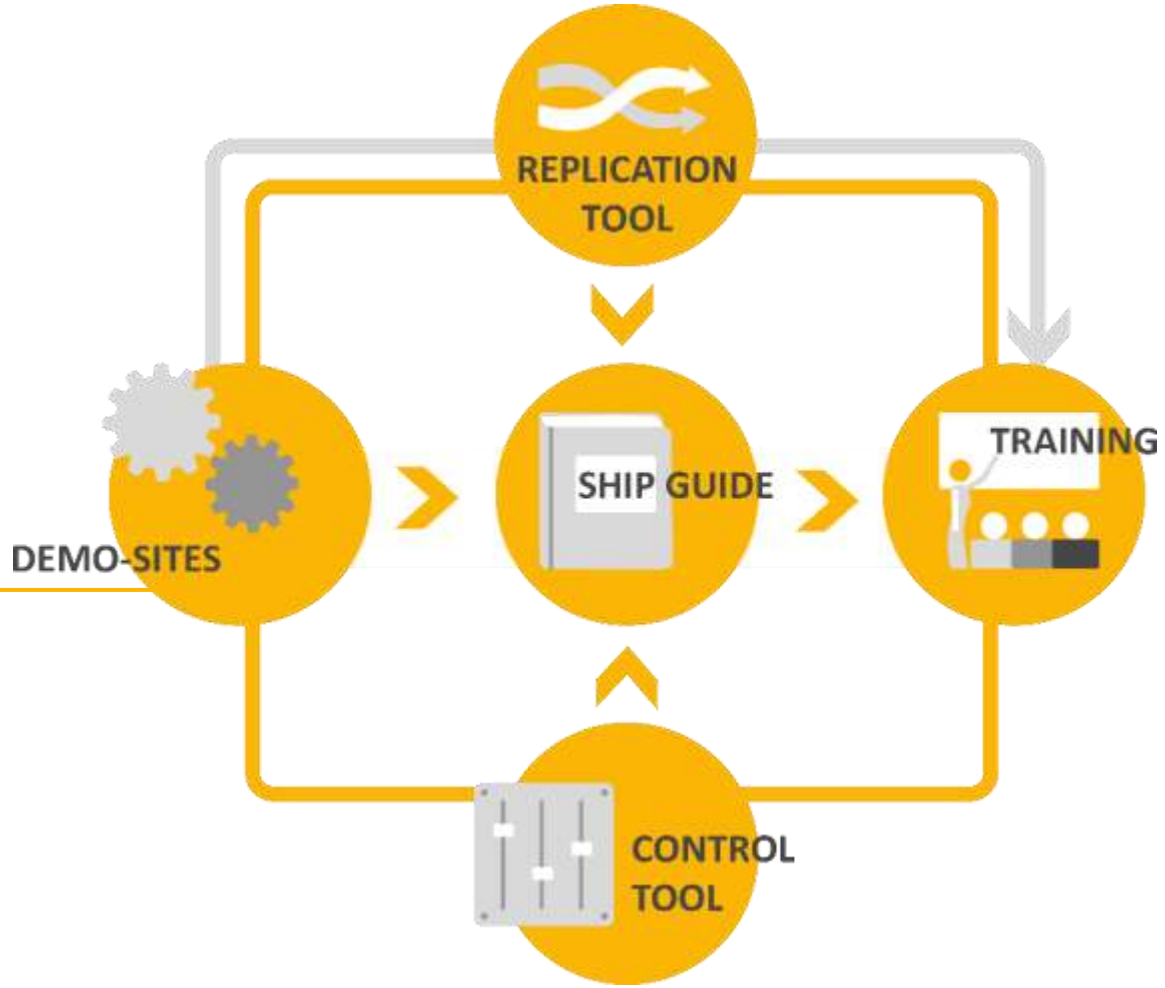
SHIP2FAIR will develop & demonstrate, in a minimum of 4 real industrial sites - **demo-sites**, a set of **tools & methods** for the development of industrial solar heat projects during their whole life-cycle.

Sugar boiling
Porto, Portugal

Foie-gras production
Castelnaudary, France

Spirits distillitation
Pessione, Italy

Wine fermentation & stabilization
La Rioja, Spain



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Tools & Methods

A software that will be developed, validated & fine-tuned at the demo-sites to support the concept design of SHIP projects & the development of techno-economic feasibility studies.

Objectives

- To define algorithms required to map local solar potential for industrial purposes
- To model the demand profiles of the industrial processes identified in the most representative use cases
- To define the necessary algorithms to evaluate the feasibility of a particular solar heat integrtion solution in a given industrial process
- To define a methodology to carry out the concept engineering and feasibility analysis of a solar heat integration in a particular industrial process

SHIP2FAIR
Tools & Methods

A Decision Support System to optimize the operation of SHIP projects combining supply and demand data specially designed for SHIP

Objectives

- To define the ICT infraestructure required to make an optimal solar heat process integration control
- To identify the most convenient control strategies allowing to make the most of the solar production for a particular process use case
- To develop a Model predictive control to optimise the management of solar production integrated with TES in collaboration with already installed process heating and CHP generators

The demo-sites & the flagship projects

A minimum of 4 SHIP systems fully validated in real processes: new demo-sites joining in 2020

Novel solar collectors demonstrated in average irradiance areas through a 18-month demonstration campaign

- **Total capacity:** 2.9 MWth
- **Solar fraction:**
  11.2% (RAR)-39% (RODA)
- **Yearly average solar efficiency:**
  37% (M&R)-54% (RODA)

- **Primary energy savings:**
  - 4 GWh/year
  - 1145 tCO_2/year avoided
  - 5.4 GWh/year increase of RES in industrial heating

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First demo-site installed

Wine fermentation & stabilization
La Rioja, Spain

BODEGAS RODA
Haro . Rioja Alta . España

Solar thermal to provide heating & cooling Viessman Vitosol 200TM 70m^2 area + Absorption machine

Heating

- Radiant floor heating for malolactic fermentation
- Heat for adsorption process
- Pipe cleaning & desinfecting
- High-pressure cleaning

Cooling

- Fermentation process
- Ageing

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Second demo-site installed

Spirits distillitation
Pessione, Italy

MARTINI

600 m2 gross area **350 kWt peak power**

- *Dual use* of solar heat
  - Summer -> Steam at 3.7 bar – 150C
  - Winter -> Space heating at 70C
- Maximization of solar output -> 0.6MWh/m^2/y

- A well designed integration with users thermo-hydraulic circuit
- Reduction of the environmental impact of the entire production

- Technology: High Vacuum Flat Panels

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Upcoming Demos

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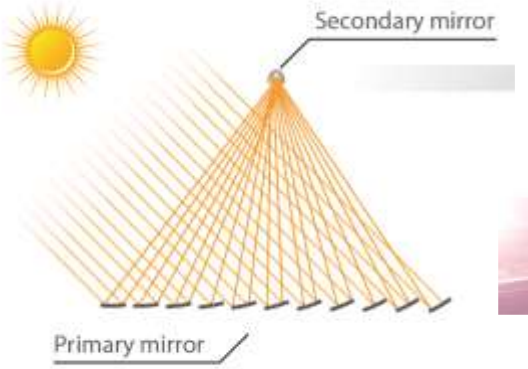
Sugar boiling
Porto, Portugal

RAR

Technology: Solar Fresnel Concentrators
Solar field size: 30 modules – 660 m2 aperture
Production: steam @10 bar
Under execution



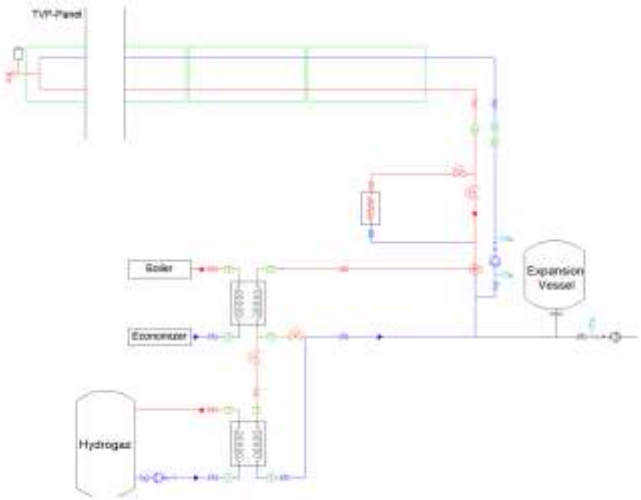
INDUSTRIAL SOLAR
thermal solutions

Foie-gras production
Castelnaudary, France

LARNAUDIE

Technology: HVFP
Solar Field size: 1600 m2 – 1 MW
Cascade application:

- Boiler feed water pre-heating @140C
- Water tank heating @65C



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The Capacity Building Program

- 500 professionals
- 400 undergraduates
- 100 Master students

Will be trained via master classes and visits to the demo-sites with the double benefit of a more prepared workforce & a good number of potential users

Will contribute to create

Feasibility studies in 10 additional sites **by the end of the project**

Will help to set the ground for

- 75 EU agro-food industries
- 25 plants from other industrial sectors **after SHIP2FAIR**

Dissemination and training facility at CEA - Cadarache - France

40 m2 fully equipped and functioning solar field

Technology: High Vacuum Flat Panels (HVFP)

Operating temperatures: up to 180C

Provider: TVP SOLAR

CEA Solar field

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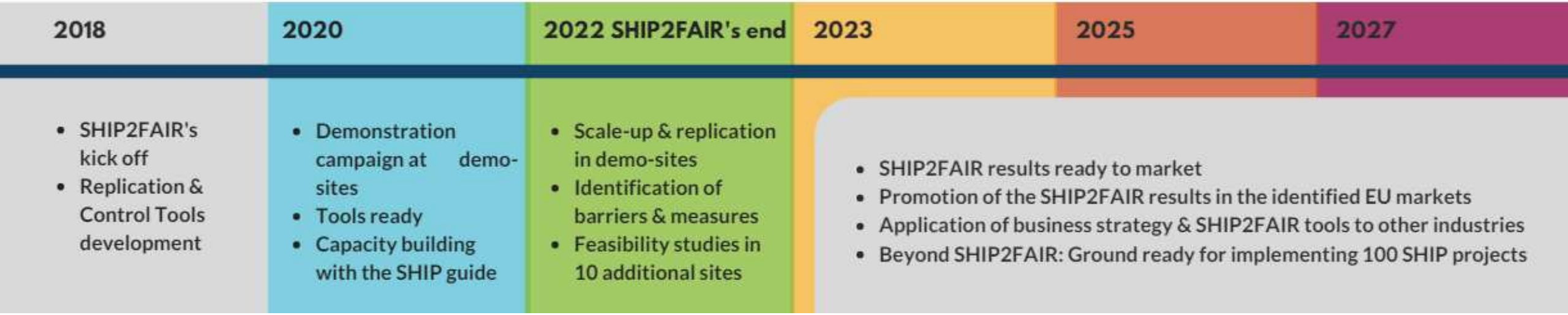
From 2018 to 2022 and beyond



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Thank you!

info@ship2fair-h2020.eu
www.ship2fair-h2020.eu

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