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Newsletter

Dear readers,

We are happy to share with you the very first ASTEP newsletter and to introduce you to this EU-funded Research and Innovation Action that aims to cover the heating and cooling demands for industrial processes by successfully demonstrating the viability of applying solar thermal energy at temperatures and for latitudes where current designs are not able to supply it.

In this 1st edition of the newsletter we will take a look at certain key topics such as the Use Cases and the project's output so far.

This new EU-funded Research & Innovation Action, kicked-off in May 2020 via teleconference where the first steps of the project were clearly defined for all the partners. It is coordinated by Professor Antonio Rovira, representing the Universidad Nacional de Educación a Distancia (UNED), in Madrid, Spain.

To engage you in some interaction, we added some exciting news & events at the end. Get involved and let's innovate the Solar energy in Industrial Processes together.

Happy reading and stay safe.

Best Regards,
Gianna Avgousti

eBOS Technologies Ltd, Cyprus



The successful completion of ASTEP will provide guidelines for planning, installation and operation of thermal solar systems in industrial companies and will quantify the performance of the developed innovative technology considering several technical and economic parameters.

Sixteen project partners involved from 9 different European countries combine their knowledge and experience in research and business. They are located in Spain, UK, Cyprus, Italy, Greece, Romania, France, Poland and Ireland. The project will last four years and will conclude in April 2024.

With the ASTEP project the European Commission initiates a new innovative Solar Heating for Industrial Processes (SHIP) concept focused on overcoming the current limitations of these systems.

Author: *Gianna Avgousti, (eBOS), Cyprus*

ASTEP Consortium

1. UNIVERSIDAD NACIONAL EDUCACION A DISTANCIA, SPAIN
2. ANALISIS-DSC, SPAIN
3. VERTECH GROUP, FRANCE
4. UNIVERSIDAD POLITECNICA DE CARTAGENA, SPAIN
5. DAVID REAY ASSOCIATES, UK
6. EBOS TECHNOLOGIES LTD, CYPRUS

7. BRUNEL UNIVERSITY LONDON, UK
8. CROWDHELIX LIMITED, IRELAND
9. RELATIONAL TECHNOLOGY, GREECE
10. UNIVERSIDAD POLITÉCNICA DE MADRID, SPAIN
11. ARCELOR MITTAL TUBULAR PRODUCTS IASI, ROMANIA
12. CENTRE FOR RENEWABLE ENERGY SOURCES & SAVING, GREECE
13. POLITECHNIKA WROCŁAWSKA, POLAND
14. IRIS TECHNOLOGY SOLUTIONS, SPAIN
15. UNIVERSITÀ DEGLI STUDI DELLA CAMPANIA, ITALY
16. MANDREKAS DAIRY, GREECE

Author: Juan Enriquez, (ADSC), Spain



Use Cases

ASTEP will validate the integration of these concepts in two industrial case studies demonstrating the viability of the proposed solutions for different industries located at different latitudes, which will enable the use of the developed technology in EU countries where concentrating solar systems, have very limited or no application. Validation will be carried out installing a single module of 17 kW_{th} (peak) in each industry, able to produce from 50 kWh per day in winter to 135 kWh per day in summer. This performance should lead to a solar contribution of 25 MWh yearly, avoiding 5.7 t of CO₂ to the atmosphere, saving 2 t of NG (KPI 7) and 5 kg of NO_x (compared to uncontrolled burners), in each industry. The module size (8 m diameter) is selected to use the most common standard components in the solar industry (evacuated and coated tubes) and thin mirrors with a width and length small enough to be manufactured in conventional furnaces in glass industry.

Use Case 1: Mandrekas

The company MANDREKAS is a family owned dairy located in Corinth (latitude is 37.93 N), i.e. it is located close to the sun Belt, where solar concentrating systems can be installed at a lower price. They produce all types of yogurt, yogurt-based dressings (tzatziki sauce) and milk

Use Case 2: ArcelorMittal

ArcelorMittal is the world's leading steel and mining company. AM Iasi, belongs to the Europe Division ArcelorMittal Tubular Products (AMTP), which is engaged with the manufacturing of welded steel tubes for

desserts (rice pudding, custard cream and chocolate). In their process they need both the generation of steam at 8 bars (175 °C), to pasteurize milk, and cooling for storing their products at temperatures around 5 °C. A simpler concentrator due to the lower latitude forces the storage system to become especially relevant to meet heat demand requirements. On the other hand, these requirements are relatively modest because only the cooling demand is 24/7, whereas the steam generation must be met only during the day. With the industrial process temperature being 175 °C, most efforts will be done to develop the storage system based on salt-salt mixture, which has been identified as the most promising mixture in this temperature range. In order to meet cooling requirements, a commercial absorption chiller and a steam generator will be used. This system must be able to work with a heat supply at the



same conditions than the industrial process (175 °C), so that a completely integrated system is developed.

many diverse applications. This industry is located at Iasi, latitude 47.1 N.



One of the key finishing products is the so-called colour coating, consisting on a thin layer of (epoxy, water-based, thermoplastic, etc.) coloured protective/decorative material, covering the whole tube external surface. In order to apply this colour coating tubes, they need to be pre-heated to a temperature of 220 °C.

In this case, the working condition for this Fresnel system is that the sun must be in the transversal plane of the concentrator, i.e. the system must rotate in the azimuth angle along the day so that the longitudinal component of the impinging sun radiation is null. Therefore, the platform must be placed over some sets of wheels that are guided in a circular movement.

Due to the fact that the sun altitude varies along the day and year, mirrors must be installed onto longitudinal rotating axis, so that their transversal tilt is adapted to the sun altitude. This implies a higher cost compared to the one-axe tracking system, but it eliminates both cosine and end losses. In addition, it eliminates the need for a platform fixed longitudinal tilt and transversal mirrors, which imply a cost reduction.

Storage system requirements are less demanding with the two-axis concentrator, as the impinging power variation is lower thanks to the nearly constant cosine factor. However, industrial process temperatures are higher, which might lead to a more

complex storage system where corrosion or dilution must be regarded.

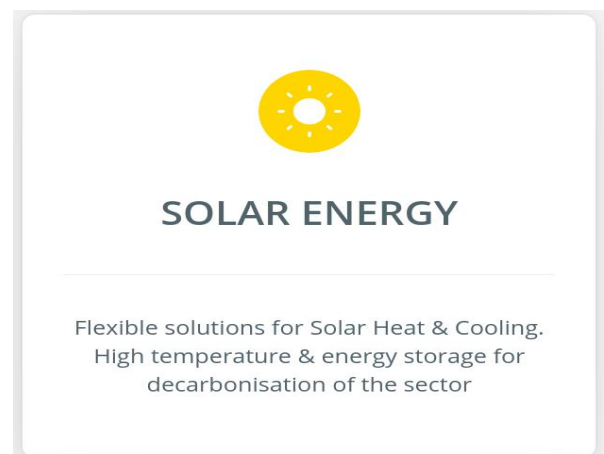
Author: Juan Enriquez, (ADSC), Spain

News & Events

On the 10th of November 2020 the **first plenary (progress) meeting** took place also via teleconference. The External Expert Advisory Board was introduced to the Consortium where some of them participated in the meeting. The early stages and the preliminary work accomplished so far were explained and shared with all the partners.

Author: Laura Torres, (ADSC), Spain

Solar Energy Helix - In the frame of ASTEP, Crowdhelix has launched the [Solar Energy Helix](#) on its Open Innovation platform. The Solar Energy Helix will form a virtual community in which interested participants and stakeholders will be able to follow the project's advancements, activities, events, and results. The Helix will also act as a hub for Crowdhelix users to share specific opportunities for collaboration related to solar energy and to network with other experts on the platform in this area of interest and connected fields. If you'd like to join the Solar Energy Helix, please email astep@crowdhelix.com for more information on how to gain access, network and contribute.



Crowdhelix Green Deal Event - To support the objective of a climate-neutral Europe by 2050, the European Commission is launching a [European Green Deal call](#) for research and innovation proposals worth €1 Billion as part of the final segment Horizon 2020. On the 8th of October, 2020, Crowdhelix organised a virtual networking event aimed at organisations and individuals interested in achieving a circular economy by supporting the European Green Deal and participating in a project targeting one of the forthcoming Horizon 2020 Green Deal topics. The event was split into two parts. During the morning session, the UK NCPs for Transport and Climate, Louise Mothersole and Emma Fenton, covered the European Green Deal call and the funding available for reorienting Europe towards a sustainable future. The keynote speaker in the afternoon session was

Hans-Christian Eberl, Policy Officer at the European Commission, (DG Research and Innovation) who updated the participants on recent developments around Horizon Europe. This keynote speech gave special attention to circular economy initiatives. ASTEP was one of the exhibitors in the project gallery, which the attendees could visit throughout the event. The event gathered 116 participants from 22 countries representing excellent organisations and businesses from both academia and industry.

Author: Natalia Grzomba, (CHX), UK



News & Events

What's next

The **next plenary meeting** will take place next May 2021 and we all hope we could have the possibility to meet each other physically.

We hope you enjoyed this edition of the ASTEP Newsletter.
Keep in touch. for the next edition, when we will bring you news of this innovative project.

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