HORIZON STE

Implementation of the Initiative for Global Leadership in Solar Thermal Electricity

NEWSLETTER

ISSUE 3

30th Nov 2020, Brussels

State of Play

Despite the Covid-19 pandemic this year, HORIZON-STE is on track to meet its milestones and many activities have been vigorously carried out by all partners. In this issue of our newsletter, we would like to share with you our progress over the last six months, as well as key findings of our activities that may be of your interest.

Work Pack 2: "Re-launching STE Industry in Europe"

ESTELA has made additional progress in WP2 since the last update. As an overview, five countries – Turkey, Portugal, Germany, Belgium and Denmark have now been under the scope of analysis, and Deliverable D2.2 Draft Country Report – Industry Perspective and Deliverable D2.3 Integrated Country Report were submitted on 30 June 2020.

- Deliverable D2.2 is publicly available: Download
- Deliverable D2.3 is publicly available: Download

ESTELA continued further its analysis of Portugal, with meetings held online because of the pandemic. The advisors to the Secretary of State for Energy and the representatives from the Directorate General Energy and Geology gave valuable inputs on the Portuguese energy strategy. They confirmed the political interest of Portugal in STE/CSP, as stated in the NECP (300MW of CSP by 2030), and the Portuguese involvement in R&I in the sector. However, the market still needs to show positive signals. Indeed, the results from the solar auction held in August 2020 only awarded PV projects, as storage requirements were not sufficient for STE/CSP to benefit from its low-cost Thermal Energy Storage competitive advantage. EDP, a major Portuguese energy player, confirmed this hypothesis in discussions with ESTELA.

In parallel, ESTELA focused on two new countries, Belgium and Germany. For Belgium, ESTELA had a very insightful discussion with John Cockerill on the Belgian approach to energy. The large role of gas in the Belgian energy landscape could offer a new perspective for concentrated solar thermal technologies. Beyond hybridisation, applications for solar heat for industrial processes could also be looked into, in the light of the promising pilot project in the port of Antwerp. Regarding Germany, ESTELA had

fruitful discussions with Deutsche-CSP, as well as with three of the four German TSOs. The interest in sector coupling and the central role of hydrogen stood out and will drive ESTELA's approach to Germany. An interview with the Ministry of Economic Affairs and Energy is planned in December 2020.

Finally, despite the Covid-19 pandemic, HORIZON-STE is on track to meet its milestone on 30 November 2020, as five Country Reports are on the verge of being completed.

Work Package 3: "R&I Impact Maximization"

WP3 has continued with its commitment to support the realization of R&I projects aligned with the SET-Plan. The main progress in this WP is reflected by the submission of two important Deliverables: *D3.1 "Proposal for prioritization of IP projects and actions for the funding agencies"* and *D3.2 "Develop indicators and methodology for monitoring success of the execution of the IP"*.

The public deliverable *D3.2 "Develop indicators and methodology for monitoring success of the execution of the IP"* presents indicators and a methodology for monitoring the success of the execution of the STE IP. The methodology is centred on three key aspects:

1. To develop appropriate indicators to assess STE/CSP's added-value. The added-value of STE/CSP compared to other renewable energies is related to the dispatchability and the flexibility of the output power;
2. To analyse the results of different Calls for Proposals related to the SET IP;
3. To track the activity of R&I actions that are executed under the framework of the SET IP.

Furthermore, to enable effective monitoring of the success of the IP, in D3.2 both quantitative indicators (such as measurable physical properties) and qualitative indicators (such as the technical level and scalability) as well as targets are defined. In this deliverable the need to revise the long-term STE/CSP targets to address new plant concepts that can reduce costs is also discussed.

- Deliverable D3.2 is publicly available: Download

During the period July-August the HORIZON-STE R+D Partners, led by CIEMAT, had a significant participation in the preparation of the "Input Paper for the Clean Energy Transition Strategic Research and Innovation Agenda (SRIA)" with the focus on the Thematic Cluster 1: Renewable Technologies – Concentrated Solar Power. In this document, the current status of the CST technologies is presented, the ongoing research is described and expected development and challenges are discussed. During the elaboration of this Input Paper, it became evident that the objectives defined in the Implementation Plan for the CSP SET Plan issued in 2017 should be revised and updated to be more consistent with the current situation of this sector. An internal discussion has

The project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 838514.

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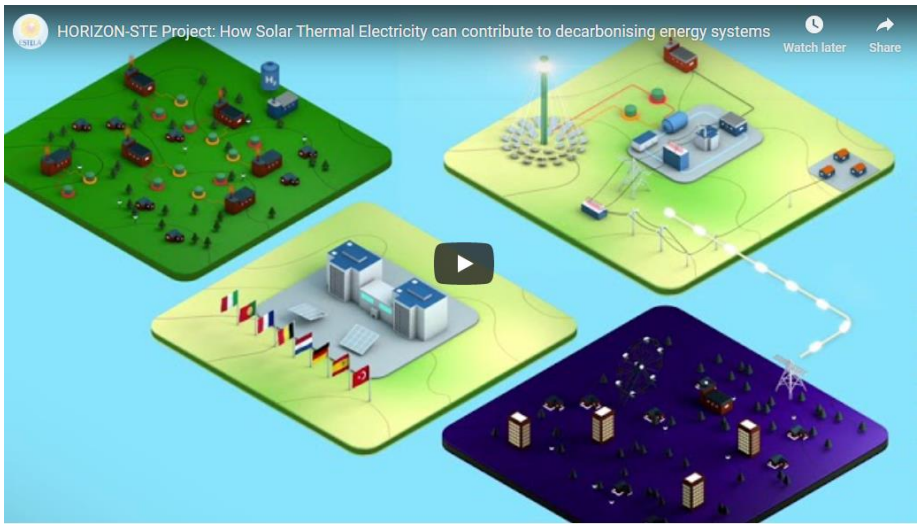
been opened within the CSP/STE sector about this issue related to the Implementation Plan revision and update.

Work Package 4: Communication and Events

Have you watched our latest video yet?



Missed it? You can watch it here: https://www.youtube.com/watch?v=DwJEZDGxdU0 to find out more what concentrated solar thermal (CST) technologies can offer and contribute to decarbonising energy systems!

We launched this video campaign this fall to raise awareness of the wide potential of STE/CSP with its outstanding long-term thermal storage assets. Read our last announcement here.

If you like the video, please spread the words by sharing it to your network:
Twitter Post
(URL: https://twitter.com/ESTELA_SOLAR/status/1311353102872780800
LinkedIn Post
(URL: https://www.linkedin.com/feed/update/urn:li:activity:6717058656271265792/).

You can also find the video on Euractiv website and Politico website until end of December!

HORIZON-STE has also published in the summer an infographic for raising the awareness of the potentials of STE/CSP and thermal energy storage (TES) systems' future uses. This infographic is a set of 5 factsheets that includes the basic introduction on how STE works, facts and figures, and potential of TES and its benefits.

- Download infographic

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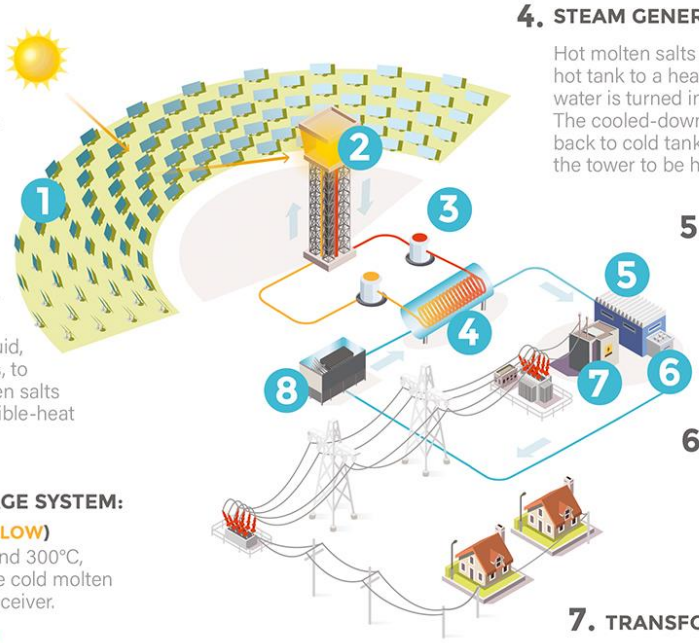
Solar Thermal Electricity (STE)

THE FUTURE OF SOLAR ELECTRICITY ON DEMAND

Solar thermal electricity (STE) technologies, also known as concentrated solar power (CSP), use mirrors to concentrate the sun's heat onto a receiver for either, driving traditional steam turbines or engines that produce electrical power, or using it (the heat) directly for industrial processes.

HOW STE WORKS

Example of a CSP Tower Power Plant



1. HELIOSTATS

Large mirrors track the sun and concentrate sunlight onto a receiver.

2. RECEIVER (TOWER)

Inside the receiver, the reflected energy is absorbed to heat up a heat transfer fluid, such as molten salts, to around 600°C. Molten salts also serve as a sensible-heat storage medium.

3. THERMAL STORAGE SYSTEM:

A. COLD TANK (YELLOW)

Molten salts, at around 300°C, are pumped from the cold molten salt tank up to the receiver.

B. HOT TANK (RED)

The hot molten salts coming from the receiver are stored in the hot tank before being pumped to the heat exchanger (steam generator), as required. The plant can continue to operate even when the storage is full.

4. STEAM GENERATOR

Hot molten salts are pumped from the hot tank to a heat exchanger, where water is turned into high pressure steam. The cooled-down molten salts are sent back to cold tank, ready to be sent up the tower to be heated again.

5. TURBINE

Like in other thermal power plants (coal-fired or nuclear), the steam is used to drive a turbine in a power block.

6. ELECTRIC GENERATOR

The turbine drives the generator, producing electricity.

7. TRANSFORMER

The electricity is then adjusted to the voltage level required by the grid, before it is injected into the distribution or transmission grid, and finally sent to household end-users.

8. CONDENSER

After running the turbine, steam is sent to the condenser before it is sent back to the steam generator.

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THERMAL ENERGY STORAGE (TES) WHAT'S NEXT?

Mature thermal energy storage technologies have continued to develop, and new ones have come to light, extending their operational hours, their versatility and demonstrating improved new concepts. This enables more and more potential uses of TES across different sectors and industries, including:

Electricity generation

CSP plus TES power plants (standalone or even hybridized with PV or Biomass) in countries with good solar resources

Modular storage for various sources of energy (e.g. PV, wind) with integrated generation

Retrofitting existing fossil-fuelled power plants **with TES** (avoiding curtailed electricity from PV or wind via heat pumps)

Heat applications

Process heat for industry

Heating & cooling

Auxiliary in production of green hydrogen (and other gases)

WHY STE?

How can STE contribute to the energy transition?

1/ **Avoiding greenhouse gas emissions** - accelerating the decarbonisation of the power system

2/ **Bringing high flexibility** and **dispatchability** in the energy system

3/ **Increasing the stability** of the power system (synchronous generation)

4/ **Generating positive impact** on local economies

5/ **Strengthening energy security**

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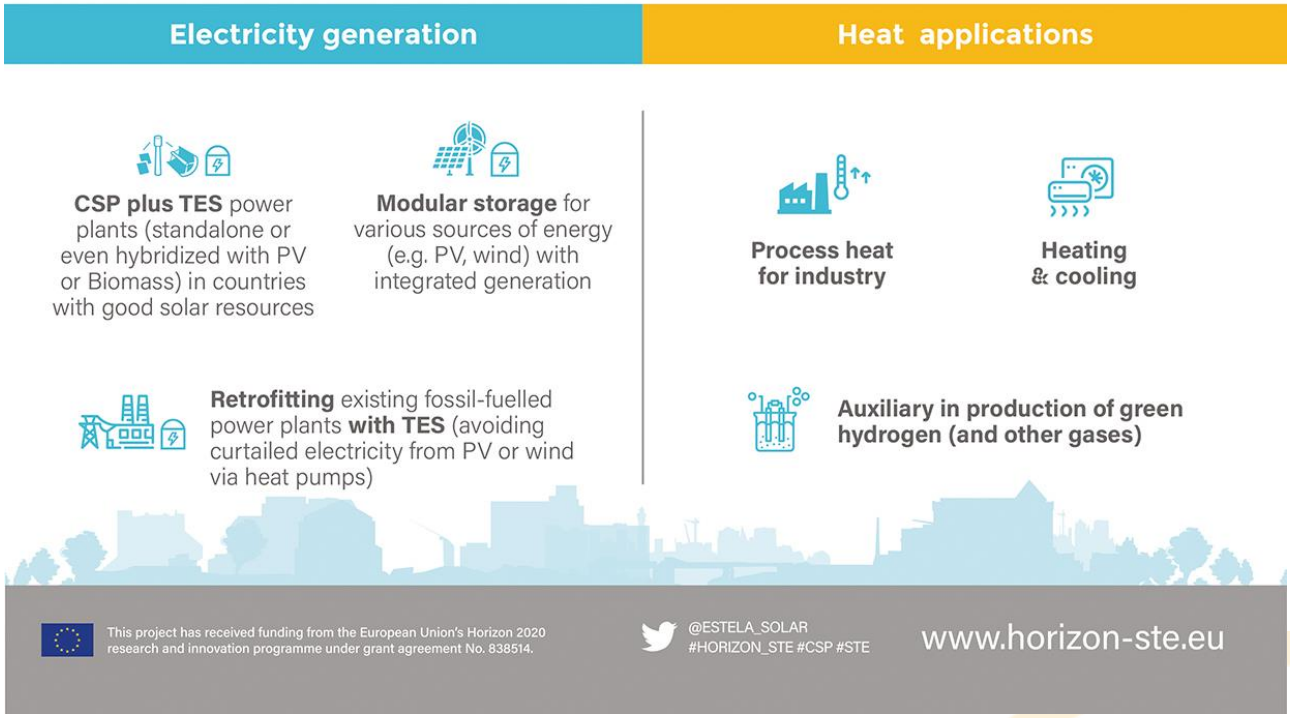

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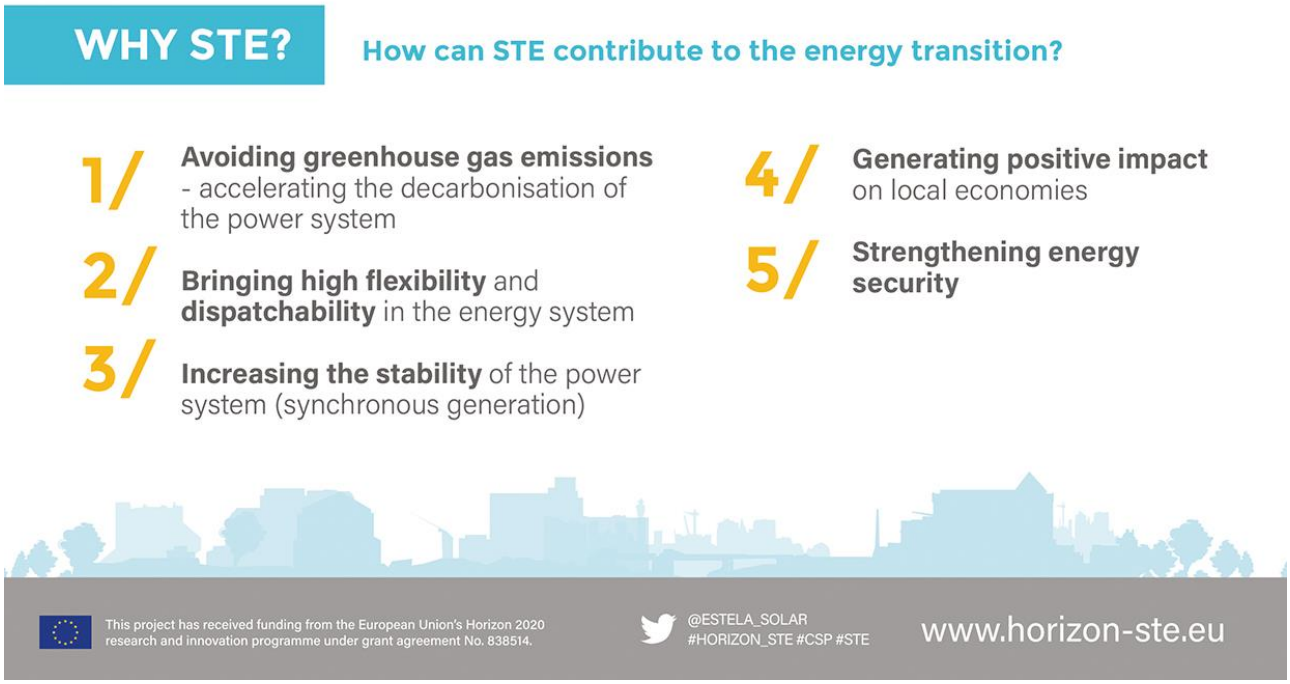

Previous Newsletters

For previous newsletter, please check them out here or visit our website: http://www.horizon-ste.eu/media-outreach/

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