001 SLAGSTOCK: Low-Cost Sustainable Thermal Energy Storage Systems Made of Recycled Steel Industry Waste

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Summary

One of the major challenges of the Concentrated Solar Power (CSP) industry is the development of cost effective high temperature thermal energy storage (TES). Currently, the most applied storage strategy in commercial CSP plants consists in a double tank configuration based on molten salt as storage material. This arrangement presents several limitations such as the reduced operation temperature range, the worldwide availability of salts and their high economic cost.

SLAGSTOCK project aims to develop an innovative thermal storage concept to overcome these drawbacks. This approach makes use of steel slags as storage material due to preliminary measurements have demonstrated that the operation temperature range of steel slags in thermal storage applications can be extended up to 1100 ºC.

Steel slags are a by-product of the steelmaking industry and currently recycled in several applications such as aggregates for construction or road materials. However, about 2,8 Mt of slags production is landfilled per year. The revalorization of steel slags as thermal storage material could represent a successful solution to obtain a low-cost storage material and hence to design an economically competitive thermal energy storage lead concept.

The versatility of the proposed solution can also be useful for different thermosolar power generation technologies such as parabolic through or power tower. In particular, the innovation proposed in SLAGSTOCK project covers the use of different heat transfer fluids such as molten salt or air in different temperature ranges. Also, in the SLAGSTOCK approach, several storage concepts are proposed which can be suitable for different CSP storage requirements.

Overall, the revalorization of this steel industry by-product into a storage material opens new possibilities within the framework of CSP and could lead to a cost-effective high temperature storage solution for both current and future thermal energy storage technologies.

Project consortium

Coordinator and contact details:

Full name of organisation:	Centro de Investigacion COOP de Energias Alternativas CIC Energigune
First and family name of coordinator:	Bruno D'Aguanno
Full address:	Parque Tecnológico de Álava C/Albert Einstein, 48 01510 Vitoria, Spain
E-mail:	bdaguanno@cicenergigune.com

Participating countries and financing:

Country	**Number of organisations involved**	**Project costs in EUR**	**Public funding in EUR**
Spain	3	919'677	259'190
Switzerland	1	160'085	120'571
Germany	1	96'888	80'740
France	1	96'636	50'707
Total	*6*	*1'273'286*	*511'208*

PSI contract is in CHF, exchange rate applied 1 EUR = 1,05 CHF