



LIFE GreenPower - Demonstration of an innovative energy conversion technology for waste heat recovery in the glass industry and other EIIs

LIFE16 CCM/DE/000085



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Project description:

Background

Energy-intensive industries (EIIs) are major emitters of the greenhouse gas carbon dioxide (CO₂) due to their high use of primary energy to drive their industrial processes. In EIIs, large amounts of waste heat occur, and low-grade waste heat in particular is vented unused into the environment. The waste heat potential of EIIs in Europe is 14 010 MW with a usable energy potential of 2 802 MW.

Objectives

The new technology developed by the LIFE GreenPower project will create significant savings of primary energy and CO₂ emissions in EIIs and it will eliminate the use of fluorinated gases. The Green Power technology will thus contribute to the growth of the waste heat recovery market in Europe, by demonstrating how low-grade unused waste heat can be efficiently converted into a required form of energy. The technology will be applicable for all EIIs and transferable to other sectors that produce low-grade waste heat. GreenPower works without harmful working mediums and fluids compared to best available techniques that use Organic Rankine Cycles, or heat pumps.

The specific project objectives are:

- Integrate and test the new technology on a pilot scale for the first time in the container glass industry, and promote its broad market uptake;

- Validate the estimated energy saving potential of 30% for compressed air generation for the bottle-blowing process that results from an increased efficiency of coupled machinery;
- Improve on existing technologies - such as Organic Rankine Cycle or Heat pumps- thanks to higher efficiency rates, lower costs, lower maintenance requirements and the elimination of fluorinated greenhouse gases;
- Demonstrate the low environmental impact on glass container production through a life-cycle analysis;
- To become Best Available Technology (BAT) in the Reference Document for the Manufacture of Glass and other EIIs

The GreenPower project will create new opportunities to meet EU climate objectives and boost eco-innovative businesses along various value chains. GreenPower will greatly increase the share of waste heat use in EIIs and will help to maintain and create employment. GreenPower contributes to the EU priority area of climate change mitigation and addresses two of the three EU policy priorities for the 2016 call, EIIs and fluorinated greenhouse gases.

Expected results: Technical-economic results

- The economic and technical viability of GreenPower demonstrated as a green, easy-to-use and low-risk technology compared to existing solutions with pay-back times of less than three years;
- The technology tested, with a waste heat input of 1 625 kW a net energy outcome of 180-250 kW of mechanical energy aiming at highest efficiency rates of more than 15%;
- GreenPower promoted for a wide market uptake by the European and global glass industry and by other EIIs, leading to up to 3 new installations during the project and identifying five European customers for European market uptake;

Environmental results

- Reduction of energy consumption for compressed air production by 30% through waste heat recovery, elimination of a cooling unit and increasing the efficiency of compressors by 10%;
- CO₂ emission savings of up to 1 566 tonnes per year for the pilot plant, respectively 6 222 tonnes per year after the end of the project with an installed capacity of 1 MW, and 1 369 kilotonnes per year five years after the end of the project with an installed capacity of 220 MW;
- 2.5 million kWh of primary energy savings per year, corresponding to a 2.7% reduction of the total energy consumption of the GHF plant;
- Reduction of the environmental footprint of a glass bottle over the full value chain based on the 'cradle to gate' life-cycle analysis approach for the GHF plant;
- Reduction of the further use of fluorinated greenhouse gases used by ORC units and heat pumps;

Market uptake

- Market uptake fostered by upscaling and replication scenarios for the glass and cement industry, including return-on-investment calculations based on the 30% primary energy savings for compressed air generation; and
- Large-scale dissemination actions, leveraging the project partners' contacts, and involving a wide stakeholder community.

Results

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Environmental issues addressed:

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	Glashütte Freital GmbH
Type of organisation	SME Small and medium sized enterprise
Description	Glashütte Freital (GHF), founded as Royal Glassworks in 1802, has more than 200 years of glassmaking experience and a long tradition of innovation. Since 2013, GHF has been owned by five shareholders. The company has 86 employees and generates a yearly turnover of €12 million. With a market share of 0.8% in Germany and a glass melter tank with a gross melting capacity of approximately 120 tonnes per day, GHF is one of the smallest glassworks, but also one of the most flexible.
Partners	TIS(Thermoelectric Industrial Solutions GmbH), Germany

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Administrative data:

Project reference	LIFE16 CCM/DE/000085
Duration	01-SEP-2017 to 28-FEB -2021
Total budget	2,125,468.00 €
EU contribution	1,236,151.00 €
Project location	Sachsen-Anhalt(Deutschland)

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