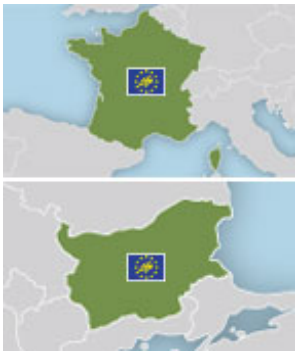

LIFE CleanOx - Cleanest oxy-fuel combustion technology with radiation based waste heat recovery for glass melting furnaces

LIFE16 CCM/BG/000059

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Project description:

Background

Glass is melted in large capacity regenerative furnaces that emit significant volumes of greenhouse gases, especially carbon dioxide (CO2). Glass is a material processed at very high temperatures in smelters heated by fuel combustion with hot air, then formed and packaged. The melting process is the most energy-intensive phase, representing 60-80% of total glass manufacturing energy consumption. Combustion of natural gas or oil and the decomposition of raw materials during the melting process produces CO2. Every year, the glass industry generates around 22 million tonnes of CO2 in Europe and 95 million tonnes worldwide.

Objectives

LIFE CleanOx aims to demonstrate an innovative radiative heat exchanger-based HeatOx solution, validated at a tableware glass plant, which facilitates waste heat recovery in oxy-fuel furnaces. The proposed technology uses radiation from a special ceramic installation directly heated by hot flue gas to preheat dioxide and natural gas optionally with steam-methane reformed natural gas.

The project aims to:

- Reduce by 30% CO2 emissions and by 90% nitrous oxide emitted by tableware glass production (compared to air combustion using a regenerative heat exchanger);

- Increase thermal efficiency in tableware glass plants (compared to air combustion using a regenerative heat exchanger: 30% less); and
- Reduce by 50-75% operating expenses ;
- Shorten payback time thus improving its long-term impact as well as its transferability throughout the glass sector.

This technology can be transferred to any industrial furnace irrespective of the type of application, provided it operates above 700°C (which includes the majority of active furnaces in Europe). The process is thus applicable to other sectors such as cement, steel and porcelain.

Expected results: The project is expected to reduce greenhouse gas emissions and to contribute to set up a low-carbon economy in the glass industry in line with the sectors (glass) and gases (CO2) covered by the EU Emissions Trading System. In particular, the following impacts on energy consumption and pollution:

1. Energy savings: 30% natural gas savings compared to state-of-the-art air-combustion, and savings of 18% compared to cold oxy-combustion; 2.1 GWh per year savings in oxygen production, equivalent to 108 kt of oil.

2. The pollutant emissions are expected to decrease:
- CO2: specific emissions can be reduced by 30%
- Nitrous oxide: emissions reduced by 90% by using pure oxygen instead of air as an oxidiser;

The LIFE CleanOx project is fully in line with the energy-intensive industries policy priority areas as well as the 2030 climate and energy framework which requires breakthrough innovations and cost-effective technologies to lower greenhouse gas emissions from sectors such as glass, cement and steel.

Results

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Environmental issues addressed:

Natura 2000 sites

Not applicable

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Beneficiaries:

Coordinator	Pasabahce Bulgaria EAD

Type of organisation	Large enterprise
Description	Pasabahce Bulgaria EAD Tableware Plant is a private commercial company, part of the iecam Group established in Turkey. It started production in 2005 and mainly serves European markets. It has an annual capacity of 50 000 tonnes, which corresponds to 180 million pieces a year.
Partners	Air Liquide S.A., France

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Administrative data:

Project reference	LIFE16 CCM/BG/000059
Duration	01-JUL-2017 to 30-JUN -2021
Total budget	2,794,283.00 €
EU contribution	1,244,869.00 €
Project location	Severen tsentralen(Bulgaria Balgarija) Île,de,France(France)

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