European Commission

INNOVATION FUND

Driving clean innovative technologies towards the market

BEAR: Hybrid regenerative glass furnace

The Innovation Fund is 100% funded by the EU Emissions Trading System

Project Summary

The BEAR project will demonstrate a first-of-a-kind hybrid end-fired regenerative furnace with a more than 40% electrical melting share and throughput capacity of 170 tons of glass per day. The furnace will be implemented in Steklarna Hrastnik's (SH) existing production site in Hrastnik, Slovenia. The hybrid furnace will replace the existing end-fired regenerative furnace for extra-white flint glass production, thereby resulting in a more than 50% reduction of natural gas consumption and up to 33% of greenhouse gas (GHG) emissions avoidance over the first ten years of operation.

COORDINATOR
Steklarna Hrastnik d.o.o.

BENEFICIARY
Kemijski inštitut (NIC)

LOCATION
Hrastnik, Slovenia

SECTOR
Glass, ceramics and construction material

GHG EMISSION AVOIDANCE
0.1 Mt CO_2 eq

AMOUNT OF INNOVATION FUND GRANT
EUR 2 238 000

RELEVANT COSTS
EUR 3 730 000

STARTING DATE
1 September 2022

PLANNED DATE OF ENTRY INTO OPERATION
Q1 2025

Climate Action

Leapfrogging 150 years of regenerative furnace innovation

The end fired regenerative furnace is a technology that has been used for over 150 years to make packaging glass. This technology is widely used in the glass industry and accounts for 75% of global production of container glass. However, it is not very energy efficient and has a high carbon footprint due to its reliance on fossil fuels. The alternative, less carbon intensive, technologies such as all-electric furnaces, have limitations that hinder an industry-wide acceptation across the container glass sector. To address this issue, the BEAR project aims to demonstrate a new hybrid regenerative furnace that combines the energy efficiency of all-electric furnaces with the operational flexibility of conventional regenerative furnaces.

With the envisioned hybridisation, the project aims the increase energy share of electrical boosting from the conventional 5-10% of end-fired regenerative furnaces to beyond 40%. This will enable SH's production site to reduce its natural gas consumption by more than 50% and avoid 0.1 Mt CO2 eq over the first ten years of operation. This is enough to offset the total household GHG emissions of the Zasavje region (>20 000 inhabitants), where SH resides, for more than one year.

Aligning the container glass sector with the green transition

The electrification of the container glass sector, with the adaptation of the hybrid regenerative furnace, will enable to align the glass melting process with the availability of renewable energy sources (RES). Moreover, with the proposed solution local RES can be coupled directly to the melting process, as planned on the project site. Thus, a sector wide uptake of the hybrid regenerative furnace would significantly increase the resilience and security of the glass manufacturing process in terms of energy supply.

Just transition of a coal region

With BEAR, SH aims to replace the existing regenerative furnace for extra-white flint glass production at one of its two sites. Both production sites are in Zasavje, a Slovenian coal region in transition, with a high unemployment rate. SH accounts for roughly 5% of jobs in the region and represents more than 10% of the region's GDP. The proposed investment in sustainable production technologies is expected to have a great impact on the local economy by retaining current jobs and creating new ones. Furthermore, with its coupling of innovative technologies and local RES, the project will serve as a model for decarbonisation to other energy intensive industries in the region.

Existing end-fired regerative furnace