



## H-REII DEMO Project

Institutional actions and policies to reduce CO2 emissions through energy recovery process in energy intensive industries - DEMO (Integrated fume depuration and heat recovery system in energy intensive industries)

energy consumption

energy efficiency

heat recovery

### PROJECT DESCRIPTION

The H-REII DEMO project represents the prosecution of the energy requalification initiative promoted by the LIFE-H REII project. The pilot project H-REII addressed the question of heat recovery in energy intensive industries. Its main purpose was the promotion of actions in support of innovative solutions for the recovery and energy valorization of the effluents in the energy intensive industries and the quantification of the potentially avoided CO<sub>2</sub> emissions. As for the H-REII DEMO project, during the development phase it experienced on the field what already designed and tested during H-REII and has achieved excellent results, crossing national boundaries to realize in Germany a first pilot plant for heat recovery in the steel industry.



### OBJECTIVES

H-REII DEMO's main objectives can be summarized as follows:

- extending to the European level the policy achievements obtained at national level within the H-REII project;
- developing the **first prototype, in the steel industry, of a heat recovery in Electric Arc Furnace (EAF) using ORC (Organic Rankine Cycle) technology**, fully integrated into a fume extraction system;
- encouraging the creation of a European Technology Platform on energy efficiency and environmental sustainability in the industry, thanks to a strong network of contacts and participation of the project partners in the dedicated, national and European working groups;
- promoting guidelines in order to amend the existing BREFs (Best Available Techniques reference documents) with the addition of heat recovery using ORC technology;
- implementing an intense dissemination activity at EU level.

### PROJECT PHASES

The H-REII DEMO project allowed the installation of the first prototype of a heat recovery system with ORC technology in an EAF in the steel industry. This recovery system, which is completely integrated into the fume extraction plant, uses the water steam produced in the process by the waste fumes.

This integration helped to decrease or even avoid electricity consumption in the fume extraction plant contributing to reduce CO<sub>2</sub> emissions and negative environmental impacts. H-REII DEMO has been developed through 9 actions; the main milestones of the project can be summarized as follows:



- 1 installation of a DEMO plant involving an innovative and integrated system of fumes depuration and heat recovery from process with ORC technology in a leading steelmaking company;
- 2 evaluation of the heat recovery potential for the analysis of electricity valorization in different energy intensive sectors, extending the estimated potential to one or more enterprises of an entire industrial sector;
- 3 promotion of the heat recovery at policy and regulatory levels, through monitoring existing legislation and producing a model for the environmental and energy authorization process for heat recovery plants aimed at standardizing an uncertain and fragmented regulatory scenario at EU level;
- 4 proposal of guidelines in order to amend the existing BREFs with the addition of heat recovery using ORC technology;
- 5 intense dissemination at EU level.

Moreover, in order to further support energy efficiency in the industrial process, the H-REII DEMO project promoted initiatives focused on setting European and national level policy toolkits in the field of heat recovery.

## PROJECT RESULTS

Many are the achievements and deliverables produced during the H-REII DEMO project.

Among the most important results there is the construction in Germany (in Riesa), at the steel mill Elbe Stahlwerke Feralpi GmbH, of the **pilot heat recovery plant using ORC technology in EAF**. In particular, the achieved benefits include the following:

- the implementation of specific know-how for further applications in various energy intensive industrial processes in order to strengthen the European leadership in the sector of integrated mining facilities;
- the calculated heat recovery potential in the investigated sectors (iron, steel, cement, glass) with reference to the EU 27 territory, accounts – based on the hours worked (h) – to approximately **12.778 GWh/yr of electricity in case of 5000 h/yr, meaning 4.766 [10<sup>3</sup> tCO<sub>2</sub>/yr] of emissions avoided, and 20.444 GWh of electricity in case of 8000 h/yr, meaning 7.626 [10<sup>3</sup> tCO<sub>2</sub>/yr] emissions avoided.**

Other achieved results:

- development of the analytical document "[Contribute to the EU Energy Efficiency Action Plan](#)";
- contribution to the national action plan: "[Contribute to the National Energy Action Plan](#)" (available in Italian);
- updating of the [national regulatory framework on policy to support electricity generation from waste heat recovery](#);
- preparation of the [Test on site report](#) of the pilot plant built in Germany;
- development of a [performance analysis](#) collecting the data and providing a performance analysis of the heat recovery system applied in the pilot plant.

The main long term benefits from H-REII DEMO are:

- the opportunity for greater environmental and energy sustainability of industrial processes with positive implications in terms of increased market competitiveness of the energy intensive industries;
- the occasion to develop industrial policy relaunching investments in manufacturing sectors which could involve different actors of the industrial supply chain;
- an effective tool to meet the objectives of energy efficiency and environmental protection at national and European levels;
- the opportunity to promote specific actions of research and development aimed at strengthening a position of European leadership turning into high export potential.



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**Acronym**

H-REII DEMO

**Number of reference**

LIFE10 ENV/IT/000397

**Reference Programme**

LIFE

**Beneficiary Coordinator**

TURBODEN Srl

**EU contribution**

851.938,00

**Call Year**

2010

**Start Year**

2012

**End Year**

2014

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