

Retrofitting Equipment for Efficient Use of Variable Feedstock in Metal Making Processes - REVaMP

H2020-NMBP-ST-IND-2018-2020 / H2020-NMBP-SPIRE-2019

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Release of project web site, press releases including a project leaflet

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Dissemination level

PU public CO Confidential, only for members of the consortium (incl. the Commission Services) 

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1. About REVaMP

The main objective of the project “Retrofitting Equipment for Efficient Use of Variable Feedstock in Metal Making Processes” (REVaMP) is to develop, adapt and apply novel retrofitting technologies to cope with the increasing variability and to ensure an efficient use of the feedstock in terms of materials and energy.

For this purpose, existing metal production plants shall be retrofitted with appropriate sensors for scrap analysis and furnace operation. Furthermore, the selection of the optimal feedstock in terms of material and energy efficiency shall be improved by application of appropriate process control and decision support tools. Also, a solid scrap preheating system operated with waste derived fuel shall increase the energy efficiency of the melting processes. To monitor and control the process behaviour in an optimal way, model-based software tools will be developed and applied.

The retrofitting solutions will be exemplarily demonstrated within three different use cases from the metal making industry, namely electric and oxygen steelmaking, aluminium refining and lead recycling. The performance of the different technologies will be assessed, and the benefits will be evaluated in terms of economic and ecological effects, as well as cross-sectorial applicability in other process industries.

2. Introduction and Summary

This deliverable D9.1, “Release of project web-site, press releases including a project leaflet”, is included in the work package WP 9 “Dissemination, valorisation and exploitation of the project results” of the project. The corresponding task is Task 9.2 “Publication and External Information Management”

BFI with support of all partners designed a project leaflet and established a project website with a public part containing key project information and results (as they appear). For exchange of information and data among the project partners a separate platform was established. Furthermore, several partners published first press releases to inform their customers and interested stakeholders about the start of the REVaMP project.

3. Project Web Site

A customised project web site providing general information on the project has been designed and is hosted by the project coordinator BFI. It is accessible for public under the URL www.revamp-project.eu. The main menu of the web site is shown in **Fig. 1**.

Under the folder “Objectives” information on the general objectives of the project is provided. The folder “Project Brief” lists the main administrative information on the project. Under the folder “Partners” a brief description of the project partners with the location of the companies across Europe is given. Also links to the web sites of each partner are provided.

The folder “Use cases” provides information as well as illustrating photos and graphs on the three use cases within the project, which come from the process industry sectors of Aluminium refining, Liquid steelmaking and Lead production. In addition, the “Work programme” of the project is sketched.



Fig. 1: Home page of the project web site “revamp-project.eu” with structure

In the “Download Area”, relevant documents for public access can be downloaded. So far only the project leaflet can be found here. In the future, all public deliverables and also publications will be made accessible. In addition, the web site will be extended by an area where dissemination events like workshops etc. will be announced. In this respect, the web site is a living tool for supporting the dissemination activities of the project.

Finally contact information as well as a data protection declaration and imprint information are provided.

The web site www.revamp-project.eu will also be linked to the domain of A.SPIRE. Under their web site www.spire2030.eu information on all already finished and currently running Horizon 2020 projects under the PPP SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) with links to the individual project web sites is provided.

Furthermore, the REVaMP project has been published on the CORDIS web site of the European Commission. Under the URL <https://cordis.europa.eu/project/rcn/224833/en>, the CORDIS’ “EU research results” service provides general information on the project as well as the project objectives, written by CORDIS science editors, as well as contact data of the project partners. In the further evolution of the project, also “report summaries” and “results in brief” that come from the publishable summaries of periodic and final reports submitted by the project participants and approved by the project officer will be published on this web site.

For exchange of information and data among the project partners a separate platform was established by BFI, which is only accessible for the persons assigned by the different project partners. It is based on the data exchange platform tool REDMINE. Here all information and presentations of the project meetings, as well as all drafts of deliverables and reports can be up- and downloaded. Furthermore, also process data which can be assessed by all project partners will be uploaded to this platform.

4. Press releases and social media

The start of the REVaMP project in January 2020 has been notified in several press releases on the homepages and in publications of the different partners. In detail the following publications can so far be mentioned:

BFI

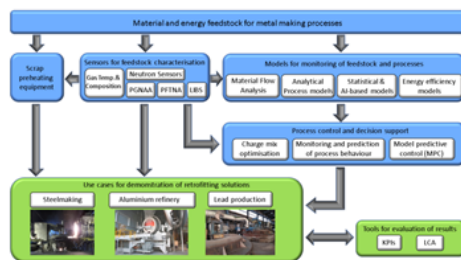
- Notification of the project kick-off on the home page of BFI (www.bfi.de) under <http://www.bfi.de/en/2020/02/21/kick-off-meeting-revamp-in-brussels/>
- The project was published by the coordinator on ResearchGate under <https://www.researchgate.net/project/Retrofitting-Equipment-for-Efficient-Use-of-Variable-Feedstock-in-Metal-Making-Processes-REVaMP>
- A so-called Factsheet of the REVaMP project was published in the company brochure “Factsheets on BFI research projects 2020”, which was published in January 2020, see Fig. 2.

REVaMP



VDEh-Betriebsforschungsinstitut GmbH

Retrofitting Equipment for Efficient Use of Variable Feedstock in Metal Making Processes



Overview on different tools and methodologies which will be adapted and retrofitted to improve energy and material efficiency of metal making processes



Neutron activation sensor to analyse scrap bulk composition directly in the container during delivery

Initial situation

- In metal making processes, metallic scraps from end of life goods are recycled and used as secondary raw materials, which is both ecologically and commercially beneficial.
- The increasing amounts of scrap in the feedstock bears challenges, since the composition and meltdown energy and thus the value in use can vary significantly.
- Metal production plants need to be retrofitted with appropriate sensors for scrap analysis, control tools for furnace operation, to cope with the varying conditions of the feedstock.

Working points in the project

- Application of novel sensors for characterisation of metal scrap regarding composition
- Setup of model-based monitoring and control systems to optimise the processes for metal production at varying feedstocks
- Implementation, test and evaluation of retrofitting technologies in three different industrial use cases: Steelmaking, Aluminium refining and Lead recycling

Expected results

- Reduced electrical and chemical energy consumption for meltdown and refining processes
- Increased metallic yield
- Reduced CO₂ emissions by increased production of high quality grades from secondary raw materials
- Less downgrading by improved characterisation of metal scrap
- Increased overall productivity

Partners



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Fig. 2: BFI Factsheet of the REVaMP project



AZTERLAN

- The REVaMP project has been added to the list of projects on the AZTERLAN web page, with a brief description in Spanish, Basque and English.
<http://www.azterlan.es/es/proyectos.html>
- The launching of the REVaMP project has been announced in the AZTERLAN social media under LinkedIn.
https://www.linkedin.com/posts/ik4-azterlan_revamp-acero-aluminio-activity-6627572936192724993-60cB
- In a brief period, Azterlan plans a press release in “Empresa XXI”, a local industry journal in the Basque Country (Es).

SIDENOR

- The launching of the REVaMP project has been announced on the homepage of Sidenor under
<https://www.sidenor.com/en/approval-of-the-revamp-project-with-participation-of-sidenor/>

REFIAL

- The launching of the REVaMP project has been announced on the Otua Group web page under <https://www.grupo-otua.com/en/press/150-project-revamp>

RWTH Aachen

- The launching of the REVaMP project has been announced on the homepage of RWTH Aachen University under
<https://www.iob.rwth-aachen.de/kick-off-des-revamp-projekts-in-bruessel/>
and under LinkedIn under
<https://www.linkedin.com/feed/update/urn:li:activity:6628257349846999040>
- The REVaMP project has been added to the list of projects on the RWTH Aachen – Institute for Industrial Furnace Technology web page, with a brief description in German and English.
<https://www.iob.rwth-aachen.de/forschung/energie-und-stoffbilanzen/horizon-2020-projekt-revamp/>

5. Project leaflet

In addition to the project web site, a project leaflet has been designed to promote the projects' mission and expected outcomes. On two pages, the most important information on the project as general description, objectives, project brief, partners and use cases are briefly described. The leaflet is shown in **Fig. 3 and 4**. It was provided to all project partners for printing and using as brochure for advertisement and distribution among partners and customers at workshops and events organized by REVaMP and at external events such as conferences, to raise awareness of the aims and topics of the REVaMP project among the stakeholders of the process industry in Europe. As mentioned above, the project leaflet can also be downloaded from the project web site.

Objectives

The main objective of the REVaMP project is to develop, adapt and apply novel retrofitting technologies to cope with the increasing variability and to ensure an efficient use of the feedstock in the metal making industry in terms of materials and energy. This will be exemplarily demonstrated within three different use cases from electric and oxygen steelmaking, aluminium refining and lead recycling. The performance of the different technologies will be assessed, and the benefits will be quantified.

Expected Results

The development, adaptation and application of novel retrofitting technologies to cope with the increasing feedstock variability

- Novel sensors for characterisation of metal scrap regarding chemical composition
- Metal scrap preheating system operated with waste derived fuel
- Software tools to model the operational input conditions of the processes
- Monitoring and control systems to optimise the processes for metal production at varying feedstocks

will ensure an efficient use of the feedstock in terms of materials and energy, achieving reliable product quality at higher productivity and a lower carbon footprint.



- **H2020 Call:** CE-SPIRE-05-2019
- **Start date:** 2020-01-01
- **Duration:** 42 Months
- **Type:** Innovative Action
- **Budget:** 9,9 M€
- **Coordinator:** BFI
- **Contact:** bernd.kleimt@bfi.de



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RETROFITTING EQUIPMENT FOR EFFICIENT USE OF VARIABLE FEEDSTOCK IN METAL MAKING PROCESSES



www.revamp-project.eu




Fig. 3: First page of project leaflet




The Project

The REVAMP project

In the European process industries large amounts of energy and resources are used to produce millions of tonnes of materials each year. Especially in metal making processes, metallic scraps from end of life goods are recycled and used as secondary raw materials in the processes. Usage of scrap is both ecologically and commercially beneficial, since it reduces the depletion of natural resources like virgin ores and avoids landfill of wastes. Even more important, the energy consumption and the CO₂ emissions of the reduction processes of metal ores can be significantly lowered or even totally avoided when using recycled materials as feedstock.

However, the metal production facilities are facing nowadays an increasing variability in material and energy feedstock. To cope with this challenge, existing metal production plants need to be retrofitted with appropriate sensors for scrap analysis and furnace operation. The selection of the optimal feedstock in terms of material and energy efficiency has to be improved by application of appropriate process control and decision support tools. Also, solid scrap preheating systems can increase the energy efficiency of the melting processes. To monitor and control the process behaviour in an optimal way, model-based software tools have to be developed and applied.



Use Cases

Aluminium refining


In aluminium refining, different kinds of old aluminium scrap are melted to produce, mostly, casting alloys for foundries, supplied according to standards and/or customer specifications. In one of the refining plants novel sensors for analysis of the incoming scrap types will be applied. In the second plant a sensorised scrap preheating system will be installed. Both plants will be equipped with model predictive control and decision support systems to optimise melting processes, for varying charge mix and energy efficiency, respectively.

Liquid steelmaking

In liquid steelmaking, scrap is one of the most important metallic input materials. Novel sensors for characterisation of the composition of different scrap types will be applied, to enable the selection of the quality and cost optimal scrap mix. Decision support and model-based control tools will allow to operate the melting processes in oxygen and electric steelmaking in an energy and resource efficient way.

Lead production

The lead production process is based on the recycling of lead batteries and other lead containing scrap. Novel sensors will be applied for monitoring of the pyrometallurgical process and for scrap characterisation. Furthermore model-based monitoring and control tools will be applied to improve the process efficiency.



Consortium

Industries

Global players from the aluminium industry, the steel industry and the lead production industry provide their processes and infra-structure for validation of the retrofitting solutions in different industrial environments: Grupal Art and Refial in Spain (Aluminium); ArcelorMittal Bremen, Germany, and Sidenor, Spain (Steel); Exide in Spain (Lead).

Research Institutes & Universities

The scientific project partners provide deep knowledge and expertise in the fields of sensor development as well as in modelling, control and optimisation of metal making and recycling processes: VDEh-Betriebs-forschungsinstitut (BFI), Fraunhofer Institute for Laser Technology (ILT) and RWTH Aachen in Germany, National Centre for Nuclear Research (NCBJ) in Poland, and Azterlan, Eurecat and Cartif in Spain.

Technology providing companies

The retrofitting equipment developed in the project will be exploited by four companies (three of them SMEs) providing sensor technology and plant equipment: LSA in Germany will provide a novel laser-based sensor; SYSKON and POLON in Poland a neutron activation sensor for scrap characterisation. GHI Homos in Spain will provide the equipment for Aluminium scrap preheating and smart furnace sensing.

Fig. 4: Second page of project leaflet