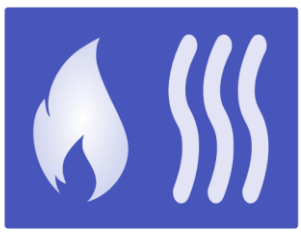

E-ECO DOWNSTREAM

Development of Heating Technologies for the Efficient Renewable Energy Consumption of CO_2-Neutral Downstream-Processes

Dissemination, Exploitation and Communication Project Website

Deliverable D6.2

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Table of content

1. Introduction

1.1 Purpose and scope of the present document

Dissemination and Communication play an extremely important role in the success of a project funded by the European Union (EU). In part, to make external stakeholders aware of the project potential and relevant outcomes as well as to maximize project outreach by ensuring that its objectives, activities and results are known to the relevant audience.

Therefore, the project website is setup as part of the communication activities. The website will be regularly updated to establish the project's public presence during the project and beyond.

This document (Deliverable D6.2 – Communication activities, project website) describes the structure, functions and contents of the website to present the project, its progress and its publishable results. Additionally links to consortium partners' websites and information about upcoming events like workshops and conference participations as well as scientific publications are available here.

The E-ECO Downstream website is accessible at the following URL link:

https://e-eco-downstream.eu/

Scope of the website

The E-ECO Downstream website is the principal source of information regarding the project, including scope, framework, consortium, and activities for the target audiences of the E-ECO Downstream project. It will function as a central hub for distribution and interactivity, both with its own content and through links to other websites or platforms. It will also act as a central repository for E-ECO Downstream deliverables, publication, documents and other material. As the project's major communication tool, a link to the website will be prominently displayed on all project-related communication materials. The website will, therefore, also be used for networking purposes.

Scope of WP6

The general idea of WP6 is to ensure wide dissemination and significant impact of the results of E-ECO Downstream to a large audience, including scientific and industrial communities and the general public. To achieve this, a common set of dissemination materials and media will be made available, a specific strategy will be implemented, and active involvement of all project participants will be required.

In the first six months of the project, an initial set of communication material is being created, including document and presentation templates. The E-ECO Downstream project website is also complimented with a social media channel in LinkedIn, which for easy access are linked to each other.

1.2 Structure of the document

This document (Deliverable D6.2 – Communication activities, project website) is divided into three main sections:

- Section 1 introduces the context of this document and its objectives.
- Section 2 defines the target audience for the project website.
- Section 3 describes the structure, functions and contents of the website at the status of the first half year.

2. Target Audience for project website

The E-ECO Downstream website is setup to engage both the project' stakeholders (see also deliverable D6.1) and members of the general public affected by and/or interested in efficient decarbonisation technology for steel mills including hot rolling; more specifically producers with reheating furnaces in the downstream process of steelmaking.

Therefore, the whole steel community and its value chain, academic and professional audiences (such as scientific communities, research centres, and public organisations) will be able to profit from the published content, as well as other European projects, and discover synergies and potential collaboration avenues. Journalists will discover recent information such as news, upcoming events, and press releases.

To increase the awareness of the project, SSSA and BFI will share the project logo and the link to the dedicated project website to be added on the partner's websites. The partners will be invited to translate key information about the project in their respective national languages. This will also increase the reach of the target audience.

3. Website structure

The website presents all relevant information on the project. This includes the project overview and outcome, events, news and available material and results from the project and contact.

Certain intermediate deliverables are made available to the public, depending on the information contained. Presentations and publications are made available on the website in the section material and results, when possible.

The website will be constantly updated to ensure the timely dissemination of information about the project.

Structure of the website

In the following the structure and contents of the webpage are described.

Note: instructions in this description are *written in italics*.

General:

Hosting of a safe webpage: https:\\

Main Structure of every page

Main menu is at top of homepage and sub-pages as shown in **Fig. 1** from webpage planning.

This **main / top menu** contains sub-menus as pulldown:

E-ECO Downstream -Logo is button for link to Homepage on every page.

The sub-menu leads to the topics of webpages:

- E-ECO-Downstream-Logo-> Button for link to Homepage
- Project
  - Mission
  - Objectives
  - Work program
  - Project Brief
  - Project team
- Results
  - Deliverable downloads
  - Publications
- Events&Material
  - Event list
  - Material downloads
- Contact&Imprint
  - Contact -> info@e-eco-downstream.eu
  - Imprint: BFI imprint as BFI hosts the website

- Privacy policy

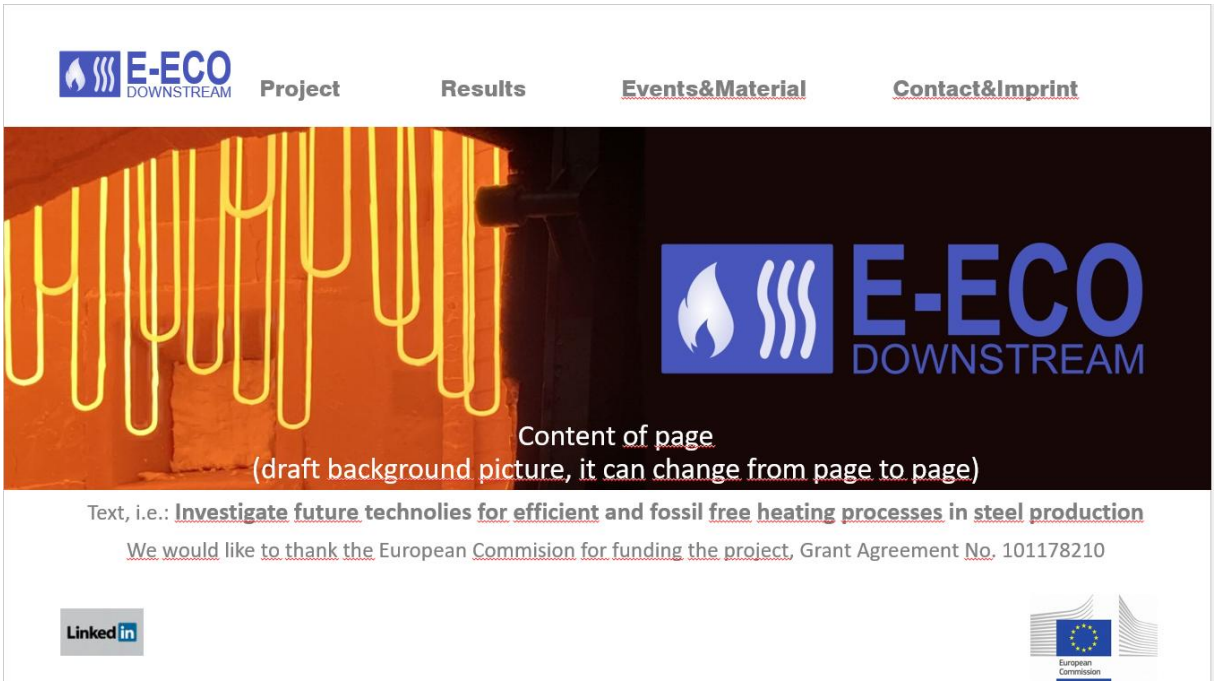

Fig. 1: Webpage planning - homepage

Bottom Menu at every webpage

- Logo LinkedIn -> Button for link to **E-Eco Downstream-Account** on LinkedIn webpages:
  LinkedIn https://www.linkedin.com/company/e-eco-downstream-project
- Logo EU -> Button for link to
  EU-Webpage https://research-and-innovation.ec.europa.eu/index_en

Content 1st Page/Homepage

Homepage (1st Page) with general statement to project:

Foto from ADI

Text homepage:

Improve technology and product quality to save resources for a fossil free steel production

Intelligent technologies enable to produce products at high quality and efficiency on the pathway to green steel and to completely avoid fossil CO_2 emissions in industry. European steel industry has continuously improved heating processes as a key component in production by research and piloting to increase product quality and save resources.

The Horizon Europe Project

contributes to this ambition.

Insert buttons as direct link to subpages:

Button: Mission Button: Objectives

We would like to thank the European Union for the funding of this Horizon Europe Project, Grant Agreement No. 101178210.

Structure of sub-pages:

In the following topics and contents are described for the setup of webpages. The contents are related to the sub-pages connected to the pulldown menu on top of every page:

In general pages with picture or figure.

Project (Menu)

Main menu point.

Pulldown-menu:

- Mission
- Objectives and Method
- Work-program and Outcome
- Project brief
- Project team

Project *(sub-page)*

Setup of page is planned and not available with D6.2

Figure from project partner

A project overview is given on the following pages regarding

- Mission
- Objectives and Method
- Work-program and Outcome
- Project brief
- Project team

Below the following descriptions are arranged one below the other but are linked and navigated by the sub-menu of the "Project":

Mission *(sub-page)*

Picture of furnace

CO_2 has a main contribution to the overall greenhouse gas emissions (GHG), leading to climate changes. To combat the resulting global warming, the EU aims for a GHG-emission reduction of 55 % by 2030 and climate neutrality until 2050. To reach these ambitious goals it is, amongst others, mandatory to move the industry away from fossil fuels. This implies an unprecedented transformation of almost the entire basic process industry.

Steel production represents one of the most energy and CO_2-intensive industries. Up to now, measures to tackle the decarbonization of the steel industry have been predominantly emphasized on the upstream processes. Despite lower CO_2 emissions a noticeable shift emerged in decarbonization strategies to account for downstream processes as well, e.g. in reheating and heat treatment furnaces. The technologies for emission reduction so far were based on energy efficiency, like off-gas heat recovery, oxyfuel-combustion, improved insulation and increased efficiency in logistics, energy- and gas management systems. Nevertheless, to reach zero GHG emissions new technologies must be developed and implemented.

The main objective of E-ECO Downstream is the efficient utilization of hydrogen, biogas and electricity to substitute carbon-based fuels to allow for a significantly lower carbon footprint in steel industry. Furthermore, fuel substitutions will result in different waste heat streams and in consequence demand for new technologies to reduce energy loss and recuperate waste heat.

Objectives and Method *(sub-page)*

Objectives

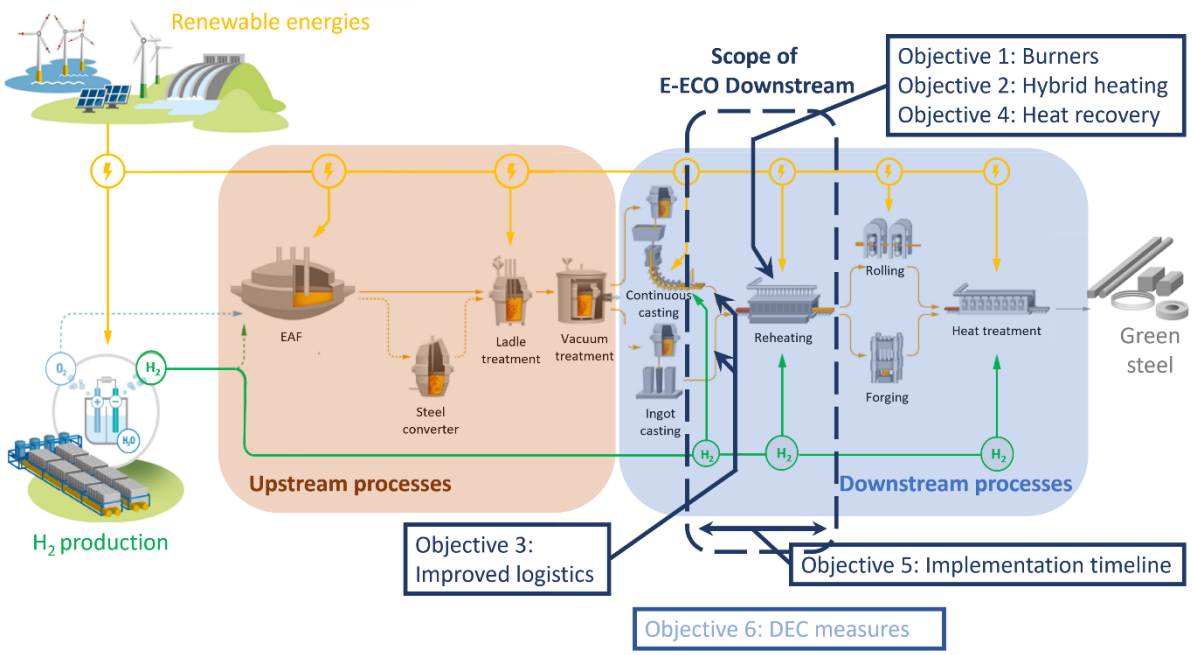

Fig. 2: E-ECO Downstream Objectives

The research work distinguishes four technical research topics:

- Fuel flexible burners for reheating furnaces
- Hybrid heating in reheating furnaces
- Improved logistic systems for increased efficiency
- Heat recovery for

as depicted in fig. 2. Aside of the final assessment, dissemination and exploitation measures the project consists of six specific working objectives:

Objective 1: Enable currently installed burners to utilize green fuels

The challenge in flexible combustion systems, that allow for blending different fuel gases (renewable and fossil), is the specification of burner for certain fuels. Instead of replacing entire existing burner systems it is aimed to replace burner components by newly 3D-printed designs The enable green fuel utilization in reheating furnaces. The analysis and parametric optimal redesign of nozzles, flame stabilizers and swirl plates will be supported by active learning techniques.

Objective 2: Elaboration of hybrid heating concepts to increase fuel flexibility

The downstream reheating processes before further processing is crucial for the final product quality while being very energy-intensive at the same time. Electrical inductive heating represents an alternative to combustion heating but lacks the high temperatures necessary to be applied in all formats and steel grades. A hybrid heating concept will be developed to reduce CO_2 emission by combining electric heating and hydrogen

combustion. Testing and assessment in a pilot walking beam furnace will provide the required KPIs for stakeholders to make informed decisions towards sustainable carbon neutral solutions.

Objective 3: Improved logistics to decrease heat loss and increase energy efficiency

Hot charging is an option for reducing CO_2 emissions when casting and hot rolling mill are directly connected. To make the application available for disconnected systems, a logistical solution is sought. Hot charge technologies and their logistical handling are investigated, thermal losses modelled and loss reducing techniques identified. Finally, fuel savings and CO_2 emission reduction will be demonstrated with respect to production mixes and management of rolling programs.

Objective 4: Adapt waste heat recovery systems to future fuels boundary conditions for increased energy efficiency

Due to the change in gas compositions towards hydrogen fuels, the H_2O content in the exhaust gas will increase and therefore it's reactivity and thus, modifications to the existing recuperators and regenerator systems for heat recovery are required. The change in waste heat streams in the future downstream processes needs to be incorporated in decarbonisation concepts to guarantee overall efficient (re-)heating.

Objective 5: Implementation timeline

The developed and investigated solutions will be assessed from a technical, economic, and ecological point of view to evaluate their applicability. An implementation timeline will be generated on a European level for the investigated decarbonization technologies/solutions and process adaptations to enhance existing steel making plants for the transition to decarbonisation.

Objective 6: Dissemination of project results among relevant stakeholders to maximize impact and benefits

Based on the identification of primary and secondary target groups worth exploitation, results will be disseminated following a defined dissemination plan. Furthermore, related or competitive technology trends will be carefully monitored and a stakeholder analysis will be performed and revised along the project. Thus, the benefits of the results can be maximised by improving the ecological, technological, economic and social impacts.

Method

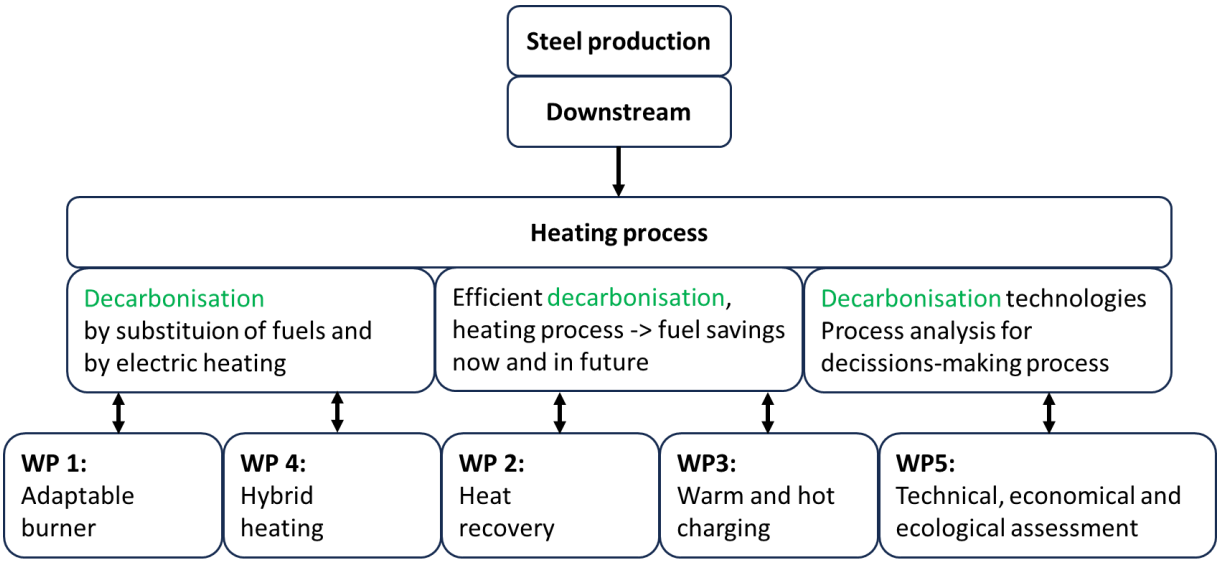

Fig. 3: E-ECO Downstream mind map modified

The methodology of E-ECO Downstream consists of cost-efficient and flexible optimization strategies to decarbonize downstream steel making processes during the transition to fossil free heating of reheating furnaces.

According to the Mind map (see Fig. 3), solutions will be developed by applying computational simulations, experimental investigations in laboratories and at testing facilities under near-service conditions as well as theoretical studies based on real operation data from industrial plants.

The focus of the investigation and targeted solutions are:

- 1. Process adaptation to new fuels.
- 2. Ensuring product quality and productivity.
- 3. Fuel flexibility.
- 4. Increased energy efficiency.

Methods for objective 1: To enable currently installed burners to utilize green fuels new components for the burners will be designed, 3-D printed, integrated into currently used standard burners and investigated under pilot and/or full scale conditions. The development process will include the application of new high temperature resistant metal powders for 3-D printing and investigations in printing and manufacturing these burner parts. The applied methods are:

- Numerical simulation and modelling of heat transfer, fluid dynamics, combustion and thermodynamics. The simulation studies for burner development and 3-D printing are accompanied by artificial intelligence systems.

- Experimental investigations of fuel flexible burners at pilot scale and/or full scale conditions experiments to investigate and understand the influence of hydrogen combustion on product and furnace.

Methods for objective 2: For the elaboration of hybrid heating concepts to increase fuel flexibility. Electrical heating and H_2 combustion are investigated under full scale conditions in a pilot walking beam furnace. The applied methods are:

- Numerical simulations for heat transfer and process modelling.
- Experimental investigations of product heating at pilot or full scale conditions in a pilot walking beam furnace.
- Lab scale experiment and modelling for detailed understanding of hybrid heating influence on the product and furnace.

Methods for objective 3: The use of hot/warm charging to improve logistics and efficiency between casting and reheating furnace is investigated theoretically. The applied methods are:

- Thermodynamic and process modelling of hot/ warm charging for the plant configuration of producers in this project.

Methods for objective 4: To reevaluate and adapt waste heat recovery systems of reheating furnaces to future fuels to increased energy efficiency. The fuel transition will change the waste heat streams (in temperature, capacity, and composition) in future downstream processes. This will be done by process analysis focused on the involved industrial facilities, and development of concepts for waste heat recovery from the selected sources and pilot testing of recuperators and regenerators. The applied methods are:

- Thermodynamic modelling and process simulation of heat recovery systems for fuels in transition and future fuels.
- Experimental investigations of heat recovery from off-gas at pilot scale with new recuperator and regenerator system for fossil free fuels and oxidizers.

Methods for objective 5 for LCA and retrofit analysis by applying new technologies in European steel plants are mainly theoretical and analytical calculations and studies.

Work program and Outcomes *(sub-page)*

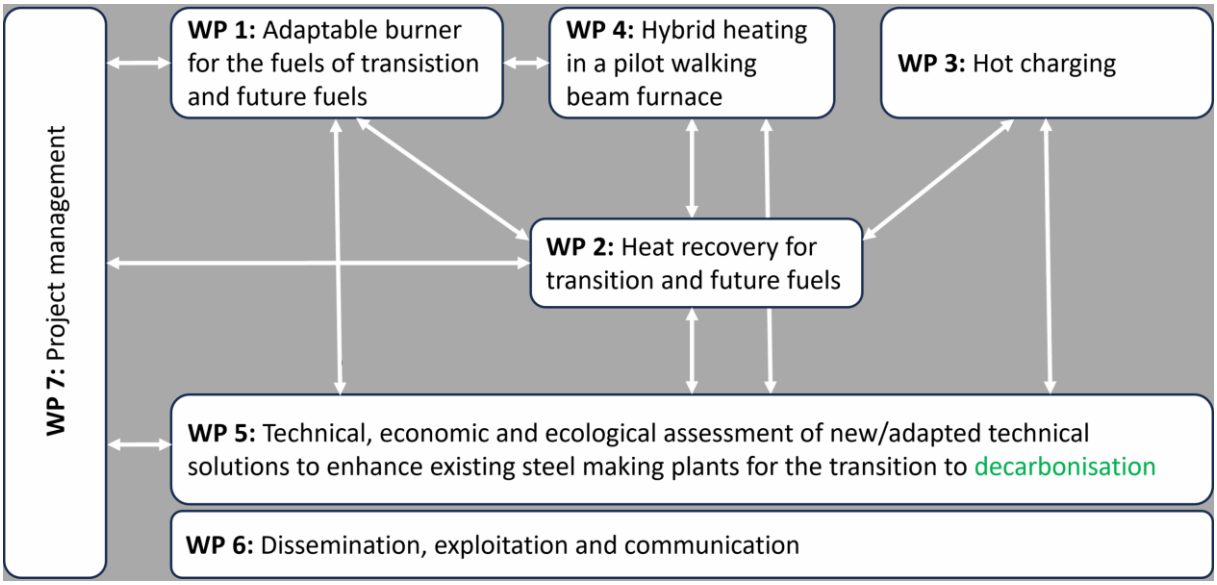

Fig. 4: E-ECO Downstream work program

Work program

E-ECO Downstream is structured systematically by incremental but iterative work phases and consists of 7 Work Packages (WPs). The WPs 1 – 4 are focussed on new and improved technical solutions and are dealing with decarbonization measures by enabling existing burners to new fuels (WP 1), increasing fuel flexibility (WP 4),energy efficiency (WP 3)and adapting existing waste heat recovery systems (WP 2) to the changing process conditions when using new fuels in the downstream processes. WP 5 will use results from the first four WPs for a technical, economic, and ecological assessment and will define an implementation timeline. The Dissemination, Exploitation and Communication WP (WP 6) is designed to maximise the impact of the results, whereas the project management & coordination (WP 7) will ensure efficient management of the project. Fig. 4 shows the structure of the project and the interrelation of the 7 WPs.

Outcomes

The expected outcomes of investigations and developments in the project are:

Outcome 1:
New products for low-cost retrofit of existing burners in RHFs to achieve fuel flexibility with renewable fuels in the future, including newly designed and 3D- printed burner components.

Outcome 2:
Demonstration of hybrid heating of different steel grades from two producers to give project partners insight in the combined effect of H_2 combustion and electrical resistive heating on the product. Important KPIs for steel industry stakeholders will be provided to make informed decisions in moving towards sustainable carbon neutral solutions.

Outcome 3:
Solutions such as adjusted and tested recuperator to adapt waste heat recovery to the changing operating conditions of downstream processes when using future fuel. In addition, scenario analyses concerning their feasibility and an evaluation of strategical investment opportunities.

Outcome 4:
Modelling study of warm and hot charging with hybrid heating to predict the CO_2 savings for producers. Theoretical analysis of production modification as relevant information for future decision-making processes in production planning.

Outcome 5:
Roadmap and implementation timeline as support for decision makers: Support of decision makers (policymakers and in industry) about possibilities for decarbonization of downstream processes. The support is based on detailed technology evaluation and process KPIs (focus for industrial decision makers), considering potential barriers and required boundary conditions (focus for policymakers).

Benefits for stakeholders

The benefits for E-ECO Downstream stakeholders are listed below:

Steel industry benefits:

- Hybrid heating will provide a flexible option to H_2 combustion (fuel flexibility) and CCS which will allow companies to see a viable CO_2 neutral solution (**Outcome 2**).
- Increased fuel flexibility by cost-efficient adaption of burners (**Outcome 1**).
- Logistical solutions for hot/warm charging to improve energy efficiency, cut cost and reduce CO_2 emissions (**Outcome 4**).
- Adaption of waste heat recovery to new fuels will increase energy efficiency and cost competitiveness when it is implemented directly during the planning of new plants (**Outcome 3**).

Manufacturers and H_2 supplier:

The new solutions will open new markets and bring decarbonization technologies to SMEs as customers (Outcome 1 and 2).

Scientists:

will push further RIA and IA based on the developed solutions and will transfer them to other applications and industries (all Outcomes).

Policymakers:

Support of decision makers and defining of boundary conditions for the steel industry to successfully decarbonize the downstream processes (Outcome 5).

Users:

will benefit from green steel to decarbonize their own products (Outcomes 1-4).

Project Brief *(sub-page)*

Figure

Title:

Development of heating technologies for the Efficient renewable Energy COnsumption of CO2-neutral DOWNSTREAM-processes

E-ECO Downstream

Term: 01.01.2025 – 30.06.2028

Duration: 42 months

GA number: 101178210

Coordinated by: SSSA, Pisa, Italy

Project team *(sub-page)*

The E-ECO Downstream consortium is composed of the following partners and their specific expertise with which they contribute to this project

SSSA (Pisa, Italy) – responsible for the coordination, research institute for production processes
Aciaierie d'Italia S.p.A. (Taranto, Italy) – steel producer
Feralpi Siderurgica S.p.A. (Lonato, Italy) – steel producer
Kanthal AB (Helander, Sweden) – supplier for resistive electric heaters systems
Kueppers Solutions GmbH (Dortmund, Germany) – supplier for burner and heat exchangers systems
Swerim AB (Lulea, Sweden) - research institute for steel production processes
VDEh-Betriebsforschungsinstitut GmbH (Duesseldorf, Germany) - research institute for steel production processes
VDM Metals International GmbH (Altena, Germany) – Ni-base powder producer

This group of dedicated producers, suppliers and research organisations with longstanding expertise in combustion, heating and steel processing.

The Consortium

Scuola Superiore di Studi Universitari e di Perfezionamento Sant'Anna (SSSA), Italy

Role in the project:

Prof. Valentina Colla from SSSA coordinates the project E-ECO Downstream.

Process analysis to develop concepts for heat recovery and assess feasibility and effects of hot charging. Scenario analyses considering future evolution of energy generation capabilities.
Key epxertise and equipment:
Process modelling and simulation via different dedicated simulations environment (e.g. Ansys and Comsol Multiphysics, OpenModelica, Aspen Plus). Modelling and assessment of hydrogen embrittlement phenomena in steel products. LCA analyses.

Link to partners website.

Acciaierie d'Italia S.p.a. (ADI), Italy

Acciaierie d'Italia S.p.A. in Amministrazione Straordinaria (ADI in A.S.) is one of the main Italian steel companies with an integrated steel route among the biggest in Europe. It is specialized in carbon steel flat products, with a rated production capacity close to 6 Mt of crude steel per year. ADI in A.S. is made up of three main facilities placed in Taranto, Genova and Novi Ligure and a series of other service centres in Italy and France. In 2021, ADI founded a new Research and Development centre equipped with 15 laboratories with more than 20 specialized researchers and technicians, that are involved in the chemical and physical analysis of materials and contribute to the green and digital transition of the steel sector through innovation, by internal activities and participating in several European funded projects.

Role in the project:
Study about the use of H_2 and biofuel (up to 100 %) in ADI's existing reheating furnace, considering specific consumption of these fuels, their effect on pollution emissions, and on product quality. In addition, a study on heat recovery and hot charging in ADI reheating furnaces.
Key expertise and equipment:
Support on definition of process parameter for simulation and experimental investigations. Lab equipment for material characterization as thermogravimetric analysis under relevant atmospheres and microscopy analysis on products. Support on evaluations on heat recovery and hot charging.

Link to partners website.

Feralpi Siderurgica S.p.A. (FER), Italy

Role in the project:
Study on waste heat recovery for heating and electricity generation regarding the entire steel plant and combining the holistic analysis with biofuel heating and increasing electrical consumption.
Key expertise and equipment:
Support on process parameter definition for simulation and experimental investigations. R&D departments for investigating energy use and generation, environmental impact, and lab for product quality analysis. Support on evaluations on heat recovery and hot charging.

Link to partners website.

Kanthal AB (KAN), Sweden

Role in the project:
Contribute with lab scale experiments, CFD modelling, element solution for the hybrid furnace and expertise in understanding and evaluating functionality under industrial operating conditions.
Key expertise and equipment:
Technology provider, heating element solutions for reheating furnaces. Expertise in the area of industrial heating technology solutions.

Link to partners website.

Küppers Solutions GmbH (KUP), Germany

Role in the project:
Consultant in design, development and manufacturing of 3D-printed burners and recuperators.
Key expertise and equipment:
Long term experience with 3D-printed burners and recuperators with investigation of material behaviour such as Ni-base alloys and ceramics.

Link to partners website.

Swerim AB (SWE), Sweden

Role in the project:
Conduct research on the topic of hybrid heating. This includes functionality, energy efficiency, heat transfer, energy demand, energy balance and material quality of the hybrid furnace by preparing for the tests, carrying out the tests and analyzing the outcome of the tests.
Key expertise and equipment:
The pilot WBF will be retrofitted to provide hybrid heating. Two zones heated by air-fuel combustion of hydrogen and soaking zone will be heated by resistive heating. Expertise in pilot infrastructure, pilot operation, material science, energy, and furnace technology.

Link to partners website.

VDEh-Betriebsforschungsinstitut GmbH (BFI), Germany

For more than 50 years VDEh-Betriebsforschungsinstitut GmbH (BFI) has been proposing and developing solutions to meet current and future R&D-challenges of steel and process industries. BFI is specialized and experienced in translating new findings into industrial practice.
As a non-profit research institute BFI has close contacts with producers, suppliers in steel and process industry as well as with research institutes and universities. Through BFI´s shareholder Steel Institute VDEh is connected close with the steel industry, its federations and associations. BFI addresses and focusses its work on emerging issues of major relevance in areas such as energy efficiency, process optimisation, measuring and instrumentation technology, and industry 4.0.
BFI is experienced in leading or joining powerful consortiums in relevant national or European research programmes and projects to tackle new research topics together with partners in industry, research and science.

Role in the project:
WP Leader of WPs 1, 5 and 7. Evaluation of high temperature degradation processes on products, burner and furnace materials, modelling of furnaces conditions under different heating conditions. Testing of burner in test rig at industrial scale, modelling of heating behaviour in test rig and industrial application.
Key expertise and equipment:
Lab equipment for and deep expertise in thermogravimetrical analysis under relevant atmospheres, descaler, AI assisted CFD simulation and modelling of burners and furnaces. Test rig for heating systems (gas burner, electric heating equipment) with measuring equipment (CCD camera, water cooled UV-camera, gas analysers, ...).

Link to partners website.

VDM Metals International GmbH (VDM), Germany

VDM Metals, based in Werdohl, is part of the Acerinox S.A. Group.
The company develops and manufactures nickel, cobalt, copper and zirconium alloys as well as high-alloy special stainless steels. For over 90 years, VDM Metals has been supplying sheet, strip, bar, wire, welding consumables and powder to customers in the chemical and plant engineering, power generation, oil and gas, electrical engineering and electronics, automotive and aerospace industries. VDM Metals employs around 2,000 people worldwide.

Role in the project:
Production and characterization of Ni-base powder alloys for AM process. Powder supply for AM-produced burner. Adjustment of alloy composition to improve high temperature properties.
Key expertise and equipment:
Expertise in high performance Ni-base alloys. ALD VIGA35 atomizer and state-of-the-art equipped powder laboratory (chemical composition, particle size distribution, morphology, flowability, apparent density). Development of new alloys and optimization of existing alloys according to required properties.

Link to partners website.

Events & Material (menu-point)

Events (*sub page*)

Previous and planned meetings, webinars and workshops are listed here.

Events

Planned Events

all events uniform with date, title, short description

Past Events

Example but content is not from E-ECO Downstream:

Latest event on top:

Project meeting 18 to 19 October 2022, city, country

The 2nd project meeting at BFI in Duesseldorf (Germany) took place on October 19 and 20, 2022. The State of the art-research and review, seminar series, a project workshop and further tasks were coordinated and defined in detail.

05.07.2022 Kick-off Meeting online

The 1st project and kick-off meeting was performed as a online meeting on July 5th 2022. The roadmap was set up, project topics were defined and tasks coordinated.

Material (*sub page*)

Contents from the project will be inserted here

Material

Example but content is not from E-ECO Downstream

Flyer: klick here *Link to Flyer*

Relevant presentations (*not available yet*)

Results (menu-point)

Results of all partners achieved and provided during the project.

Pulldown:

- **Deliverables** Link to Deliverables
- Publication

Deliverables & Milestones (sub-page)

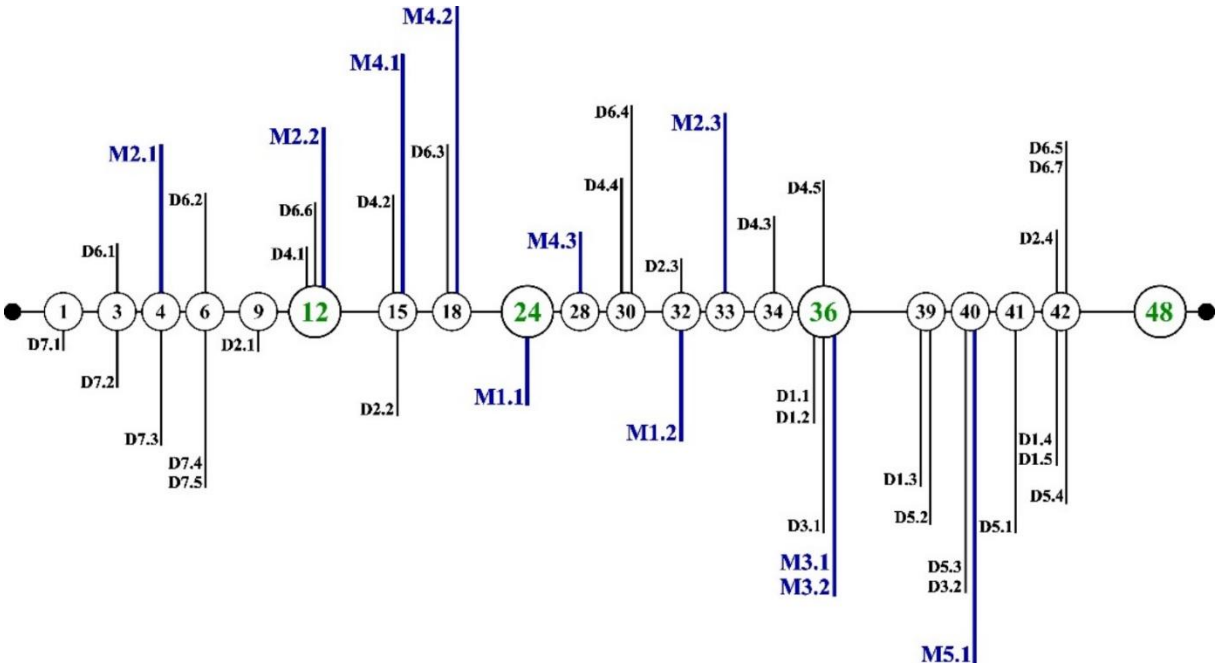

Fig. 5: Timeline of E-ECO Downstream

Deliverables: List with number and short title of deliverable

- Deliverables (Link to PDF) listed below each other

Milestones: List with number and short title of milestones

Publications (sub-page)

List of Figures

List of Tables

No tables in this document

List of acronyms and abbreviations

Acronym	Full Name
AB	Advisory Board
APCs	Associations, Platforms and Clusters
BFI	VDEH-Betriebsforschungsinstitut
BT	Businesses and Traders
CO	Communication Objective
CSP	Clean Steel Partnership
DO	Dissemination Objective
EAF	Electric Arc Furnace
EC	European Commission
ESTEP	European Steel Technology Platform
EU	European Union
HEI	High-Education Institution
HEU	Horizon Europe
HS	Hydrogen Supplier
KPI	Key Performance Indicator
OEM	Original Equipment Manufacturer
P	Policymakers
RTO	Research and Technology Organisation
SC	Scientific Community
S	Society
SI	Steel Industry
SSSA	Scuola Superiore Sant'Anna
STEM	Science, Technology, Engineering and Mathematics
TRL	Technology Readiness Level
U	Users
W	Workers
WP	Work Package