



Metallic Elements Dissipation Avoided by Life cycle design for Steel

Deliverable 8.2

DEC Plan – Version 1

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Abstract

The present document constitutes the deliverable D8.2 named “DEC Plan – Version 1”. The document describes the Dissemination, Exploitation and Communication activities. The document is based on the terms and conditions established in the Grant Agreement signed by the European Commission and the project coordinator, and its Annexes as well as other MEDALS specifications and requirements. The dissemination, communication and exploitation activities are being conducted in the framework of the EU horizon project entitled “Metallic Elements Dissipation Avoided by Life cycle design for Steel” (Project Acronym: MEDALS; Grant agreement no. No 101138516). The main objective of the task is to maximize the effects of the project knowledge and results to the wide range of industrial communities, companies and organizations, which share an interest in optimizing energy and resource efficiency in manufacturing. To align the activities to the actual progress of the MEDALS project, the plan will be reviewed, evaluated and modified annually.



1 Introduction

The main purpose of this deliverable D8.2 is to describe the communication, dissemination and exploitation strategy of the MEDALS project and to improve the visibility of the all the activities involved. This document includes a section on the context of the project and identifies the communication and dissemination objectives, the target groups and the key results. The document also defines the tools used to communicate with the audience and to disseminate the project's outcome. In addition, it specifies the responsibilities, policies and measures to assess the communication and dissemination activities.

The scope includes all actions taken in and outside the project in terms of knowledge dissemination and public communication and exploitation on the project and its results. During the project, the communication, dissemination and exploitation actions will be continuously monitored, and plans will be updated. Consequently, this document (D8.2) is not a fixed document, rather it is intended to be a living document in which information can be made available on a finer level of granularity through updates as the implementation of the project progresses and when significant changes occur. There is envisioned that four major versions of the communication, dissemination and exploitation plan will be prepared during the project lifespan. The timing of the major versions of the communication and dissemination and exploitation plan. The document will be updated with support of all project partners.

Version	Publication date	Change
D8.2	30.09.2024	First version M3
D8.3	30.04.2026	Second version M22



2 Communication, dissemination and exploitation strategy

2.1 Objectives

The communication and dissemination strategy aims to maximize the effects of the project knowledge and results to a wide range of industrial communities, companies and organizations, which share an interest in optimizing energy and resource efficiency in manufacturing. The main strategy is to progressively increase communication and dissemination efforts as project results are obtained. First communication and dissemination activities will tend to assure a wide awareness of the MEDALS project and later actions will tend to progressively create favourable conditions for exploitation actions after the end of the project.

Main objectives of the MEDALS's communication, dissemination and exploitation strategy are:

- To raise public awareness and promote the MEDALS project;
- To engage in a two-way dialogue with the scientific community, project stakeholders (partners, European Commission project officers, potential investors), end-users, policy-makers and the general public;
- To exchange experiences with projects and groups working in the field in order to join efforts, minimize redundancy and maximize potential;
- To disseminate the fundamental knowledge, the methodologies and technologies developed during the project;
- To pave the way for a successful commercial and non-commercial exploitation of the project outcomes.

2.2 Subject of dissemination

The following general subjects of dissemination have been identified:

- MEDALS project (general scope, coverage, goals and milestones and plans to reach them);
- interim results (reached objectives and achievements)
- Digitalization of industry (general ideas of production digitalization and use of supportive cognitive solutions)
- results, impacts and best practices of the MEDALS technologies (in respect of industrial IPR issues)
- MEDALS techniques and methodologies (in respect of IPR issues)
- MEDALS technologies (in respect of industrial IPR issues)



2.3 Target audience

In order to structure the communication, dissemination and exploitation activities and to be able to analyse the impact of these activities, a more detailed division of the target audience was developed. The main target groups of the communication, dissemination and exploitation activities are shown in **Table 1**.

Table 1. Target audience of the MEDALS project.

Target audience	Motivations
Project partners	The ideas, results and methodologies need to be shared among the project partners in order to improve the work process and utilize the transfer of best practices. The employees of the participating partners are important as their motivation and support will significantly affect the final performance and actual usability and acceptance of the developed solutions.
Potential end-users	Potential end-users should be targeted to pave the way for the potential further commercialisation of MEDALS technologies.
System integrators and ICT solution providers	System integrators and IT solution providers both actively support production digitalisation activities. The MEDALS best practices and impacts will promote adopted reference implementation and show the benefits of the production digitalization and adoption of cognitive solutions, scrap sorting and tramp removal processes and valorization of steelmaking residues using different methods as well as digital solutions, new sensors, big data analysis, advanced modelling and simulation and validation in relevant (industrial) environment
Industrial sector, Professional Associations	Targeting the industrial sector and professional associations will provide wider acknowledgment of the project results and will resolve in wider uptake of the general MEDALS ideas (production retrofitting, digitalization and cognitive solutions, scrap removal, recovery of tramp elements).
EU projects working in similar domain	Exchange the experiences and best practices among the projects or groups working on similar topics. Moreover, to identify synergies that could lead to a cooperation and improved uptake of the results.
EU and national/regional policy-makers	Policy-makers represent an important target group for the project as they can influence and support further upscaling and commercialisation of MEDALS ideas and developed technologies through public policies and directions.
Academic and research community	MEDALS practical application of the cognitive based solutions, scrap recovery, removal of tramp elements will provide important feedback to the scientists and researchers, about the usability and robustness of the adopted concepts, methods and algorithms.
General public	To a lesser extent, the public will be targeted. However, it is important to inform the general public about the research funded by the EU in order to improve the lives of Europeans.



2.4 Messages

2.4.1 Initial key messages

An initial set of key messages of the MEDALS project has been defined. Key identified messages for specific target audiences are shown in **Table 2**. More refined and detailed messages will be developed during the project lifetime to more precisely address the specific target audience. It will revolve around the commitment of the steel sector (represented by MEDALS Consortium) towards stepping up its efforts to mitigate climate change and contribute to a more sustainable and competitive steel sector, offering a clean steel and securing better jobs soon. General project goals, outcomes and planning will be communicated.



Table 2. MEDALS key messages for specific target audience.

Target audience	Key messages
Project partners	• Main project ideas • Project work progress (methodologies, approaches, problems, solutions, best practices) • Details about specific solutions (how it works and how it will support the production process)
Potential end-users	• Details about the developed solutions • Impacts of the MEDALS technologies • Generalization possibilities to other technologies • Importance of the digitalisation and cognitive solutions for the factories of the future, Importance of good scrap preparation/separation methods, Methods to remove tramp elements (copper and tin) in the liquid phase; methods to recover copper from steelmaking residues through pyrometallurgical processes; new steel products that can handle a higher copper content while maintaining required application properties • Good practices and lessons learnt for specific use case
Industrial sector, Professional Associations	• MEDALS use case impacts • Importance of the digitalisation and cognitive solutions for the factories of the future, technologies, Methods to remove tramp elements, valorization of scrap • Impacts on production performance and environment
EU projects working in similar domain	• MEDALS best practices • Problems and open issues • Areas where more expert knowledge is needed (cooperation opportunities)
EU and national/regional policy-makers	• Importance of the digitalization • Potential of the advanced technological solutions (AI, optimization) for the factories of the future • Impacts on the environment and production performance • Further development and commercialisation steps • Obstacles during the development and exploitation • Good practices and lessons learned
Academic and research community	• What methods and algorithms were successfully validated on the industrial use cases • What algorithms are missing or perform poorly (focus of future research and development) • Comparison to the state-of-the-art solutions
General public	• Importance of the digitalization • Potential of the advanced technological solutions (AI, optimization) for the factories of the future • (1) Higher scrap recycling rates can significantly reduce CO₂ emissions; (2) Scrap composition is changing with the electrification (more copper and other tramp elements); (3) The MEDAL approach for scrap recycling is fully in line with EU policies such as the Green Deal, Fit for 55, Digital Decade, etc. • Impacts on the environment and production performance



2.4.2 MEDALS in short

Full title	Metallic Elements Dissipation Avoided by Life cycle design for Steel
Horizon EU Call	Digital, Industry and Space
Start date	2024-01-07
Duration	48 Months
Type	Innovative Action
Budget	5.74 M€
Coordinator	KUNGLIGA TEKNISKA HOEGSKOLAN

MEDALS project aims to improve the efficiency of steel recycling by minimizing the loss of valuable alloying elements and reducing greenhouse gas emissions. The project will explore innovative methods to enhance the separation and recovery tramp elements, particularly through advanced sorting technologies and pyrometallurgical technologies. Additionally, it will evaluate the feasibility and economic impact of adopting automated sorting and partial dismantling techniques to increase the recycling rates of different types of stainless steel. The project will provide a cost-benefit analysis to justify the adoption of these advanced technologies and propose policy recommendations to encourage their implementation. By optimizing the recycling process, the MEDALS project aims to increase the material yield and value of recycled steel, reduce environmental impact, and support the steel industry's transition toward a more sustainable and circular economy. MEDALS is dedicated to revolutionizing the recycling of ferritic steel scrap by addressing four major scientific questions that are crucial for advancing the industry towards sustainability.

- **Understanding Scrap Evolution:** MEDALS seeks to comprehend how scrap composition is changing and what these changes imply for new recycling technologies. This includes researching scrap flow and composition changes and developing metrics to fairly compare different recycling processes.
- **Optimizing Scrap Handling:** MEDALS aims to improve decision-making in scrap handling and workflows. This involves investigating new sensors and data collection strategies, as well as exploring big data and developing algorithms that can be used in future recycling processes.
- **Enhancing Tramp Elements Removal and Recovery:** MEDALS key focus is on scaling up new technologies to efficiently remove tramp elements copper and tin, which degrade the quality of recycled steel, and recover these elements of the new steelmaking residues. This will be addressed



by researching and validating new technologies in relevant environment up to TRL5 and integrating these systems to demonstrate their effectiveness in relevant industrial environments (TRL6).

- **Minimizing Environmental Impact:** MEDALS focuses on understanding and minimizing the environmental impacts associated with scrap steel recycling. This includes investigating and demonstrating significant reductions in impacts compared to current standards. This includes integrating energy-efficient sorting and processing technologies that require less power and optimizing operational workflows to minimize energy consumption throughout the recycling process.

More about the project

The MEDALS project enhances the recycling of ferritic scrap steel by implementing advanced technologies for better separation and recovery of valuable metals and minimizing the impact of tramp elements. The focus is on creating a comprehensive model for scrap flow and predicting changes to adapt technologies accordingly.

Scrap Flow Modeling and Prediction: Use Material Flow Analysis (MFA) and Substance Flow Analysis (SFA) for modelling scrap flows and element transitions, assessing the economic and environmental value of recycling and alloy recovery. Use Life Cycle Assessment (LCA) to evaluate the environmental impacts and resource utilization, considering the degradation in quality due to alloy transitions into tramp elements. Investigate the economic viability of alloy recovery from complex magnetic alloyed steel products that end up as shredded scrap, incorporating the entire life cycle from design to scrap processing and steelmaking.

Performance Metrics Development: Develop a new performance metric to compare different tramp element removal techniques. This will involve collaborative workshops with internal and external stakeholders to define relevant factors and their importance, creating a comprehensive metric that includes economic, sustainability, and performance values.

Sensor Technologies and Data Collection: Innovate scrap treatment by integrating new sensor technologies for material composition analysis, enhancing pre-sorting and storage processes based on tramp element content. Implement big data models to improve decision-making in scrap handling and optimize the recycling process.

Implementation plan in MEDALS project is classified by doing initial research on scrap flow modelling and prediction followed by the development of new performance metrics and sensor technologies and technologies for the tramp elements removal (of the liquid steel) and recovery (from the steelmaking residues). Conduct lab experiments to test and refine technologies. Deploy technologies in industrial settings to validate their effectiveness and scalability. Collect data and



feedback to refine the models and methodologies. Analyse pilot results to assess the technologies' performance and environmental impact. Final adjustments and technology optimization based on comprehensive data analysis.

Consortium

The consortium is formed around the metal production sector and it consists of:

University and research institutions:

- KUNGLIGA TEKNISKA HOEGSKOLAN, Sweden (KTH)
- UNIVERSITY OF LIMERICK, Ireland (UL)
- POLITECNICO DI BARI, Italy (POLI)

Industrial end users (steel producers):

- THEO STEIL GmbH, Germany (STEIL)
- SIDENOR INVESTIGACION Y DESARROLLOSA, Spain (SID)

Partners with different portfolios:

- KOBOLDE & PARTNERS AB, Sweden (KOB)
- LSA-LASER ANALYTICAL SYSTEMS & AUTOMATION GMBH, Germany (LSA)
- FUNDACION TECNALIA RESEARCH & INNOVATION, Spain (TEC)



2.5 Communication and dissemination channels, tools and activities

For communication and dissemination purposes, several different channels, tools and activities will be adopted, as presented in the following subsections. **Table 3** overviews the main channels, tools and activities together with the addressed target groups.

Table 3. Main channels, tools and activities used to address specific target groups.

Channels, tools and activities / Target groups	Project partners	Potential end-users	System integrators and ICT solution providers	Industrial sector, prof. assoc.	EU projects	Policy-makers	Academy and research	General public
Unified visual identity								
Project presentation template								
Other corporate material								
Website								
Shared repository								
Tools from European Commission and European Clean Steel Partnership								
Social media								
Newsletter								
Workshops								
Education								
Demonstrations								
Publications in journals and magazines								
Exhibitions and conferences								
Networking channels								

2.5.1 Unified visual identity

All of the communication, dissemination and exploitation tools should use a consistent brand identity for MEDALS. One of the first actions in the communications task was to develop the project's identity. To build its brand recognition, a logo was designed during the first month of the project (refer **Figure 2**). It is and will be included in all documentation (paper or electronic), tools and promotional material.



Figure 1. MEDALS logo.

The logo consists of the project acronym “MEDALS”, where part of it is highlighted in larger letters. This emphasizes that the project will be able to achieve its objectives.

The colors used in the MEDALS logo are:

Shade of Green		R 176 G 176 B 176
Shade of Grey		R 0 G 176 B 80

2.5.2 Project presentation template

A presentation template (refer **Figure 3**) was designed and distributed to all of the partners in the beginning of the project in order to have unified presentations in the kick-off meeting and throughout the whole project.



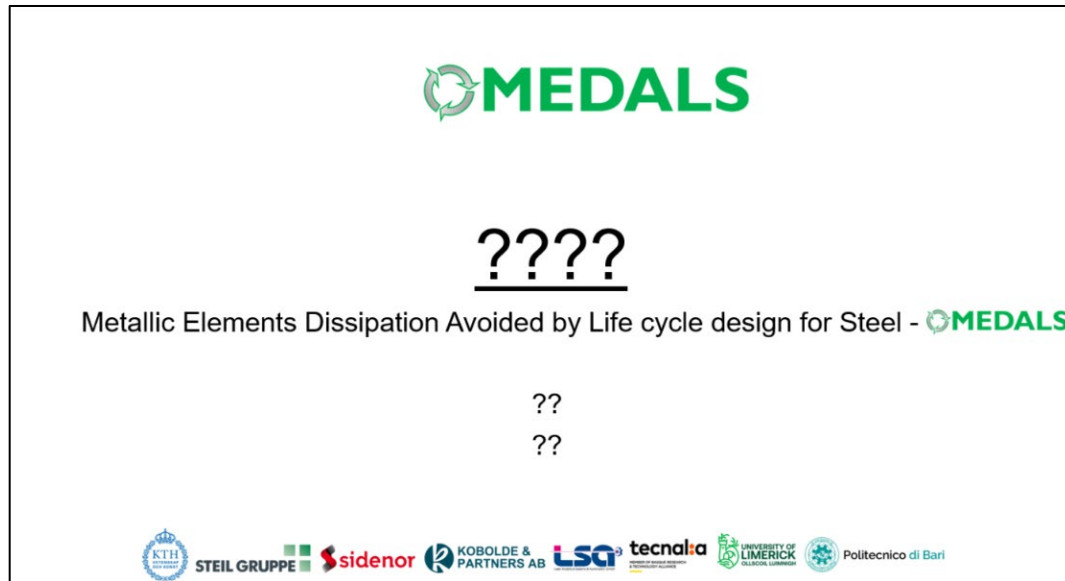


Figure 2. MEDALS project presentation template.

2.5.3 Website

The purpose of homepage is to provide basic information about the content of the MEDALS project, the current workflow of the project, interesting news related to the work and achievements, etc. The project website is accessible at <https://www.medals.proj.kth.se/eu> and is responsive to the browser and mobile devices. The website addresses especially the following target groups: general public, EU and national/regional policy-makers, Industrial sector & Professional Associations, EU projects working in similar domain.

The website will be regularly updated in order to reflect the current project progress. The website visitors will be able to gain the following content:

- General information about the project;
- Description of all consortium members taking part in the project;
- Information about titles, leaders and objectives of all work packages;
- Description of events organized within the framework of the project;
- Information about publication of the results;
- Information about granted patents;
- Public deliverables;
- Recent news about the project;
- Addressing and contact information;



Funded by the
European Union

- Appropriate acknowledgment and reference to the European Union's Horizon EU Framework Programme;
- Integration with the social media activities (LinkedIn).

2.5.4 Shared repository

For internal communication and dissemination purposes the MEDALS project is using an internal storage solution (Microsoft Teams). The solution was deployed on the KTH servers and all members of the MEDALS project have access to it. The purpose of the internal storage solution is to increase the document sharing process and to improve the transparency among different activities. Internal storage will provide the place to store and share deliverables, WP documents, literature, meeting documents, financial documents etc. Moreover, the datasets may be stored, archived and shared among the partners to maximize the dataset reusability.

2.5.5 Tools from European Commission

In order to enhance the project diffusion, MEDALS partners will make use of the tools offered by the European Commission:

- CORDIS “projects and results” service provides:
 - (i) “Project information” based on the project's grant agreement,
 - (ii) “Report summaries” that come from the publishable summaries of periodic and final reports submitted by the project participants and approved by the project officer and
 - (iii) “Results in brief” written by CORDIS science editors based on each report summary.
- CORDIS Wire, to publish articles on the CORDIS News and Events service.
- Research results magazine that features highlights from the most exciting EU funded.

2.5.6 Social media

The MEDALS project will be featured through the LinkedIn channels of project partners, where updates, results, and events will be regularly distributed. These LinkedIn posts will aim to engage a general audience, project stakeholders, the industrial sector, professional associations, and EU projects working in similar domains.

2.5.7 Newsletter

The purpose of newsletters is to promote and raise awareness about interesting developments, good practices and other news about the project. Newsletters will be prepared periodically from partners'



inputs and distributed to the relevant audiences by individual partners. The newsletter will address several different target groups (internal partners, industrial, scientific).

Moreover, MEDALS news will be issued periodically on the project website and provides:

- Project-related news (e.g. launches, meetings, demonstrators)
- Announcements of the project's progress
- Dates, details, comments regarding project related conferences, meetings, events or publications
- Lectures, talks, and trainings opportunities

2.5.8 Workshops

Special events dedicated to transfer of knowledge and dissemination of the results will be organized. At least one or two workshops will be held to enable knowledge transfer and experience exchange between the consortium partners. Moreover, workshops will be organized, to present the availability and benefits of the project solutions as well as reference architectures to the industrial associations and business consultants and/or to provide training on when to advise the implementation to manufacturing clients. The workshops will be organized as an individual event or will be held together with the periodical consortium meeting or other events (e.g. conferences, seminars).

2.5.9 Education

The dissemination of the results will also cover the preparation of training materials contributed by all consortium partners. The prepared materials will represent the basis for supporting different education and training programs during and after the project's lifetime. The material will mainly be prepared for industrial employees (production managers and technicians in the field of process industries) as well as post- and under-graduate students. The education and training programs may cover several objectives and results of the MEDALS project such as production digitalization, production modelling, control and optimization, use of simulations, DSS (Decision Support Systems), data-based reasoning tools in decision making processes, scrap recycling rates, removal of tramp elements, etc. During the project's lifetime, the gathered material will be used for workshops executed by regional RTO representatives for the employees of the consortium industrial partners. Moreover, the MEDALS best practices will be added to the already existing programs, where consortium partners are involved as lecturers.



2.5.10 Demonstrations

The project's best practices will be also disseminated in the form of the use case demonstrations. The aim will be to engage and find new cooperation synergies within the European process industry community, ICT solution providers and complementary innovation projects. The venue of the demonstrations will be mostly at the industrial partners' site (off-line and on-line demonstrations) and trade fairs (off-line demonstrations). The industrial partners with support of RTOs will perform these activities.

2.5.11 Publications in journals and magazines

Project results will also be disseminated in industrial and technical journals and magazines, and peer-reviewed scientific journals.

Scientific publications are an effective way to disseminate high-level project information and to attract the interest of representatives of various target groups. Some journals, where the results are planned to be published are:

- International Journal of Production Research;
- CIRP Annals on Manufacturing Technology;
- ISIJ International, Steel Research International;
- Ironmaking & Steelmaking;
- Metallurgical Plant and Technology;
- Metall. Materials Transactions B;
- Steel and Technology;
- Steel Research International;
- IEEE Transactions on Industrial Electronics;
- Engineering Applications of Artificial Intelligence;
- Expert Systems with Applications;
- Applied Soft Computing.

Prior to the publication, the project members should be informed about the intention. Only with its approval the publication can be published and in case of IPR/confidentiality infringement, a publication can be delayed. These activities will be mostly performed by the RTO organizations.



2.5.12 Exhibitions and conferences

The results will be presented on a range of international and local conferences. Potentially interesting international conferences are the following:

- European Steel Application Days (ESTAD);
- Association for Iron & Steel Technology Conference and Exposition (AISTech);
- European Oxygen Steelmaking Conference (EOSC)

Moreover, the consortium partners will promote project results through their presence (stands) and presentations at industrial exhibitions and trade fairs,

Networking channels

One of MEDALS priorities are networking activities with industrial clusters and projects with complementary objectives (national/regional and Horizon EU). The working experience and knowledge gained by similar projects will be a valuable tool for guidance of the project actions and will enhance the expertise of the project teams. Moreover, joint collaboration opportunities will be assessed to foster the synergies and compatibility of the project outcomes.

All partners will put efforts to maintain the existing networking connections and to extend their networks. Partners will pursue relevant target organizations from within their existing networks and through new contacts made through their participation in the project, for example at scientific or trade-fair events. The networks will be facilitated to promote and disseminate the project objectives, activities, results, etc.



3 Communication, dissemination and exploitation plan

3.1 General plan

The general communication and dissemination plan was developed prior to the project beginning (refer **Table 4**). This plan defines specific objectives to be achieved for each year of the project life-time and also after the project ends. Each objective is linked with some general methods used to achieve the objectives. The general plan represents the initial idea of the communication and dissemination activities. More refined plans will be developed during the project execution. These yearly plans are presented in the following subsections.

Table 4. General communication and dissemination plan of the MEDALS project.

Time period	Objective	Method
M1-M22	• Create awareness about the MEDALS project • identify complementary projects	• Website, preliminary promotion material (leaflets, brochures, posters), Social media • Attendance in seminars, congresses, trade fairs • Promotion and dissemination in strategic networks of the partners
M22-M48	• Create awareness about the innovative aspects of the MEDALS project and disseminate first results in industrial manufacturing networks • Promote the uptake of specific methods, technologies and tools in metal industry domain • Dissemination of the project's innovation outcomes to the current and next generation of employees	• Web-site upgrade • Articles published in international industrial journals, conference papers • Organize international workshop for all interested stakeholders • Newsletter to potential industrial users within metal industry domain • Preparation of the materials for educational purposes
M48 and further	• Identify and initiate new collaboration opportunities to adopt the MEDALS project components within the metal industry domain • Dissemination of the project's innovation outcomes to the current and next generation of employees	• Demonstrations for potential new collaboration partners • Organize two workshops on the MEDALS technologies and "train the trainer" workshop • Prepare a set of pre-commercial brochure



3.2 Plan of the activities from M1 to M22

Based on the general communication, dissemination and exploitation plan, a more refined plan of the activities was prepared. The planned activities from the M1 to M22 and participating partners are shown in **Table 5**.

Table 5. Plan of the communication, dissemination and exploitation activities from M1 to M22.

Objective	Activities	Partners
Create awareness about the MEDALS project	Regular update of website and social media with MEDALS related news	KTH, all
Create awareness about the MEDALS project	Preparation of promotion material (flyer)	KTH
Create awareness about the MEDALS project	Preparation and distribution of newsletter	KTH, all
Create awareness about the MEDALS project	Attendance and promotion at the domain exhibitions and fairs	Industrial partners, all
Create awareness about the MEDALS project	Attendance and promotion at the external conferences, workshops and seminars	All
Create awareness about the MEDALS project	Preparation and publishing of the industrial papers	All
Create awareness about the MEDALS project	Attendance at the conferences and presentation of MEDALS ideas	All
Create awareness about the MEDALS project	Organization of workshops	All
Create awareness about the MEDALS project	Networking and dissemination of MEDALS project ideas	All
Identify complementary projects	Networking and identification of similar projects	All



3.3 Plan of the activities from M22 to M48

These activities will be further defined. The probable table is highlighted in **Table 6**.

Table 6. Plan of the communication, dissemination and exploitation activities from M22– M48.

Objective	Activities	Partners
Create awareness about the MEDALS project	Regular update of web-site and social media with MEDALS related news	KTH, all
Create awareness about the MEDALS project	Update of the promotion material (flyer)	KTH

3.4 Plan of the activities after the end of the project

These activities will be further defined. The probable table is highlighted in **Table 7**.

Table 7. Plan for the communication, dissemination and exploitation activities after end of the project (M48 and further)

Objective	Activities	Partners

The first part of the strategy aims to report original research results of our applied and industrial research to advance global knowledge on the scrap sorting and tramp removal processes and valorization of steelmaking residues using different methods as well as digital solutions, new sensor, big data analysis, advanced modeling and simulation and validation in relevant (industrial) environment. A high degree of joint publications is expected between the public and the private sector due to the programme setup (for example, between KTH and SID, or STEIL and UL). The results and outputs shall generate benefits for the targeted audiences through the following pathways, defined by quantified targets to create new and original, high-quality knowledge as a basis for engineering system designs and further research activities together with a broad diffusion of knowledge and Open Science: **At least 14 peer-reviewed publications in high-ranking scientific journals.** The plan is for our partners to achieve at least 14 peer-reviewed publications in top 20% peer-reviewed journals with at least 8 joint publications reporting on original applied and industrial research. We fully support the



mandatory EU **open access** policy (license type: CC-BY) to all publications and underlying research data related to MEDALS results.

14 Scientific presentations at international conferences. MEDALS partners will present the results at distinguished international conferences targeting on excellence and broad geographical coverage.

18 Oral presentations at industry and academic seminars involving tech scouts and foresight managers: MEDALS researcher will disseminate the results through presentations at local inhouse R&D meetings at our partners and at organisations from outside the network to encouraging a dialogue between R&D units, process groups, service units as well as diverse scientists and decision makers.

3 Webinars: These webinars (90 minutes each) will showcase how the MEDALS approach and technologies will help to transform scrap management and steel making, the current challenges and risks associated with our innovations and how the network makes scientific/technical progress to overcome these challenges.

3 Trade publications: MEDALS partners will participate in different tradeshow, exhibitions and professional fairs across Europe to engage with a broader professional audience. It is intended to directly (own booth) or indirectly (through partnership) participate in at least 4 fairs and give at least 3 presentations.

3 White papers and public technical reports: The consortium will create and publish 3 white papers that present the results, outputs and findings on MEDAL and the new innovations and workflows detailing the technical specifications, methodology, results, potential errors and lessons learned.

MEDALS international conference: During the 4th project year we will organise an international conference and invite other national and EU-level projects in the field as well as interested PhD students, postdocs, professors and industrial innovators to disseminate our findings at broader scale and to have a dialog on future directions.

3.5 Exploitation activities

MEDALS will conclude with a number of expected results with an overall TRL in the range of 6-8. Exploitation of results in this stage involves taking the necessary steps towards achieving industrial scale deployment and full-scale manufacturing in the EU. The partners signed Consortium Agreement where the exploitation actions are detailed. Different exploitation pathways have been already analysed: internal product development, licensing, assignment, joint venture, spin-off, etc. most feasible options tend to the creation of a spin-off between consortium partners to exploit the MEDALS results, or also licensing the technologies to other external organization. Besides the mentioned common exploitation



strategy, **Figure 3** and **Figure 4** shows the exploitation pathway during project duration and after MEDALS is finished.

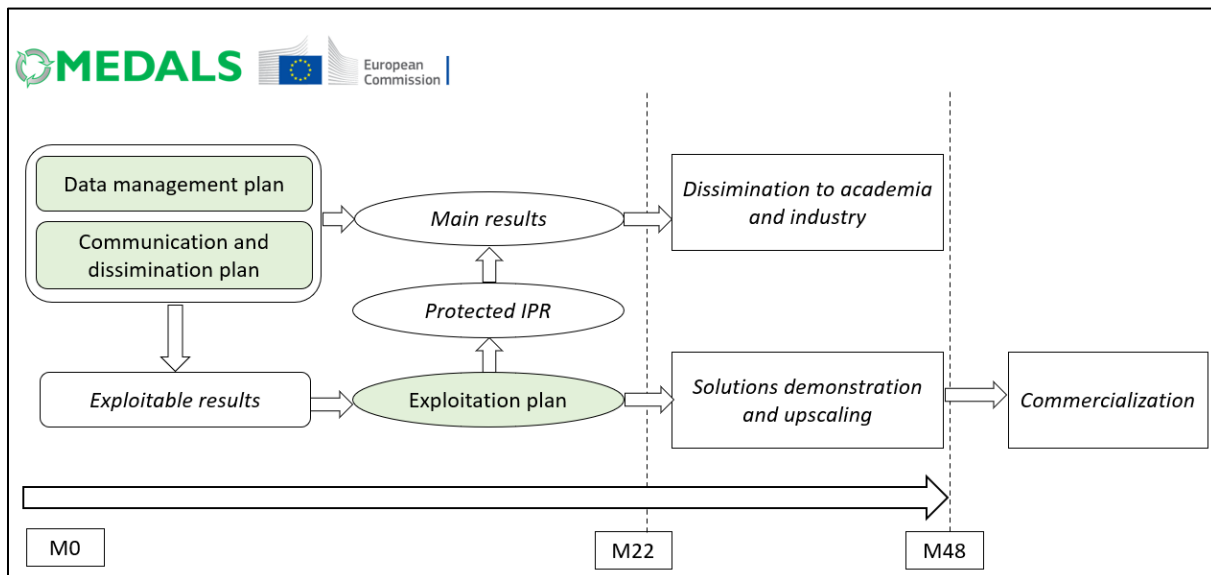


Figure 3. Results management for an efficient exploitation plan generation.

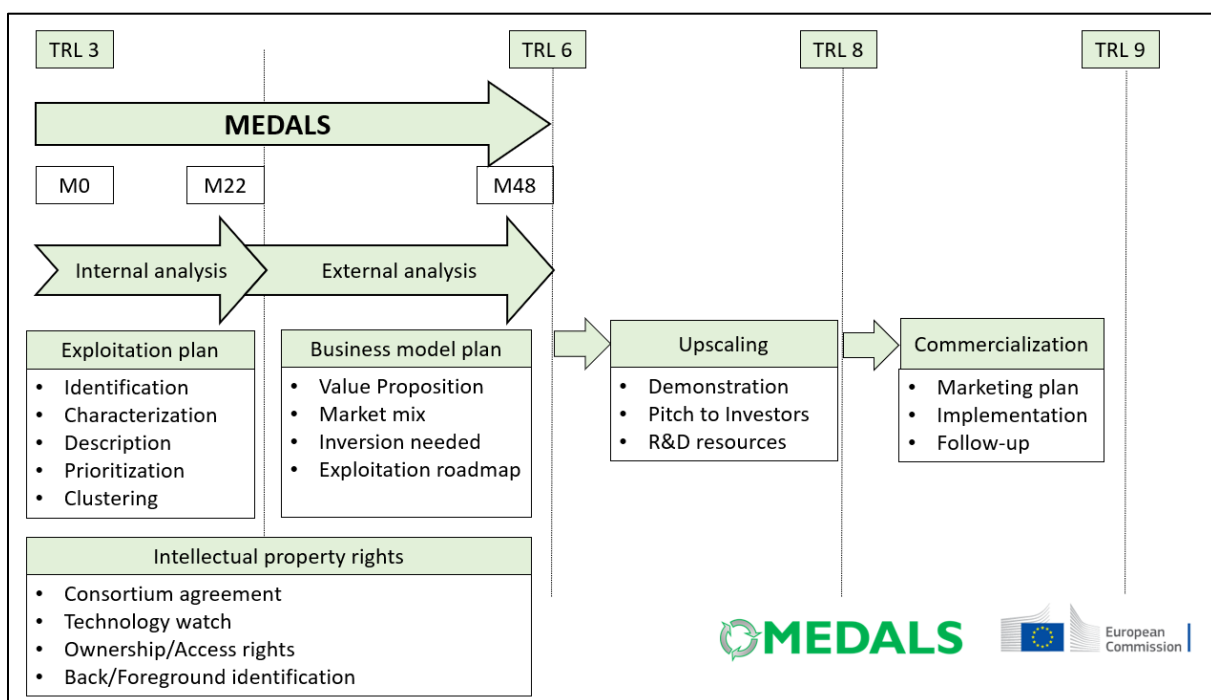


Figure 4. Exploitation strategy of MEDALS project.

During the first 22 month of the project the exploitation plan is generated identifying key exploitable results in terms of their characterization, description, and prioritization. The intellectual property rights of these key exploitable results are analyzed in a first stage following consortium agreement rules, identified background and foreground, technology watch and patent analysis. However an exploitation plan requires its completion with an external factors analysis that will allow the ideation of a business model plan. This includes the value proposition of the product and how it will match customer needs, a marketing analysis of addressed sectors for commercialization, The economic investment and Return of investment expected and an exploitation roadmap for long term development of the solution will also key aspects of this stage that will be developed from M22 to M48 and will end with the presentation of the deliverable D8.3. Undated business plan including the marketing mix. Two steps will remain ahead once the project will end, as far as this is a research and innovation action and upscaling will be needed for most of the results from expected TRL6 achievement. Specific demonstration activities followed by pitching to investors and the performance of additional R&D activities in the form of new projects are considered for this stage. Finally a commercialization of the product will follow based on a marketing plan, its implementation and regular follow up.

3.6 Exploitation plan

During the first 22 month of the project the exploitation plan is generated identifying key exploitable results in terms of their characterization, description, and prioritization as mentioned in **Table 8**. The intellectual property rights of these key exploitable results are analyzed in a first stage following consortium agreement rules, identified background and foreground, technology watch and patent analysis. However, an exploitation plan requires its completion with an external factors analysis that will allow the ideation of a business model plan. This includes the value proposition of the product and how it will match customer needs, a marketing analysis of addressed sectors for commercialization, The economic investment and return of investment expected and an exploitation roadmap for long term development of the solution will also key aspects of this stage that will be developed from M22 to M48 and will end with the presentation of the deliverable D8.3. Undated business plan including the marketing mix. Two steps will remain ahead once the project will end, as far as this is a research and innovation action and upscaling will be needed for most of the results from expected TRL6 achievements. Specific demonstration activities followed by pitching to investors and the performance of additional R&D activities in the form of new projects are considered for this stage. Finally the commercialization of the product will follow based on a marketing plan, its implementation and regular follow-up.



Table 8. Preliminary list of exploitable results (the list will be enlarged during the project).

No	Envisaged outcomes with commercial potential	Potential protection of IP assets	Primary owner	Targeted user and additional areas of use that are not in scope of this project
1	New sorting methods for pre-sorting and processing	Patent and trademark	STEIL	STEIL and other metal recycling companies such as Sim, BIR Group, EMR, SITA, Stena, etc.
2	New sensors	Patent and trademark	LSA, STEIL	LSA and other sensor companies such as SIEMENS, SICK, VEGA, Trafag, Balluff, etc.
3	New algorithms	Copyright	UL, STEIL	UL, joint ownership possible, commercial or non-commercial license to other scrap processing companies.
4	Scrap flow data service	Patent and copyright	KOB	Research bodies, including the JRCs, working on product design for circular economy and recycling companies looking at optimal process design.
5	Pyrometallurgical technologies for valorization of steelmaking residues	Patent or Trade secret	TEC	TEC, transfer of ownership or granting exclusive or non-exclusive licenses. Steelmaking companies and waste treatment companies.
6	Vakue in Use (ViU) data service for scrap as a basis for scrap processing investment assessment	Patent and copyright	KOB	KOB, owner and transfer or license to investors and scrap processing companies, policy makers, commercial or non-commercial license to other scrap processing companies.
7	New steel grade based on new pyrometallurgic process routes for the tramp elements removal	Patent or Trade secret	KTH, SID	KTH, SID joint ownership possible, transfer of ownership or granting exclusive or non-exclusive licenses. Steelmakers and steel components producers.

Use and valorisation of the results. The protectable types of intellectual property will create new opportunities and eventually revenue sources. The (Key Performance Indicators) KPIs will be monitored during the project and used to guide internal decision-making.



Commercial licensing: MEDALS partners will protect IP asset (e.g., patent, trademark) to create commercial value through granting exclusive or non-exclusive licenses to third parties in exchange for payment of royalties. The involved parties will agree on the duration and the terms of conditions case-by-case. The consortium will make sure that a potential license does not impact the implementation of the project and achieving the objectives and the targeted impacts. KPI: Number of licenses granted, minimum target 2 patents.

New business ventures: The results of MEDALS likely lead to a new venture in the form of a spin-off or a joint venture or a disruptive start-up company with the goal to improve scarp management and tramp element removal e.g. through novel software/applicational, exploration services or social innovations and services. KPIs: Number of ventures and jobs created, minimum target 1 new venture, 3-4 new jobs.

Selling: MEDALS partners can sell their IP to companies inside or outside the network through a transfer of ownership agreement, which can generate direct revenues for the seller. This can be especially useful for our partners that do not have the strategic goals or resources to fully develop or commercialize the IP. KPI: Number of ownerships transferred, no specific target.

Competitiveness and market expansion: MEDALS results and intellectual property assets will allow the industry partners (e.g., SID) to secure their market position and competitiveness through the targeted innovations. This paves the way to grow their businesses in existing markets further and generate new market opportunities. KPI: Number of subsystems that reach TRL6.

Strategic partnerships: MEDALS partners can form new strategic partnerships with other companies and research organizations that have complementary expertise or resources. This can help to accelerate the development and commercialization of the IP, as well as provide access to new markets. KPI: Number of new partnerships generated during the project, the minimum target is 3.

Branding: MEDALS companies can use their IP to further improve their brand identity, which can increase the perceived value of their products and give them a strong position to find new talents that support the green transition. This can help to generate customer loyalty and differentiate the companies from its competitors. KPI: Number MEDALS partners that incorporate the green transition and circular economy in their brands, the minimum target is 3.

Make use of results in further research and innovation activities: We actively seek new contacts in other research- and innovation networks/clusters and with industry representatives from outside the network for a two-way exchange and new collaborations KPI: Number of national or EU proposals submitted to explore uncovered directions of the project, minimum target 3.



A series of three exploitation workshops: The MEDALS consortium will develop a large set of potential results and IP assets that shall be partly transferred to stakeholders from outside the network to create new collaborations and to ensure an uptake of results and further innovations in the field, for example by companies that act as potential customers. At the same time, we will collect feedback on the further scale-up and market deployment, potential business cases and more elaborated business plans. KPI: Number of organisations taking part in each workshop, minimum target 10.

Inform professional associations and funding agencies about the outcomes: Inform relevant professional associations (e.g., Process4Planet) as well as national and international funding agencies (e.g. EISME, CINEA, HaDEA, EIT Climate) about the outcomes of the project and participate in public and community events. KPI: Participation of at least 8 events by MEDALS partners.

Transfer the results into new (more digital) business models: Create and validate assumptions for new business cases and business models that can further drive the development mechanical and pyrometallurgical and support commercialization activities (e.g. go-to-market strategy, business plan, etc.). KPI: Creation of 3 different business cases that are economically viable.

Trigger investments in new technologies along the value chains: The MEDALS results shall help to trigger new investments (e.g. InnovFund, European Investment Fund, Resource Capital Funds, companies, private investors) in a further scale-up towards first of its kind (FOIK) full-scale/full-capacity demonstration plants in order to reach TRL8-9. KPI: Number of potential investments to go with the MEDALS technologies after the project from TRL7 to TRL8-9, minimum goal is 15-30 million EUR, within five years after the end.

Feedback to policymakers: Inform policymakers (local/national ministries, EU commission/parliament) about the outcomes directly through press releases and events or indirectly through reports by professional associations and science and technology academies to create and implement new policy initiatives and decisions. KPI: number of new contacts made, minimum target 15 contacts in 5 countries.



4 Dissemination management and assessment

Over the lifetime of the project, four major versions of the communication, dissemination and exploitation plan are envisioned, as shown in **Table 2**. The consortium partners share the responsibility to support the preparation and execution of the Communication and dissemination plan and are obliged to follow the common policies and rule. The communication and dissemination activities will be regularly evaluated, in order to assess effect and refine future actions.

4.1 Distribution of responsibilities

KTH is the leader of the Communication and Dissemination activity and is responsible for the preparation of the communication and dissemination plan. The plan will be reviewed and updated with support of the other consortium partners. The project partners will confirm major document versions. According to the Article 29.1 of the EC-GA “Each beneficiary must – as soon as possible – ‘disseminate’ its results by disclosing them to the public by appropriate means (other than those resulting from protecting or exploiting the results), including in scientific publications (in any medium).” Therefore, every possible opportunity will be embraced by individual partners or on a collective basis, to make MEDALS and its results known among target groups. Therefore, all partners of the consortium must contribute to the dissemination according to their foreseen role and effort and using all available tools.

4.2 Policy and rules

4.2.1 IP protection

All dissemination activities in the MEDALS project should respect intellectual property (IP) rights protection. Practical application of IP rights protection agreed among MEDALS project partners is defined in Section 9 (Access Rights) of the Consortium Agreement (CA).

Section 8 of the CA states that during the Project and for the period of 1 year after the end of the Project, the dissemination of own Results by one or several Parties including but not restricted to publications and presentations, shall be governed by the procedure of Article 29.1 of the Grant Agreement subject to the specific provisions from CA, such as:

- Prior written notice of the final version of any planned publication shall be given to the other Parties at least 45 calendar days before the publication. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the coordinator and to the Party or



Parties proposing the dissemination within 30 calendar days after the date of the abovementioned prior notice. If no objection is made within the time limit stated above, the publication is permitted.

- Moreover, a Party shall not include in any dissemination activity another Party's Results, Background or Confidential Information without obtaining the owning Party's prior written approval, unless they are already published. This obligation shall, however, not apply to any publication which complies with mandatory law, in which a right to publish exists. Such publication shall not constitute a breach of the terms of this Consortium Agreement.

4.2.2 Common visual identity

A common graphic identity has been defined to allow for better visibility and recognition of the MEDALS project. Therefore, all dissemination tools and activities (internal or external) should refer to or include:

- Name of the project.
- Project's website URL.
- Project logo.
- Acknowledgements to EC public funds.
- The official EC logo, with the Horizon indication.

4.2.3 Acknowledgements and disclaimer

All publications based on work funded by EC within the activities of the MEDALS project should acknowledge their affiliation to MEDALS and bear recognition of the EC funding.

Dissemination of results (in any form, including electronic) such as scientific papers and publications produced by the project will contain the mandatory EU emblem with the following sentence:



A disclaimer on every publication and presentation is recommended. Typical text is as follows:

“Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.”



Funded by the
European Union

4.2.4 Open access

The consortium partners agree to use the “green access” model in order to guarantee a free public access to all published scientific publications according to the terms and conditions of publishers. Self-archiving will be performed by fusing “ResearchGate” or similar online repositories and project’s web-site. Gold “open access” can also be used, and if not otherwise agreed, the party of the first author should cover the publishing costs.

The responsible/leading/first author of the document should as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications. Moreover, he/she should ensure that:

- Open access to the deposited publication (via the repository) is provided at latest on publication, if an electronic version is available for free via the publisher, or within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.
- Open access to the bibliographic metadata that identifies the deposited publication is provided via repositories. The metadata should include-
 1. The terms "European Union (EU)" and "Horizon EU":
 2. The name of the action, acronym and grant number;
 3. The publication date, and length of embargo period if applicable, and
 4. A persistent identifier (DOI).

4.3 Evaluation of communication, dissemination and exploitation plan

WP 8 aims at delivering information and communicating on the results of the project, its activities and its achievements to targeted audience groups. The communication, dissemination and exploitation will be regularly overviewed and updated annually, in order to:

- Analyse past dissemination effects and maximize the future dissemination reach.
- Ensure that the dissemination objectives are continuously in line with the interest of the partners and the project objectives.
- Adapt to the market changes.

We have selected KPIs in order to be able to adapt the content and overall communication, dissemination and exploitation strategy in order to best respond to the groups’ expectations. To measure the impact of the dissemination activities, two sets of quantifiable KPIs have been defined.



The first set of KPIs targets the visibility of the project, and the second one the knowledge impact creation. Each KPI has its own cumulative target over the timespan of the project (refer **Table 9**, **Table 10**). More details about the quantifiable KPIs will be provided in table **Table 11**, where major communication and dissemination results will be listed and described.

Table 9. KPIs for visibility of the project.

KPI	Target [M1-M12]	Target [M1-M24]	Target [M1-M48]
Number of press releases issued	1	2	3
Number of newsletters issued	1	2	3
Number of brochures, leaflets	1	2	3
Number of domain exhibitions, fairs attended	1	2	6
Number of external conferences, workshops, seminars, etc. attended	3	7	10

Table 10. KPIs for knowledge impact creation.

KPI	Target [M1-M12]	Target [M1-M24]	Target [M1-M48]
Number of scientific publications	0	3	7
Number of industrial papers	2	5	10
Number of conference papers and presentations	2	5	8
Number of training and teaching programs that have included the MEDALS topics/materials	0	3	6
Number of workshops, training events organized	1	2	4

The aim is to generate impact through the following quantified activities together with the targeted Key Performance Indicators (KPI):

1 Project website: To form two-way contact with different audiences and stakeholders and share knowledge and materials, including educational presentations and contribute to legacy by serving as a record of the project to ensure that the project's outcomes and impact are preserved for future reference. *KPI: Target number of visits 5,000 in the first year with a growth rate of 4,000 per year.*

16 Newsletters: Engage with our internal and external stakeholders and highlight our project progress and results as well as building visibility and enable engagement. MEDALS will publish the electronic newsletter quarterly on the website and distribute it through email. *KPI: Distribution to at least 800*



subscribers (first year and a growth rate of 250 subsequent years) from industry, academia, and interested individuals such as students, teacher, parents.

At least one social media channel: Use of LinkedIn for professional networking (connections to all relevant socio-economic actors), to advertise related jobs at the participating organisations, improve public relations through sharing news and updates about the project, as well as promote its achievements which will raise awareness about the project. Furthermore, MEDALS will use LinkedIn to generate further funding opportunities through connecting to potential funders, agencies and partners who may be interested in supporting the project later a further scale-up to TRL7 or above. *KPI: number of LinkedIn connections/followers established, target first year 1,000, with an annual growth rate of at least 300.* The network will explore the use of other social media channels (e.g. Twitter) during the project through a cost-benefit-analysis.

At least 27 posts using the social media channels of our partners: Our 8 partners have established social media channels with bold audiences who are interested in future directions, business opportunities and sustainability. We will use these channels and organise guest posts to promote the project and its outputs, monitored by the Coordinator. *KPI: Number of Likes, target is at least 400 for each post.*

At least 18 in-house media mentions at our partners: All partners are committed to presenting the project in in-house media, e.g. newsletters, reports, stories to employees. The utilisation of these established in-house communication channels will reach several thousand people, upper management and decision makers. *KPI: At least two .*

4 Participations in annual, open-door events and science & technology festivals showing the public-private research partnership: The academic institutions (KTH, UL, POLI, TEC) will present MEDALS at their open-door days and Researcher's Nights and potentially at science festivals to showcase research outputs and its relevance for the economy to high-school students, parents, interested citizens, and other students to create interest in green jobs and required skills. *KPI: Distribution of at least 2,000 project flyers/info material.*

2 Professional interviews: We leverage our network to get contacts to professional journalists, science bloggers and technology podcasters to get the chance for an interview, creating an opportunity to reach the public at large. *KPI: to reach at least 10,000 people per activity.*

3 Infographics: Infographics are a visual way to present complex data and information. They can be used to communicate research findings in a simple and engaging way that is easy for the general public to understand. Infographics can be shared on social media, websites, and other digital platforms.

1 Media kit: Creation of a project poster, a flyer and a slide deck to give an overview on the project and the change MEDALS seeks to make. *KPI: The number of downloads of the different items from our website, target is at least 5,000 downloads.*

At least 2 Videos to be published on the website and YouTube: MEDALS will produce and publish at least 2 videos to explain the importance of scrap management in the steel making process in a visual and engaging way. They can feature interviews with researchers, industrial innovators, animations, and other visuals to explain the progress in a clear and concise manner. Videos will be shared on social media, websites, and other digital platforms. *KPI: Overall, at least 10,000 views till the end of the project.*

10 Press and news releases: Press releases will be used to announce research findings to the media and the general public written in a clear and concise language, and provide an overview of the research and its implications. *KPI: Distribution of each press and news release at least on three other platforms reaching a minimum of 4,000 people.*



14 Blog posts: The partner network will create at least 14 blog posts to provide more in-depth information about the scientific goals and how they can transform the scrap and steel industries. The blog posts will be shared on the project's website, as well as on social media (e.g. LinkedIn). *KPI: View of the posts on our website, the target is at least 3,000 views.*

Table 11. List of quantified Communication, Dissemination and Exploitation result.

Date	Result name/title	Description	Type	Target groups	Reference/link	Involved partners

4.3.1 Evaluation at M22

At M22, the communication, dissemination and exploitation activities will be evaluated and achieved KPIs will be overviewed. The evaluation results will be provided in this subsection and will be available in revision of 8.3. **Table 12** and **Table 13** are probable illustrations about the same.

Table 12. Evaluation of KPIs for visibility of the project at M22.

KPI	Target [M1-M22]	Actually achieved at M22
Number of press releases issued	1	tbd
Number of newsletters issued	1	tbd
Number of brochures, leaflets	1	tbd
Number of domain exhibitions, fairs attended	2	tbd
Number of external conferences, workshops, seminars, etc. attended	3	tbd

Table 13. Evaluation of KPIs for knowledge impact creation at M22.

KPI	Target [M1-M22]	Actually achieved at M22
Number of scientific publications	0	tbd
Number of conference papers and presentations	2	tbd
Number of training and teaching programs that have included the MEDALS topics/materials	0	tbd
Number of workshops, training events organized	1	tbd



4.3.2 Evaluation at M48

At M48 the communication, dissemination and exploitation activities will be evaluated and achieved KPIs will be overviewed. **Table 14** and **Table 15** are probably illustrations about the same.

Table 14. Evaluation of KPIs for visibility of the project at M48.

KPI	Target [M1-M48]	Actually achieved at M48
Number of press releases issued		tbd
Number of newsletters issued		tbd
Number of brochures, leaflets		tbd
Number of domain exhibitions, fairs attended		tbd
Number of external conferences, workshops, seminars, etc. attended		tbd

Table 15. Evaluation of KPIs for knowledge impact creation at M48.

KPI	Target [M1-M48]	Actually achieved at M48
Number of scientific publications	14	tbd
Number of conference papers and presentations	14	tbd
Number of training and teaching programs that have included the MEDALS topics/materials	18	tbd
Number of workshops, training events organized	3	tbd

