Industrial Partners (Horizon CL4) sought for Validation of Intelligent Additive Manufacturing Using Recycled Steel in Net Zero-Compliant Repair and Remanufacturing Applications.

Summary

Profile type
Research & Development Request

Company's country
Germany

POD reference
RDRDE20250625015

Profile status
PUBLISHED

Type of partnership
Research and development cooperation agreement

Targeted countries
- **Czechia**
- **France**
- **Austria**
- **Sweden**
- **Netherlands**
- **Germany**

Contact Person
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Term of validity
30 Jun 2025
30 Jun 2026

Last update
30 Jun 2025

General Information

Short summary

The DURIAN project aims to reduce CO2 emissions in the EU steel industry by enabling SMEs to produce spare parts via wire-based additive manufacturing.Using machine learning, it addresses material variability from recycled content and creates adaptable process maps.The goal is to minimize waste and carbon footprint while ensuring reliable spare part production within two business cases under the Net Zero Industry Act. Partners in the Net Zero Industrie are sought using big parts made from steel.

Full description

In the EU, the steel industry is responsible for a staggering 22% of total industrial CO2 emissions. This means that the production of the raw material on which the industrial revolution and thus the prosperity of the EU is based will still be responsible for almost a quarter of all CO2 emissions in 2023. To counteract CO2 emissions, numerous activities in different steel-processing sectors need to be considered. It is therefore important to consider not only the production of new components, but also applications where components are often scrapped instead of repaired for cost reasons. This in turn implies that SMEs in the EU need to be enabled to produce low-cost components with

adequate quality and short lead times. With additive manufacturing as a disruptive technology, this is possible. By using a basic semi-finished product (wire), an infinite variety of component designs can be produced. However, this variety of geometries and materials in combination with different quality and property requirements pose additional challenges. As the proportion of recycling increases for steel products, the impurities of the new materials and generally the scattering of the material composition increase acting as a disturbance variable to the AM process. As a result the process parameters change which affects the stability of the process.

Within the framework of DURIAN (Disruptive Universal Recycled-steel Intelligent Additive maNufacturing), these aspects are being addressed. By carefully observing the wire-based additive manufacturing (AM) process, large amounts of data are provided to develop models based on machine learning (ML) concepts. Based on the findings, a process map is developed that can be implemented in production systems to enable efficient production of spare parts on demand, minimising the overall waste of resources (time, energy, material) and carbon footprint per part, while still ensuring reliable access to spare components.
In order to demonstrate the feasibility of this technology, two business cases are to be addressed within the framework of the project. These are industries that fall under the remit of the Net Zero Industry Act. The utilisation of intelligent and resource-efficient manufacturing will facilitate the innovative Repair, Refurbishment, Remanufacturing or new manufacturing of components.

Timescales:
The consortia is using a proposal that has been rejected before but can be used as a very good base to write the final proposal for this call. They should be having all partners on board by the end of july and the proposal will be written in August and September.

Partners:
- Universities from Germany, Czech Republic, Austria and Sweden,
- Companies from Germany, France and the Netherlands

Partners needed:
Partners in the Net Zero Industrie are sought that can benefit from producing parts additively - using big parts made from steel e.g. for windpower, geothermal power, heat exchangers or turbines.

Advantages and innovations

Participation in the DURIAN project offers Net Zero Industry (NZI) partners a strategic opportunity to align their operations with the European Union's ambitious decarbonisation objectives while simultaneously gaining early access to advanced manufacturing innovations. By engaging with DURIAN, NZI partners will benefit from the implementation of wire-based additive manufacturing (AM) using recycled steel: an approach that addresses both environmental impact and supply chain resilience. This technology is designed to support the repair, refurbishment, and remanufacturing of steel components, thus extending product life cycles and reducing dependency on resource-intensive primary production.

One of the principal advantages for NZI partners is the potential for substantial reductions in carbon emissions per manufactured part, achieved through localized, on-demand production using recycled inputs. This contributes directly to EU carbon neutrality targets and enhances corporate sustainability performance. Additionally, the ability to manufacture spare parts with shortened lead times and reduced material waste promotes operational efficiency and supply security—particularly relevant in sectors where component failure can lead to costly downtimes or logistical bottlenecks.

Moreover, DURIAN offers a low-risk environment for exploring and validating disruptive technologies. NZI partners are not required to have prior expertise in AM or machine learning; instead, they gain support from a consortium of leading research institutions and technology developers. This facilitates the seamless integration of innovative processes into existing industrial contexts.

Partners also contribute to the development and testing of digital process maps, enabling future readiness for Industry 4.0-compatible production systems. They will not only shape the technological outputs of the project but also influence future regulatory and market standards in sustainable manufacturing.

Technical specification or expertise sought

The DURIAN project seeks industrial partners operating within sectors defined by the EU's Net Zero Industry Act who are actively pursuing more sustainable and resilient manufacturing practices. These partners are not required to possess existing expertise in additive manufacturing (AM) or machine learning (ML); rather, they should demonstrate a strong interest in adopting disruptive technologies that enable circular, low-carbon production models.

The project aims to validate intelligent, wire-based AM processes using recycled steel for the efficient repair, refurbishment, or remanufacture of components. Industrial partners are expected to provide representative use cases, define relevant technical and quality requirements, and support the integration of AM into real operational environments.

Their role is pivotal in evaluating the feasibility, environmental benefits, and economic viability of the proposed approach. Engagement in the DURIAN project offers partners early access to innovative technologies, collaboration with leading research institutions, and a pathway to decarbonize component supply chains while enhancing production flexibility and security.

Stage of development

Available for demonstration

Sustainable Development goals

- **Goal 13: Climate Action**
- **Goal 12: Responsible Consumption and Production**
- **Goal 9: Industry, Innovation and Infrastructure**

IPR Status

No IPR applied

IPR Notes

Partner Sought

Expected role of the partner

The DURIAN project aims to transform steel part production by enabling intelligent, sustainable additive manufacturing using recycled steel and machine learning (ML)-enhanced process control. To demonstrate its real-world viability, DURIAN seeks industry partners aligned with the Net Zero Industry Act who:

1.Provide real use cases and operational conditions in which worn-out steel components are typically discarded.

2. Collaborate in co-developing and testing the wire-based additive manufacturing system for Repair, Refurbishment, or Remanufacturing (RRR).

3. Validate ML-based process maps in live production settings with high material variability, using recycled inputs.

4. Quantify environmental and economic benefits, such as CO_2 savings, cost reductions, and faster lead times.

5. Support regulatory, safety, and certification requirements relevant to critical industrial components.

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **SME 11-49**
- **R&D Institution**
- **Big company**
- **SME 50 - 249**
- **SME <=10**

Call Details

Framework program

Horizon Europe

Call title and identifier

HORIZON-CL4-INDUSTRY-2025-01-TWIN-TRANSITION-05

Submission and evaluation scheme

Anticipated project budget

7000000

Coordinator required

No

Deadline for EoI

15 Jul 2025

Deadline of the call

23 Sep 2025

Project duration in weeks

Web link to the call

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/HORIZON-CL4-INDUSTRY-2025-01-TWIN-TRANSITION-05

Project title and acronym

Disruptive Universal Recycled-steel Intelligent Additive maNufacturing (DURIAN)

Dissemination

Technology keywords

- **02007008 - Iron and Steel, Steelworks**
- **10003004 - Recycling, Recovery**

Market keywords

- **08001012 - Speciality metals (including processes for working with metals)**
- **08002003 - Process control equipment and systems**
- **08002002 - Industrial measurement and sensing equipment**
- **08001009 - Speciality/performance materials: producers and fabricators**

Targeted countries

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Sector groups involved