Biocarbon to replace fossil carbon in manganese alloys production

Project presentation (2/3 sentences) : Eramet will demonstrate the use of biocarbon for state-of-the-art manganese ferro-alloy furnaces, as a main lever to reduce its CO2 footprint, potentially providing additional competitiveness.

Starting date of the project	2021
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	The project will be first implemented in Norway (in the towns of Porsgrunn, Kvinesdal and Sauda). If it is replicable, the solution will be extended to France (Dunkerque), US (Marietta Ohio) and Gabon (Moanda)
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Today all sources for carbon needed for production of manganese alloys are fossil, with the main contributor being the reductant in the form of coke. Reductants take the oxygen from the ores to produce metal. The project will first demonstrate the use of carbon from biomass as a reductant in a large-scale operational environment for production of manganese ferroalloys, before implementing the solution fully at all relevant industrial sites.
Detailed project description	In order to establish knowledge allowing production of biocarbons with characteristics potentially suited to production of manganese alloys in current industrial furnaces, Eramet has carried out research and development activities since the 1990s in Norway, in cooperation with research institutes and academia The demonstration project stretches from 2021 until 2024 and will demonstrate the use of significant amount of biocarbon (possibly thousands of tons) in industrial operation. The project is supported by a grant from ENOVA, a Norwegian state enterprise administrating grants for activities related to climate, environment, and energy efficiency.
Main project's drivers for reducing the greenhouse gas emissions Enter the information in the appropriate boxes	

Reduction levers	**Details on the aspects of the project**
☐ Energy and resource efficiency (including behaviour)	
☒ Raw material Decarbonisation	Use of biomass-based raw materials instead of fossil carbon (metallurgical coke)
☐ Energy efficiency improvements	
☐ Improving efficiency in non-energy resources	
☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)	
☐ Financing low-carbon producers or disinvestment from carbon assets	
☐ Reduction of other greenhouse gases emission	

Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope

Indicate the aspects of the project that contribute to the reduction of emissions per category of emissions considered (left-hand column) and the quantification of associated emissions.

Indicate the main hypotheses and calculation steps in the intended section (below the table)

	Aspects of the project contributing to the reduction of emissions by emission category	**Quantification of associated GHG emissions by emission category** **Please follow the quantification methodology used in the Afep guidelines.**
Reduction of the company's carbon dependency		
Scope 1 *Direct emissions generated by the company's activity.*	Fossil carbon currently used will be replaced by a sustainable source of biomass which is neutral in terms of emissions from an ETS perspective.	Estimation for 2025 : - 200 ktCO2/y Estimation for 2035 : - 700 ktCO2/y
Scope 2	The projects will not contribute on scope 2.	0

For further details, please refer to the methodology guidelines.	

Indirect emissions associated with the company's electricity and heat consumption.		
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*	There will be an impact from production of biocarbon and this has not yet been quantified and compared to current coke production which also emits CO2. Transport emissions are expected to be similar to the ones of cokes.	This information is not available at this stage.
Increase of carbon sinks		
Emissions Absorption *Carbon sinks creation, (BECCS, CCU/S, …)*		
GHG emissions avoided by the company at third parties		
Avoided Emissions *Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.*		

Clarification on the calculation or other remarks:
Biocarbon is assumed to have zero CO2 emissions from fossil carbon source. Following EU legislation (scope 1), biocarbon have thereby zero CO2 emission The calculation of reduction in CO2 emission is based on the amount of coke displaced by biocarbon times the emission factor from coke to CO2. This emission factor is approximately 3 tCO2/tcoke. It is based on French agency ADEME's CO2 emissions factor of 0.389 tCO2/MWh and average Eramet plant data.

Modality of verification of the quantification.	**Calculation standard used (ADEME base, GHG protocol, etc.): GHG protocol. Our CO_2 emissions reduction target and associated roadmap has been validated by the SBTi in 2021** **Verification of the calculation (internal or external): External**
Other environmental and social benefits of the project If possible, list the impacts and Sustainable Development Objectives concerned	We have not identified any major other benefits of the project. A social benefit will be employment for people working in the production of biocarbon.
Project maturity level Tick the corresponding current maturity level	☐ Prototype laboratory test (TRL 7) ☒ Real life testing (TRL 7-8) ☐ Pre-commercial prototype (TRL 9) ☐ Small-scale implementation ☐ Medium to large scale implementation **Remarks**: click here to enter the level of maturity of the project
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	The potential will depend upon the results of the demonstration project. If this first phase is successful, the concept can be extended to all the manganese ferroalloy plants and other pyrometallurgical industries with similar reductant needs.
Amount of investment made (in €)	This is confidential information. The main investments are anticipated to be made by the biocarbon suppliers.
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☐ MT (4-10 years) ☐ LT (> 10 years) **Remarks:** The profitability will depend on the project results and market condition. Therefore, the profitability is uncertain.
Engaged partnerships	
Open comments from the project owner	Sustainable certified biomass as recommended by European Commission's latest Renewable Energy Directive (REDII) annex IX.
More about the project	
Contact the company carrying the project Please specify an ad hoc e-mail address that will allow the reader to contact the project company directly	henrik.lund@eramet.com

Project URL links	https://www.enova.no/om-enova/om-organisasjonen/teknologiportefoljen/co2mbi--co2-reduction-in-manganese-ferroalloy-production-through-bio-carbon/
Titre SEO	Use of biocarbon in manganese alloys production
Méta Description	Eramet's R&D is testing and demonstrating the possibility of replacing fossil carbon with biocarbon in manganese alloys production with the aim of deploying this production method to its suitable industrial sites.
Illustrations of the project 3 photos/videos minimum (in HD format to be attached)	