

ULCOS

Title : Ultra-Low CO2 Steelmaking

Priorité Thématique	Appel	Domaine	Instrument
NanoMatProd (3)	FP6-2002-NMP-STEEL-3	NMP-2003-3.4.5.1	PI
Coordonnateur	Chef Projet BRGM	Services concernés	Durée (mois)
ARCELOR (L)	B. BOURGEOIS (EPI)	EPI, REM	60

Abstract

This proposal to the 6FP is part of **ULCOS**, an initiative launched by the major players in the European Steel Industry and its main partners in other industries and academia (47 partners, 15 European countries). A related proposal, also part of the ULCOS initiative, was presented to the RFCS program as proposal RFCS-PR-03113.

ULCOS is a major RTD program, which plans to **find innovative and breakthrough solutions to decrease the CO2 emissions of the Steel industry**. The context is the post-Kyoto era. The target is an expected reduction of specific CO2 emissions of 50% as compared to a modern Blast Furnace. Within 5 years, the project will deliver a concept process route, based on iron ore, with a verification of its feasibility in terms of technology, economic projections and social acceptability.

It would be unrealistic today to choose among the candidate technologies that show potential for achieving this target, because they are still tentative and the successful one will have to be selected on technical and non-technical criteria (future energy market, internalization of CO2 mitigation costs in market prices, societal acceptance). The project hence starts by examining a panel of technologies, which have passed a first prescreening but need to be investigated more closely. This approach is believed to be the most efficient in terms of resources and lead-time necessary to develop the new technology.

Examined in the first stage of the proposed stage-gate approach, are: (1) new carbon-based smelting-reduction concepts, making use of the shaft furnace but also (2) of new less common reactors; (3) natural-gas based pre-reduction reactors beyond state-of-the art technology; (4) hydrogen-based reduction using hydrogen from CO2-lean technologies; (5) direct production of steel by electrolysis, and (6) the use of biomass, which circulates carbon rapidly in the atmosphere. CO2 capture and storage (7) will be included in the design of these technologies.

The project will produce the answers necessary to carry out the pruning of these technologies and lead to a final technology proposal after 5 years. It will develop the methodology for selection and produce the scientific and technical information necessary to carry out the intermediary evaluations.

List of participants:

No	Organisation Name	Country
1	Arcelor	Luxembourg
2	Corus	United Kingdom
3	Corus	Netherlands
4	Dillinger Hütte	Germany
5	LKAB	Sweden
6	Ilva (RIVA)	Italy
7	Saarstahl	Germany
8	ThyssenKrupp Stahl	Germany
9	voestalpine	Austria
10	Air Liquide	France
11	Danieli-Corus	Netherlands
12	EDF	France
13	Ferrostaal A.G.	Germany
14	Küttner	Germany
15	LHOIST	Belgium
16	PWurth	Luxembourg

17	Rautaruukki	Finland
18	SSAB	Sweden
19	Statoil	Norway
20	VAI	Austria
21	ALPHEA	France
22	Armines	France
23	BFI	Germany
24	BRGM	France
25	CIRAD	France
26	CRM	Belgium
27	CSM	Italy
28	ECN	Netherlands
29	GEUS	Denmark
30	CSIC-INCAR	Spain
31	IPTS	Spain
32	MEFOS	Sweden
33	SINTEF	Norway
34	SINTEF	Spain
35	LABEIN	Spain
36	BTG	Netherlands
37	Europlasma	France
38	GVS	Italy
39	METALYSIS	United Kingdom
40	University of Aveiro	Portugal
41	CNRS-LEPII	France
42	University Kassel	Germany
43	University Leoben	Austria
44	University Nancy, LSG2M	France
45	University of Lulea	Sweden
46	University Trondheim, NTNU	Norway
47	University Pisa, SSSA	Italy