



Industrial Symbiosis in Practice: View from the industry

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Table of contents

1. Introduction to European Aluminium
2. Introduction to the Innovation Hub
3. Two practical cases related to Industrial symbiosis
 - A. CORALIS : use of waste/by-products from the aluminium recycling value chain by the steel sector
 - B. RemovAL: Use of Bauxite Residue by the cement sector
4. Key challenges to promote the Industrial symbiosis business case



1 / Who we are

85+

members

approx. **600** plants

in 30 European countries
(EU, EFTA, UK, Turkey, BiH)

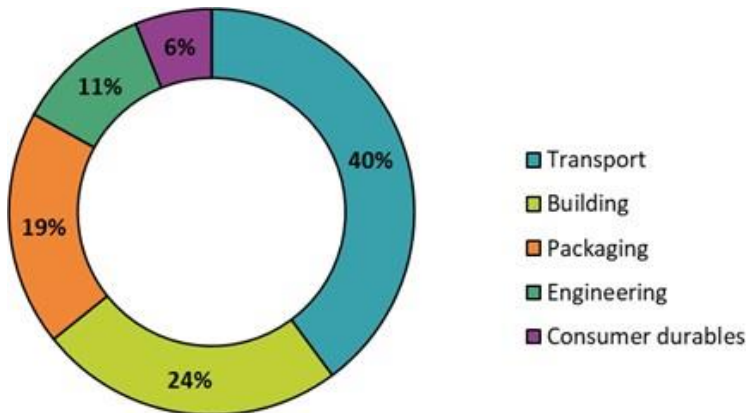
1 million + Direct

and indirect jobs
across Europe's value
chain

Founded in
1981

European
Aluminium
represents the
entire value chain
of the aluminium
industry in Europe

**An innovative value chain serving EU key markets
(end uses for 2020)**



€40

Billion annual turnover
[2018]

90%

of aluminium is recycled in
construction and automotive
in Europe

Europe produces

6%

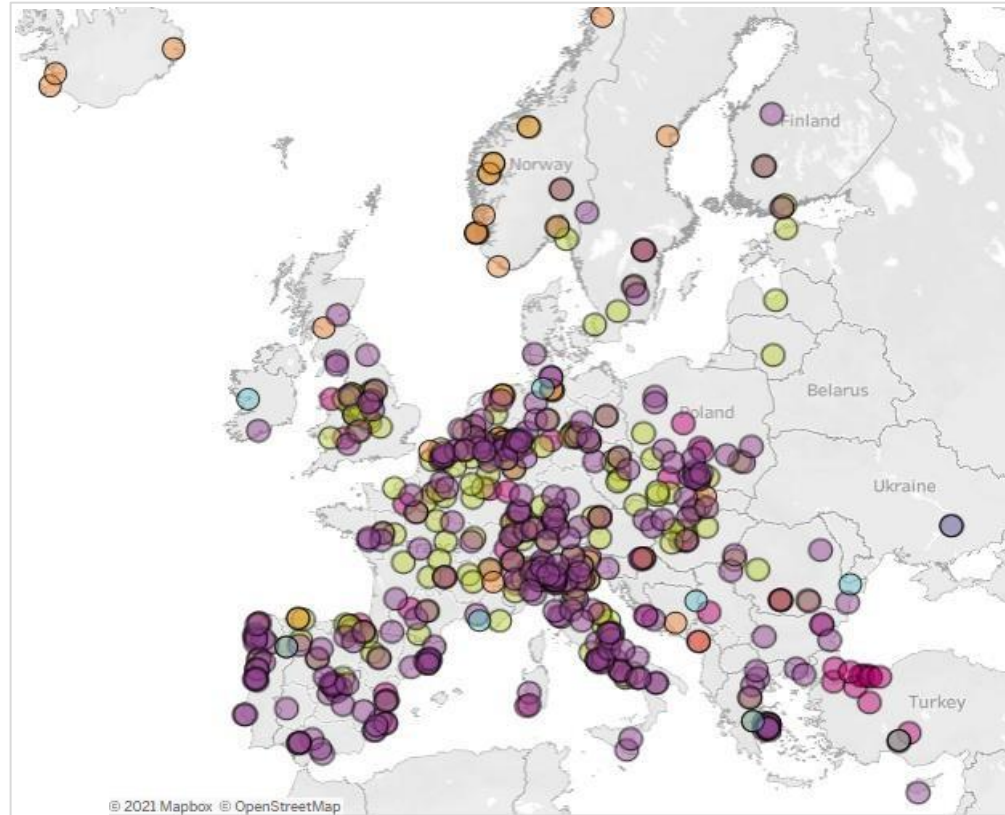
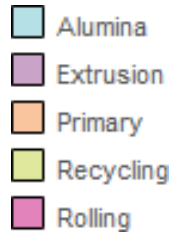
of worldwide **primary**
aluminium [2020]

51%

of European production comes
from recycled sources [2020]

1 / Overview of the aluminium industry in Europe

Aluminium industry in Europe: more than **600 plants** covering the entire aluminium **value chain**

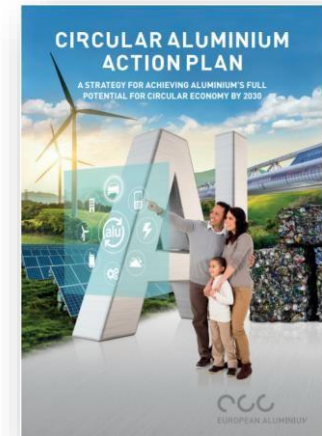
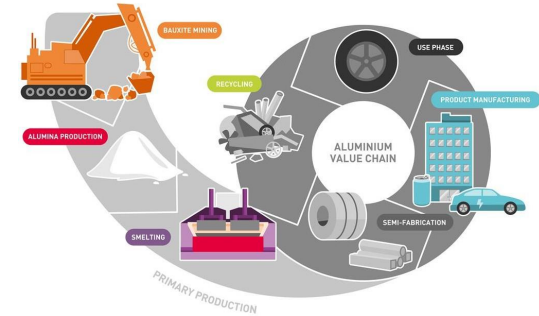


2 / Innovation Hub - Key rationale

Fully Decarbonise and circularise the aluminium in the value chain is a must!

This implies:

- The transformation of the aluminium sector
- A strong collaboration between players along the value chain and with other sectors, e.g. energy sector, scrap collectors/dealers, etc.
- Collaborative platforms as enablers



2 / « Innovation Hub » : main objectives



- Build a proactive community of innovative companies across the value chain.



- Connect with the EU innovation agenda
- Track relevant funding opportunities



- Be the aluminium voice for innovation
 - Engage with the PPPs
 - Contribute to the EU's research agenda & priorities



- Trigger research projects that advance a sustainable future & tackle technological challenges

2 / 15 companies and 2 Market Groups engaged in 2021



3 / Seeding projects along the value chain

Legend

7 On-going projects

2 new projects started 2021

A



CORALIS*
(2020-2024)

SAIS – SPIRE*
(2020 -2023)



METABUILD*
(2021-2025)

SALEMA*
(2021-2024)



FORMALUB
(2019 – 2023)

aluSELECT
(2020 -2021)

USE PHASE

PRODUCT MANUFACTURING

SEMI-FABRICATION

PRIMARY PRODUCTION

SMELTING

ALUMINA PRODUCTION

BAUXITE MINING



AlSiCal*
(2019-2023)

RemovAL*
(2018-2022)



ReActiv*
(2020-2024)



* Project 100% EU funded

3.A / CORALIS



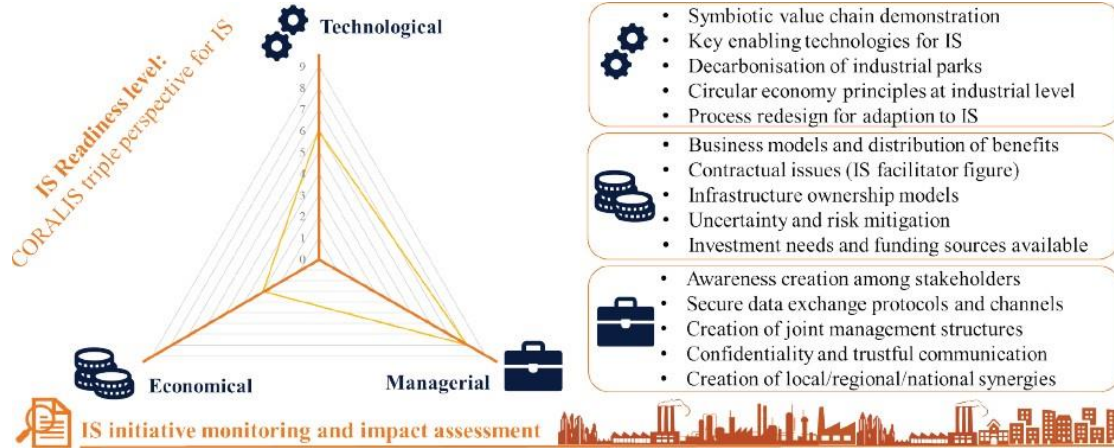
CORALIS- Creation Of new value chain Relations through novel Approaches facilitating Long-term **Industrial Symbiosis** .

Duration: 4 years. Submitted under [CE-SPIRE-01-2020](#) call.

Project budget : 22,8M€, with 18 M€ EU funding

Coordinator: CIRCE, 29 partners (5 RTD, 2 universities, 4 SMEs, 15 large companies, including Raffmetal, and 3 associations).

Role of Innovation Hub: Transferability and dissemination actions, including the organisation of 2 thematic workshops.



Started in Oct 2020



Brescia Steel, Cast Iron, Aluminium



Core Ambition: Reduction of landfill disposal by replacing key raw materials like carbon sources for iron production with industrial waste and bioresources

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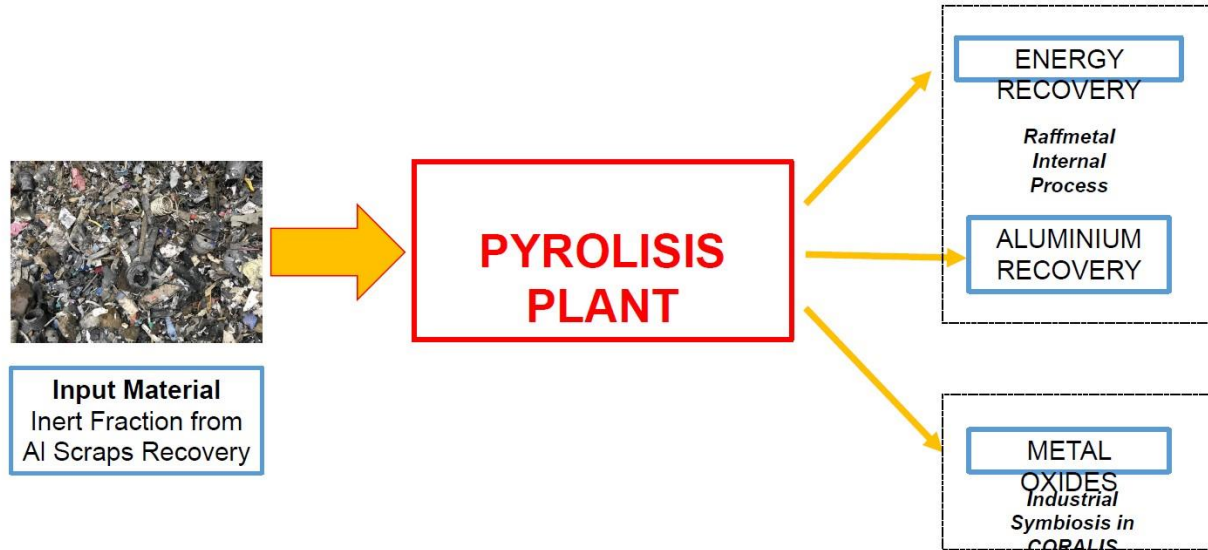


3.A / CORALIS - Industrial symbiosis case - aluminium

Objective:

Turning metal oxides from the aluminium recycling value chain into resource for the steel sector

The Pyrolysis Plant – CORALIS PROJECT



3.B / RemovAL - First Flag-ship project

Started in May 2018



First Horizon 2020 project facilitated by the Innovation Hub

- Main objective:
 - Deliver and validate a feasibility study for **valorising Bauxite Residue** along with other industrial by-products, e.g. Spent Pot Linings (SPL),
 - Develop 6 innovative pilot plants across Europe
- 4 years project (2018-2021) with 11,5 M€ EU funding
- Coordinator: Mytilineos S.A., Metallurgy business Unit
- 26 partners including European Aluminium, Rio Tinto, Alum, and International Aluminium Institute.
- Cross sectoral project including the construction industry, especially **cement industry**



3.B / Policy Brief document

Objective: outlining the current state of Bauxite Residue production and handling in Europe and highlighting the legislative challenges faced in its valorization

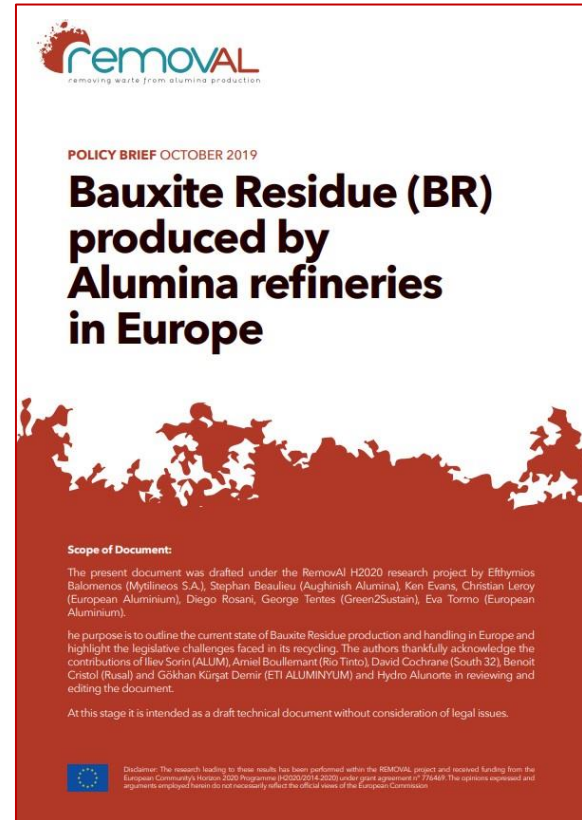
Development core group: Mytilineos, Aughinish, International Aluminium Institute, Green2Sustain & European Aluminium

Commented by the Alumina stakeholder group:

- RemovAL partners: Mytilineos, Rio Tinto, Aughinish, Alum, International Aluminium Institute and European Aluminium
- Other stakeholders: Alteo (FR - Gardanne), Aluminium Oxid Stade GmbH (DE) & ETI Aluminyum (Seydisheir -Turkey)

Free access:

<https://www.removal-project.com/wp-content/uploads/2020/03/removAL-Policy-Brief-Mar-2020.pdf>



／ Use of Bauxite Residue in European Cement industry

- **Filtered Bauxite Residue** as filter cake with low soda content can be used by cement plants
- Cement plants can use **Bauxite Residue (BR)** in the range of 1,5-3%w as **clinker raw material**
- But only **2-3% of the BR European production** is used by the cement sector, i.e. 110kt/year are used by 2 Greek and one Cyprian cement plants on a total of about 6 Mt of BR/year
- The **Waste status** of Bauxite Residue hinders such use



Figure 8: Left: Transportation and storage of Filtered bauxite residue as filter cake at storage site in Mytilineos, Right: Loading on a ship for use in a cement plant.

／ Key challenges to get an Industrial symbiosis business case

- Producer of the stream
 - Environmental benefits to transfer the stream to another sector/industry, e.g. avoiding landfilling or disposal costs
 - Limited processing in order to convert the stream directly usable by the other sector
 - Economic incentives to process the stream, e.g. by selling the stream to the user or by avoiding disposal cost.
- User of the stream
 - Direct interest to use of the stream which substitutes some primary materials
 - Positive economic balance of using this stream vs. primary/alternative material
 - Stability in term of supply, quality , composition, etc.
- Legislative framework, i.e. Waste status vs. EoW /by-product
 - Getting a EoW or by-product status for the targeted stream is essential
 - Getting acceptance/harmonisation of such status across MS is also essential
 - JRC will work soon on harmonised criteria for some priority streams

An adequate & harmonised legislative framework is a pre-requisite for promoting industrial symbiosis where burdens and benefits are well-balanced between the producer and the user of the stream