

EPOS INSIGHTS #2

ANALYSIS OF 5 EUROPEAN INDUSTRIAL CLUSTERS

Led by:



EPOS insights are publications summarising the most relevant outcomes of the EU funded EPOS project. The overall aim of the EPOS project is to enable cross-sectorial industrial symbiosis and provide a wide range of technological and organisational options for making business and operations more efficient, more cost-effective, more competitive & more sustainable across process sectors.

INTRODUCTION

This insight summarises the preliminary qualitative analyses on a selection of five European clusters in view of their potential for cross-sectorial collaboration.

This work converges to provide an analysis of EPOS industrial sites and their potential for clustering in order to achieve resource and energy efficiency, especially focusing on industrial symbiosis.



EPOS CLUSTERS

EPOS consists of five clusters. An EPOS cluster is defined as two or more industrial sites that cooperate with each other and with the local communities in order to efficiently share streams and activities, with the aim of enhancing economic gains, environmental quality and social responsibility for the business as well as the local community.

These clusters are further divided into either an industry cluster or a district

cluster, depending on the kind of symbiosis activities that are already in place. There are two district clusters and three industrial clusters. In an industrial cluster companies cooperate and in a district cluster the local community is involved from a technical or engineering point of view.



METHODOLOGY



Literature review



List of potential industrial symbiosis projects

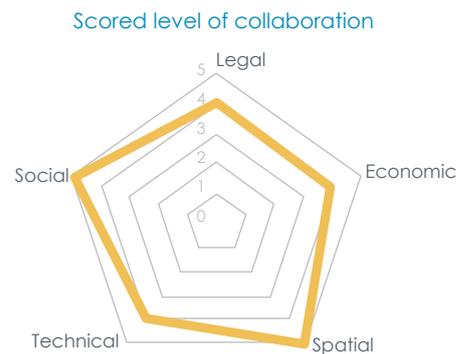


Preliminary study of each site with LESTS surveys and interviews



Propositions of specific opportunities for each cluster

- 1. LESTS (Legal, Economic, Spatial, Technical, Social) survey** and its visualisation with pentagons
- 2. SWOT analyses** of each of the EPOS clusters. Based on the SWOT analyses, recommendations were made to provide a reference for possible improvement in resource efficiency on individual EPOS site or by EPOS inter-site symbiosis.



For each of the EPOS clusters, the LESTS analyses resulted in understanding the existing collaborations involving EPOS partners in the five clusters. This helped to set the frame for further collaborations, and drawing inferences about needs, duties and wishes of each industry at their respective EPOS sites. It was then attempted to provide a set of opportunities to meet these individual needs, duties and wishes with joint actions, in essence to initiate -where absent- and strengthen -where existing- clustering activities.

MOST PROMINENT NEEDS

Each EPOS cluster is distinct in the challenges and opportunities it provides for industrial symbiosis.

The most prominent needs are:



reducing carbon emissions



improving energy efficiency



improving efficient material use

Considering the low prices of fossil fuels, the financial costs of setting-up renewable energy infrastructure, coupled with the risks and liabilities intrinsic to industrial symbiosis, case specific investigation needs to be carried out, to provide valuable information for the proposed industrial symbiosis projects.

THE DISTRICT CLUSTERS IN DETAIL

1. Dunkirk, France



The Dunkirk cluster is located in the North of France. It is one of the EPOS district clusters and it is led by a steel production complex (ArcelorMittal).

The district cluster of Dunkirk provides a good example of collaboration between a number of private and public bodies. The different platforms that are available to ArcelorMittal in Dunkirk provide a great opportunity to strengthen the ties between industry and community and have an overall positive impact on the regional development.

The opportunities identified for the Dunkirk cluster reach beyond conventional industrial symbiosis projects, and aim for closed-loop solutions and business model.

The district heating network of Dunkirk brings together a number of industries and provides heat to the Dunkirk city. The port of Dunkirk, Urban Community of Dunkirk and the presence of Ecopal, an industrial ecology platform, provides an added advantage to ArcelorMittal to reach for innovative solutions to future resource and energy related challenges.

ARCELORMITTAL [DUNKIRK]



 satellite site

 lead industry

2. Visp, Switzerland



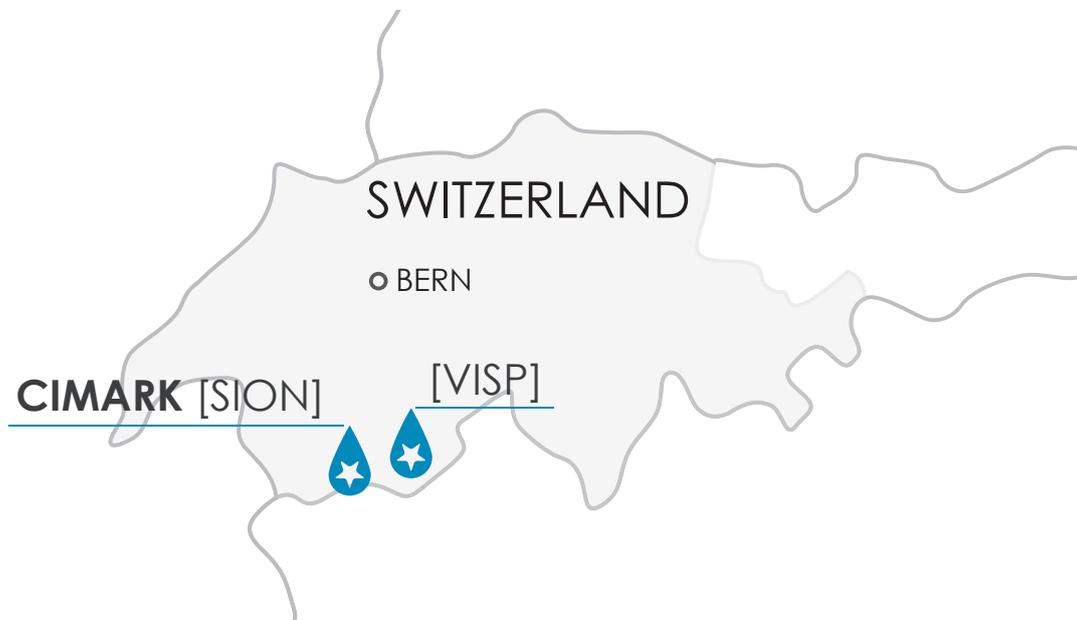
The Visp cluster is located in Switzerland. Visp is the second EPOS district cluster, and the only one where a local SME (CimArk) takes the lead of the symbiosis activities.

Similar to the Dunkirk cluster, the Visp cluster exhibits a high level of trust between industry and public bodies in Visp city.

study to learn the importance of stakeholder willingness to initiate and maintain a project, even if the costs only balance the profits.

The EPOS SME, CimArk, can utilise the opportunity to learn from the experience in Dunkirk cluster, and propose a number of interesting projects to the City of Visp and other industries in the region.

The existing district heating network provides a good case



THE INDUSTRIAL CLUSTERS IN DETAIL

3. Rudniki, Poland



The Rudniki cluster is located in southern Poland. It is led by a cement production plant (CEMEX), and includes a steel production plant (ArcelorMittal) and two mineral plants (Omya).

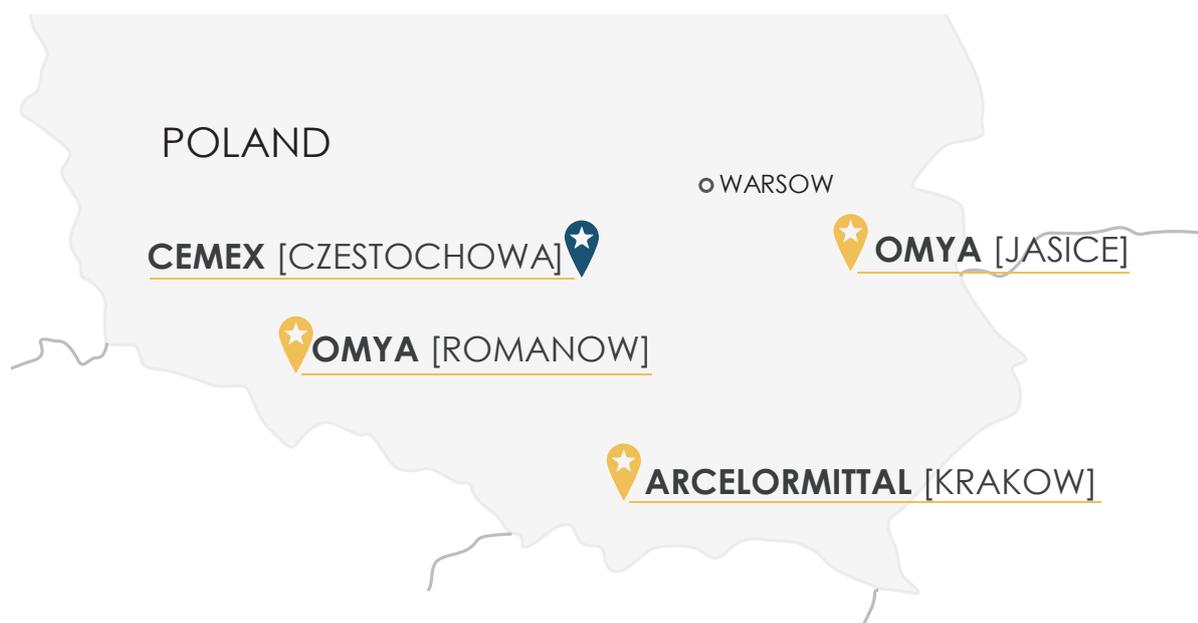
The LESTS and SWOT analyses of the Rudniki cluster resulted in two recommendations. To overcome the perception of distance between the different EPOS sites, the existing supply chain routes of EPOS partners could be used to create connections between the different sites. A deeper study of supply chains of each EPOS partner will also result in optimising their respective supply chains, and possibly improving the impact on environment and society.

The second recommendation, is about by-products valorisation. For instance,

a possibility have been individuated to set-up a slag processing unit close at ArcelorMittal Krakow site or at CEMEX Rudniki site.

This processing plant can process slag from ArcelorMittal (and possibly other steel manufacturers) and sell the derived products on the market. Experience of ArcelorMittal Dunkirk can exemplify how this synergy may work, as ArcelorMittal Dunkirk has a slag treatment plant on the site, owned by a third party.

The Rudniki cluster will need to engage in industrial symbiosis activities, which produce a high value for the partners that significantly outweigh the costs of connecting the sites via different transport options.



satellite site



lead industry

4. Lavera, France



The Lavera cluster is situated in the South of France, near Marseille. The chemical site (INEOS) in Lavera leads the cluster, having a steel plant (ArcelorMittal) in Fos as satellite site.

Lavera cluster conveys a number of opportunities for EPOS industries, with the added challenge of overcoming the distance between the two sites. In spite of the distance and infrastructure limitations between the sites, it was found that the industries already engage in sharing the services of the same person for their human resource departments.

Another possible opportunity was identified for ArcelorMittal, to use the existing business ties of INEOS with a

Gas company located in the cluster, and possibly set-up a new plant which separates carbon dioxide from exhaust gases (a replication of INEOS-Gas company collaboration on Lavera). For every opportunity identified, the investment costs, pay-back time and the low prices of existing solutions presented themselves as a recurring challenge.

To initiate industrial symbiosis between the two industries and engage in district cooling network, it is crucial to utilise the existing platform of Grand Port of Marseille Mediterranean and seek funding from third parties to engage in district cooling network.



5. Hull, United Kingdom



The Hull cluster is located in the

Humber region (United Kingdom).

The cluster is led by a mineral plant (Omya), and includes a chemical site (INEOS) and a cement production plant (CEMEX). The highest number of industrial symbiosis opportunities were identified for the Hull cluster.

Since the EPOS sites in Hull are located in relatively close vicinity, there is a higher opportunity to engage in by-product exchange.

Among the **19 opportunities identified** for the Hull cluster, two present the highest potential.

These two major opportunities involve all EPOS partners in the cluster.

- to utilise the waste stream from INEOS as fuel in the cement kilns
- to use the reject stream from Omya as raw material for for cement production process, in exchange for using Cement Kiln Dust to replace the current use of Omya's reject stream.





COLOPHON

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