



## Regulatory barriers to industrial symbiosis in metal sector

**A new study** has investigated the possibility of a regional industrial symbiosis of metal industries across the Sweden-Finland border. The analysis suggests that it is technologically feasible, but that regulatory support may be inefficient, particularly with respect to changing the status of a waste product to a by-product.

**Industrial symbiosis** is the exchange of material and energy between traditionally separate industrial organisations in a way that benefits all those involved and potentially the environment. The study investigated the potential of organising a system of metallurgical industries in an industrial symbiosis around the Gulf of Bothnia between Sweden and Finland.

The industries were: four carbon steel mills, one stainless steel mill, one zinc plant and an iron regeneration plant. There are potentially three main forms of symbiosis to be found between these industries. Firstly, the dust, scales and sludge from steelmaking could be fed into a regeneration plant to produce iron and zinc. Secondly, the waste product jarosite from the zinc plant could be processed by fuming off zinc and other volatile materials and the resulting slag used for construction. Lastly, the manganese dregs resulting from zinc production could be used in stainless steel production. None of these face significant technological challenges, although the processing of jarosite is currently energy intensive. The waste flows of iron, zinc and manganese could be transported by boat, but a risk assessment would need to be conducted.

In terms of regulation, developing this symbiosis would require changing the waste status of a material to non-waste by-product status. Typically this requires the company to apply for a new environmental permit, which can be a lengthy process. For example, a steelmaking plant in Finland applied to remove the waste status of slag and scrap metals and the process lasted from 2002 to 2008. This was largely because the environmental authority considered slag and scrap metal to be waste, as it requires further processing prior to reuse. However, the company did not see the materials as waste because they are never discarded and are part of a continuous production process.

The EU Waste Framework Directive<sup>1</sup> outlines that a substance can be considered a by-product as long as its further use is certain and lawful, it can be used directly without further processing other than normal industrial practice, and it is produced as an integral part of the production process.

Considering the EU and national regulatory frameworks, the study suggests that operators within the proposed metallurgic industrial symbiosis should not change the status of steel residues into a by-product as the required recovery facility will be considered 'further processing'. The manganese dregs could be considered as a by-product if they can be fed directly into the steel process. However, the jarosite is unlikely to receive by-product status as it requires processing and is toxic.

To address these shortcomings, the researchers suggest introducing a Common Pool Resource (CPR) based governance system, under which by-products become the responsibility of a collective organisation created by committed members of the Industrial Symbiosis. The members would share risks, such as the costs of processing and transporting waste products, and the unpredictability of changing waste status into by-product status.

The researchers highlight that their conclusions may not be applicable to all industrial symbioses. Those with less harmful and low volume material streams may be more suitable to an open market form of governance.

1. See: <http://ec.europa.eu/environment/waste/framework/index.htm>

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