A scrap sourcing strategy to secure supply and minimize logistics costs for H2 Green Steel

BY SOFIA IVARSSON & SOPHIA SANDSTRÖM (June 2022)

Steel is endlessly recyclable, and the scrap is a critical input raw material for steel production. With decarbonisation of our society, demand for steel scrap is increasing in Europe, and H2 Green Steel's localization in Boden is a competitive disadvantage due to the long distances from scrap generating areas. Europe is currently the largest exporter of scrap worldwide, and has a well-established scrap market that is complex and rigid. This thesis, on behalf of H2 Green Steel, is looking to challenge many of the current ways of working to find a cost-competitive scrap sourcing strategy.

Scrap is any product that contains steel and has lost its initial value, most commonly obsolete products such as old cars. It is generated where there is industry and society, and is exported worldwide from North sea ports. The European countries generating the most scrap are therefore Germany and the UK, and the largest exports come from ports in Benelux and the UK. Scrap suppliers process the scrap in heavy machinery that removes residual elements and cuts the material into smaller pieces that are easier to transport and re-melt in the steel mill. The transportation is usually done in bulk vessels or bulk trains, and on barges within Europe.

For H2 Green Steel who require large annual volumes of scrap, it is economically beneficial to utilize large bulk vessels. This is the recommendation for sourcing from Rotterdam and Amsterdam in the Netherlands and Tilbury in the UK, where large scrap volumes exist. However, this strategy faces some difficulties in the winter, when ice-classed vessels are necessary to transport to Boden, and the market supply of large bulk ice-classed vessels is limited. Consequently, H2 Green Steel should also source scrap in smaller bulk vessels from Gdansk, which is the cheapest alternative due to the shorter distance. Luleå Hamn is likely to become a bottleneck due to all the new industrial activity in the region, not only from H2 Green Steel. In order to minimize the risk of supply chain disruptions, certain scrap volumes should be delivered on bulk trains. This includes both scrap volumes generated within Sweden, and with a direct train from the Ruhr-region in Germany. The Ruhr-region has an additional benefit of being an automotive hub, where a lot of new high-quality scrap can be sourced, that is especially sought after.

By using the recommended strategy, H2 Green Steel can be a real competitor in the scrap market despite their localization and secure the volumes they need to scale up their production in the coming five years.

This popular scientific article is derived from the master thesis: Cost efficient scrap metal sourcing, written by Sofia Ivarsson and Sophia Sandström (2022).