# Improved new scrap utilization through industrial symbiosis matchmaking

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**Abstract.** The production of major industrial metals has risen rapidly over the past decades [1]. Predictions for the steel industry show that the demand will most likely grow until the end of this century [2]. This increasing demand is a barrier to achieving a truly circular value chain. As long as the demand increases, extraction of virgin material will remain necessary. Furthermore, as we keep injecting pure virgin material in our value chain, the impurities that are added along the different life cycle stages are diluted. For this reason the real consequence of current material use and reuse is still unknown. As we move towards a circular value chain, not only the volumes of reusable resources but also the quality of those streams become more important to monitor. For each material and each application, quality will be defined by different parameters. However, there is a need to better characterize material streams in order to identify the possibilities on the short term and to estimate the consequences on the long term. New scrap comprises scrap that is generated when steel is fabricated into finished products. Generally, this scrap is of higher quality with well-known compositions in contrast to end-of-life old scrap. Estimating the volumes of new scrap generated within the manufacturing industries is a challenging task. Some sources indicate, that these volumes represent around 13 to 16% of the total amount of steel that flows through the manufacturing industry, with a slightly higher volume of 20% for the automotive industry [3]. In this paper; the quantity and quality of new scrap material streams will be mapped as a first step towards understanding the feasibility of a truly circular value steel value chain. In addition, alternative destinations for the new scrap will be explored to avoid the furnaces and encourage industrial symbiosis.

[1] OECD (2015), Material Resources, Productivity and the Environment, OECD Green Growth Studies, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264190504-en
[2] S. Pauliuk, R. Milford, D. Mu, J. Allwood "The Steel Scrap Age" Environmental Science Technology, 47 (2013), pp. 3448-3454 https://doi.org/10.1021/es303149z
[3] Patrik Söderholm & Thomas Ejdemo (2008) Steel Scrap Markets in Europe and the USA, Minerals & Energy - Raw Materials Report, 23:2, 57-73, https://doi.org/10.1080/14041040802018497