

Future Raw Material Supply: Opportunities and Limits of Aluminium Recycling in Austria

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Abstract In order to promote sustainable production by using secondary raw material from existing material stocks, complementary to primary raw material, information about the future availability of secondary resources constitutes a prerequisite. In this study, a dynamic material flow model of historic aluminium (Al) flows in Austria is combined with forecasts on future Al consumption to estimate the development of old scrap generation and in-use stocks until 2050. In-use stocks are estimated to increase by 60 % to 515 kg/cap. by 2050 assuming a scenario of moderate economic growth. Old scrap generation in 2050 would thereby more than double (up to 30 kg/cap.) in comparison to the 2010 amounts. Despite this substantial increase in old scrap generation, industrial self-supply from old scrap will probably not exceed 20 %, and final consumption self-supply of Al will not exceed 40 % given present conditions. Opportunities and limits of increasing self-supply through higher collection rates and lower scrap export levels are investigated in this study as the European Raw Material Initiative considers enhanced recycling to be a key measure to ensure future resource supply. Based on these

analyses, a self-sustaining Al supply from post-consumer Al is not expected if current trends of Al usage continue. Therefore, comprehensive resource policy should be based on a profound understanding of the availability of primary and secondary resources potentials and their dynamics.

Keywords Future aluminium scrap · Recycling · Secondary raw material supply · Dynamic material flow modelling

Introduction

The latest economic crisis underlined that industry is an important pillar of the European economy. In order to strengthen the European economy, the European Commission aims to raise the share of manufacturing back to 20 % of GDP by 2020 [1]. The supply of industry with raw materials has been identified as one of the major weaknesses hampering the growth of industry [2]. Therefore, several raw material initiatives [3, 4] have been launched in order to secure raw material availability. The EU strategies focus on three core aspects: (1) access to raw materials on global markets, (2) sustainable extraction of primary raw materials in the EU and (3) increasing recycling and resource efficiency as well as substitution of critical materials in order to ease the dependence on primary raw material imports [5]. Even though aluminium (Al) is not on the list of materials facing a critical shortage, the material amount provided from mining production within the EU is below 10 % of global supply [6]. Due to high energy costs and strict environmental regulations, Europe is facing a decreasing trend in primary production, reaching a level below two million tonnes in 2013 [7], corresponding to 14 % of total European Al supply. Despite economic

The contributing editor for this article was S. Kitamura.

Electronic supplementary material The online version of this article (doi:10.1007/s40831-015-0027-3) contains supplementary material, which is available to authorized users.

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