

**Aluminium Material Flow and Value Chain Analysis in the Kenyan
Industry**

Peter Marko Weramwanja

**A thesis submitted in partial fulfillment for the Degree of Master of
Science in Mechanical Engineering in the Jomo Kenyatta University of
Agriculture and Technology**

2010

ABSTRACT

Vision 2030 is Kenya's development blueprint aiming at making the country a newly industrialized middle income nation, and providing high quality of life for all the citizens. In support of this vision, this research work aimed at investigating the supply chain systems and demand for aluminium in Kenya. This is because aluminium has practically replaced copper in high-voltage transmission lines in Kenya. The other major uses of aluminium in Kenya include: domestic and industrial construction, packaging (aluminium foil, cans) and kitchenware. Material categories and transformation processes were identified and the materials examined. Aluminium consumption, production and availability was determined by collecting secondary data from Kenya National Bureau of Statistics, Kenya Bureau of Standards, Ministry of Environment and Natural Resources, and Kenya Association of Manufacturers. The primary data and effects were acquired from the industry players through questionnaires that were distributed and interviews carried out in specific industries. The analysis was carried out through Material Flow Analysis and Value Chain Analysis.

Annual collective data on aluminium consumption, production, and efficiency to assist in running aluminium industry has not been available to users. Therefore there was a need to avail the data on the market in order to get a clear understanding and information on aluminum material transformation, consumption, production and use by the government and potential investors in Kenya.

ported billets, coils and ingots, imported semi fabrications and castings, imported scrap and local scrap consumption increased steadily by 35% , 55% , 37.1% , 35% , 197% and 241% respectively. The year 2008 recorded a slight drop due to the 2007 political instability. Imported bauxite, unwrought aluminium and wrought aluminium consumption was projected to

increase by 53.1% , 54.9% and 32.8% respectively between the years 2009 and 2019. During the period of study, aluminium sector recorded Material Efficiency, Energy Efficiency and Capacity Utilization rate means of 80.95% , 26.68 mt/TJ and 48.84% respectively. The local industry efficiencies compared too low to the global Material Efficiency, Energy Efficiency and Capacity Utilization rate that varied between 92% to 98% , 80 mt/TJ to 92 mt/TJ and 81% to 93% respectively. Information on use of aluminium material in its primary and secondary states was provided.

The findings of the study will be useful to the private sector and government when establishing the cost of transformation, consumption and production that may lead to investing in aluminium processing plant in Kenya. Value chain analysis will provide the basis of determining the material costs that are incurred at each stage of the production cycle for this material, which will consequently facilitate the formulation of a long-term duty structure. This will form the basis for informed and supportive decisions from policy makers and during trade negotiations over tariffs with other countries. Current and potential investors will be able to forecast market trends in terms of aluminium material availability and efficiency by comparing with the global trends.