According to estimates of the German Federal Ministry for the Environment, the German building stock contains around 10.5 billion tonnes of mineral building materials, around 220 million tonnes of timber products and around 100 million tonnes of metals. Due to continuous building activities, especially renovation and retrofit measures, it is estimated that this raw material stock will grow by a further 20% until 2050 [1]. Every year more than 450 million tonnes (5.6 t/person) of mineral raw materials (e.g. sand, gravel) and more than 15.5 million tonnes (194 kg/person) of metals (e.g. steel, aluminium, copper) are required within the sector for maintaining and constructing new buildings. The focus of this paper is the analysis of construction related raw material flows using material flow analysis (MFA) in Germany. To provide system control options in a circular economy, a deeper knowledge about material flows and stocks is required. A large range of statistical data (e.g. production, import/export, waste etc.) was evaluated and disaggregated, to investigate the impact and self-supply potential through secondary materials, of the German building industry.
Currently, the demand cannot be covered by recycled materials leaving the building sector and further primary raw materials are needed. Potentially, only 18% of the mineral raw materials can be substituted by recycled construction waste. In contrast, for steel and aluminium the substitution rate has reached levels over 40%.