

GIS-based Analysis of Vienna's Material Stock in Buildings

Fritz Kleemann, Jakob Lederer, Helmut Rechberger, and Johann Fellner

Keywords:

building material
building stock
geographic information systems (GIS)
industrial ecology
urban metabolism
urban mining



Supporting information is linked to this article on the JIE website

Summary

The building stock is not only a huge consumer of resources (for its construction and operation), but also represents a significant source for the future supply of metallic and mineral resources. This article describes how material stocks in buildings and their spatial distribution can be analyzed on a city level. In particular, the building structure (buildings differentiated by construction period and utilization) of Vienna is analyzed by joining available geographical information systems (GIS) data from various municipal authorities. Specific material intensities for different building categories (differentiated by construction period and utilization) are generated based on multiple data sources on the material composition of different building types and combined with the data on the building structure. Utilizing these methods, the overall material stock in buildings in Vienna was calculated to be 380 million metric tonnes (t), which equals 210 t per capita (t/cap). The bulk of the material (>96%) is mineral, whereas organic materials (wood, plastics, bitumen, and so on) and metals (iron/steel, lead, copper; aluminum, and so on) constitute a very small share, of which wood (4.1 t/cap) and steel (3.2 t/cap) are the major contributors. Besides the overall material stock, the spatial distribution of materials within the municipal area can be assessed. This research forms the basis for a resource cadaster, which provides information about gross volume, construction period, utilization, and material composition for each building in Vienna.

Kleemann, F., Lederer, J., Rechberger, H. & Fellner, J. (2016): GIS-based Analysis of Vienna's Material Stock in Buildings. *Journal of Industrial Ecology*. 20 (0): 1-13. DOI: 10.1111/jiec.12446.