

ESR17-067 - TransLoC: Transformation of Cities into a Low Carbon Future and its Impact on Urban Metabolism, Environment, and Society

Abstract

Radical past transformations of the anthropogenic metabolism were mainly driven by severe social challenges. The measures in response to these challenges often created new problems when implemented at full scale. An example is the Neolithic Revolution that aimed to reduce food shortage but also created deforestation. A radical transformation of today is towards a low-carbon city by up-scaling of existing local scale measures at city level to mitigate greenhouse gas (GHG) emissions. This up-scaling, however, will result in a number of implications, as the transformation requires raw materials, causes novel emissions and wastes, and influences the whole society. The proposed project analyzes the changes induced by the transformation towards a low-carbon city, focusing on energy generation and consumption, GHG emissions, materials flows, and labour quantity and quality in the sectors of transport and buildings, applied to the case study of Vienna. Low-carbon city scenarios derived from GHG emission reduction targets are analyzed for their energy flows, embodied energy, material flows and stocks and thereby induced environmental impacts beyond GHG emissions. The result is an integrated model that not only determines the aforementioned impacts, but also the option to substitute raw materials by waste recycling. By determining the impact of scenarios on labour quantity and quality in the green job market, a holistic analysis of the low-carbon transformation in Vienna is provided.

Scientific disciplines:

Environmental engineering (40%) | Environmental sociology (30%) | Sustainable urban development (30%)

Keywords:

transformation, low carbon future, low carbon city, greenhouse gases, energy, transport, buildings, material flows, waste, recycling, emissions, resource depletion, economic value added, green jobs, labor quantity, quality of labor

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Further links to the persons involved and to the project can be found under
<https://www.wwtf.at/funding/programmes/esr/ESR17-067/>