URSETA – An interdisciplinary decision support tool for sustainable energy and mobility strategies

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Abstract

The City of Vienna (Austria) follows a long-term initiative to become a Smart City. Efficient, affordable and low-carbon energy systems, as well as environment-friendly transport systems are obligatory to provide a sustainable development of a city. URSETA (Urban Strategic Energy and Transportation Analyses) is a decision support tool which is able to communicate the dynamics of a city system and shows the potentials of implementing sustainable energy and transport techniques. Based on the Geographic Information System (GIS) data of two representative areas, the energy system including different types of energy carriers (natural gas, electrical, thermal) is analysed by an energy hub model. The transport behaviour of the city system is examined by implementing an integrated, dynamic transport and land-use model. The optimal energy and heat supply of the future city is computed by a mixed integer linear optimization problem. Various sustainable strategies with a time horizon of 10 and 20 years are evaluated in the URSETA model. The obtained results are implemented in a spatial 3D model. This model features dynamic information visualisation in a virtual reality environment and enables access for different types of stakeholders.

Keywords: decision support tool, 3D GIS spatial model, transport model, land-use model, energy hub model, energy supply, mixed integer linear optimization, sustainable strategies, urban strategies