Strategic Modelling and Visualisation of the transportation system for the growing city of Vienna

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The city of Vienna (Austria) follows a long-term initiative to become a Smart City. Efficient, affordable and low-carbon energy transport systems are obligatory to provide a sustainable development of a city. By 2030, the population of Vienna will have grown by 300,000 inhabitants to 2 million people. The increase of mobility of people in Vienna plays an essential role in terms of achieving climate change targets. The city of Vienna is a complex system, for analysing future scenarios an inter-disciplinary approach based on different geographical and chronological scales is chosen. For this study an integrated land use and transport model is set up, as an added value implemented with sociologic mobility data and finally visualised.

MARS (Metropolitan Activity Relocation Simulator) is applied to simulate and evaluate which policy measures are most effective in terms of CO2 reduction in the transport sector over a time period of 30 years. In three different scenarios the optimisation of the modal split will be simulated, considering competition, user behavior (including non-motorized modes and e-mobility), services-based infrastructure, mobility patterns and mobility needs. Research shows, that the form, extent and motivation of mobility behaviour of people are, especially in an appropriate socio-spatial differentiation, of marginal consideration. Change in individual mobility behaviour plays a central role for the planning of urban transport policies and will therefore be implemented into the MARS model, but is not a top-down-process.

For strategic spatial developments and support in the planning processes of CO2 reduction as well as optimising the modal split, the specific results of calculated MARS scenarios have to be relocated in a spatial context. A visual interpretation of the individual input parameters and the illustration of dynamic outputs are handled in a three dimensional game engine environment. Furthermore the three dimensional model serves as a decision support tool, which can be used for the communication with various stakeholder groups.

Connecting the three aspects is one of the goals of the doctoral programme "Urban Energy and Mobility Systems" (URBEM-DK) which has been instituted by Wiener Stadtwerke Holding AG and Vienna University of Technology. Ten researchers from the disciplines of economics, sociology, transport planning, ICT, building, visualisation and energy networks develop, by means of a holistic approach to the way to a Smart City Wien and energy and mobility strategies for the way to a "sustainable supply of safe, affordable and livable "city on the example of the Austrian capital Vienna (http://urbem.tuwien.ac.at).

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