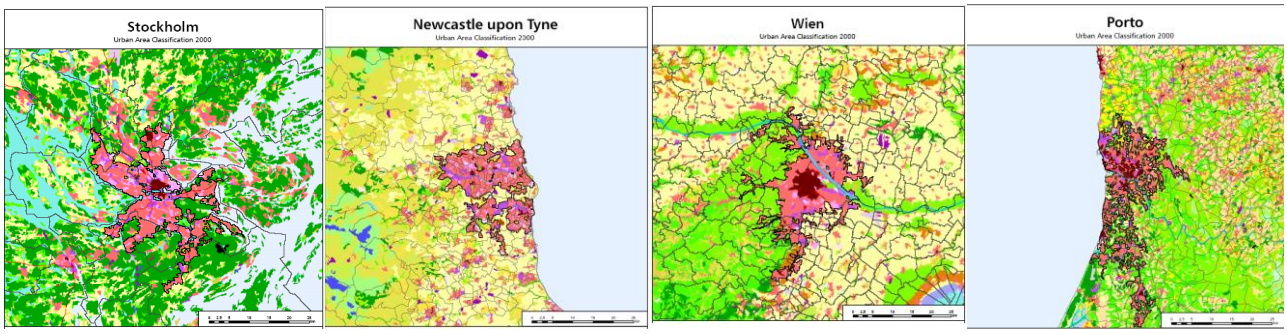
EUROPEAN COMMISSION / European Research Area

EUROPEAN UNION
EU-CHINA SCIENCE AND TECHNOLOGY WEEK

SUME
Urban Planning for Energy, Transport and Resource Efficiency

Urban form and resource use

The research project SUME is about how the spatial form of urban systems can be designed in a way which is consistently consuming less energy and land, contributing to improve environmental conditions in a climate change agenda.



Cities are laid out in spatial terms in the most different ways – for historic, economic and cultural reasons. But what about the future – do these various urban forms hold up against the urgent needs to make life more sustainable, more energy efficient? With less transport, with less use of materials ?

SUME attempts to show how urban resource use is being influenced by the spatial form in which cities are being built. And it tries to point out ways to design cities – and to change existing cities.

The challenge is climate change, as a global phenomenon. Urban centres are strongly affected by climate change. However, cities are also a key contributor to climate change, as city activities are the main source for carbon dioxide (CO_2) emissions. If global efforts to address climate change are to be successful, they will need to integrate city requirements and environmental management capacities (UNEP/UN Habitat 2009).

Impact of urban form on resource use

Cities - urban systems - use flows of resources, energy and waste to maintain life in them. To build cities also uses substantial resources for the building process.

The spatial form of cities – the densities used, the layout, the transportation grid - has a great long-term impact on the resources needed for the daily operations within an urban systems over time: The amount of energy needed for heating, cooling and transportation, and also the land needed for its expansion.

It is extremely important to understand these issues well, since building cities in a specific form has consequences reaching far beyond one or two generations. The SUME analysis and modelling will show the impact of various urban forms on resource use, providing long-term development projections for a number of case study cities.

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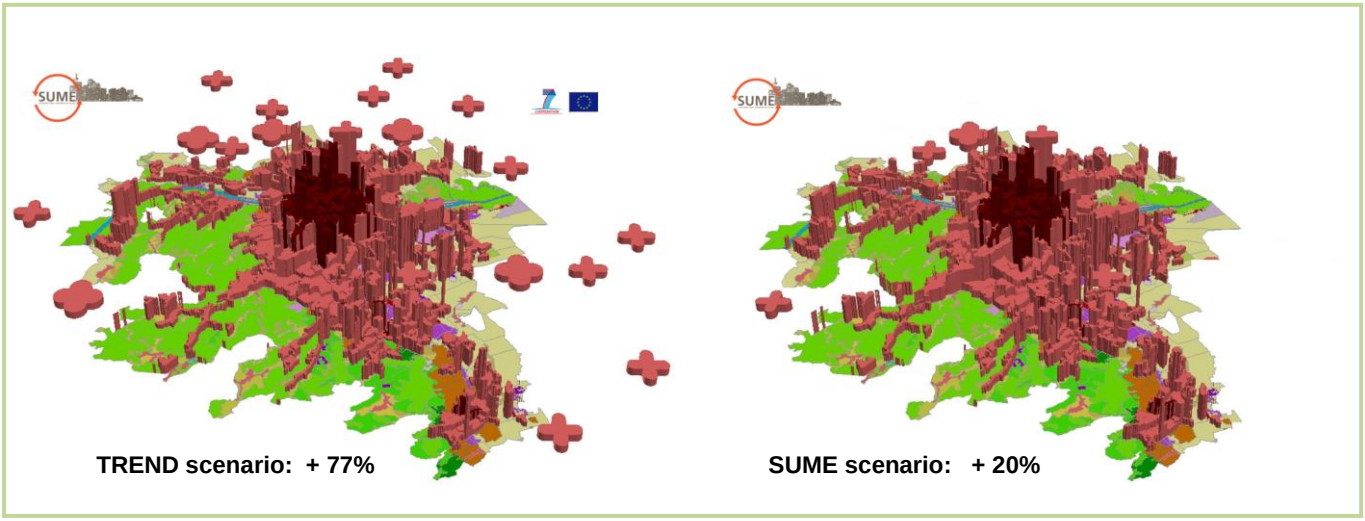
The Project Objectives

Driving forces shaping urban development processes are demographic change, the performance of urban areas in (global) economic competition, the innovative capacity under various societal conditions. How these drivers actually shape urban development in spatial terms, is little researched. How decisions on urban form in the long run influence urban systems´ physical interaction with the environment – the use of resources - is far less understood.

The principal goal of the SUME research project is to close that research gap, leading to urban spatial development concepts which provide the ground for more sustainable urban areas in the future.

Urban policy choice for the future: Urban development scenarios for 2050

As an example from the urban development scenarios: Will the urban zone (in red colour) of Vienna expand by 77% (as in a Trend-Scenario) or by 20% (SUME scenario) until 2050?



While the Trend-scenario continues to develop additional housing and infrastructures in the densities and spatial distribution of the peripheral segments of the urban zones, the SUME scenario follows a consequent urbanization policy, focusing on lines and nodes of public transport, increasing building densities in a moderate way. All this – over time – has far reaching impacts on the modes of travel, travel distances, land being used and, subsequently, on energy needed for those purposes.

Expected Results

Based on a urban form and development survey of European cities, a number of them will be selected for scenarios and case studies. The expected project outcomes include

- a number of spatial development scenarios for selected cities (until 2050), such as Vienna, Munich, Newcastle, Stockholm, Porto and Athens
- comparing trend and SUME spatial development as a basis to analyse policy options
- develop and apply a spatially-explicit urban resource flow (metabolism) model, to be tested and applied in case study cities
- an agent-based model component to allow the simulation of urban planning decision-making
- an investigation of actors and planning policies and institutions relevant to influence the spatial dimension of urban development, designing appropriate policies and policy tools
- an urban planning and evaluation method to analysed the impact of large scale urban development projects on the overall resource performance of a city

For more information, please visit the website: http://www.sume.at
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Project Partners:
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