CITY 2050: COMPACTNESS COUNTS

Land consumption could be reduced by 80 percent, according to the EU's SUME project in which a new land-use planning model based on urban metabolism has been developed to calculate resource-efficient urban structures and meet the EU's green-house gas emission goals.

Higher density, lower land consumption and mixed forms of development are required according to members of the SUME project team. This provides a way to achieve more sustainable cities in the future. Accommodating population increases does not have to result in huge urban sprawl: future land consumption in and around European cities could be reduced substantially – up to 80 percent. This would have substantial impacts on energy consumption for heating and transport, contributing to reduce green house gas emissions. State-of-the-art urban and regional planning tools based on an urban metabolism approach are essential to achieving these changes. The conference "Urban Development 2050" on 3 May 2011 in Vienna, Austria, discusses how urban planning can adopt an urban metabolism approach.

(Vienna, 3 May 2011): What will our cities look like in the year 2050? According to EU-FP7-funded SUME research project, European cities will be much more compact than today. Unused building land and infrastructure will be redeveloped, new construction will provide more floor-space and green open areas for residents, a lower share of detached houses provide more 'urbanity'. All in all, future urban development will be built close to modern and efficient public transport systems. Urban planning with a focus on the compact use of space and infrastructure will result not only in a dramatic reduction of area growth, but also energy consumption. Vienna for example as one of seven European cities analysed by the SUME project will see a considerable growth of population: While the Austrian conference on spatial planning forecasts a plus of 35 percent until 2050 – this means a rise of population to 2.4 million in the agglomeration – the necessary spatial expansion could be limited to just 14 percent. Compared to that, a trend-scenario based on current building practice would need an urban area expan-sion of 55 percent.

Even more population growth is projected for the Stockholm agglomeration, where the number of inhabitants will increase by 44 percent. But even there, in a city with rather scattered settle-ment patterns the trend – projected 47 percent increase of land use – could be reduced to 20 percent if strategies proposed by the SUME project are implemented.

The same holds for energy demand: Heating, a main consumption factor, could reduce its energy demand dramatically if state-of-the-art energy standards are adhered to and the adaptation of the existing housing stock is being accelerated. Munich and Newcastle show the largest potential for reduction of space heating demand – a reduction of 82 percent on the basis of SUME-strategies can be reached in 2050 compared to 2010, followed by Stockholm and Vienna with a potential reduction of 81 percent. The potential to reduce energy demand in

densely populated Athens and the shrinking city of Oporto/Portugal is slightly lower. However, it can be enhanced through building renovation strategies which EU cities will need to meet EU's greenhouse gas mitigation goals for 2050.

The SUME project also aims to provide new indicators to show the potential for reorienting urban development towards attractive public transport systems, with a major effect on resource efficiency for transport. This so-called UDP-indicator – UDP stands for 'urban diversity pattern' – will be applicable for all types of cities in order to provide comparable data when planning public transport and urban development.

"We see our project as a foundation for more sustainable urban planning" says Christof Schremmer, the SUME project-coordinator from ÖIR (Austrian Institute for Regional Studies and Spatial Planning). "Besides 'green construction' we rely on moderate densification and greater efficiency in the use of buildings within our cities. Our scenarios for various European cities show that it is possible to reduce much of the additional expansion of our urban areas, by up to 80 percent. This means shorter travel distances and the potential to provide more attractive public transport systems, leading to much more resource efficient cities. Urban planning according to resource-oriented decisions can lead to improvements in both energy efficiency and quality of life".

MIA – a new planning tool for more resource efficiency

Low-energy, zero-energy or even surplus-energy houses are good examples of the shift in approach towards energy efficiency. Highly resource efficient cities also need to draw on wider concepts to reduce car traffic, space and energy consumption. The application of Metabolic Impact Analyses (MIA), a method developed in the SUME project, brings the idea of resource efficiency into the practical assessment of urban development projects. In a six step process, the MIA assessment not only takes building qualities into account, but also reflects the location of a project within the given urban fabric, calculating the impact on urban infrastructure and transportation. Case studies where MIA will be tested in large urban development projects include Hjorthagen/Royal Port in Stockholm, a revitalized former industrial zone for about 13.000 inhabitants, the "Seestadt Aspern" in Vienna, a completely new lakeside quarter projected for about 20.000 people, and the Antas area in the city of Porto, with around 10.000 inhabitants.

"Urban Development 2050" Conference: From Athens to Vienna – Seven urban case studies and practicable planning tools

At the invitation of ÖIR, a group of international experts and city planners meet in Vienna on 3 May 2011 to discuss new tools for urban planning inspired by the concept of urban metabolism. The conference aimed to provide a platform for the exchange of ideas and experience, using the SUME results as a comparative background.

Athens, Munich, Newcastle-upon-Tyne, Porto and Stockholm will present their view of the challenges to create resource-efficient cities, their innovative approaches to the task and their development perspectives along with Vienna.

The alternative spatial scenarios developed by ÖIR for these cities are based on population projections for 2050, focusing on land and energy consumption. In three parallel sessions, the conference will discuss a method to estimate the impact of future urban development on energy use and other resources ('urban metabolism'), the resource impact assessment of large urban development projects (MIA) and related urban development policies which can be applied in European urban settings ('policy guide').

Eight EU-countries plus China are partners to the SUME-project

The SUME project partners are:

- from Austria: ÖIR – Austrian Institute for Regional Studies and Spatial Planning (project coordinator)
- from Austria: Klagenfurt University, Faculty of Interdisciplinary Studies, Institute of Social Ecology
- from Portugal; the Research Centre for Territory, Transports and Environment of the University of Porto (CITTA)
- from Sweden: Nordregio – Nordic Centre for Spatial Development, Stockholm
- from Germany: Potsdam Institute for Climate Impact Research
- from Greece: Foundation for Research and Technology Hellas, Institute of Applied and Computational Mathematics, Heraklion
- from the Netherlands: the Technical University Delft, OTB Research Institute for Housing, Urban and Mobility Studies
- from the UK: the University of Newcastle upon Tyne, Institute for Research on Environment and Sustainability
- from Poland: the Warsaw School of Economics

The Chinese Academy of Sciences contributes to the project with its institute for satellite-based monitoring of settlement development.

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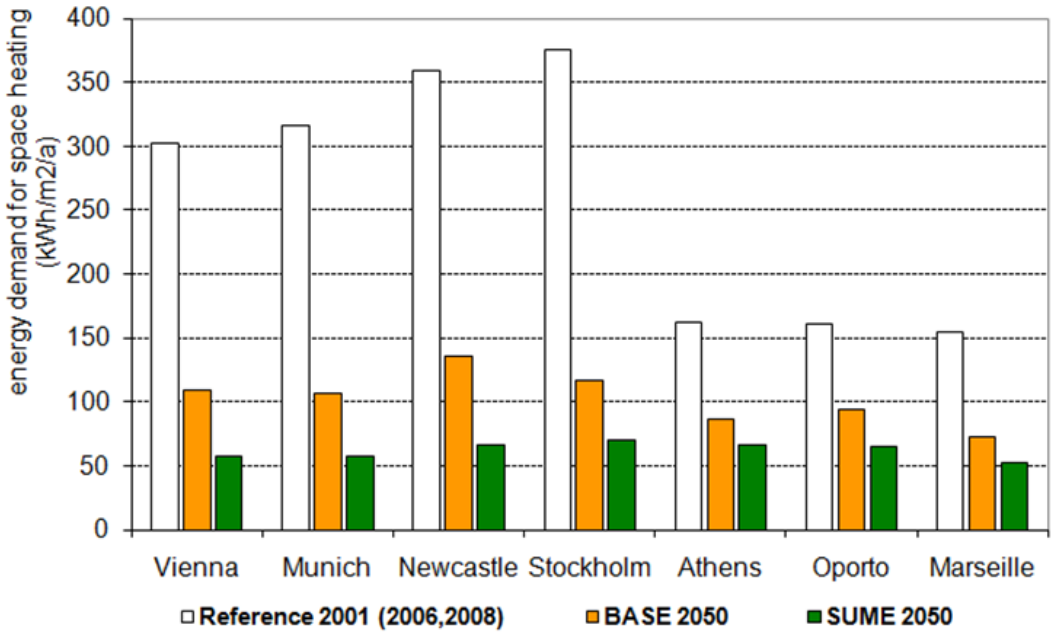
Graphs

Population development and projected land use in two scenarios

	Vienna	Stockholm	Athens	Oporto	Munich**	Marseille***	Newcastle
Population development 2000-2050							
Population (UMZ) (starting year)	1,805,340	1,280,450	3,436,775	1,271,238	1,663,732	944,785	1,058,070
Projected development	+ 34.7%	+ 44.3%	+8.9%	- 3.7%	+ 17.7%	+ 20.3%	+ 11.8%
Urban fabric within UMZ starting year (km^2) *	313	332	221	235	232	137	214
Urban fabric growth out of UMZ in km^2							
Scenario BASE	171	155	52	0	95	41	15
Scenario SUME	45	65	0	0	31	0	0
Urban fabric growth out of UMZ in %							
Scenario BASE	55%	47%	24%	0	41%	30%	7%
Scenario SUME	14%	20%	0	0	13%	0	0

* Corine data: land use categories continuous and discontinuous urban fabric, UMZ: Urban Morphological Zone
** starting year 2008
*** starting year 2006

Total housing stock – energy demand for space heating per m^2 ($kWh/m^2/a$) in the years 2001, 2050 BASE and 2050 SUME



Source: OIR, SUME Project, 2010