FP 7 Research Project
SUME
Sustainable Urban Metabolism for Europe

Ursula Mollay, Barbara Saringer-Bory
May 18th, 2011
Essen, Germany
SUME Project Partners & Case study cities

- **Scenario Cities (Countries)**
  - (GB) Newcastle upon Tyne (GB)
  - (DE) Berlin (DE)
  - (SE) Stockholm (SE)
  - (AT) Potsdam Inst. of Climate Change Impact
  - (PL) Warsaw (PL)
  - (GR) Athens (GR)
  - (GR) Iraklion (GR)
  - (CN) Beijing (CN)
  - (PT) Porto (PT)
  - (FR) Marseille (FR)

- **SUME Project Partner**
  - (AT) Austrian Institute for Regional Studies and Spatial Planning (OIR, coordinator)
SUME – project: Workpackages

WP1  Scenarios of urban development in Europe

WP2  Spatially explicit modelling of urban metabolism

WP3  Metabolic impact of urban development projects & restructuring

WP4  Urban development policy guidelines
SUME scenario approach
Urban development scenarios 2050: Inputs and guiding principles

- Spatial development paths for different cities, 2000 – 2050
- Main drivers:
  - population and job change (projections),
  - development of living space per capita
- Spatial disaggregation level (ca. 150-700 cells)
- Inputs:
  - Land use, densities and building typologies, protected areas and restrictions, infrastructure plans, larger development projects, development plans
Example Vienna: Scenario building process
Short-medium term projects (according to urban development plans)
Medium-long term development axes
Allocation of population according to city-typical densities
Indication for remaining surplus of future population to be allocated outside the UMZ
Urban development scenarios: Guiding principles

- **BASE scenario** as the continuation of current spatial trends (densities, spatial configurations)

- **SUME scenario** as a path of sustainable spatial planning – focusing on the interrelations between urban form and metabolic performance

- SUME – scenarios **4 planning principles**:
  - gradual step up of densities in existing urban fabric
  - where attractive public transport can be provided
  - mix of functions (esp. in public transport nodes)
  - potential of enforced thermal renovation and reconstruction (combining replacement activities with densification)
Scenarios 2050: Overview

- Vienna
- Athens
- Marseille
- Munich
- Newcastle upon Tyne
- Oporto
- Stockholm
Vienna

- 1.8 Mio. population
- \( \rightarrow 2050: +35\% \)
- Pop. + jobs/km² in urban fabric: 7.251
BASE scenario 2050:
urban fabric + 55%
SUME scenario 2050:
urban fabric + 14%
Munich

- 1.7 Mio. population
- → 2050: + 18 %
- Pop.+jobs/km2 in urban fabric: 8.759
BASE scenario 2050:
urban fabric + 41%
SUME scenario 2050:
urban fabric + 13%
Oporto

- 1.3 Mio. population
- → 2050: - 4 %
- Pop.+jobs/km2 in urban fabric: 5.403
BASE scenario 2050:
urban fabric + 0%
SUME scenario 2050:
urban fabric
+ 0% PT-focus
Stockholm

- 1.3 Mio. population
- → 2050: + 44 %
- Pop. + jobs/km² in urban fabric: 5.278
BASE scenario 2050: urban fabric + 47%
SUME scenario 2050:
urban fabric +20%
Urban spatial development: BASE and SUME scenarios
### Scenarios BASE and SUME: Growth of “urbanized zones” 2000 – 2050

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### Scenarios BASE and SUME: Growth of “urbanized zones” 2000 – 2050

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- **Population Change 2000-2050**
- **BASE**
- **SUME**

Growth of urbanized zone in % 2000-2050
Urban form and diversity:
Impact on transport (→ energy)
The second challenge: Transport

- The share of car use for daily trips is influenced by the accessibility of good quality public transport.

- Growing cities tend to expand spatially, they lose in compactness and access to public transport lines.

- **But:** Urban spatial development scenarios show the trends, SUME scenarios show the potential to improve accessibility.
The potential to use public transportation, depending on spatial development 2000 - 2050: UDP indicator for BASE and SUME scenarios

UDP = Integrated public transport potential indicator: 12 = max., 3 = min.
Urban development scenarios: Key findings and conclusions
Spatial development – urban form

- BASE scenarios 2050 show urban spatial expansion faster than population dynamics, also in stagnant urban agglomerations.
- Fast growing cities will show massive growth of their urban fabric, but they also have the greatest potential to focus the development.
- Cities with low densities and high fragmentation need an approach with a high focus on public transport within city boundaries.
- High density situations like in Athens raise the question for an alternative strategy: sustainability also needs open (green) space, and liveable densities.
- The SUME-scenario development principles show large action space for cities over time, esp. in fast growing agglomerations (reducing land consumption).
Urban diversity patterns – transport

- The BASE scenarios indicate a substantial decline of urban form factors contributing to a sustainable transport system (deteriorating access to public transport), although expansions of the public transport system are included.

- A SUME development strategy, including densification and a focus on good access to high-level public transport, will be essential to maintain current levels of accessibility.

- Especially in growing cities (with rising standards of floor space) it will be necessary to implement intensified SUME-strategies in order to maintain today’s standards of accessibility.
Key-strategies for urban development

• Re-development of existing urbanized areas with excellent public transport is the key to reduce large-scale future expansion and energy consumption

• A new policy-set beyond green-field and brown-field development is needed:
  • **Attractiveness**: better green area and open space quality in inner-city neighborhoods
  • **Densification strategies** and mobilizing building land in areas with lower densities and good access to public transport
  • Building and energy-oriented **renovation and reconstruction strategies**

• Large scale development-projects can give an impulse to form new centers to improve the overall urban diversity pattern

• Major efforts in coupling of policies for transport infrastructure and spatially focused housing, residential and economic development is needed → links between sectoral policies and between municipalities in agglomerations
Thank you.

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