Urban Research at KIT: A Contribution to Sustainable Urban Development

More than half of the world’s population is currently living in urban areas and this proportion is increasing continuously. In the 21st century, cities are challenged by globalization, increasing complexity and interlinkage of infrastructures, scarcity of resources, environmental pollution, climate change, and demographic change.

Research at KIT contributes to the investigation, development, and design of the city of the future in all essential aspects. With a unique combination of expertise in natural sciences, engineering, social sciences, humanities as well as planning and design, KIT researchers investigate at functional and life scales of a city using a holistic approach. KIT provides knowledge for sustainable urban development to stakeholders and policy makers on a local, regional, national, and international level.

KIT researchers have identified six challenges for urban areas, to the solution of which contributions are made:

1. **AMBITIOUS STRATEGIES**: Strategies for adaptation and mitigation
   - Impact minimization
   - Improvement of resilience

2. **URBAN SYSTEMS**: Analyze, finance and control
   - Development of a sustainable city: Adapting structure and image
   - Holistic and integrative planning and design

3. **PLANNING AND DESIGN**: the city
   - Architecture, urban planning and development
   - Integral consideration of technological, economic, social, usage and design aspects
   - Development, application and evaluation of planning methods and planning devices
   - Virtual engineering – virtual city models
   - Cooperation with urban planning authorities
   - Connecting participation processes and planning procedures

4. **RESOURCES**: Efficient and sustainable use
   - Efficient urban material and energy flows
   - Resource-efficient buildings
   - Integrated Water Resources Management

5. **INFRASTRUCTURES**: Developing and connecting
   - Modeling, simulation, monitoring, balance study and analysis of material and energy flow
   - Integral concepts for resource efficiency in urban areas and usage of renewable energies in buildings
   - Development of efficient building materials
   - Building Lifecycle Management
   - Integrated urban water management

6. **QUALITY OF LIFE**: Assess, preserve and enhance
   - Air quality in the megacity of Beijing needs to be improved

**KIT APPROACH**

- Measuring and improving the quality of life
- Better understanding of ecologic, economic and social complexity and dynamics
- Protection against hazardous environmental pollution
- Investigating urban ecology and assessing ecosystem services
- Measuring, modeling and analyzing environmental pollution (air quality, water quality and soil quality)
- Determination of well-being and desirability
- Investigating demographic change, migration and multi-locality

**AMBITIOUS APPROACH**

- Phosphor recycling from waste water
- Energy efficiency assessed: "Tokyo with or without transport"
- District Future: sustainability transformation of an urban district

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