



Future Megacities

Energy- and Climate-Efficient Structures in Urban Growth Centres

Urbanization as a Global Challenge

Global Change is a collective term of all changes in the global environment that may alter the capacity of the Earth to sustain life. One of the most powerful drivers of global change is urbanization, including socio-economic transformation as well as complex interactions of urban areas with their physical environment.

According to United Nations estimates the proportion of the world's population living in cities will rise from today's 50 % to 70 % by 2030. Nearly 90 % of the future population growth is likely to be concentrated in cities. Growing by a total of 60 million inhabitants per year, the urban share is expected to rise to about two-thirds of the global population by 2030.

Urban agglomerations are the focal points of global economy and are characterized by high densities of people and information and concentrated flows of resources, goods and capital. This provides the basis for relative efficiency in economic activities, high productivity and average incomes, use of natural resources and life-style patterns. Other potentials of urbanization are related to the use of new technologies, access to information, education and health care services. If distributed equitably, the benefits of urbanization could improve the quality of life of urban dwellers significantly.

Sustainable forms of urbanization are still a challenge for urban growth centres in new or emerging economies of industrialising and less developed countries. Many cities are associated with unbalanced growth, fragmented spaces, unemployment, environmental degradation, social segregation, lack of infrastructure and lack of access to key resources. Nonetheless, according to the World Bank, about 80 % of the expected growth of newly-indust-

rializing countries and less developed countries is likely to be produced in cities. Considering the enormous rate and pace of migration into urban centres, politicians and governing bodies of the cities are simply no longer able to keep up adequate services without support. All decision makers have to step into a new balance with their citizens and potent partners to find new ways to efficiently utilize their limited financial means.



The need for Energy- and Climate-Efficient Structures in Urban Growth Centres

Urban agglomerations and, in particular, megacities are important arenas for energy use and production. Although cities only make up 2 % of the earth's land surface, they are responsible for three quarters of global energy consumption as well as approx. 85 % of the global greenhouse gases produced.

Cities not only advance climate change, they also receive the full brunt of its consequences. Floods, storm tides, strong winds, heavy rain as well as heat

waves and droughts are likely to occur more frequently in the future. They endanger human life, residential areas, infrastructures, ecological systems, economic life, public health and safety in cities.

Even so, urban growth centres offer strategic starting points for energy efficiency and climate protection. The concentration of humans, material flows and residential districts in future megacities makes it possible to lower the consumption of resources because modern governance, planning and service concepts mean, that more humans can be supplied more economically, at least theoretically, using the same transport, energy and space expenditures. Furthermore, the functional integration of urban industries, infrastructures and networks could make the accelerated dissemination of innovations possible, not least in the energy sector. In view of the intensity of competition in the search for energy and climate efficient solutions, megacities are also to be regarded as lead markets for energy and infrastructure systems. Innovations in technology and urban planning could help to set up sustainable structures and guidelines for energy demand and production (for instance in the residential and construction, household, traffic, industry and waste sectors), decouple economic growth and energy consumption, and lead emissions at least from an exponential to a flattening growth curve. Technical and non-technical innovations in urban areas could pave the road to better climate protection.

Research as Foundation of Innovation

Research ranks high on Germany's political agenda. It is the key to innovation. Networks and cooperation between researchers and industry play an important part in the introduction of new products. The path taken extends from the regional to the international level. Including the most creative minds into research offers new opportunities and builds upon manifold experiences to broaden our knowledge base. As innovations cannot be planned, they have to draw from creativity, and have to foster and support new alliances of cooperation.

Future Megacities: Energy- and Climate-Efficient Structures in Urban Growth Centres

The Future Megacities programme of the German Federal Ministry of Education and Research (BMBF)



contributes to BMBF's "High-Tech Strategy for Climate Protection" and is part of the "Framework Programme – Research for Sustainability" of the Ministry.

Aims:

In the context of Germany's overall approach to climate issues and efficient mitigation strategies in the international and the national arenas, it is the goal of the Future Megacities programme to create good or even best practice examples for sustainable urban development.

Therefore the bilateral teams have to

- research, plan, develop and realise in an exemplary way technical and non-technical innovations for the establishment of energy- and climate-efficient structures;
- enable the city, along with its decision makers and inhabitants, to bring about increased performance and efficiency gains in energy production, distribution and use;
- demonstrate that the resource consumption and greenhouse gas emissions by the energy-using sectors can be reduced in a sustainable way in the future.

Recently the programme started its main phase (2008-2013) following a set-up-phase of 2.5 years.

Focus:

The projects strike a geographic as well as thematic balance. They deal with urban agglomerations in China, Ethiopia, India, Iran, Morocco, Peru, South Africa and Vietnam. The projects are dedicated towards specific energy- and climate-efficient structures in areas like housing and construction, nutrition and urban agriculture, public health and quality of life, urban planning and governance, direct energy supply and consumption, mobility and transport, water supply, waste treatment, and environmental management. The emphasis of the research lies on “prevention and therapy” instead of just “diagnosis”. Projects have to demonstrate that they are commendable (good practice) and transferable (best practice).

True partnership approach

The above described approach will only function in close co-operation with local partners by introducing innovations that are adapted to the specific local conditions and are useful and accepted.

Decisions on urban development in urban growth centres need to draw on a solid foundation of scientific knowledge. Those taking the decisions must be able to take advantage of new and well adapted technologies, identify effective management tools and appraise and transfer “good practice” from other cities where appropriate. Scientific research, capacity building and the development of adequate technologies, therefore, are key resources to widen the range of policy options for the governance of mega-urban development.

Capacity building and international networking figure prominently in this programme. Scientists and companies are required to develop their projects in a user-oriented and participative manner, i.e. in close cooperation with local institutions responsible for urban development in the respective countries. From the outset, stakeholders from politics, economy and society have been included to ensure that the research questions are suited to pressing, local needs. All projects address the ecological, economic as well as social aspects of



their research topics in a coherent concept. These inevitably need to be studied multi-dimensionally and, as far as possible, in an interdisciplinary, even transdisciplinary fashion.

Expected results

Outcome of the research will be strategies and pilot projects that show new ways for the introduction of energy- and climate-efficient structures in urban growth centres through:

- technical innovations in urban infrastructure adapted to local conditions and accepted by the citizens,
- new ways in political decision processes, new forms of political decision making and governance,
- new management instruments in urban decision making,
- tools to evaluate the effectiveness of urban planning measures,
- capacity building and vocational training,
- new partnerships combating climate change.



Internet: www.bmbf.de, www.future-megacities.org