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## **Visions for Urban Development in the 21<sup>st</sup> Century The Challenge of Combining Sustainable Land Use and Economics**

Thinking about urban development in the world of the early 21st Century regional differences in terms of substance and strategies become apparent. We experience, on the one hand an increasingly closer global interaction, on the other completely different patterns and approaches to town planning.

### **Internal Development and Urban Quality**

In Europe we are confronted with 90% completed cities which have evolved over time and are forced to adjust to the changing demands of an aging and decreasing population. The necessary measures are similar throughout all European regions. Restructuring rather than expanding our cities while simultaneously utilising redundant 'brown-field' land, such as railway areas, barracks and industrial sites is the aim. Residents must be drawn back into the city centres whilst green landscape remains undeveloped and used for recreation. Manifold uses and individual protection of historic built form combined with contemporary high-quality architecture are key image factors of the European city. Quality rather than expansion is the goal.

European cities and regions increasingly compete for an intelligent, well educated workforce and an attractive environment offering high living standards. Languishing in the status quo and a frightening slowness induced by bureaucracy and politics make perceiving change as the decisive competitive advantage impossible. Acting faster, more radically, more effectively and more economically than one's rivals gives one a competitive edge.

## **The Goal of Sustainable Urban Development**

In contrast to Europe and hand in hand with explosive population growth, a rapid and seemingly un-containable process of expansion and urbanisation is taking place in Asia, America and Africa. The UN forecasts an increase of the world's urban population of up to 61% by 2015. This suggests that in ten years time there will be approximately 350 cities accommodating more than a million inhabitants, 153 of which in Asia alone. Also, 18 out of 27 Megacities with more than ten million people will be in Asia. I have been working in China with my practice, AS&P, for ten years, and the speed of change is breathtaking, yet sometimes frightening. I do believe, however, that first steps, including relevant legislature, have been made towards an efficient reduction of the enormous environmental burden. Cities like, for instance, Shanghai implement a development plan targeting the year 2020, which strives to balance economic criteria with environmentally friendly and sustainable ones.

Economic and social processes are influenced by a large number of factors, which are to be evaluated individually. During my professional practice in excess of 40 years I have realised more and more how limited the urban planners' impact on the decision making-process in society is. Regardless of the energy spent and efforts to convince, my estimate of the planners' actual influence would be not more than 5% out of all relevant factors. Nevertheless, I am convinced of the importance of town planning as a strategic element of the future-oriented thought process. This, however, is only true if we overcome static patterns of thought again and again, intensively challenge so-called inherent necessities, offer society new strategic options, and remain open to experiment.

At a first glance the contrary developments in the world, which are to be influenced through town planning, are not directly comparable. If, however, we think about methods of achieving a sustainable and economically sensible urban development for the next two or three decades, we face the same basic problems in Europe as in Asia. This is due, in part, to the fact that the global economic framework and international investment decisions are becoming increasingly intertwined. Large Spanish or British real estate companies are no longer bound by national borders. If we fail to innovate in Europe we will see a reversed transfer of knowledge and technology in many sectors within 20 years time. The Transrapid and communications technologies in China are current examples for this.

## **A Quantum Leap of Concepts, Ideas and Strategies**

In the metropolises of the 3<sup>rd</sup> World, new urban planning structures are urgently needed which incorporate the historical experiences of European cities while also taking into account local historical, climatic, cultural and religious characteristics. Required today are the planning and construction, at the highest technical level, of economically feasible and sustainable networks in the developing regions and metropolises of the 3<sup>rd</sup> World; networks which contribute to the preservation of the environment and the improvement of living standards. Thus, implementing the goals of Agenda 21.

An analysis of the successes and failures of Shanghai's development over the past 10 years — an unimaginably rapid process by European standards — shows that the megacities will only be sustainable and controllable in the future if they cease imitating antiquated and obsolete models and technologies borrowed from other nations. The dynamics of growth in the metropolises — so difficult to influence — necessitate a quantum leap of concepts, ideas and strategies. And I am convinced that such a quantum leap is possible.

Shanghai's municipal government seems to have recognised this reality in political terms. Practical implementation is already under way. The all-too-often ineffectual or half-hearted initiatives and widespread transposition of familiar concepts to the new megacities suggests that the explosive character of their development remains insufficiently understood. Nevertheless, it is increasingly evident that the world's megacities may well become decisive sites for determining the Earth's ecological carrying capacity. It is necessary to transfer — in an adapted form — the goals widely accepted in Europe to urban development in the 3<sup>rd</sup> World.

## 1. Decentralised Concentration

The concept of decentralised concentration is the fundamentally correct spatial organisation system for the urban agglomerations of the Megacities. The conservation of natural resources and more determined efforts at environmental protection form the basis of sustainable urban development. In this context, spatially organized settlement development is a central — perhaps even the pivotal — element.

The spatial-structural principle of order termed here decentralised concentration reveals itself as the sole viable approach. Concentration leads to compact settlement entities allowing for shorter distances, minimal use of virgin land and efficient transportation and municipal infrastructural networks. Decentralisation allows for self-sufficient units of a sensible scale, facilitating efficient and stable technological, social and organisational structures. Decentralised organisational structures and diverse cities offering high living standards are the result.

## 2. Regional and Urban Landscapes

During rapid urban expansion, the sacrifice of all natural expanses often results in perilous environmental conditions and natural disasters.

Consequently, larger agglomerations require inner-city networks of open spaces and regional greenbelts, which might be designated "landscapes" by virtue of their dimensions alone. They also function to create climatic corridors, ensure supplies of cool air to the city, and help prevent flooding. Appropriately scaled free expanses subdivide the surface area covered by built-up agglomerations. The human scale remains perceptible, which has a stabilising effect on the entire urban system.

Supplying cities with food causes severe ecological burdens due to intensive farming and long transport chains. Rising living costs, in turn, promote additional commercial

activities with corresponding repercussions. Urban agriculture can minimise this problem, and creates further positive effects representing an alternative form of urban green zones.

Given the overall surface area of cities, such "inner-city landscapes" are essential structural elements. Artificial canals and parks and green areas along streets are no substitute for consistent ecological landscape planning. By concentrating urban green spaces along main streets they are reduced to mere aesthetic elements with a certain air cleansing function.

Shanghai is making every effort to increase the city's green areas. A regional reforestation program was launched in 2001. A 20-km-long segment of the Huang Ho riverbank, and the 17-km-long inner-city Suzhou Creek will be rehabilitated and rendered publicly accessible. For Shanghai's application for the 2010 World's Fair, based on the theme "Better Cities for Better Life," an obsolete steel mill on the Huang Ho River will be relocated. International design competitions will ensure quality. Yet this is not enough. The Megacity requires an integrated regional landscape concept.

Landscape is just as important as the built environment. Whoever cannot see this is liable to thwart future development — and not just in the cities.

### **3. Networking the Infrastructure**

Urban living conditions are also largely determined by the quality of the technical infrastructure. In Europe we also often rely on outdated, even historic, urban infrastructure often 100-years-old. Moreover, the chosen systems and standards are substantially responsible for the degree of ecological stress generated by the urban organism. The need to save resources and spare the environment, as well as the chances to do so are enormous. Only within an intelligently networked infrastructural system is large-scale resource conservation and emissions reduction possible.

Development and optimisation of such systems calls for an interdisciplinary approach; one that integrates the various aspects of environmental, architectural, urban and infrastructural planning on equal terms. Urban development and settlement technology must be worked out simultaneously, not consecutively.

In terms of technical infrastructure, the following basic principles are indispensable:

- an integrated concept for water supply and disposal, with separation systems and rainwater use.
- separated collection and differentiated handling of solid waste types with the objective of recycling management and additional energy production.
- combined generation of power, heating and cooling.
- optimised, modular control systems with common circuits for all media, for example via navigable channels.
- introduction of a variety of technical options: (fuel cells, energy from naturally regenerating raw materials, solar heating, heat pumps, photovoltaic cells, etc.).
- energy-conserving construction.

Using Shanghai's Zhangjiang Hi-Tech Park as a model and applying the above principles, we have achieved a prognosticated 50 % conservation of drinking water, a ca. 47 % reduction in primary energy use and a drastic reduction in the solid waste stream. CO<sup>2</sup> emissions are being reduced by ca. 65 %. Financial performance of such systems are markedly better than for conventional infrastructure. The costs of increased planning performance and expenditures for key technologies are economised on via intelligent overall systems, as well as in operational gains. In China – as in the entire 3<sup>rd</sup> World – energy and water are wasted to a colossal degree, squandering resources and burdening the environment.

Cities are investing immense sums, supported by international organisations and globally based firms, in non-networked, outdated urban infrastructure. Here too, a quantum leap is called for. The required technologies are available, yet the organisational structures and fee schedules are lacking which would reward conservation and facilitate integration. Perhaps such intelligent structures will be realised more easily in dynamic Shanghai than in Europe. Networked and cost-effective urban infrastructural systems are a precondition for sustainable urban development.

#### **4. Energy-Saving Building**

Environmental conservation, the reduction of greenhouse gases and rising energy costs are responsible for energy-conscious building becoming an urgent issue worldwide. Economic investment sums within the sector are enormous. In Germany alone there are 24 million dwellings in need for increased insulation, which could reduce the annual consumption of oil for heating by 200 billion litres. This equals a reduction of emissions by 450 million tonnes, almost as much as the total emissions output of the German industry of 500 tonnes per annum.

In Russia and China it is still common practice to build without any insulation, which is not acceptable. AS&P designed the first Chinese city to adopt European energy-saving standards. The first 1000 dwellings of the International Automobile City Anting are completed, including insulation and combined heat and power (CHP) technology, which saves 48% of the average annual energy costs. The slightly higher investment costs of this city for 50,000 residents will be more than balanced by lower operating costs. The same system can be adopted for offices and industrial uses.

#### **5. Mobility and Traffic Management**

In Megacities, the compatible organisation of mobility demands both the clear dominance of public local passenger transport and the introduction of the most advanced methods in traffic management. For both ecological and economic reasons, the organisation of inner-city transport of passengers and goods is one of the key questions facing major cities and urban agglomerations. A well-functioning public local transport system represents the only option for sustainable urban mobility in the 21<sup>st</sup> century. Mobility always means individual transport, even in China's metropolises. Still, priority must be explicitly accorded public transportation, and with

far greater emphasis than previously. The degree of consistency attained in this context has implications for a city's overall functional articulation. In the Old World, development to date has led to untenable conditions, ones highly undesirable for China. Moreover, air pollution can be significantly reduced.

Above and beyond construction of a given transportation infrastructure, its operation is also crucial. What is necessary is a networked, integrated traffic management system encompassing multiple modes of transport. This requires not only investment in high-tech solutions (detection, satellite navigation, centralised administration, etc.), but also a new, integrated manner of thinking on the part of individual operators and organisations. To this end, solutions will be developed, in part with assistance from AS&P, in both the European and American markets. These are a must for the sustainable safeguarding of mobility in the Megacities of the future.

## **6. Optimisation of Urban Management**

An ever more heterogeneously employed society and its bureaucracy produce administrative and organisational structures, which are not able to decide matters quickly and efficiently. Optimisation of urban management and private investment is urgently required. The strengths of different knowledge backgrounds need to be tapped into in order to see through sustainable, ecologically appropriate energy and resource conservation in all domains. This is also true for financing structures and tax and fee policies, which have a fundamental impact on citizen behaviour. Successful urban management and cost-effective allocation of financial resources are achievable only in combination with private organisations. In particular, the development, construction and operation of integrated infrastructural projects, or so-called "multi-utility concepts," are well-adapted to the introduction of innovative organisational and financing models. Organisation and management in the framework of public-private partnerships create the preconditions for the cost-effective allocation of financial resources and for long-term economic success. Provided there is participation from government authorities, commercial enterprises and the general population, a comprehensive "win-win" strategy is achievable in the sphere of urban development.

## **7. An Ecological Urban Development System**

While many of these proposals seem obvious, many will see practical realisation only decades from now. A portion of these proposals is embodied in the integrated and ecological urban development system developed for China by AS&P and Fichtner Engineering.

By the year 2030, urban districts constructed on modular principles will become a reality in Shanghai, Beijing, Chongqing and other Chinese cities. Such districts will be planned on a basic development grid of ca. 400 x 400 m. This represents the adoption of units of measurement employed in ancient Chinese cities, all of which were laid out orthogonally. The Li, the old Chinese unit of measurement, is equal to about 400 m. In this way, urban districts will come into being that are free of auto

traffic, reserved solely for pedestrians and cyclists. Shopping streets, an old Chinese tradition, will lead into the interior. As in the older urban quarters, district parks will constitute central cores. Novel, however, will be the flexibility of development and the increased urban density, with structures rising to 6 - 8 storeys.

Functionally, services and commerce will be sited toward the exterior of a given district, the interior being primarily residential. Buildings will exploit solar energy and natural climatic factors. Construction materials will be ecological, i.e. predominantly natural and recyclable. The infrastructural network will be co-ordinated for optimal use of all resources. The result will be a circulation system that generates minimal emissions. Communication networks will facilitate telecommuting, reducing traffic to a necessary minimum. Public transport will be provided in the form of electric buses. Private automobiles, much-used via car sharing, will be picked up at automated parking depots and dropped off there again later. Optimal linkage of all environmentally relevant factors will also lead to an economically viable network.

In this way, humane living conditions will be created. An enduring city with shorter travel routes will be attained, one with a stable mix of uses. The goal is as much to restore ecological equilibrium as to minimise costs. Such an approach can function macroeconomically in the long term only given the inclusion of building and operational costs. This ecological urban development system can be elaborated anew, case-by-case, according to the same principles, for any urban configuration.

The visions for urban development in the 21<sup>st</sup> Century are only viable if new strategies and innovations are put to use as a catalyst for changing the society, as well as for creating a higher quality of life.