

Ecotecture to the rescue

By Norman Foster

Two trends that are affecting global practice in architecture will strengthen in 2005: the need to pursue sustainable patterns of development, and the opportunities presented by the developing economies in Asia and the former Soviet block. These two trends are, of course, interconnected.

The need to address man's impact on the environment has never been more urgent. As I write, environmental disasters make the headlines: from flooding in Bangladesh to drought in the Yellow River valley; from the destruction of the Greenland ice sheet to the loss of an entire ecosystem in the North Sea and hurricanes in the Caribbean. Scientists predict that the Earth will warm by 1.4-5.8°C by 2100 more than temperatures are thought to have changed since the dawn of humanity. It is now widely accepted that this is largely due to rising concentrations of greenhouse gases, most significantly CO₂. But how many people are aware that in the developed world buildings consume half the energy we generate and are responsible for half the CO₂ emissions, the remainder being divided almost equally between transport and industry?

That is alarming enough. But what will happen as the developing world catches up? Recently I have been to China, Kazakhstan, Russia, Libya and Cuba: countries that only a short time ago were out of bounds to western interests. The pace of change in many areas is breathtaking. China predicts a doubling of GDP in 2010 compared with 2000. Its building boom is unprecedented, fast and furious.

Our new terminal under construction in Beijing offers a sharp contrast with experience in Europe. Over 1m square metres, it is larger than all four terminals at Heathrow plus the future Terminal 5. But the entire process from commissioning to completion will be faster than the public inquiry for Terminal 5-and was the outcome of that ever in doubt? Cities such as Beijing and Shanghai change by the day. China is home to half the world's construction cranes. Yet the environmental implications are sobering. For example, China currently consumes half the world's cement, and manufacturing one tonne of cement produces one tonne of CO₂.

To avoid global environmental catastrophe, every country has to adopt sustainable development strategies. Sustainability requires us to think holistically. The location and function of a building; its flexibility and lifespan; its orientation, its form and structure; its heating and ventilation systems, and the materials used-all affect the amount of energy used to build, run and maintain it. Virtually every new building can be designed to run on a fraction of current energy levels. But even if the buildings were zero-energy and carbon-free, we would still have problems.

Densely does it in Monaco and Kensington

There are two further crucial issues: population growth and the shift towards living in cities. The world's population stands at 6.4 billion; in ten years it is expected to reach 7.5 billion. By 2015 there will be 23 "megacities", with populations over 10 million each. Nineteen of them will be in developing countries, where up to half the population will be urbanised. What will those cities look like?

Cities that sprawl are far less energy-efficient than densely planned communities. Car travel is a crucial factor. Imagine somebody driving 20 km (13 miles) to work each day.

His or her housing will consume 720 litres of oil a year, the workplace 285 litres and transport 900 litres. Alarming, in most countries car usage is still increasing. China is the most extreme example. Car sales are predicted to grow by up to 30% annually from 2005.

To reduce car travel we have to encourage compact cities and high-density new development. Critics argue that higher densities lead to poorer environments. But that does not follow. Monaco and Macao, the world's densest Urban communities, are at opposite ends of the economic spectrum. In London some of the most densely populated areas offer the most desirable lifestyle: Kensington and Chelsea have population densities up to three times those of London's poorest boroughs.

Holistic thinking must equally be applied to infra" structure, transport systems, streets and public spaces the "urban glue" that holds cities together. The quality of infrastructure directly influences the quality of urban life. The clean nature of much post.industrial work means that workplaces can be combined with housing and localised communities can be sustained when transport connections, businesses, schools and shops are all within walking or cycling distance of home.

Architects will have a vital role as advocates in 2005, encouraging sustainable solutions around the world. But we also need more progressive developers and politicians with the courage to set goals and incentives for society to follow. Some countries have taken a lead: Germany has long understood the need to reduce consumption and adopt renewable energy sources, and that is reflected in building codes. Others, to varying degrees, lag behind, There are no technological barriers to sustainable development, only those of political will. If we are to avoid the environmental damage wrought by the unsustainable patterns of the past, then the rich and emerging economies must act in unison and with urgency: 2006 could be too late.

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