

Creating sustainable cities for the 21st century

The growth of cities is inexorable. The unprecedented pace of urbanisation demands that we adopt new approaches to providing essential services, and realise the possibilities offered by technology.

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The world is modernising and industrialising faster than ever. Meanwhile, we are witnessing unprecedented population growth: the world's population has nearly tripled since 1950 and today stands at approximately seven billion¹, an astounding change never to be repeated. These and other factors contribute to the urbanisation that is transforming our planet. Over half the world's population now lives in cities, and by 2050 this figure may rise to 70 per cent globally.² As a result, cities are expanding on a massive scale. In 2007, UN Habitat counted 19 megacities with 10 million inhabitants or more, and there will be 26 by 2025.³

Cities in the developing world face pressing humanitarian problems that those in developed countries do not – including widespread poverty, the growth of slums, and disease prevention. However, achieving greater sustainability in cities is now a priority for all alike. City dwellers are living beyond their means. Cities account for less than three per cent of the earth's land surface, but up to 80 per cent of greenhouse gas emissions⁴; and rising demand for energy will only worsen the environmental impact of urbanisation. Unless today's leaders and policymakers respond, their children and grandchildren will face the consequences: climate change, shortages of resources and massive strains on infrastructure, with the inhabitants of densely populated megacities in the developing world most vulnerable to the impact.

How can we make cities more sustainable? A city is a complex set of intersecting systems, both physical – such as the energy grid and transport network – and socioeconomic – including law enforcement and governance – whose efficiency and productivity can be improved through strategic vision and modern technology. In recent years, the term 'smart city' has been used in government, the private sector and academia to describe the application of information technology to city services, with the explicit aims of reducing costs, delivering better outcomes, and improving sustainability. Here, highlighting leading practice from some of the organizations we have collaborated with, we consider smarter approaches to energy, transport, and public services.

Energy: shaping demand, managing supply

Despite providing economies of scope and scale, cities contribute significantly to climate change and rising demands for energy. To counteract this, energy providers must manage supply and demand with less carbon impact.

This goal begins in the home, by progressively shaping customers' demand for energy and making it more sustainable. Customer portals and in-house displays can offer real-time information to help customers correlate their energy consumption

and spending. They can show individuals the pattern and cost of energy use across their household appliances, the energy derived from renewable sources, and the carbon footprint of their homes. Likewise, smart metering has the potential to even out the demand for energy throughout the day, so that the carbon impact of less-clean, peak-time energy generation is reduced. Smart meters enable the flow of renewable energy back onto the grid, and alert customers when their energy use departs from its normal pattern, resulting in higher costs and carbon emissions. Energy providers such as Fortum are deploying smart meters, making the meter-reading process more efficient and giving the possibility of a time-of-use pricing approach that encourages customers to exploit off-peak energy.

The same principle must be applied to the broader energy infrastructure. The traditional power grid carried energy in one direction from the power plant to the points of use. Smart grids, now being introduced in China, North America and Europe, support the monitoring and management of existing carbon-based energy alongside renewable energy systems through two-way energy flow and distributed generation, to reduce overall consumption.

Transport: enabling smarter mobility

As cities expand, suburbanisation widens their footprint and increases the distances their inhabitants travel for work and leisure. An effective transport system thus becomes vital to the city's productivity and delivers economic, social, environmental and health benefits for everyone.

Traffic congestion is a typical urban problem, especially in rapidly expanding cities. Here too, user behaviour can be changed to make better use of capacity. The Dutch Ministry of Transport introduced road-pricing initiatives that resulted in traffic being more evenly distributed, and the province of Utrecht developed a two-way communication system that gathers real-time traffic information and proactively suggests less-congested routes to drivers.

However, long-term sustainability depends on maximizing use of public transport as an alternative to the car. The most forward-thinking cities are developing integrated networks that allow people to make connections easily and take the fastest route using multiple modes of transport. Ideally these will be underpinned by smart solutions to fares and ticketing such as London's Oyster card, supported by a single multi-modal customer-service platform. Real-time passenger information on services will become the norm, as SNCF and Dutch Rail have already identified, because by helping customers make informed choices about their routes, transport providers can improve the customer experience while making better use of capacity.



Shanghai, China's most populous city, has seen rapid development since the 1990s and is at the heart of global finance and trade

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Public services: improving access and efficiency

Poor public services impede the attractiveness, and thus the development, of a city. Faced with rapidly growing and changing populations, city administrations must maximise their efficiency, broaden access to services, and become more adept – not only in responding to citizens' needs, but also in proactively identifying the services that individuals, households or businesses are likely to require.

By making government *accessible* to customers via a combination of channels, including online, phone and face to face, agencies can offer citizens and businesses choice and flexibility, while improving cost-efficiency. Bureaucracy too often makes services difficult for customers to reach – unified access is the ideal. Many cities globally have realized this and are implementing progressively better means of access. Public-sector organizations can often deliver game-changing service improvements by simplifying processes and driving down their operating costs through streamlining service chains across multiple organisations, sharing assets, and implementing e-procurement platforms. Stockholm is one of several cities whose administration drives towards streamlining its customer services, freeing up resources to focus on delivery of services on the front line.

The current trends in population and cities, compounded by today's levels of consumption and waste, do not point towards a sustainable future. To steer a different course, cities need collaborative leadership, the vision to turn the latest technologies to their advantage and the aptitude to engage

their customer base in a way that fundamentally changes the game. Cities' system of systems presents a complex web for decisionmakers to navigate through, to optimise economic, social and environmental outcomes. Sustainability is paramount. Europe's emerging Reference Framework for Sustainable Cities promises to facilitate the kind of multilevel dialogue and experience sharing that is required to build vital capacity, and to provide valuable tools and metrics to foster improvement. However, the challenge transcends the developed, developing and undeveloped worlds, and demands sustained commitment from city leadership, industry and each of us to act now – for those that the 'blessed generation' leaves behind.

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Footnotes

- 1 *World Population Prospects: The 2008 Revision*, United Nations Population Division, Department of Economic and Social Affairs, New York, 2009. www.esa.un.org
- 2 *State of the World's Cities 2010/2011: Bridging the Urban Divide*, United Nations Human Settlements Programme (UN-HABITAT), London, 2010. www.unhabitat.org
- 3 *State of the World's Cities 2008/2009: Harmonious Cities*, United Nations Human Settlements Programme (UN-HABITAT), London, 2008. www.unhabitat.org
- 4 *Re-engineering Cities: a Framework for Adaptation to Global Change*, Richard Dawson, Philosophical Transactions of the Royal Society A, Vol 365, No 1861, pp3085-3098, 13th September 2007. www.rsta.royalsocietypublishing.org