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TOMORROW'S WORLD?

Urban sustainability A new report sets out three contrasting visions of the city and urban sustainability. Malcolm Eames and Tim Dixon look to a greener future

With more of us than ever living in cities, creating sustainable cities is vital to all our futures. In the UK, that means retrofitting our existing urban areas. But what would a retrofit city look like? A new report from the Retrofit 2050 project, a consortium bringing together some of the UK's leading urban researchers, sets out three contrasting visions of the city and urban sustainability.

In recent years, the need to re-engineer existing buildings and urban infrastructure has gained increasing prominence. On a global scale, the concentration of our growing human population within urban centres has focused attention on the role of cities in climate change mitigation and adaptation, and in achieving the broader goals of sustainable development. Although cities are seen as the source of many of our most pressing environmental and resource depletion problems, the creativity and innovative potential of cities may also provide their solutions.

Moreover, in the UK, as with many parts of Europe and the US, the critical challenge is not so much how to build new eco-cities, but how best to deal with our ageing building stock and urban infrastructure. In the UK, for example, less than 1-2% of total building stock each year is new build, and some 70% of total 2010 building stock will still be in use in 2050.

In this context, the Climate Change Act 2008 and its related 80% emissions reduction target for 2050 have done much to focus attention on the impact of the built environment on carbon emissions. This is not surprising, given that emissions from buildings (36%) and industry (35%) account for more than two-thirds of total greenhouse gas (GHG) emissions in the UK, with the residential sector responsible for 23% and the non-residential sector 12%. Alongside this, government has sought to develop strategic frameworks for more effective and integrated co-ordination of planning and infrastructure (eg the

Planning Act 2008, the National Infrastructure Plan (2011), the Low Carbon Transition Plan (2009), Carbon Plan (2011) and the Energy Act 2012).

Together, these documents set out longer-term aspirations to develop systemic responses for the management of infrastructure networks, particularly the development of low-carbon transitions within existing critical infrastructure in new and existing developments. However, action on the ground has been patchy.

First, although much of the UK's low-carbon agenda at city level has been set by the Core Cities programme, which brings together the city-regional "big hitters", such as Manchester, Birmingham and Bristol, a survey of the UK's top 60 cities (by population size) for the RICS found that only seven have 2050 carbon emission reduction targets in place. Similarly, only one in five UK cities have an explicit low-carbon plan or strategy. Best practice is the exception rather than the rule in this area.

Secondly, the government's Green Deal – its flagship policy intended to radically improve the energy efficiency of the nation's homes and commercial properties – has got off to a decidedly shaky start.

Moreover, while the challenges facing the Green Deal may eventually be overcome, the fact remains that carbon emissions targets, no matter how important, can tell us little about the sort of future cities in which we might want to live. Urban sustainability requires much more than reductions in carbon. It is a multidimensional problem that requires a strong and integrated focus on energy, water, and waste and resource use, in order to underpin the provision of a healthy and socially sustainable environment within which diverse communities can flourish. Globally, cities are now starting to engage in earnest with this debate, which is why city visions have become so important.

City visions
Imagining the future of the city has been the stuff of literature and popular culture since the days of Thomas More's *Utopia* in 1516. Cities themselves have frequently been the focus for utopian visions, but they have also been imagined in dystopian and apocalyptic terms as hellish places, where poverty and despair prevail. Indeed, much of the visionary thinking which evolved from the work of More, Leonardo da Vinci and others is closely linked with contemporary urban planning theory.

For example, in the 20th century we have seen the emergence of garden or social cities, which promote the idea of a metropolitan, polycentric region (the work of Ebenezer Howard, for example); the contemporary or radiant city, which emphasised urban monumentality (Le Corbusier); Broadacre City, which unintentionally led to urban sprawl (Frank Lloyd Wright); and the ecological or spiritual city, which captured the concept of workplace-people (Patrick Geddes).

Today, more than ever, cities need to envision and strive for a more sustainable future. Shared visions help people make sense of the future; they can open-up and make transparent societal choices; they help us to determine what sort of future we want; they promote discussion and debate; and they allow us to see how we can mobilise, deploy, and manage resources to achieve a desired future.

But what should a retrofit sustainable city future look like? How should we seek to re-engineer our cities and the wider regions in which they are embedded? While government and business agendas are converging around the "buzz" of the smart city, many local activists have very different notions of what sustainability should mean in an urban context, as exemplified by the self-sufficiency and resilience concerns of the "transition towns" and urban food movements.

2050 retrofit visions
The *EPSRC Retrofit City Futures* report sets out three distinctive visions of what a sustainable future might look like for the UK's core city regions in 2050. Based on workshops with national experts and an extensive programme of foresight and horizon scanning research, these visions are not intended to represent the future of particular cities. Rather they suggest possible futures through which to explore potential technological, infrastructure, land-use, socio-economic and cultural change. Moreover, while the visions represent competing views of urban sustainability, they are not entirely exclusive. One can certainly imagine how elements of these visions might coexist, albeit at different scales within a city-region.

Each of the futures is located within a "possibility space" described by two key dimensions of change for systemic urban retrofitting (see figure 1). The "change in land-use and urban form" dimension describes the extent of change within the city-region, on an axis from low to high. At the low end of this axis, changes in the built environment and urban infrastructure are largely overlaid on or accommodated within existing patterns of land use and urban forms. At the high end, they are radically reconfigured.

The "social values and institutions" dimension describes the structure of social relations and patterns of economic activity, including policy and consumption. At one end of this axis, market-oriented solutions to delivery of public goods predominate, together with individualist values emphasising short-term private consumption. At the other end, public goods are delivered through co-operative and collective institutions, with a strong role for civil society. The individual is seen as part of a wider community and

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mechanisms for the allocation of resources are aligned with long-term social goals. Between these two, communitarian values continued with strong local governance institutions to drive social investment at neighbourhood and city scales.

For each future the report provides a synopsis or "guiding vision", together with a short narrative and illustration describing the basis of each vision: a portfolio of technological and social innovations, in the domains of energy, water, and waste and resource use are also given in each case.

The important point here is that the Retrofit 2050 visions are not intended as self-contained predictions. Rather, they seek to draw attention to the competing pressures and dynamics capable of shaping the evolution of cities. For example, much of the change in the self-reliant green city is predicated on significant change in the way social values and institutions operate; much of the smart-networked city vision is concerned with overlaying new technologies onto existing infrastructures.

Of course, every city is to some extent unique. When considering the future of real cities we need to consider not just their natural and built environments, but also their particular economic, social, political and demographic structures. It is also necessary to recognise the diversity of values and interests that will shape different expectations of the future within any individual city. The challenge then becomes one of understanding how such visions "touch down" in particular places and specific regional contexts: each with their own particular environments, infrastructure, demographic, socio-economic and governance structures.

The work of the EPSRC Retrofit 2050

THE 2050 RETROFIT VISIONS

Smart-networked city: The city as a hub within a highly mobile and competitive globally networked society. Pervasive, information-rich virtual environments integrate seamlessly with the physical world. ICT provides real-time information to drive efficiencies through automation and intelligent control, and advanced market-oriented solutions allow for the internalisation of environment costs. This is an open, outward-looking society in which the mobility of people, goods and services remains high.

Compact city: The city as a site of intensive and efficient urban living. Urban land use, buildings, services and infrastructure provision are optimised to create dense urban settlement forms that encourage reduced demand and more efficient use of energy and resources. Concentration in urban centres reduces pressures on the periphery. Significant efficiencies are obtained through systems integration and redesign.

Self-reliant green city: The city as a self-reliant bio-region, living in harmony with nature. A self-replenishing, largely self-reliant system of circular metabolism, where resources are local, demand is constrained and the inputs and outputs of the city are connected. In many ways this is an inward-facing society, but one conscious of its global responsibility to "live within its limits".

project is therefore focusing on the future of two particular city-regions: Cardiff/South East Wales and Greater Manchester. However, the visions set out in the *Retrofit City Futures* report have a wider resonance, by encouraging those that read them to question their own assumptions and to engage positively in the task of creating the "sustainable cities of tomorrow" today.

Download the Retrofit City Futures report at: www.retrofit2050.org.uk/sites/default/files/resources/Visionsreportfinal.pdf

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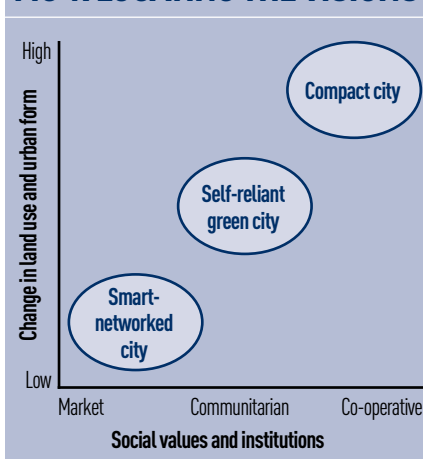
FIG 1. LOCATING THE VISIONS

TABLE 1. KEY CHARACTERISTICS AND INDICATORS OF THE 2050 RETROFIT VISIONS

	Smart-networked city	Compact city	Self-reliant green city
Change in land use and urban form	Low-moderate	Moderate (densification)	High (extensification)
Social values and institutions	Market-oriented values, with emphasis on private consumption. Light-touch, networked governance with public sector, local authority and intermediary organisations acting as facilitators for business.	Communitarian and localist values expressed at a city and neighbourhood level, coupled with strong local governance and planning systems and an emphasis on social investment.	Co-operative and collectivist values underpin new models of participation and shared ownership, in which mutualism and local self-reliance are coupled with strong concerns for social equity and a questioning of materialism.
Economic growth	3% pa	2.3% pa	<1.6% pa
UK population by 2050	86.4m	76.4m	66.8m
Urban density by 2050 (assuming a large city)	No significant change: 40 dwellings per ha (160 people per ha)	Dense: 70 dwellings per ha (275 people/ha)	Less dense: 30 dwellings per ha (or 120 people/ha)