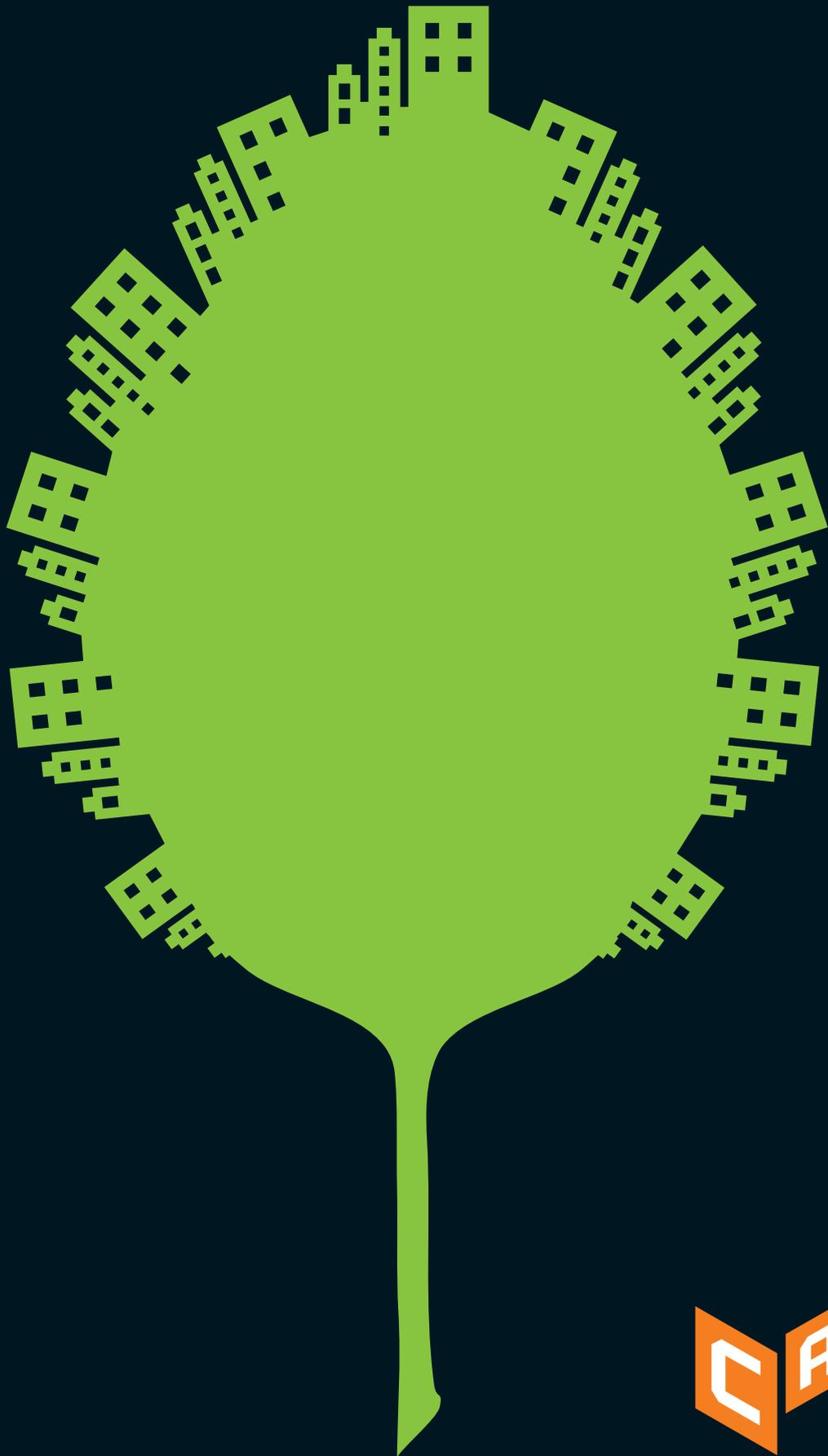


Hallmarks of a sustainable city



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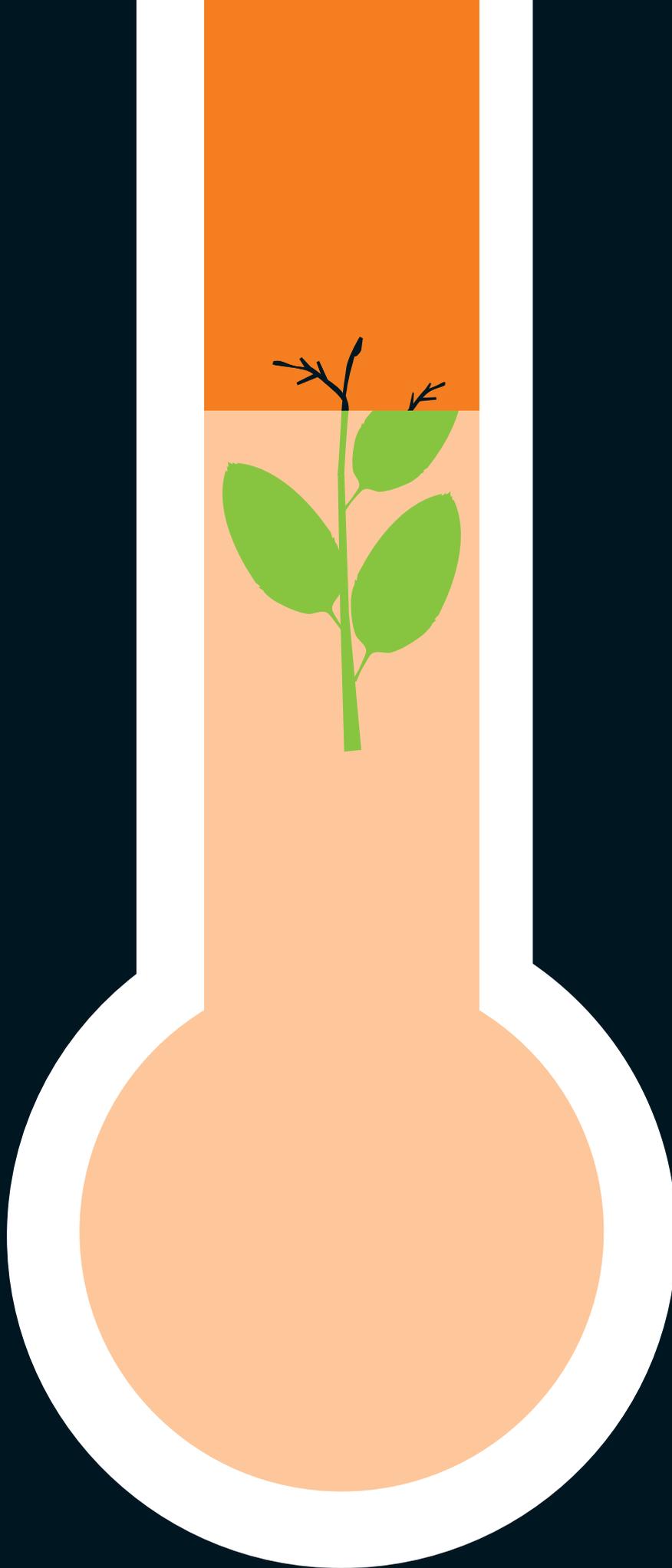
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CABE 1 Kemble Street London WC2B 4AN
T 020 7070 6700 F 020 7070 6777
E enquiries@cabe.org.uk www.cabe.org.uk
www.sustainablecities.org.uk

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The opportunity of climate change



The world's climate is changing. The scientific evidence is incontrovertible: most of this change is due to human activity, and the process is speeding up as more and more carbon dioxide, methane and other greenhouse gases are pumped into the atmosphere.

The next 10 years are critical. Carbon dioxide emissions must be cut rapidly. If they are, according to the Intergovernmental Panel on Climate Change, we may limit the rise in global temperatures to two degrees centigrade. But if we continue on regardless – and towns and cities contribute up to half of all emissions – the rise could be up to six degrees centigrade.

This could trigger mass extinction of many plants and animals, a complete loss of ice sheets, rising sea levels and significantly altered weather patterns. There is no luxury of time.

Even in the northern hemisphere, where the impact could be less than elsewhere, the effects from a rise of two degrees will be felt by every town and city. As more and more of the world's population crowds into cities, the urban environment needs to become a better place to live: a place that improves health, well-being and economic prosperity while simultaneously – and dramatically – reducing greenhouse gas emissions.

This means re-designing how we think and how we organise our lives. It requires courage, vision and leadership. These are being shown by some places, such as Manchester, Seattle and Toronto, which recognise climate change as one of several critical environmental symptoms attributable to unsustainable ways of living and over-consumption of resources. But such inspirational examples are still all too rare.

Alongside the climate crisis, we face an economic crisis. Rather than the world's economic malaise diverting attention from the need to become more sustainable, the two problems in fact provide a

remarkable opportunity for positive change. But we need to think big. The costs to the Exchequer if the country faced a food or water crisis, or a power shortage, would dwarf the bail-out to the banking sector.

This is why CABE views investment in sustainable development as a national insurance policy. It is not just a responsibility for markets to take on, but a positive choice for government to make and the public to endorse.

In the context of an international 'green new deal', it is encouraging that relatively small investments can deliver so much. It can create new jobs, limit the environmental impact of towns and cities, and reduce the cost of running them. Oxford City Council, for example, recently invested £200,000 in energy efficiency, alongside the Carbon Trust. This has become a revolving loan fund for measures that will payback within five years. And it is cost neutral, because annual payments into the fund match the annual savings made in energy bills.

Cities that respond well to climate change will be more efficient, resilient places. That response can also help to solve social and economic problems, such as fuel poverty and traffic congestion, and so deliver a better quality of life.

If civic leaders can see that a vigorous response delivers what their citizens want, then creating a low carbon, sustainable environment becomes a promising arena for change instead of a quagmire.

Plenty of technological aids are emerging, of course. So far, none of them offers a silver bullet. The real answer lies in changing the way we govern, finance, manage and design cities.

Where do you start?

2

For towns and cities to be economically competitive, socially progressive and environmentally responsible, they must reduce their inefficient use of finite resources. CABE believes every place can become better by:

Understanding and nurturing its unique qualities as the basis of its response to a changing climate

Each town and city is different, shaped by the geography of the place itself, the passage of time and the people who live there. The best solutions for one place may not suit another. It is therefore essential to understand what physically shapes your town or city – the land, water and wind – and how that can contribute towards resilience, for instance to extremes of weather.

Knowledge of the nature of a place needs to be teamed up with knowledge of the local impacts of climate change, from the UK Climate Impacts Programme. Local authorities that embed this analysis in their local development framework and core strategy can establish a policy for the decisions to make them sustainable.

Using the planning system to target interventions at the most appropriate scale

Good spatial planning should shape our urban environment. It allows us to respond to complex needs at the most appropriate scale – whether regional, city or neighbourhood. The planning system has struggled to distribute activities in a sustainable way.

It should always be possible to walk, cycle or take public transport to work, to school or college, to shops, to the park or the cinema. When the planning system gets these kinds of basics right, it will provide busy, distracted citizens with a genuine choice to reduce their carbon emissions.

Vitally, we need to use the landscape of towns and cities – trees, parks, rivers and lakes – to mimic natural processes, like water flow and cooling air

flow. This green infrastructure should be as much a priority for a successful place as grey infrastructure – like the road network, or the sewage system.

Forging a new city vision and infrastructure through civic leadership and collective action

Creating sustainable places will require the public, private and voluntary sectors to collaborate effectively. Reliance on the market to deliver essentials, even banking or housing, has evident shortcomings. What is needed is a new market model which endures over the long term because it delivers sustained value.

Running a town or city depends upon engaging the whole community. Gaining enthusiastic consent for the changes required means two things: first, providing impressive cultural and political leadership – people are very much influenced by seeing others take risks; second, using communications channels imaginatively, so that more people appreciate the benefits of a low energy, low emission lifestyle and want it for themselves.

Knowing your starting point, setting targets, and celebrating progress

At the heart of the challenge is a requirement to reduce the ecological footprint of our towns and cities. A reliable baseline is essential. City-wide consumption of all natural and man-made resources should then follow the rule of the four Rs: reduce; re-use; recycle and recover. The use of energy and water, and the reduction of waste, must be monitored from the start of any new programme, alongside carbon emissions.

Each town or city should set specific reduction targets, so that it can measure its success. The progress of everyone's efforts to reduce their impact on the environment should be updated regularly – and published. We can then celebrate everything that is being achieved or hold authorities to account when they fall short.





How to recognise a sustainable city

- An appetite for change
- Leaders who can think long term
- Working across administrative boundaries
- Freedom to control land and assets
- Complete focus on whole-life value

An appetite for change

We are not currently meeting the challenge of climate change. A review by CABA in 2008 of 700 planned major construction projects and housing schemes showed that the issue was being taken seriously in only a fraction of them. So a complete change of priorities is required.

The key for civic leaders is fully understanding the issues and then creating a public mandate for action. Environmental concerns alone have rarely won many votes, so people need to see how decisions will directly improve their lives.

On the ground, this might mean the chance to share the benefits and profits from a communal district heating system. At the strategic level, every decision must aim to improve quality of life while also reducing the levels of pollution, water and energy use, and waste.

Local authorities already have legislative powers to promote the well-being of their citizens, and yet these remain overwhelmingly under-used.

Given the nature and timescales of climate change, there is no alternative to making hard decisions. But this requires creating a consensus on what is for the collective benefit of every citizen, as opposed to the interests of individuals; and stimulating an appetite for change among leaders, politicians and the constituencies they serve.

Leaders who can think long term

Climate change needs leaders in the public sector who act as stewards of the city's environmental resources, and champion quality of design and quality of place. Once this was mainly about fostering civic pride; now, it is as much about fostering civic survival.

It is urban leaders who most need to address all the issues arising from climate change. And it oversimplifies current realities to think of the public sector as steward of society's assets for the long

term while business provides short-term profits for investors.

Local government needs to decide to use its resources and assets in an innovative way, and provide sufficient stability and a level playing field to give business the confidence to invest in a place.

From now on, city leaders must establish the market rules within which decisions are made. It is up to them to set long-term priorities. A population enjoying improved health and well-being offers a more attractive workforce for business and industry. A city that supports sustainability will also support innovation. Providing a home and a market for new low carbon growth sectors – in technology, manufacturing and design – will increase economic vitality.

This quality of civic leadership is impossible if short-term changes of political control can just blow the city's long-term goals off course. To create sustainable cities, it is fundamentally important that leaders champion long-term decisions. This is true above all for critical projects related to transport, building schemes, green space, energy and waste. These all require sustained and sizeable investment which cannot usually be delivered in less than two political terms.

Working across administrative boundaries

Climate change has wide-ranging environmental, social and economic impacts. It cares nothing for administrative boundaries or professional disciplines.

Cities and towns need to respond with bold proposals, and cut through bureaucratic inertia. A good start has been made. The Greater London Authority pioneered a comprehensive climate change plan which set priorities far beyond what it controls directly. The plan encompassed targets for every organisation it needed to influence. The Association of Greater Manchester Authorities is establishing a climate change agency – in effect,



'Greater control of land and assets will help towns and cities to invest in energy security, flood protection and water supply'

a sub-regional partnership – to tackle the aspects of climate change that one authority cannot tackle on its own.

Working in this way creates new demands on the systems and operation of a city. You need to ensure, for instance, that energy and waste are planned and managed together across administrative boundaries. The demand and supply of resources, particularly of water and food, may require a local authority to influence utilities and business across an entire region.

As a result, towns and cities must convene robust and refocused local strategic partnerships. Public and private bodies need to recognise the regional and sub-regional implications of their policies. Decisions should reflect an overall plan to reduce climate change impacts and improve quality of life, and spatial planning functions must be given a key role in the corporate management team of every major local authority.

Working across boundaries means understanding the wider impact of local decisions. Each new hospital and school, for instance, has a huge influence on transport and energy needs, and yet their impact at a neighbourhood level is often not properly considered. From now on, these decisions must be assessed within the context of each authority's sustainable community strategy.

Local area agreements should be used to target action on climate change and exploit the multiple benefits of particular approaches. An investment in green infrastructure, for example, can meet both environmental and social policy objectives, improving public health and well-being.

Progressive authorities are now teaming up to realise the wider benefits and funding that can flow from shared priorities. The new multi-area agreements provide opportunities for local authorities to work together at different scales across regions. Work in Portsmouth and Urban

South Hampshire shows how to reap the benefits of pooling resources within new strategic frameworks for delivering sustainable growth across a region.

Freedom to control land and assets

While local authorities clearly need to improve their own estates and lower their own carbon footprint, they should also take a proactive approach to intervening in local land markets.

Across Europe, a consistent feature of towns that have embraced sustainable development is the progressive lead that the public authority took in acquiring land, delivering the public infrastructure and then attracting and shaping investment there.

Central and local government in the UK need a mature debate, informed by sound research and long-range planning, about retaining and increasing holdings in land and buildings. Currently, a local authority's objective to reduce carbon emissions and improve living conditions is often in conflict with an economic strategy focused on realising short-term value and capital receipts.

Greater control of land and assets will help towns and cities to invest in energy security, flood protection and water supply, and give them a leadership role in providing a sound base for long-term private investment.

At present, because urban areas have fragmented land ownership, areas decay with buildings remaining below modern standards and open spaces under-utilised. Policymakers need to identify holdings that could help improve environmental performance. This might include, for example, investing in urban forestry and parks on the basis of urban cooling effects and biomass fuel supplies, and assessing buildings to see if they are suitable for green roofs or renewable energy installations.

Landowners and other investors can be involved in joint ventures. Public land can be used for wind turbines, solar arrays or district heating schemes.

There is also a strong role for community control and equity as part of the new economic modelling and regeneration that is required for a more sustainable future. This could mean community ownership of renewable energy sources and their distribution networks.

Complete focus on whole-life value

Existing valuation techniques for assets, land and infrastructure are frequently flawed or misapplied. Current timetables used in valuation modelling are far too short and fail to account for the benefits of a longer-term sustainable approach to living in an urban community.

Towns and cities must address anomalies in their own valuation and asset management practice, and their focus on short-term returns. Encouraging lower but secured investment returns over a longer period may offer greater protection from boom and bust cycles.

The recent rise in energy prices has motivated many local authorities to seek alternative sourcing arrangements. Instigating measures to encourage greater efficiency, reduce waste and use diversified renewable sources can lead to significant savings.

Speculative property development in towns and cities, fuelled by the increase in market value of land with planning permission, has largely been welcomed. This will certainly change when it becomes apparent that the real upfront costs of sustainable development, such as providing low carbon energy infrastructure, are so significant that developers can only recover them over a longer timescale. Different models of development will need to emerge, which in turn will force a reappraisal of what actually creates land value. The presence of sustainable infrastructure could be one of the most compelling offers that a town or city can make to attract new development and enduring investment.



The creation of Emscher Landschaftspark in the Ruhr Valley has involved the ecological regeneration of the contaminated 220-mile Emscher river system over a 30-year period. It has created a new park landscape, with major centres connected by green corridors, all underpinned by an impressive green infrastructure strategy. Seventeen local authorities have worked together across an 800 square mile area. Radical new uses have been found for mines and factories, and 6,000 properties have been refurbished or built to high environmental standards. Yet the real value of Emscher Landschaftspark lies in the impetus it has given across Europe to new forms of living and working.

What needs to be done?

4

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Copenhagen in Denmark has led the way in sustainable energy planning. Since the 1970s oil crisis, the city has worked to an overarching strategy to reduce energy consumption and reliance on oil. A network of efficient district heating and power schemes use energy from waste, wind, ground and spare heat from industry. This means greater energy security for the city. Most people connect to the system and so are cushioned from fluctuating fuel prices. Municipal authority and local limited company ownership of energy providers ensures some community ownership, financial transparency, and consumer engagement. The largest company serves 140,000 households, operating on a not-for-profit basis with a turnover of £37 million. *(See also the city's work on transport, p15)*

Responding to a changing climate is one dimension of a comprehensive approach to sustainable development. Every town or city that creates a plan to tackle climate change will need to go through the process of reappraising policy. Sometimes this will concern issues that are familiar – even perennially defeating – like reducing car use. But policy around renewable energy, for instance, may include measures such as harvesting biomass from urban trees and may feel brand new.

What follows are seven issues for every place with aspirations to become sustainable. They are not in order of priority and their significance will vary depending on the town or city, its location and its existing assets. But each priority is dependent on another. Water harvesting, flood prevention and mitigating the heat island effect all link together with creating recreation areas and wildlife corridors.

Each priority fits into a single strategic jigsaw – to make a place where people want to live their lives, bring up their children, and feel part of a prosperous and healthy community.

1 Energy – reducing carbon emissions and ensuring security of supply

Towns and cities need to be more efficient and resilient. Each should produce an energy strategy, involving the utility companies, that maps current and future needs and sets out a plan for future provision, prioritising a range of low carbon, sustainable energy sources.

Climate change and energy efficiency are key areas in measuring local authority performance under the comprehensive area assessment. The national indicator set has five different indicators relating to energy and 90 per cent of local area agreements include one or more climate change indicators amongst their nationally agreed targets. Meeting the targets can deliver additional funding.





Woking in Surrey has pioneered the development of a network of over 60 local energy generators, including photovoltaic arrays and a hydrogen fuel cell station, to power, heat and cool municipal buildings and social housing. Decentralising energy production in this way has enabled the council to reduce its carbon emissions by 77 per cent since 1990.

National indicator 186, for instance, measures a per capita reduction in carbon emissions across the whole of the local authority's area, and requires the commitment of every public body.

For many towns, the local strategic partnership will have a key role to play. Bristol's participation in the Carbon Trust's low carbon cities programme has helped draw together key public bodies, including the universities and NHS Trusts, into a common approach to reducing carbon emissions.

Across regions, the right solutions need to be implemented at the right energy scale. The EU has set the UK a target to source 15 per cent of energy from renewables by 2020. This target could be exceeded with political will. Not every technology is suitable in every place but many can run in tandem, such as wind and solar power.

Solar water heating, photovoltaics and ground source heat pumps are viable for individual buildings and at a community level. Some of the greatest improvements can come through neighbourhood schemes, including combined heat and power. Waste heat from combustion for district heating is heavily used on the continent – and badly neglected in the UK. Wind turbines on local authority-owned land on exposed sites at the edge of towns can be financially viable and popular.

2 Making buildings more comfortable, safer and cheaper to run

The construction and use of our homes and other buildings produces approximately 45 per cent of the UK's carbon emissions. Around 75 per cent of the current building stock will still be standing in 2050. Progress on energy efficiency – the cheapest way to reduce carbon emissions – has been desperately slow but the UK government is now moving fast to catch up with other northern European countries.

Measures must be taken to reduce the energy required to heat and power our buildings, alongside

'Waste heat from combustion for district heating is heavily used on the continent – and badly neglected in the UK'

efforts to reduce demand through behaviour change. The energy efficiency of the existing housing stock varies. A range of different methods, such as insulation, double glazing and more modern heating equipment, will be required. Cities should work strategically to both co-ordinate funding options to assist homeowners with the costs and address their own stock. Reducing energy demand goes hand in hand with increasing security of supply. Where possible, existing neighbourhoods should be linked into renewable energy technologies being installed in new urban developments.

Sensitive heating controls also help with fuel bills for residents – cutting fuel poverty and reducing the number of deaths of old and vulnerable people from cold in winter or overheating in summer.

How we manage our energy also needs to change. Cities should explore all options, including setting up local energy service companies (ESCOs) which can deliver smarter ways to use less energy across neighbourhoods. Local communities can be involved in schemes and have a financial interest in their successful outcome.

Within buildings, far greater use of simple heating and cooling techniques, such as passive solar heating in winter and awnings for summer shading and cooling, will help.

But we also need to reconsider the way we live our lives, and demand has to be reduced through behaviour change such as turning off appliances. We all need sufficient information to make informed choices. Smart metering is one way of guiding users to take greater control over consumption. Energy efficient schools and community buildings can act as a local showcase for good practice.



The development of Malmö in Sweden was centred on a sustainable strategy that set an objective of reducing carbon emissions by 25 per cent between 2008 and 2012. To achieve this, a range of design and planning interventions were deployed, including investment in more efficient buildings and attempts to change behaviour. The Västra Hamnen (Bo01) area exemplifies an approach to sustainable energy masterplanning.

'There is an absolute priority to integrate transport and planning in urban areas, to reduce the need to travel'

©Urban Initiatives



The Greater Ashford Framework provides an integrated sustainable development strategy for the town. It allows Ashford to absorb significant growth within a cohesive infrastructure, including well-connected streets, good public transport services, and a strong network of green public spaces. It is actively encouraging walking and cycling as part of a new settlement-wide spatial strategy, not least through turning a dual carriageway ring road into an ordinary two-way street.

3 Making streets fit for people

Road transport is responsible for around 86 per cent of domestic transport emissions. Cars account for about half that figure.

Fundamentally we need to reduce the length and frequency of vehicle journeys. There is an absolute priority to integrate transport and planning in urban areas, to reduce the need to travel. Places need to be well connected, offering a choice of ways to get around. Walking, cycling and public transport must become attractive and easy options.

Cities need support from regional development agencies and government offices to co-ordinate a strategic regional transport strategy aimed at reducing car use. A mix of uses – residential, business and entertainment – together with sufficient, suitable densities, is vital to ensure adequate demand for public transport services. Making a car unnecessary should be a primary consideration in choosing or permitting development on any given site.

Our streets are frequently unpleasant places to be unless you are inside a vehicle. They need to become places where people can enjoy walking or gathering and sitting, in shade or sun. When planning and design are integrated with traffic management, places can be transformed.

A quarter of all car journeys in England are under a mile, with two thirds under five miles. Getting more people walking and cycling instead can be encouraged through designing streets, squares and green spaces to create safe routes, linked to public transport. Better design raises the quality of life, and creates places where people want to spend their time and money.

It is essential that transport policy measures are mutually reinforcing. Look, for example, at the way the congestion charge went alongside greater investment in bus services in London. Parking strategies have a profound effect on car use.



You can make it harder to park legally, and you can encourage positive choices: the City of Westminster has introduced parking concessions for electric vehicles.

New forms of public transport, particularly those that use renewable electricity, not only reduce carbon emissions but also provide a quieter and less polluted public realm. The municipality of La Rochelle in France has pioneered the use of electric vehicles as part of its sustainable transport strategy.

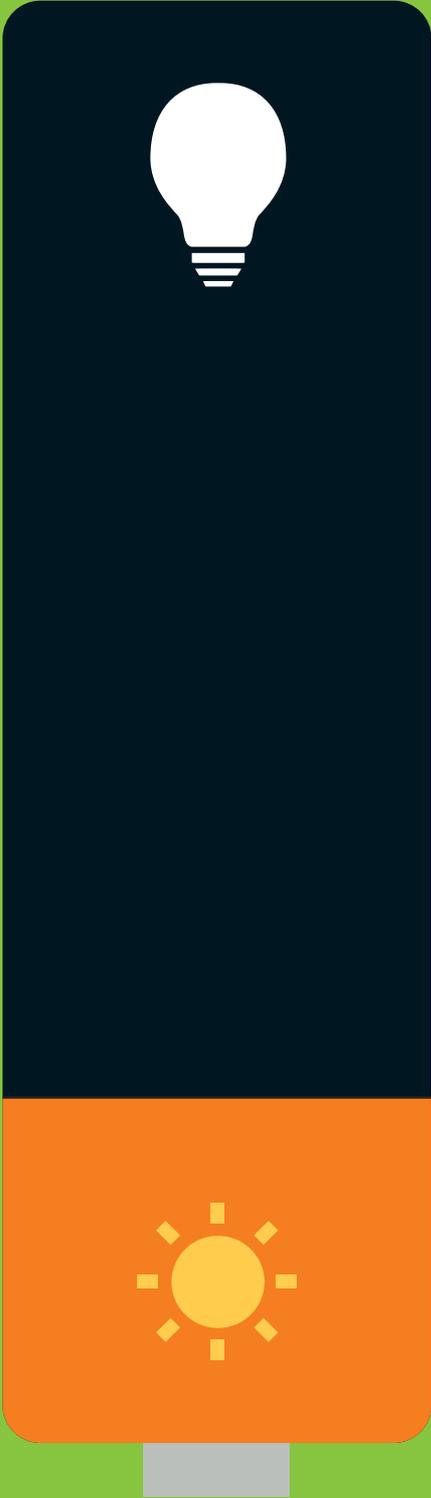
Restrictions on polluting vehicles, and banning them completely in some areas, will encourage the purchase of low-emission vehicles for both commercial and private use. This is good news not only for pedestrians: residents living above or near busy streets can open their windows instead of having to resort to energy-intensive air conditioning.

Although congestion can be a problem at peak hours, city-wide traffic demand management should also address under-capacity in the network. Increasing the load of vehicles is important in both cars and trucks; around 30–40 per cent of trucks on the road are empty and many cars are single occupancy. Initiatives such as car sharing, car clubs and company/school travel plans can be instrumental in making best use of a finite amount of roadspace.



Copenhagen has integrated its transport and public space policies, transforming the city centre and ensuring that the city's airport, rail and suburbs are all connected to the centre by the metro system. In the city centre, a combination of measures has encouraged an increase in walking and cycling and a decrease in private car use. Many public squares and streets are pedestrianised and form a well-connected public realm. The city has implemented a programme to gradually reduce the number of car parking spaces by 3 per cent per year and further develop cycle lanes and a free cycle hire scheme. *(See also the city's work on energy, p10)*

Tram, Bilbao, Spain (above left): grass-covered tracks, first used in Liverpool back in 1924, introduce a form of green infrastructure into cities



4 Rethinking waste

Reduce, re-use, recycle: wise words, but still each year England generates around 100 million tonnes of waste. A high proportion of this ends up in landfill creating methane gas – currently 3 per cent of the UK's greenhouse gas emissions.

Waste is a resource that is simply under-used: attitudes have to change so that waste is seen as a resource to be reprocessed into something useful or treated to recover value or energy, rather than as something to be disposed of.

Local authorities should be looking for solutions at a range of different scales. Over 15 years, the 11 district councils of Hampshire, Portsmouth and Southampton unitary authorities have been using Project Integra as an integrated waste management strategy. They have vastly improved their recycling and landfill diversion rates: an astute example of how to combine resources and expertise.

Proposed changes to the EU Renewables Obligation in 2009 require half of disposed waste to comprise biomass. This could provide a considerable energy stream. A range of new technologies, such as gasification, plasma pyrolysis with gas reformation, and anaerobic digestion should make it possible to adopt a principle of minimal waste in almost every situation. This might mean using the organic waste residue from anaerobic digestors, for example, as soil conditioner.

Towns and cities should work to minimise packaging at the point of sale, for example by imposing on supermarkets and other large retailers a gradually reducing limit of waste.

Local authorities can support and insist on networks to re-circulate construction waste.

They should also plan to reduce the need for freighting of waste by looking to collect, sort, reprocess and treat waste at the neighbourhood

scale. This waste can in turn provide a local fuel supply for combined heat and power stations. Most modern waste management processes can be carried out indoors, which means new facilities can be better integrated into existing development. The Isle of Man's new waste to energy plant shows how high-quality design can help to change public perceptions of waste management as ugly and unwelcome.

New houses, refurbished social housing, schools, hospitals and commercial buildings should all be designed to accommodate hall segregation and storage of waste materials before collection. Local authorities need to take the lead, for instance by subsidising the kit for waste segregation, and providing regular and convenient collection services.



In Hammarby Sjöstad in Stockholm, recycling networks are integral to the design of the whole place. A new model for recycling, energy, waste and water management was jointly developed by utility companies with the city council, with the aim of being twice as environmentally effective as normal new build projects. Waste and biomass provide energy for residents and business.

'Half the country now lives in areas officially suffering water stress. In other words, many cities have less available water than they need'

5 Planning for a shortage or excess of water
Half the country now lives in areas officially suffering water stress. In other words, many cities have less available water than they need.

Water purification is an expensive process, yet only 7 per cent of the water we use at home is for drinking and cooking. A third of it is simply flushed down the toilet. At the same time, most storm water is wasted into sewers.

Cities need to take a strategic view of water supply and storm water. The government has already imposed a responsibility on local authorities to prepare surface water management plans. Rainwater needs to be captured and utilised

effectively within buildings, urban gardens, parks and other green spaces. A well-managed water supply is the key to a green city. And a green city provides people with places to rest, exercise and socialise.

Towns and cities need to reduce the overall wastage of potable water to prevent shortages and rising prices. Consumer behaviour is crucial here, and financial incentives could promote water efficiency and the use of water meters.

Where new development is planned, careful consideration should be given to local water resources, and planning conditions applied to address any shortage. Rainwater harvesting for flushing toilets and washing is a well-developed technology.

Effective water planning across the city and beyond needs the skills of environmental planners and landscape architects, water engineers, ecologists, scientists and architects. This means evaluating the existing network and the capacity of foul and surface water drainage and river catchments, and levels of water availability and consumption, to see how they can accommodate the future impacts of climate change.

The most economically damaging aspect of climate change to date has been extreme wet weather. The UK summer floods in 2007 caused 13 deaths, flooded 48,000 homes and 7,300 businesses, cost £3 billion and for a time left several urban areas without drinking water or power. Although the potential impacts of extreme weather are inherently uncertain, they can be substantially reduced.

The greatest benefits will emerge from understanding how a green space network and the water network interact, and developing a co-ordinated strategy to address them both. The strategy needs to cover the local water catchment areas, rather than local authority administrative boundaries, and so requires partnership working



The East London Green Grid, with its green infrastructure and fresh water management objectives, has been influential in guiding the planning decisions of the local authorities. It aims to create a network of interlinked, multi-functional and high-quality open spaces with the potential for comfortable environments, managing surface water and flood risk, and generating energy.

Milton Keynes floodplain (left): recreates a local flood plain forest to tackle flood risk

The Met Office HQ, Exeter (right): exemplifies the use of sustainable drainage through paving, swales and basins

©Stephen McLaren



with neighbouring authorities or, more radically, different governance arrangements.

One of the best ways to mitigate the impact of flood risk is by restoring flood plains. These spaces can be used for recreation and wildlife habitats. Creating green corridors along rivers on the flood plains, with storm water lakes for fishing and boating, picnic sites, trees, and cover for wildlife, are an efficient, environmentally sound approach to flood prevention. The Milton Keynes flood plains forest involves the restoration of a site adjacent to the River Nene to create a new landscape with much greater flood storage capacity.

At the scale of individual buildings, the priority is to allow water to percolate naturally into the soil and groundwater, for example through front and back gardens. This reduces the flow to surface water drains and river systems caused by impermeable paving and piped drainage. Green roofs will help prevent flash flooding, while the design of drains should include detention and retention ponds to slow the flow of water. Large canopied trees act as a water store and slow percolation.

A good example of this being co-ordinated is the design of the new Met Office HQ in Exeter. It

©Broadway Malyan/Francis Ware



exemplifies the use of permeable paving, filter drains, swales, traditional piped drainage systems, detention basins and balancing ponds.

6 Moderating the heat island

Cities are warmer than surrounding areas because heat is stored within concrete and tarmac, a problem compounded by traffic and poor air circulation between tall buildings. You can feel this when trying to get to sleep on a hot summer night in a city centre, where temperatures are often 10 degrees centigrade warmer than in the suburbs.

This urban heat island effect can be extremely dangerous. In August 2003, 35,000 people across Europe died from heat, 2,091 of them in England. These deaths are particularly iniquitous because climate change affects the poorest most: the people at greatest risk are least able to adapt the places where they live.

Increasing tree cover by 10 per cent can reduce the surface temperature of a city by between three and four degrees centigrade. The prediction of hotter, drier summers means that it is vital to protect existing trees and prioritise the planting of new ones. Larger tree canopies contribute hugely to the shading and cooling of streets and buildings.

'Sensitive urban design and strategically connected green spaces can create corridors of cooler, cleaner air coursing across a town'

© Jefferson Smith/Bere architects



Choosing deciduous species minimises the possible downside of screening out winter sunlight.

Green spaces create microclimates through evaporative cooling and shading, making cities more comfortable places to live in, work in and visit. This is where a well-managed water supply can

© FAN travelstock / Alamy



Using natural air and water flows should be at the heart of city planning and management. In Stuttgart, Germany, they have been actively pursuing climate planning since 1983. Green spaces are protected at strategic places across the city to allow cool air flows to improve air quality and reduce the urban heat island effect.

be crucial in preventing green spaces turning brown, cooling the city when most needed.

Sensitive urban design and strategically connected green spaces can create corridors of cooler, cleaner air coursing across a town. A city-wide urban heat island management strategy will address the problem from the small scale (encouraging green roofs) to the large (having a better warning system). It complements a flooding strategy, since the design and management of green spaces, trees and water reduce the threat from both.

7 Making green spaces work for people and wildlife

'Eat food. Not too much. Mostly plants,' is now a familiar maxim for improved public health. Food production and distribution is also a major contributor to carbon emissions, so locally grown food is important.

Urban green areas are a significant source of sustainable food in the UK but this potential has yet to be realised. Local authorities should seek to provide allotment land to meet demand and encourage local food production in areas of significant new development. There are also opportunities to create community gardens or orchards from derelict plots, or within new development, which improve mental health and well-being. These can also play a role in community cohesion: Benwell Nature Park, Newcastle, is a wildlife reserve created on a former housing site which is now a focal point for the community that helped create it.

For most of the time, life in an urban environment obscures how dependent we are on natural ecosystems, and how much their quality affects our physical health and mental well-being. Ecological biodiversity is critically important, from the services it provides through to the warnings given by its loss, and wildlife, plants and birds survive, thrive or disappear because of human



activity. Urban areas, particularly gardens, already hold a higher density of wild creatures than farmland, but space needs to be consciously provided for flora and fauna.

Wildlife stands a better chance of adapting to climate changes if there is a well-functioning green infrastructure: rare orchids can grow happily on green roofs, for example. Some species, however, will need to move in order to survive: there are already signs that some are moving northwards and to higher altitudes. Fragmented habitats can prevent migration, and we need to design movement corridors.

This is not new: Warrington New Town exemplified the establishment of urban forestry as a network to link together new development. Urban forestry can supply fuel for biomass boilers, whether on a big scale in a green belt or from street tree pruning. City authorities need to identify opportunities and sites and reflect them in green infrastructure plans, in local development frameworks and in planning decisions.



The Muse, Islington, London (other page): an energy-efficient solar family home that aims to set a standard for future housing. Its green roof is good for biodiversity and bird boxes have been built into the house walls

Benwell Nature Park, Newcastle (left): a Green Flag-holding wildlife reserve created on a former housing site by the local community

Saplings, National Forest (right): this new forest is transforming 200 square miles of central England and has already seen more than seven million trees planted. Up to 2012 the forest is absorbing 43 million kilograms of carbon every year

Policy recommendations

5

Creating the framework and incentives

Tomorrow's towns and cities are already here. So to create the conditions for sustainability, we need a policy framework and incentive structure that responds to what we already see and know.

The changes recommended below draw from CABE's practical experience and research, reinforced by our work with the core cities. They are designed to enable local authorities to take a leadership role within a city-region and to deliver both climate change adaptation and increased prosperity built on a sustainable economy.

Sustainable neighbourhoods

Every place is made up of individual neighbourhoods, each unique and each important to the businesses and the people who live there. These neighbourhoods must be able to respond physically to the climate challenge.

Some interventions, such as sustainable urban drainage systems or combined heat and power, are obviously best delivered at a neighbourhood scale. But even the refurbishment of individual dwellings can be done more efficiently at the neighbourhood level.

The Department of Communities and Local Government (CLG) and the Department of Energy and Climate Change (DECC) are committed to retro-fitting existing properties. Yet government-funded programmes have so far targeted housing quality and energy efficiency at an individual property level or, in the case of decent homes, at an estate level. They have not run a programme for climate change mitigation and adaptation at the wider neighbourhood scale.

Such a programme could be designed to work across all housing types and tenures, including private rental and owner occupier, and be delivered by local authorities and the voluntary sector. It could create exemplar neighbourhoods, in the spirit of Bristol's home action zones and Manchester's

new sustainable regeneration areas, as identified in their climate change action plan.

The Foresight Programme's Sustainable Energy Management in the Built Environment project is urging the creation of low emission neighbourhoods, and the Royal Town Planning Institute wants to see eco-towns planning guidance applied to existing areas.

So CABE recommends that CLG and DECC co-create a sustainable neighbourhoods scheme. Operating at a neighbourhood level would not only save time and money but would also stimulate the market for green building materials and renewable energy technologies, and generate jobs in the construction trades and professions that are suffering in the recession. It could play a strong role in engaging local communities, and create ownership of the climate change adaptation agenda through collective action.

Better public building

Government, both central and local, is a significant property owner and manager, with responsibility for public spaces and transport as well as buildings. This provides an excellent opportunity for politicians and civil servants to demonstrate leadership on resource efficiency and asset management as part of their work to meet mandatory targets and commitments.



Cable Street Community gardens, Bow, London. Women from the local Bangladeshi community plant potatoes in their allotment

©Ray Roberts / Alamy



Parklands, east London (this page): after the London Games in 2012 the Olympic Park will be transformed into the largest urban park created in Europe for 150 years

Academy of St Francis of Assisi, Liverpool (other page): built with the environment in mind, the academy features green roofs and photovoltaic panels. The environmental surroundings helps to shape the school curriculum

Central government should demonstrate leadership by making a public commitment to improving the energy efficiency of their properties in Whitehall by a minimum of one rating in the next year (for example from G to F). An overwhelming majority of display energy certificates for the public estate have scored extremely poorly, with even relatively new buildings underperforming. CABE recommends that government should manage both supply and demand of energy, using a variety of measures such as staff incentives and smart metering.

Local government too has a strong role to play in meeting the carbon reduction commitment as laid out in the Climate Change Act 2008, and local authorities will be assessed on their progress.

The Audit Commission has reassessed and streamlined the many measures of local government performance. There are three national indicators that deal explicitly with climate change: NI 185 (percentage of carbon emissions reduction from local authority operations), 186 (per capita reduction in carbon emissions in the local authority area) and 188 (planning to adapt to climate change).

CABE recommends that 185 and 186 are made mandatory for all authorities, as they reflect the duty on local authorities under the Climate Change Act 2008, and would provide a good measure of progress towards mitigating climate change.

One way to meet NI 185 is to develop a plan of action for improving the resource efficiency of the authority's own building stock, public spaces and transport fleet. This follows on from CLG guidance *Building on Strong Foundations: A Framework for Local Authority Asset Management* (February 2008). It aims to assess how local authorities are using their assets to support the strategic aims of public well-being, and this plan of action would also deliver work opportunities for skilled people affected by the recession.

To meet NI 186, local authorities will need to show a reduction in their per capita CO₂ emissions across the business and public sectors, domestic housing and transport. In order to make real progress in these areas, local authorities must ensure that there is the appropriate infrastructure to enable people and business to make sustainable, low-carbon choices. This infrastructure could be anything from a programme of domestic building insulation to increased investment in public transport or new energy solutions.

Integrated planning

Creating sustainable towns and cities requires everyone working within government, at all levels, to think holistically about their spatial and service delivery plans. Policies for economic regeneration, public service improvement and health and well-being should be mutually reinforcing.

There is an exceptional new opportunity to bring together economic development and spatial planning with the 2008 Local Democracy, Economic Development and Construction Bill. This requires that existing regional spatial strategies and regional economic development plans be drawn together into a single coherent plan, under the leadership of the regional development agencies. CABE recommends that the new single regional strategies are not approved by the secretary of state unless the merger is successful.



© London Development Agency

'Policies for economic regeneration, public service improvement and health and well-being should be mutually reinforcing'

At a local level, authorities must ensure that transport plans, service delivery plans (local area or multi-area agreements) and spatial plans are fully integrated. CLG has issued guidance on integrating sustainable communities strategies and core strategies, but this should be extended to include transport planning. In the context of climate change, people need to be able to get to work and access local services by walking, cycling or using public transport.

Policy guidance on open space, sport and recreation (PPG17) should be revised to include new direction on the inclusion of green infrastructure. This must be not just at neighbourhood or single local authority level but across cities and whole regions, creating regional strategies and multi-area agreements. Links with other guidance should be made, particularly biodiversity and geological conservation (PPS9) and development and flood risk (PPS25).

Transport planning guidance (PPG13) is badly out of date. The traffic impact of development needs to be considered, and not just the density of vehicles but the choices available to people. This should be directly linked to PPG17 so that there are links between transport and green infrastructure. This would enable green cycling and walking routes to be part of the transport network.

It is no longer tenable to consider transport planning in isolation. If cities are to be sustainable, then traffic and car use has to be reduced, with a shift to electric vehicles, public transport, cycling and walking. The guidance should reflect this.

Jubilee Greenways

It would be difficult to overstate the vital role that green infrastructure can play in preparing towns and cities for climate change. A well-designed network of green spaces mitigates the urban heat island effect, provides opportunities for exercise, and can alleviate some of the worst effects of flooding.



© CABE/Dave Morris

So government needs to promote green networks much more boldly as an integral part of infrastructure masterplanning. A three-pronged approach is required: to improve green space sector skills; to provide the policy framework that promotes green spaces and corridors; and to raise public awareness of their value.

In London, the Jubilee Walkway Trust is developing the Jubilee Greenway. This is a 60-mile greenway that will circle London. It is expected that this will be opened in 2012 by the Queen, to celebrate both her 60 years as sovereign and the London Olympics.

The Department for Environment, Food and Rural Affairs should run a competitive funding programme to promote urban greenways throughout the country. The funding could have two phases, so cities can undertake the necessary feasibility studies before building their own greenway. Community engagement and improved biodiversity should be primary objectives from which other benefits in climate change mitigation will flow. Planning guidance should be updated to include greenways as part of flood defence planning, mitigation of the heat island effect, and promotion of public well-being, health and recreation.

High life (top): New York City's new 'High Line' linear park has been created on a disused railway line, offering cross-town views of the Manhattan skyline and the Hudson River. The park's central gathering area features stepped seating

Future model (bottom): all homes at the sustainable model district of Vauban, Germany, feature the *Passivhaus* ultra-low energy building standard. Four in 10 home owners live without cars



A call to action

If cities are a hallmark of our civilisation, then there is a long way to go before we reach the gold standard. In this recession, climate change presents us with an extraordinary opportunity to reshape our urban environments and their economies. With decisive, well-informed leadership at local and national level, we can create prosperous places that offer everyone a better quality of life. We should grab that chance now.

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Preparing towns and cities for a changing climate

www.sustainablecities.org.uk cuts through the complexities of the climate change debate, to provide expert advice, clear priorities for action and describe good practice in sustainable urban design and management.

It has been created to support the people whose job is to make decisions about how to plan, design and manage towns and cities.

There are real challenges facing those responsible for reducing carbon emissions from the built environment, and adaptation to climate change. Every town and city needs to be managed as a complex system, which means taking a cross-cutting approach to issues and assets. The key priorities, like energy and waste, need to be addressed at the right scale. Action and funding has to be prioritised, and long term decisions taken in the face of short term pressures. And finally, the benefits of climate action need to be clearly communicated – from supporting economic and social resilience, through to creating better quality places.

So www.sustainablecities.org.uk provides tailored, expert advice which is arranged around seven spatial scales, from individual building to regional. This structure is systematically linked with six critical sustainability themes – energy, waste, water, transport, green infrastructure and public space. It is designed to break down silos. You can see, for instance, how low-carbon and renewable energy technologies or transport will work across a neighbourhood.

Most importantly, this kind of integrated thinking will underpin decisions about where new homes, schools, healthcare, shops and employment should be located, and how regeneration should be planned and implemented.

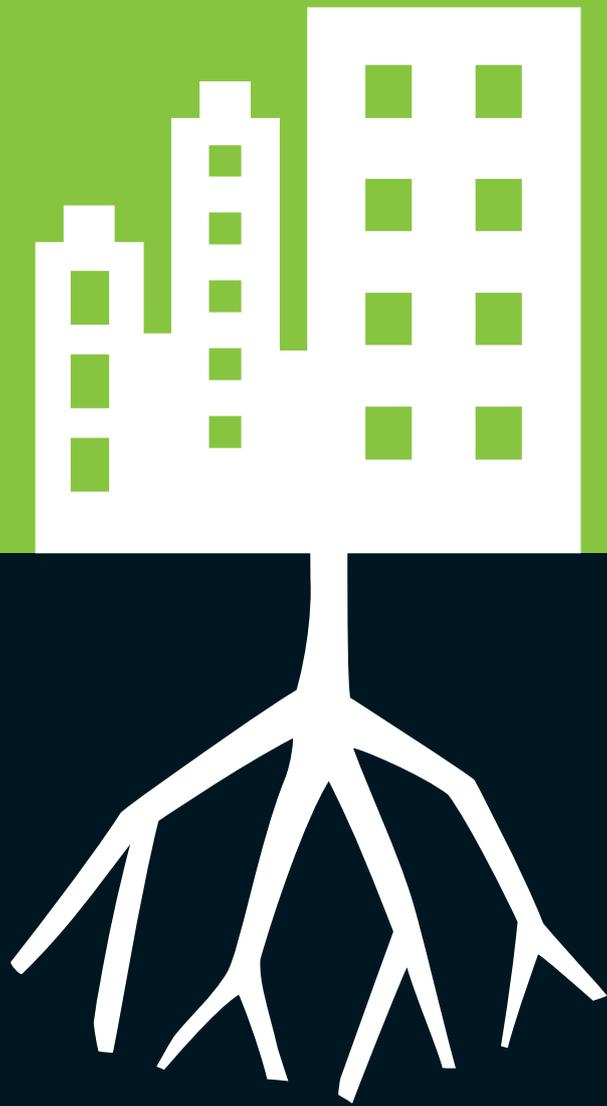
www.sustainablecities.org.uk provides an invaluable knowledge base of examples of good practice from

around the world, to help decide the right approach for your city, town, neighbourhood or site. One size never fits all when it comes to the built environment. But you can learn fast from the experience of others.

As the government's advisor on architecture, urban design and public space, CABI is helping cities and towns to become more sustainable places. To create the web resource, we have drawn on the advice of 30 of the UK's foremost built environment and sustainability experts. We also worked closely with England's eight core cities, because their experience of regeneration is highly relevant when it comes to making places more sustainable, and more resilient to climate change.

You can sign up to a regular e-newsletter that alerts you to updates.

www.sustainablecities.org.uk



Climate change is one of the world's greatest and most urgent challenges. But it also offers an opportunity to redesign how we think and organise our lives. *Hallmarks of a sustainable city* sets out the practical and policy responses to climate change that CABE believes are needed to ensure our towns and cities are genuinely sustainable places. The publication will be of interest to the people that lead local authorities – council leaders, chief executives, senior directors and heads of service – as well as national and regional government, development agencies and voluntary organisations.

CABE
1 Kemble Street
London WC2B 4AN
T 020 7070 6700
F 020 7070 6777
E enquiries@cabe.org.uk
www.cabe.org.uk

Commission for Architecture
and the Built Environment

The government's advisor
on architecture, urban design
and public space

Sustainable Cities

Hallmarks of a sustainable city marks the introduction of CABE's sustainable cities programme and a new web resource offering practical help for the people making decisions about how to plan, design, and manage towns and cities. www.sustainablecities.org.uk

