

---

**Chris Guenther** on the seven characteristics of a sustainable city **Page 2**

**Graham Chapman** explains why green energy is central to Nottingham's strategy **Page 6**

**Baron Frankal** and **Alison Gillespie** outline Manchester's innovative investment framework **Page 8**

**Sir Terry Farrell** gives his vision for future of the Thames estuary **Page 10**

---

# Insidetrack

---

## Cities: the new green entrepreneurs





---

Edited by Karen Crane

---

Designed by Howdy

---

Printed by Park Lane Press

---

© Green Alliance, March 2013

---

Green Alliance's work is licensed under a Creative Commons Attribution-Noncommercial-No derivative works 3.0 unported licence. This does not replace copyright but gives certain rights without having to ask Green Alliance for permission.

Under this licence, our work may be shared freely. This provides the freedom to copy, distribute and transmit this work on to others, provided Green Alliance is credited as the author and text is unaltered. This work must not be resold or used for commercial purposes. These conditions can be waived under certain circumstances with the written permission of Green Alliance. For more information about this licence go to <http://creativecommons.org/licenses/by-nc-nd/3.0/>



The views of contributors are not necessarily those of Green Alliance.

---

---

## Comment

---

“  
UK cities are leading, facilitating and demonstrating great enterprise by investing in low carbon, resilient place-making”

---

Mega cities have glamour and cachet - Beijing, Berlin, Bangkok, Bogota - alluring, diverse, potent. The trends set by the world's biggest cities attract interest and investment. Perhaps it is the intrigue of the partially known, but they represent something distinct from the states which host them: a perception of opportunity. It is why urbanisation is a relentless tide.

But what about the rest? What about Bristol, Bradford, Brighton and Basingstoke? Here, the issues are of a different nature and scale. But, in a dense, highly urbanised island, and with greater similarity than difference, UK cities share an aspiration to become more sustainable places and to develop greener economies.

Austerity budgeting hasn't killed this impulse, but appears to be giving it new impetus as cities seek ways to raise new income from capital investment. Despite the economic climate, UK cities are leading, facilitating and demonstrating great enterprise by investing in low carbon, resilient place-making. Their dynamism contrasts with many central government programmes which remain siloed and lacking in real drive. This issue of *Inside Track* focuses on the new leadership cities are providing.

Chris Guenther and Dimitri Zenghelis outline the opportunities that cities must seize for their local communities, economy and businesses. This means recasting relationships with national government, as we illustrated in *Green cities: using city deals to drive low carbon growth*, our recent analysis of the new city deals.

Co-ordinating delivery of critical infrastructure in the future means changing models of governance and mindsets, replacing vanishing grant funding with new investment, as Manchester's Baron Frankal and Alison Gillespie discuss.

Graham Chapman demonstrates Nottingham's political self-interest in making green energy work for the city. And, significantly, the quality of a place's future vision is illustrated by Sir Terry Farrell, who emphasises the need to place natural infrastructure at the heart of plans for London's development.

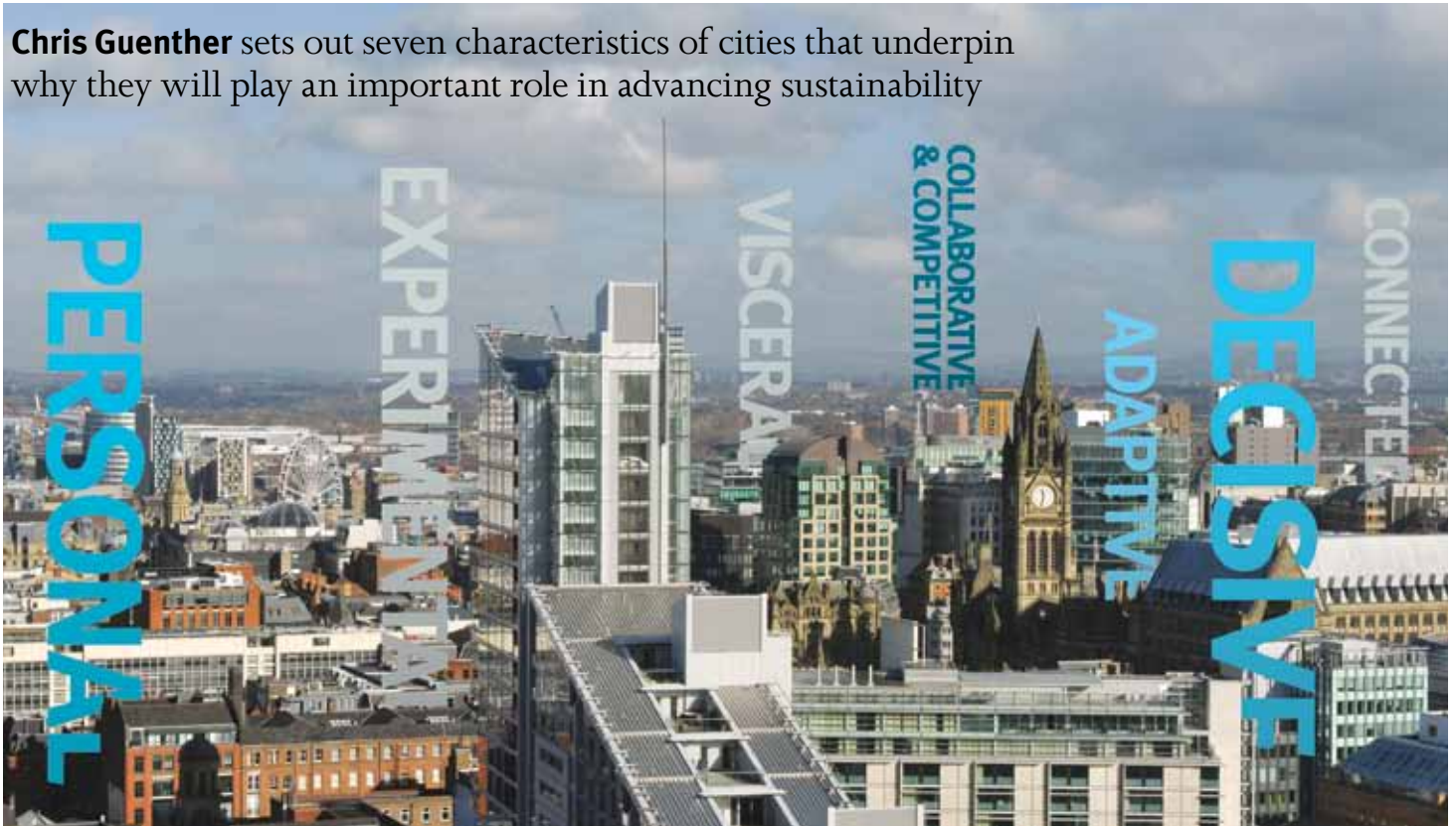
Our cities have the expertise and appetite to deliver a new wave of green enterprise. If they reach critical mass they could rebalance the UK's political culture as well as its economy.



Edward Hobson, deputy director

# Why cities will lead

**Chris Guenther** sets out seven characteristics of cities that underpin why they will play an important role in advancing sustainability



We are reminded constantly that humanity faces unprecedented challenges: climate change, resource constraints, economic volatility, over and under nutrition, widening inequality, and political conflicts that are increasingly aggravated by these issues. Yet, even as awareness of the causes and potential solutions to these challenges has never been higher, overall progress remains frustratingly slow or non-existent. Understandably, many of us have looked to national and international leaders, multinational companies, universities and other large scale institutions to provide leadership but, while their efforts have been earnest and sometimes substantial, they have so far failed to make very much difference.

It is not hard to see why this is the case. We know that to achieve global environmental, social and economic sustainability, ie to begin to permanently address or adapt to the fundamental challenges of this century, will require novel approaches to and combinations of technology, public policy and financing, and major shifts in both individual and organisational behaviour, all playing out on a global scale. But, the larger the system, the harder it is to consciously bring this about. No matter how well we understand the problems and their likely solutions, we are simply overwhelmed with too much complexity, too little feedback and not enough shared vision and trust to enable big changes to take hold.

This is one reason why we now see, and will continue to see, so much leadership and innovation emerging at smaller scales: from activists and entrepreneurs, from schools, hospitals and community organisations and, crucially, from the cities and towns they are a part

of. At the city level, the challenges play out in more specific ways, solutions are more rapidly tested and refined, and communities are better able to unite to support and adopt new ways of doing things. And what takes hold in one city often becomes a model for what is possible in others.

In early 2012, SustainAbility published *Citystates*, in which we argued not only that cities represent smaller systems within which to enact change but that, by their nature, they offer the best means for us to rapidly develop, test and replicate sustainability solutions around the world. We also explored the role and opportunity for businesses, which are increasingly expected to drive meaningful progress on sustainability, to create shared value in the context of cities.

At its core, *Citystates* posits the following seven characteristics that underpin the positive role that cities both large and small might play in advancing sustainability more widely:

## Connected

Cities offer the possibility of both physical and social connections that drive stronger communities, greater trust and more effective collaboration. 'Connected' now also refers to the way in which many cities are pushing the boundaries by digitally networking people and urban systems, leveraging enormous amounts of data culled from smart meters and smart sensors, in everything from stop lights to power grids, to drive new levels of efficiency, collaboration and economic development. The rise of the 'sharing economy', best exemplified by car and bike share services cropping up in cities around the world, is just one potent

example of the power of bringing community and technology together. As we further harness the value of such physical, digital and social connections, there is potential to enable dramatically more sustainable systems and lifestyles.

### Decisive

It is widely agreed that there is an overall lack of political will when it comes to addressing sustainable development. But that's not the headline in many cities around the world. One reason is that many mayors have direct control or influence over key sustainability levers including waste, water, transit, land use, buildings, economic development and more. Furthermore, because many challenges are more immediate and tangible in an urban context, there is greater pressure on and expectation of mayors to act. It is no wonder then that the most ambitious pragmatic efforts to address climate change, energy consumption and resource depletion are emerging from cities, rather than at the national or global level. By leveraging a global network of 'decisive cities', we may yet have the chance to circumvent some of the structural roadblocks to action on these and a host of other issues.

### Adaptive

Adaptiveness – or its now popular cousin, resiliency – will be essential to navigating a future defined by growing environmental, social and economic risks. There is something instructive then in how cities inherently grow and adapt organically over time. Certainly their evolution is the product of so many intentional actions as well, and though their adaptiveness may be inherent, there is not always enough of it to ensure prosperity or indeed survival. But, in general, cities possess energy and momentum that lie somewhere beyond our direct control and that has enabled some of them to persist for millennia. By harnessing this capacity for adaptive innovation, we can drive sustainability beyond what deliberate, co-ordinated action alone can accomplish.

### Collaborative and competitive

There is an intriguing and quite productive tension in cities' tendency to both compete and collaborate with one another. On the competitive side, cities are engaged in an escalating global war for the talent, tourists and private investment needed to drive prosperity. This is a potent driver of the public innovation and investment that shapes the essential character and productivity of any given city. At the same time, a growing number of cities, both large and small, are finding the cause and capability to collaborate, scaling up and spreading innovation, often across regional and national boundaries. More and more frequently this is in the service of sustainability. United Cities and Local Government (UCLG), C40, Metropolis, Local Governments for Sustainability (ICLEI), Cities Alliance and WeGo (World e-Governments Organization of Cities and Local Governments) are but a few examples that underscore the trend. This essential, dynamic tension between collaboration and competition has the potential to catalyse and rapidly spread sustainable innovation around the world.

### Visceral

Cities invite and inspire more rapid, effective responses to sustainability challenges, in part because their challenges are, or have the potential to be, so much more vivid. Air and water pollution, social dislocation, congestion and other urban challenges are acute and undeniable to the

populations affected by them. And when the challenges are more visible, citizens, businesses and policy makers begin confronting the same reality, and dramatically different and more effective responses are made possible. Furthermore, once a given solution has been demonstrated, and stakeholders see and experience it directly, there is vastly greater potential for it to be adopted and replicated. By understanding and enhancing cities' intrinsic advantage of natural feedback loops, we can seed the possibility for far more sustainable policy, strategy and behaviour.

### Personal

The power of identity as driven by the collision and expression of varied personal and shared values and, just as important, a sense of place is key to cities' potential. As seen recently in Cairo's Tahrir Square or New York's Zucotti Park, the city can be a touchstone for the power struggles that define our age, and which may determine the long term potential for sustainability. Meanwhile, the rise of mostly young, educated, digitally and culturally aware, and economically influential citizen-consumers is changing the political and economic landscape in many cities, and rapidly pushing sustainability up the agenda. There is tremendous potential if businesses, policy makers and civil society organisations cannot only engage citizen-consumers' core values, but also push them to take action on those values.

### Experimental

Cities often possess innate advantages for the cycle of experimentation, failure and redesign that leads to true innovation. This may include research and development ecosystems, low barriers to entry, ready markets for radically new products and services, and the ability to rapidly test and improve on new ideas in the context of real life. They also allow for more participatory innovation, where a wider array of stakeholders can help to shape the environment around any given solution, to ensure its sustainability and successful adoption. Building on and leveraging these advantages will drive more rapid prototyping and replication of sustainability solutions across cities.

With these seven characteristics clearly articulated, it can be concluded that cities are a powerful new frontier for the collaboration needed between civil society, business and government to drive sustainability forward. Cities themselves will play a critical role in setting the conditions, while businesses that adequately invest, and are sensitive to the unique opportunities and constraints that cities offer, have the chance to generate enormous social and economic returns for decades to come. There are signs that this phase change is already well underway in many cities, yet we've only just begun to understand its broader potential. It is now our collective opportunity to realise it.



**Chris Guenther** is research director at SustainAbility and co-author of *Citystates* (SustainAbility, March 2012)

# The economics of resource efficient cities

In an increasingly urban world, getting the city economy right for a low carbon, resource efficient future will enable us to deal with climate change as well as realise economic benefits, says **Dimitri Zenghelis**

Cities will be at the centre of the resource efficiency story in the coming century. They are home to half the world's seven billion population, produce 70 per cent of the world's GDP, and 75 per cent of total greenhouse gases. By 2050, 75 per cent of the world's population is projected to be living in cities. The Asian Development Bank estimates that 44 million people move to cities each year.

Cities have clearly played a major role in the creation of the problem of anthropogenic climate change and they will form a central part of any response. No effective global collaborative agreement to tackle climate change can be delivered without the full involvement of cities. Yet urban areas are well placed to lead the resource efficient transition, and benefit most directly from it.

Cities are also well placed to lead the process of low carbon innovation. They combine a mix of specialisation and diversity derived from a concentration of people and economic activity that generates a fertile environment for innovation in ideas, technologies and processes. Urban regions already produce ten times more renewable technologies patents than rural regions. They produce and distribute the resources that provide better livelihoods for urban and rural residents alike.

Cities benefit from strong action on reducing emissions and better utilising resources, through a unique mix of co-benefits. These include: increased efficiency; innovation; reduced noise; reduced congestion; reduced pollution; and an attractive environment for skilled labour, entrepreneurs and innovative firms. But cities are also vulnerable to costs of inaction, especially risks from climate impacts, such as heat, water shortages and floods. Their size and economic complexity mean that specific problems such as congestion, waste, poor access to education and crime require considered, city specific public intervention. At the same time, high population density and compactness can allow for economics of scale and collaboration.

As the world seeks to recover from the financial crisis of 2008 and the subsequent sovereign debt hangover, focus has inevitably shifted away from designing resource efficient policies. Yet delaying or postponing co-ordinated investment in resource efficiency is dangerous: the stock of greenhouse gases is rising at historic rates and the irreversible depletion of resources is set to continue. Moreover, cities risk locking in infrastructure, technologies, and behaviours that will be very difficult to reverse retrospectively. This is especially true of emerging economy cities who will be building the bulk of their infrastructures in the next two or three decades.

Greenhouse gas emissions are directly related to income. Per capita incomes are generally higher in cities than in surrounding rural areas,



generating higher average per capita demand related to major emissions sources. The tendency towards deindustrialisation in the rich world has meant some cities have increasingly exported their emissions making developed world urban areas look far better than they actually are by ignoring emissions linked to their material consumption and the embodied energy generation occurring elsewhere.

Emissions have also been associated with differences in settlement patterns, leading to an underlying tendency to lower average per capita emissions in denser, more compact cities. Consequently, some world metropolises are far more energy and carbon efficient than others, whether measured by unit output or per capita. Paris, São Paulo, London, Dhaka, Hong Kong and Tokyo have among the world's lowest levels of energy intensity: about a quarter of that of the five highest scoring cities and less than half of the average of the largest fifty cities.

Cities with limited urban sprawl and integrated urban transit systems have, in many cases, become affluent with low emissions per head. Their relative resource efficiency is mainly a result of greater transport energy efficiency due to reduced distances and greater shares of green transport modes; also of greater energy efficiency in buildings due to lower surface-to-volume ratios of more compact buildings and lower embedded energy demand for urban infrastructure, due to high utilisation. But compact, well managed cities with intelligent infrastructure can also be more attractive to footloose workers than suburban or rural communities. Inner city Paris, Rome, Barcelona and London, together with New York, Singapore and Tokyo, provide examples of creative, growing city centres with access to a variety of amenities, including green space. Hoornweg found that dense cities tend to have

lower per capita emissions, provided they are also served by good public transport systems (see 'Cities and greenhouse gas emissions: moving forward', *Environment & urbanization*, vol 23, no 1, 2011). With shorter transport networks and less diffuse utility infrastructures, denser cities generate significant savings in operating costs, running to thousands of dollars per year for the average household.

Denser cities are more resource efficient and generate significant savings in operating costs. But suburban living remains popular, especially in cities whose urban centres suffer neglect, pollution, crime and outward migration of people and wealth. So dense cities need to be carefully planned to attract the wealth creating individuals who could choose other options. Not surprisingly, cities that today are regarded as green leaders have a track record in long term and integrated planning, particularly related to land use and public transport infrastructure.

Although investing in resource intensive development may be cheaper in the short run, requiring less careful planning, it is likely to be extremely costly over the medium term and very difficult to reverse. It is estimated that people in Portland, Oregon, save US\$2 billion annually through three decades of co-ordinated policies to change land use and transport systems. Measures include modest increases in building density, light rail transit schemes and policies to encourage walking and cycling. In many European cities, recycling levels are in the region of 50 per cent of domestic waste, with Copenhagen sending a mere three per cent of its waste to landfills.

Major world cities are increasingly taking the lead in setting strong targets. Examples include New York (30 per cent cuts in greenhouse gases over 2007-30), Los Angeles (35 per cent cuts over 1990-2030), Seoul (40 per cent cuts over 1990-2030) and Hong Kong (50-60 per cent cuts over 2005-20). In China, the National Development and Reform Commission (NDRC) low carbon city project (part of 'local' 12th 5-year plans) includes major conurbations such as Tianjin,



Chongqing, Shenzhen, Xiamen, Hangzhou, Nanchang, Guiyang and Baoding. In Europe, Copenhagen, Stockholm, Freiberg and Barcelona have set testing targets.

Technological innovation will go hand in hand with resource efficiency at the urban level. Integrated technologies will help make dense complex cities work efficiently. Cities that think, adapt and evolve will learn to optimise their resources, food, energy, health, communications and climate through 'smart grids', connected healthcare, connected public safety and smarter buildings and energy management. A broadband digital infrastructure can connect people to people, people



to city systems and city systems to city systems, allowing cities and residents to respond to changing circumstances in near real time.

But the need for co-ordinated policy does not end once the infrastructure for roads, buses, railways and smart grids is in place. Policy signals must continue to ensure sustainable behaviour and management. Pricing the externality is necessary to harness the power of markets, limit transaction costs and address numerous market failures. This can be done through carbon pricing, via tax or trading, or, implicitly, through regulation. Bringing forward lower carbon technology, funding research, development and deployment, and overcoming information barriers to reduce waste and inefficiency, must also form part of the policy set. Finally, policy must be integrated and coherent. This means policies must be coherently planned, for example, efficiently reducing congestion and emissions requires complementary measures on public transport, cycling, electric and shared vehicle infrastructure, urban planning, zoning and carbon pricing.

We are at a crossroads: inaction will reduce citizen welfare, increase costs and insecurity and will eventually risk urban catastrophe. Resource efficient growth is the only sustainable, long term option. A strong move now to low carbon cities can bring a new era of progress, induced innovation and prosperity. Credible long term policy can reduce uncertainty in recession and generate profitable new markets by leading the race to supply a resource constrained world. The choices made in cities today on transport, infrastructure, buildings and industry, will determine the technologies, institutions and behaviours they lock into and, more broadly, whether mankind can both manage climate change and capture the benefits of resource efficient growth.



**Dimitri Zenghelis** is a Green Alliance associate. He is senior visiting fellow at the Grantham Research Institute at the LSE, associate fellow at Chatham House and senior economic advisor to Cisco's long term innovation group.

# Green at heart



Enlightened self-interest is working as an approach for Nottingham, which has put green energy at the heart of its long term growth strategy, says **Graham Chapman**

Two to three times a week I cycle to work, not primarily to reduce my carbon footprint but because it helps me to keep fit and saves money. I have solar panels on my house because the financial rate of return is far higher than I get in a savings account. I am also pleased that a by-product of these two acts is a reduction in my carbon footprint.

This is the philosophy behind Nottingham's approach to the environment: enlightened self-interest, and, on the whole, it works. In particular, it explains why the main thrust of the city council's approach to carbon reduction is to concentrate on energy production and consumption because this is where a green philosophy and self-interest most readily coincide.

The reasons are quite simple. First, energy use is a major part of commercial and industrial costs. At a time when profit margins are tight, turnover is flat and prices are rising, it becomes all the more attractive to reduce energy use. In planning terms, for example, we are finding it easier to talk to developers about planning conditions which involve alternative energy sourcing because they know it affects the bottom line.

Security of supply is important. The bigger firms, such as Boots, tend to think in decades and recognise not only that there may be a peaking of oil and gas supplies, but also that the geopolitics of sourcing make supplies highly unstable. It is for this reason that we are working with Boots to find alternative energy sourcing in their enterprise zone.

The council is also concerned about poverty, particularly because the imminent benefit cuts coincide with an unprecedented rise in domestic energy costs. We have, therefore, carried out large scale insulation projects in both private and social housing. More recently we have promoted programmes of internal and external cladding of homes without cavity walls and one of the most extensive domestic solar panel projects in the UK.

Green investments are also a source of income. Currently the interest rate on council lending is less than one per cent. Moreover, all local authorities, but particularly those with the most deprived populations, are suffering from government cuts. For these two reasons we need to make the most of our reserves and historically low borrowing rates.



We already identified solar panel investment last year as a lucrative investment source giving a seven per cent rate of return. However, we are also looking to invest the value of a landholding to encourage the construction of a gasification plant. This will produce sustainable energy for the area, recycled materials and even some manufacturing, but also at a better rate of return for the council than from investing the capital receipt, which brings us onto waste disposal.

The cost of landfill is rightly rising. Already Nottingham is benefiting from reduced waste disposal costs given our interest in the district heating plant. Expansion of energy generated from waste capacity within the city will provide a low carbon solution, insulate us against rising energy prices and effectively remove waste from landfill.

Jobs are another factor. Getting people into jobs is our top priority, yet Nottingham's labour market is unbalanced. We have a supply of graduates from two successful universities and a supply of people with basic qualifications. What we don't have is a sufficient supply of skilled non-graduates. Sustainable energy is one of the four key sectors the council has designated for growth, with the potential to supply jobs at all levels. To this end we are supporting the development of a sustainable construction academy at one of the further education colleges; we are trying to ensure that projects with council involvement and, in particular, in district energy, take on and train local labour by subsidising apprenticeships through the council's own jobs scheme. We have also set up an investment fund to encourage fast growth firms, many of which will be in the clean technology sector.

## “Sustainable energy is one of the four key sectors the council has designated for growth, with the potential to supply jobs at all levels”

We have a strategy aimed at creating a hub for green technology and providing the supply chain which will result in local jobs. Extensive research is being carried out in the city. E.ON and the University of Nottingham are collaborating on a new generation of super battery to improve energy storage, and batteries used in hybrid vehicles are being developed for domestic energy storage. We have also created a technology investment fund directed mainly but not exclusively at bio, health and green technology.

Transport development is a priority for Nottingham, which is probably the foremost transport authority in England. The city has a high public transport usage, reducing energy consumption. We have supported this policy because reducing car dependency and encouraging public transport use makes social and economic sense. The reduced carbon emissions are a happy by-product. Thus, the council-owned bus company Nottingham City Transport, which has recently been named Bus Operator of the Year, runs new low emission buses and has seen customer growth in ten out of the past 11 years. We have kept it in public ownership simply because we can guarantee continued investment in the service as well as the social benefits it can provide. It also gives a financial return to Nottingham's council tax payers.

The tram has shown similar success and we are developing two further lines. The aim is to develop a network across the conurbation.

We are considering the possibility of powering it from the district heating system and using its braking energy to generate electricity.

Finally, Nottingham is only the second authority in the world to introduce the workplace parking levy. There are signs of reduced car usage as a result. But this was not the primary purpose. It was intended to provide a revenue stream to pay for subsequent lines of the tram and for the green buses which service the workplace and hospital sites in the city.

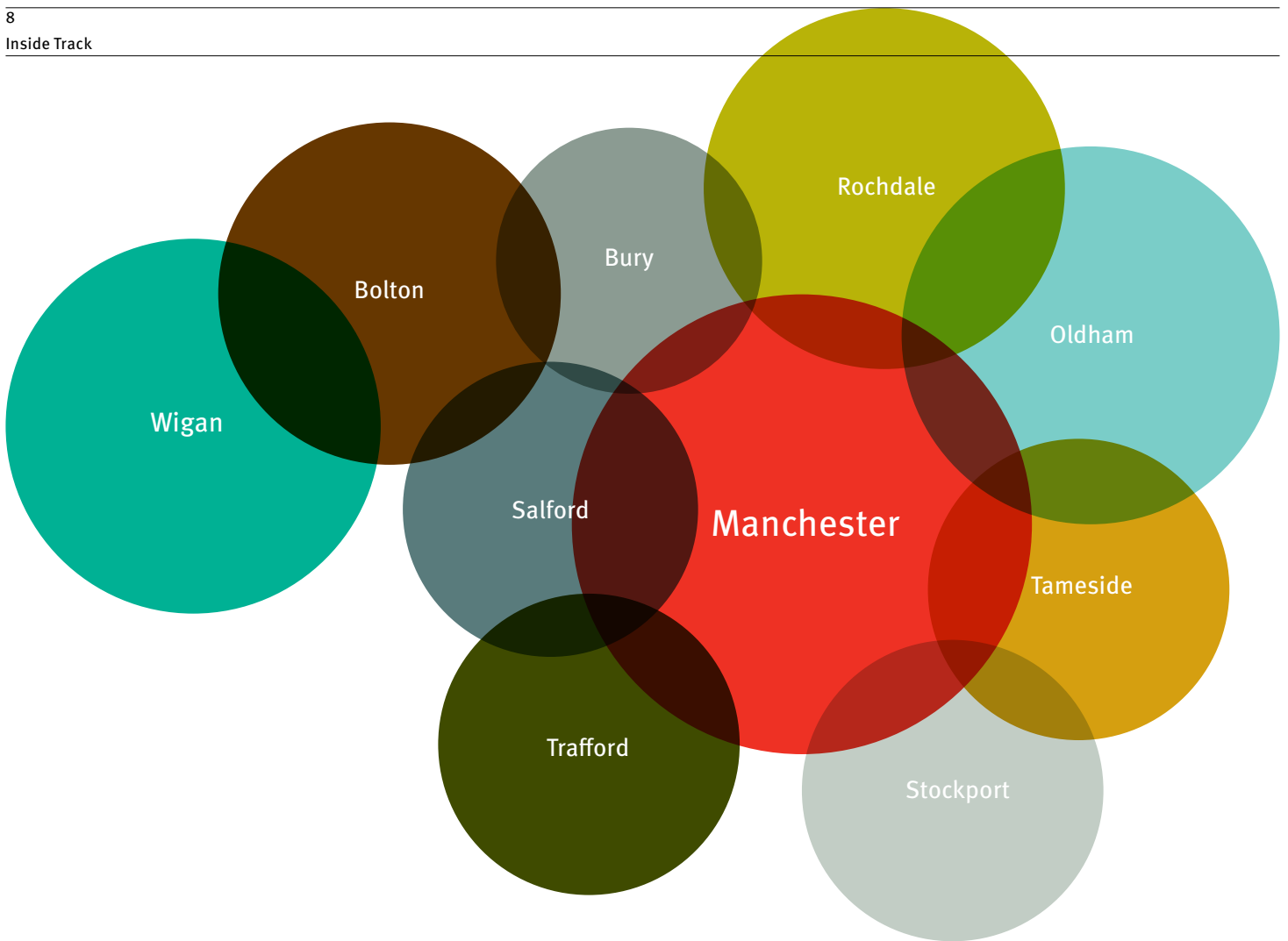
These are the pieces of jigsaw which make up a coherent whole. Jobs are the top priority for Nottingham because they provide social cohesion. Green energy is key to creating the competitive sustainable environment which will help maintain employment but it also provides a range of jobs to which different sections of the Nottingham population can aspire. It provides an opportunity to elevate the level of skills in the city. Efficient energy consumption in transport helps decongestion, making the city, in turn, a more efficient place for job creation. Our energy strategy also helps to solve part of the problem of waste disposal. Moreover, the cost of energy in general is such that green energy generation provides a return on investment for the council.

But all in the garden is not totally green. It may be laudable that Nottingham is the most energy self-sustaining city in the UK. But this achievement pales into insignificance when compared with best practice outside the UK, for example in Germany, and when compared with what is possible. We still have much to do. The district heating system could be far more extensive than it is. Although there are many groundbreaking green initiatives, we have not yet developed a coherent cluster. We also suffer from the British disease of not transferring innovation effectively into local production. There are still large numbers of properties, especially those owned by private landlords, which are not properly insulated; and there are skills and investment shortages in the sector. And vacillations in government policy are making long term planning difficult.

But what we have recognised, as indeed the Germans did long before us, is that green energy is at the centre of a virtuous circle of enlightened self-interest and, as such, is an essential part of our city's long term strategy.



**Councillor Graham Chapman is deputy leader of Nottingham City Council and portfolio holder for economic development, resources and regeneration.**



## Breaking out of the grant cycle

Most public sector projects have been funded in the past through grants, but this route is increasingly unavailable.

**Baron Frankal** and **Alison Gillespie** describe how Manchester is responding with a different, more market-oriented mindset

**G**reater Manchester is good at blowing its own trumpet and has rightly been lauded for the way it has managed through the financial crisis. The controversial Manchester Independent Economic Review set the way forward for its sustainable economic growth and it has built a consensus around the Greater Manchester Strategy. There was a difficult political journey in laying the strongest foundations for governance, with the founding of the UK's first statutory combined authority, as well as its local enterprise partnership. The city continues to develop tools to implement its ongoing development, such as the Integrated Greater Manchester Assessment, the 'Manchester model' of cost benefit analysis, which is the backbone of the various community budget initiatives, and current work on data sharing. Here, we concentrate on one of the most important tools developed: Greater Manchester's investment framework.

In terms of evidence base and methodology, the investment framework exhibits best practice in the areas you would expect, but its most important element is that its basis is investment. It sounds startling but it is actually a radical departure that the fund, which includes money from the Regional Growth Fund (RGF) and Growing Places, operates on the basis of a sound return over a sensible period. It is also highly strategic, investing in deliverable, value for money projects that have the greatest economic impact, meaning long term, sustainable economic growth that increases productivity and creates jobs. Much of the framework is about developing those projects, to get them investment ready more quickly and to suit today's strained financial circumstances.

Recognising and supplementing the investment framework was an important part of the city deal for Greater Manchester. The deal put in train several steps towards empowering this 21st century version of the city, to make more decisions on how to maximise its economic

growth. The agreements were geared towards accelerating growth, boosting skills and increasing international activity. On the investment side, the solid and statutory basis of the co-operation between the ten local authorities vested in the only combined authority in the country put Greater Manchester in a unique position. As Lord Peter Smith, the Greater Manchester Combined Authority's chair said: "These agreements on the Greater Manchester city deal taken together will have a huge impact. Our innovative new funding model has challenged orthodox thinking and means we can press forward with much needed investment in transport infrastructure which will play a vital role in helping our economy realise its potential."

## “Because things will get worse, not better, political courage is needed to drive efficiency further and faster to build up funds to support and invest in private sector-led growth”

The broad economic forecast is not positive and, in the mix, there is medium term stasis in terms of reduced credit, private borrowing and real estate values likely to continue to depress demand in key areas, including property and construction. This will only increase the pressure for public sector counter-cyclical action to drive economic growth, even as the fiscal room for manoeuvre continues to decline. Put simply, because things will get worse, not better, political courage is needed to drive efficiency further and faster to build up funds to support and invest in private sector-led growth.

Crucial in making this sustainable is that investors, Greater Manchester in this case, can capture and keep more of the proceeds of growth that successful investment creates, for example through business rate retention. The reordering of local government finances in this direction should have a strong incentivising effect that skews such investment towards GVA (gross value added) and business rate-generating development, nearer to where the market actually is. New homes bonus, the community infrastructure levy, council tax and income from tax increment financing or enterprise zones are all long term revenue flows that can help contribute to the cocktail of funding projects needed to make them viable.

Genuine progress, that this way forward is both viable and goes with the grain of government policy, is shown with the 'earn back' model, which was agreed in the city deal. This outlined a radical deal where the government agreed, in principle, that up to £1.2 billion invested upfront by Greater Manchester in infrastructure improvements will be paid back to the combined authority when additional and evidenced economic growth is seen. This is the first tax increment finance style scheme in England outside London. These earned back funds will be reinvested in further infrastructure improvements to allow Greater Manchester to reach its economic potential. The first phase will enable the early implementation of schemes like the South East Manchester Multi Modal Strategy (SEMMMS) and the extension of Metrolink to Trafford Park.

Manchester's investment framework continues to develop these elements and has established a solid track record in terms of attracting

capital, drawing on RGF, Growing Places, the Greater Manchester Transport Fund and the European regional Evergreen Fund. This is a highly innovative model, better geared than most to current conditions and based on a presumption that current fiscal circumstances are here to stay. It is under these conditions that investment must still be stimulated and facilitated. Available public funds need to be used strategically with high leveraging. In particular, opportunity exists for projects that are ultimately commercial but not immediately fundable, where bridging the gap helps the private sector take up economic capacity faster than it otherwise would. The funding is usually quickly recycled, so it can be used again and again, and the need for private sector capital provides a real market test of whether the presumptions made about return are robust.

A recent addition to the stable is an evolving partnership with UK Green Investments (the Green Investment Bank), another outcome of the city deal. This 50/50 joint venture is to animate and invest in a strong pipeline of low carbon projects, and so develop a portfolio of low carbon assets, levering in significant extra funding and unlocking finance to accelerate their development. Greater Manchester has committed its own resources and expertise to a low carbon hub, as a demonstrator for this and other central government programmes and pilots which, as well as contributing to long term sustainable economic growth, are designed to reduce carbon emissions.

## “Greater Manchester has committed its own resources and expertise to a low carbon hub”

Although early and experimental, this investment framework is nonetheless a good case study for others in terms of making the painful but necessary shift from grant to investment funding, and from what is seen as necessary to what is actually possible. Underlying and decisive factors in this case are the governance foundation being unitary and statutory, and the economic area being cohesive and large enough to manage displacement internally to a significant degree. This enables deals like earn back to mitigate government concerns. A strong, wide and internally consistent evidence base is also important, as is the strategic assessment framework attached to it. The same models can be used when considering investment, in transport, employment sites or housing. As the approach reaches maturity and critical mass, and focus moves to revenue and areas such as low carbon, there remains much work to be done to build on its early success, but a solid start has been made.



**Baron Frankal** is director of economic strategy and **Alison Gillespie** is senior analyst at New Economy, one of the six Association of Greater Manchester Authorities (AGMA) commissions. Its purpose is to create economic growth and prosperity for Manchester. Find out more at [neweconomymanchester.com](http://neweconomymanchester.com)

# The Thames estuary: London's green engine room

Sir Terry Farrell offers his vision for the development of the Thames estuary



London is under immense stress, with the Greater London Authority (GLA) predicting, and planning for, another 1.25 million people living in the metropolis by 2031. That's an additional population the size of Birmingham. Even with the regeneration of these post-industrial corridors, space in London is getting scarce and its infrastructure is under increasing strain.

With the highest return on investment for public and private sectors, and the highest gross value added (GVA) per capita, growth in London and the greater south east is critical to the UK's future prosperity. But where is the space for this growth to happen? And how can we create the infrastructure that it needs in a sustainable and resilient way?

The answer is to rediscover and re-evaluate the natural order that underlies London. London has long had a symbiotic dependence on the Thames and its tributaries, as natural providers of food, transport, and power, as conduits for waste and sewage and, last but not least, as routes out to the countryside. Today, London is ever more reliant, socially, physically and economically, on the Thames estuary for this complementary natural infrastructure.

An integral, downstream part of the metropolis, the estuary has gradually been reclaimed from the sea and is where true globalisation started: navigation and exploration of the world began in places like Greenwich, Woolwich and Chatham. The large docks, once located in east London, gradually moved out along the Thames to Tilbury and Medway. The Thames estuary has been the engine room of London. A place where waste is discharged and power generated. Almost ten per cent of the nation's power is still generated here. Centuries of place based economic activity has united into a coherent human landscape.

The estuary has the region's greatest potential, with its open green spaces and natural features and a local appetite, amongst unitary and county councils, to invest in and deliver sustainable economic growth.

Along the Thames, from Tower Bridge through east London and onwards downstream, I am convinced that place-making, or making somewhere with a distinct identity, is the key to this transformation. With at least 1.5 million people living in a rich and diverse constellation of places, we must recognise the importance of this diversity, and support their growth and regeneration.

This coherence provides a basis for a strong economic rationale for the future. The region supports successful economic sectors, including business and financial services, particularly in east London with major potential for new environmental industry: the London Array windfarm alone will provide enough sustainable power for 750,000 homes. There

“

**The big idea is not a single mono-manic project but, rather, an overarching vision with landscape as the primary infrastructure”**

is much inward investment, with built and planned new infrastructure: from the Jubilee line and Docklands Light Railway, to the Channel Tunnel Rail Link, and with Crossrail and maybe another airport on their way. And there is extensive brownfield land in accessible locations to support new infrastructure. The first ship has already docked at the major new port at London Gateway, with full opening by the end of this year. There is more potential for growth than in the pressured centre of London, in existing and new communities and in commercial centres, all within a high quality, biodiverse landscape. By basing growth and regeneration around these assets, the perception and economic prospects of the Thames estuary can be transformed.

I am often asked what the 'big idea' is when questioned about a vision



photo: Dae Sasitorn/www.lastrefuge.co.uk

of this nature. Here, in this 80 kilometre long estuary, the big idea is not a single mono-manic project but, rather, an overarching vision with landscape as the primary infrastructure; one that is fundamental to creating a sense of place and a feeling of belonging. If this vision of a coherent, connected landscape is the picture on the box, then the pieces of the puzzle are the myriad regional, local and community schemes that the public, private, and civic sectors are already beginning to realise.

There have been many attempts to provide greater spatial connection. The Thames Gateway proposals, under the former Deputy Prime Minister John Prescott, precipitated a joining up of planning activity across the region with one result being the Thames Estuary Parklands initiative. The focus on the region's green infrastructure, its green spaces and rivers, was vital to ensure new development was sensitive to its context.

As I put so much emphasis on landscape as the primary infrastructure, I was heartened by the government's recent announcement that the Thames estuary is to be one of 48 local nature partnerships (LNPs) established across England. I have always passionately believed that regeneration of the Thames estuary should begin with the landscape, its most outstanding and unifying feature. Long recognised by poets, painters and writers, including Hopkins, Turner and Dickens, the estuary is a natural and beautiful landscape of wetlands, marshes and mudflats, a landscape of sufficient quality to compare with the national parks.

The ambition for LNPs is that they will help to manage the natural environment as a holistic system, embedding its value in local decisions for the common benefit of nature, people and, not least, the economy. To do this, they will need to be self-sustaining strategic partnerships of a broad range of local organisations, businesses and people, with the credibility and, indeed, clout to work with and influence other local decision makers. Effectively the Thames Gateway LNP will crystallise the partnership working that has already been quietly taking forward

both the vision and the reality of the Thames Estuary Parklands initiative.

What is not widely understood is how much progress there has already been on the ground, with great strides being made in transforming the perceptions of place and the quality of life. All over the estuary, new, high quality landscapes – such as Erith Marshes and the Dagenham Washlands – are being created, which will have lasting impact on the environmental, social and economic potential of the region.

These initiatives, whether macro or micro, are slowly but surely contributing to a connected landscape infrastructure, a network of strategically planned, high quality green spaces and other environmental features. Over time it will meet the eastward extension of the excellent Green Grid planning initiative in east London by the GLA and Design for London.

The broad political concord about the vision is striking. I see the choice of the Thames estuary as one of the first LNPs as recognition of this, and as a soundly based vehicle for the holistic vision, informing and guiding hundreds of local interests. It reflects the balancing of demands of the broader region while ensuring that natural qualities continue to shape the opportunities for the future.



**Sir Terry Farrell** is a renowned urban designer and architect. He is the design adviser to the Mayor of London and design champion for the Thames estuary. [www.terryfarrell.co.uk](http://www.terryfarrell.co.uk)

# Cities take centre stage

**Edward Hobson** reflects on the city deals of 2012 and what they tell us about how UK cities can deliver green economic growth

The signing of the first city deals last year was but one tentative step to recast the relationship with between cities and the centre. The UK's major urban hubs have been given decision-making powers, devolved funding and new financing models, in return for drawing up growth plans.

Eight city deals were agreed in July 2012 with Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield. A further 20 cities are lining up to do the same in a second wave of deals this year.

The question concerning us at Green Alliance was whether cities would use the deals as an opportunity to make progress on their stated low carbon aspirations. Not because it was requested by government, or even because it was appropriate policy, but because all the evidence shows it makes good economic sense in the long term.

Broadly, our analysis *Green cities: using city deals to drive low carbon growth* found the deals played to local strengths and there was clearly a low carbon economic imperative. Cities with proud industrial traditions have ensured that new investment is secured for emerging markets. Newcastle and Liverpool have both concentrated on building their offshore energy industries, with Newcastle aiming to secure £500 million in investment and 8,000 jobs; and Liverpool has planned for £100 million in investment and 3,000 jobs in the sector. Sheffield has worked on ensuring it benefits from new investment in nuclear by upskilling the manufacturing base.

Energy initiatives were common to all of the first eight city deals, specifically in relation to the Green Deal and local energy initiatives, notably around heat. Birmingham, by virtue of its size, used its city deal to net an additional £3 million for its Green Deal programme. This is one of the largest Green Deal initiatives from a public authority and it reflects the need for cities to co-ordinate improvements at scale for communities, rather than rely on individuals and the market to instigate change.

The deals showed a growing appetite for investing in a variety of district heating schemes across the cities. For instance, Sheffield and Nottingham have both planned expansions in district heating systems, the latter focusing on the regeneration of its Creative Quarter. Clearly, after decades of knowing the potential of combined heat and power, its viability is improving, and now local expertise is potentially moving ahead of national policy in realising the deliverability of the Renewable Heat Incentive.

The game changer is the extent to which the deals are helping to set cities up to better attract investment and capture subsequent value. Birmingham, Bristol, Sheffield and Leeds all developed new ventures for pooling and leveraging investment funds. Manchester, for instance, created a 50/50 joint venture to develop a portfolio of low carbon investment options for the Green Investment Bank. This shift reflects a broader necessity, to move from reliance on state funding for infrastructure investments to reconsidering how local government generates new revenue and recreates a role for itself.

Looking ahead, the cities involved in the wave two deals are being encouraged to focus on a single initiative, so the question of how they can frame their priorities with a focus on low carbon growth, and embed means of achieving progress across their deal, is a pressing one. City deals are becoming a significant way of 'doing business' with government, making them a good channel for cities to speed up progress on their existing commitments to low carbon and resource security goals.

From a government point of view, city deals offer a significant opportunity to develop productive new relationships. Cities have a huge amount to offer central government departments, like the Department of Energy and Climate Change and Communities and Local Government, in understanding how retrofit or heat network objectives become realities on the



ground, allowing these ambitions to be realised at the city scale. Cities are also enthusiastic about this opportunity and the deals process can be capitalised on as a new way for cities and the centre to work together on tackling climate change and achieving low carbon growth. There is a wealth of expertise being built up in our cities, the question is how to harness it for the benefit of moving further and faster across the whole of the UK.



**Edward Hobson** is deputy director of Green Alliance and leads our work on cities. [ehobson@green-alliance.org.uk](mailto:ehobson@green-alliance.org.uk)

# Transforming tower blocks

With more concerted action, existing tower blocks could become the sustainable homes of the future, says **Hannah Kyrke-Smith**



**T**ower blocks are a familiar feature of the urban landscape. Their compact nature offers great potential to support residents in greener lifestyles. New blocks are built with this in mind but most of those built in the past weren't designed this way. Pulling them down and replacing them is an option but, to transform cities into sustainable places at the same time as meeting pressing housing needs, there is a need to make the most of what is already there.

Last year, with the support of The City Bridge Trust, we decided to find out what would be needed to make existing tower blocks into resource efficient, better connected places to live. Following workshops with residents in three London estates, and interviews with stakeholders across the country, we published our conclusions in *Towering ambitions: transforming high rise housing into sustainable homes*. We also produced a toolkit, *A better place to live*, to help high rise residents take action themselves.

We found inspirational examples of action across the country, including meeting communal energy needs through low carbon generation, dealing with waste, water efficiency, green spaces, and improving sustainable travel choices.

Despite the potential, most policies to encourage greener behaviour are designed with street properties in mind, meaning that tower blocks are missing out on opportunities. For example, the new Green Deal scheme helps householders afford insulation and double glazing, but doesn't help tower block residents who want to install measures in their own flats. Smart meters make it easier for householders to monitor and reduce their energy use, but when they have to be sited in the basement of a block, communication becomes a problem.

So what can be done to improve things? There are opportunities in dealing with waste, water, transport and green spaces, but we found that the greatest potential for change is in addressing heating and energy challenges. Housing providers and energy companies could work together, using the Energy Company Obligation (ECO), to finance whole block retrofits. This would help energy companies meet their ECO targets cost effectively and, at the same time, make retrofit more affordable for housing providers. Energy companies could also prioritise tower blocks as exemplars for their smart meter trials, ahead of the national roll out. And the government could

integrate tower blocks into its proposals for heat networks, explicitly encouraging city decision makers to include them in their low carbon district heating plans.

Residents, housing providers and others we spoke to showed there is huge potential and enthusiasm to make these changes. And, whilst they won't happen overnight, with sufficient support and better targeted policies and initiatives, existing tower blocks could yet prove to be sustainable homes of the future.



**Hannah Kyrke-Smith** is policy adviser at Green Alliance. She is working on the next phase of this project, focusing on specific energy challenges for tower blocks and their communities, also supported by The City Bridge Trust. [hkyrke-smith@green-alliance.org.uk](mailto:hkyrke-smith@green-alliance.org.uk) Follow Hannah on Twitter at [@hannahks1](https://twitter.com/hannahks1)

# The new normal

With the Circular Economy Task Force, we're looking at how we can keep resources circulating in our economy and reduce business risks. **Dustin Benton** describes the reasoning behind the work

**W**hy should we redesign our economy to be more circular? For an environmentalist, the reason is obvious: there is no waste in nature: all ecosystems are circular. In contrast, the consequences of a linear economy are pollution and habitat destruction. But there are good instrumental reasons too, and these have driven the resurgence of interest in the circular economy, a major focus of Green Alliance's current work.

The first, and oldest, reason is the 'premium product dividend'. A substantial, and growing, number of consumers value environmental benefits enough to either pay

“**The value of designing out waste ranges from £53 billion for the UK alone, to trillions across the global economy”**

more, or actively choose products which produce better environmental outcomes. This is part of the reason consumer brands are increasingly investing in circular, resource efficient business models.

The second reason is the 'free money' that companies can capture by using resources that are currently wasted. Analyses by McKinsey, Oakdene Hollins, and others show that the value of designing out waste ranges from £53 billion for the UK alone, to trillions across the global economy.

The third reason is supply risk. Demand for all raw materials is growing rapidly as the population grows and less developed countries catch up with western lifestyles.

Rising demand is coupled with reduced availability across a range of materials. Metals like copper, zinc, and nickel are being found at lower and lower ore concentrations, while rare earths, precious, and other specialty metals already require vast quantities of energy and water to extract.

Even where raw materials are relatively abundant, as is the case with fossil fuel derived plastics or biological materials like wood, the ecological cost of extraction is rising: the reputational risks of Arctic oil, shale gas and tropical hardwood production spring to mind.

We've had resource crunches in the past, and these have been overcome by technology. But technological revolutions have also had a dark side: they've shifted constraints from one environmental limit to another. The industrial revolution traded limited muscle power, constrained by land available for food production, for much more abundant fossil power, but at the cost of local habitat damage, water and air pollution, and climate change. The green revolution traded limited naturally occurring nitrogen, phosphorus and potassium for much more abundant fossil fuel-derived ammonia and mined phosphorus and potassium, but at the cost of eutrophication, biodiversity loss, ozone depletion and climate change.

By shifting burdens from one domain to another we have continued to prosper, but evidence from earth systems scientists now suggests that we are now close to, or exceeding, multiple environmental boundaries. This limits our ability to solve resource constraints by throwing more

energy, water, or land at a problem because these resources are linked, and there is much less slack in the system. As our resource demands have become global, so have our impacts across interdependent ecosystems.

It's not just ecosystems that are at risk, environmental impact is increasingly a problem for business. Over 50 per cent of accountants surveyed by ACCA now identify environmental impact as part of their business risk evaluation. A similar survey by IDC showed that 61 per cent of chief

“**Over 50 per cent of accountants surveyed by ACCA now identify environmental impact as part of their business risk evaluation”**

financial officers have a strong interest in tracking and measuring their company's impact on the environment, based on a belief that measurably reducing environmental impact will be a competitive factor for global companies. This reflects both consumer concerns and the recognition that environmental impacts underpin material price volatility.

With the Circular Economy Task Force (CETF), we are working on how these risks might be measured and then managed. We know that reused materials and redesigned products and services have lower environmental impacts and, consequently, are much less exposed to material security



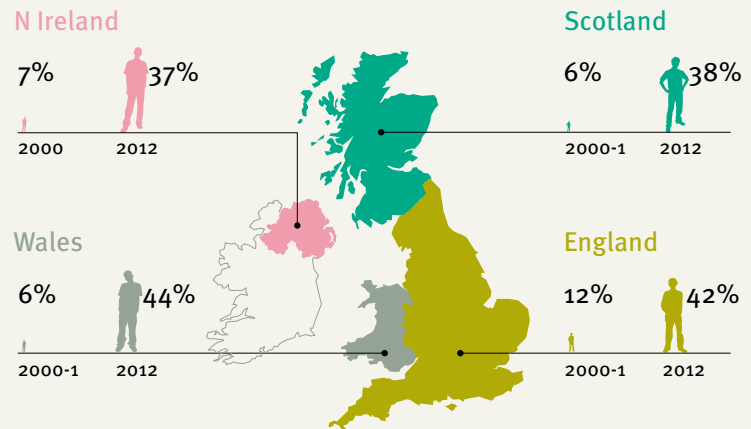
## How much money could the circular economy save?



risks. Smart companies looking for green growth have already recognised this and are actively working out how to adapt their business models.

Unfortunately, as with climate change, simply understanding that there is a problem, and that it can be managed, may not be enough. A circular economy will require much greater supply chain co-ordination, with companies involved in resource production, product design, retail, and resource recovery collaborating to keep materials in circulation, rather than ending up as waste. The CETF members represent companies across the supply chain, to help understand how to make this co-ordination the new normal. Over the next six months we will be identifying the barriers to collaboration, and recommending how business mindsets, regulation and incentives could change to make a circular economy happen.

## How well is Britain doing at household recycling?

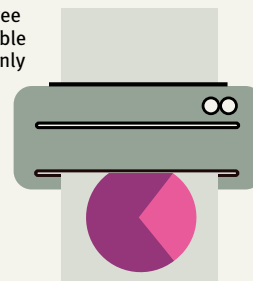


**Dustin Benton** leads Green Alliance's Resource Stewardship theme.  
[dbenton@green-alliance.org.uk](mailto:dbenton@green-alliance.org.uk)  
 Follow Dustin on Twitter at [@dustin\\_benton](https://twitter.com/dustin_benton)



## Reducing materials use and energy

Kyocera's cartridge-free printer uses a recyclable cassette containing only toner

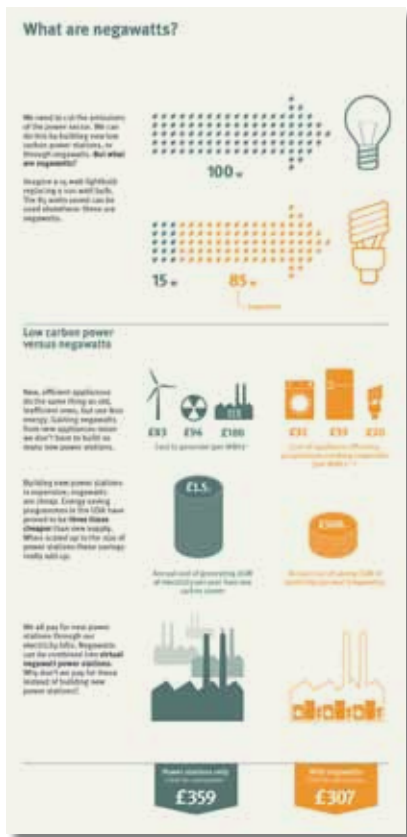


Improved design = 90% reduction in consumer waste

Smaller, smoother toner particles = 30% less toner = 30% less energy

# The power of negawatts

**Rachel Cary** explains why reducing electricity demand has to be an essential part of the Energy Bill



Extract from *The power of negawatts* (October 2012)

The government is currently in the midst of a long process to reform the electricity market. Much attention has focused on whether it will deliver a package that meets its three objectives: maintaining security of supply, cutting carbon and reducing the cost to the consumer. Reducing demand for electricity would help with all three but, to date, the focus of the reform has only been on bringing forward new sources of electricity. We now need to make sure that the Energy Bill, currently being debated in parliament, not only pays for new low carbon power but also helps people to save electricity in their homes, schools and businesses. Increasing efficiency will also provide jobs and attract economic investment for the long term.

Green Alliance's work over the past two years has led government to reassess its entire policy framework to reduce electricity demand. The government has commissioned independent research which shows that there is potential to reduce electricity consumption by 146TWh by 2030 (compared to a total demand of around 370TWh today) but relying on existing policy is only likely to deliver 37 per cent of these savings at best.

Our early analysis of the electricity market reform process, which will be put into place by the Energy Bill, showed a glaring gap: no measure to reduce electricity use, only incentives for the production of low carbon power. But, there are ways government could help and the Department of Energy and Climate Change is now considering a number of financial incentives for electricity saving, set out in the Electricity Demand Reduction consultation that closed at the end of January.

As we showed in *Creating a market for electricity savings*, published with WWF in October 2012, countries around the world have been using innovative policies to incentivise different types of electricity user

to use less electricity. Electricity saving programmes in the USA include those offering rebates on efficient appliances; replacing appliances for free (usually for low income consumers); replacing motors and lighting in factories; or using behavioural insights and comparing consumers' energy habits to their neighbours, encouraging them to use less energy.

International experience has shown that these policies deliver real reductions in electricity use, reducing the need for new power stations. In some cases electricity saving projects, used to buy time before a transmission line could be upgraded, were so successful that planned upgrades never happened.

We are delighted that government is finally taking electricity demand reduction seriously and is looking at new financial incentives. The Energy Bill now needs to be amended so that it allows for the introduction of an electricity efficiency feed-in tariff (FiT) to pay for projects that reduce electricity use (ie produce 'negawatts'), similar to the FiT already given to renewables.

Green Alliance will continue to work with others to build support for this amendment so the UK doesn't miss out on this unique opportunity to ensure that the electricity reforms are a good deal both for consumers and the environment.



**Rachel Cary leads Green Alliance's Low Carbon Energy theme. Read *Creating a market for electricity savings* and our infographic *The power of negawatts* at [www.green-alliance.org.uk](http://www.green-alliance.org.uk) [rcary@green-alliance.org.uk](mailto:rcary@green-alliance.org.uk)**

## Introducing our chief economist



Former economic adviser to the European Central Bank (ECB), **Julian Morgan** joins us in April as our first chief economist.

An experienced macroeconomist, Julian started his career in the government economic service. He then worked for the National Institute of Economic and Social Research before spending 14 years at the ECB, in charge of work on econometric modelling and analysis.

We're delighted that Julian will be bringing this experience right to the heart of the debate around the green economy. He will establish a centre for sustainable economics at Green Alliance, leading our work to assess the UK's performance in making the economy greener and helping us to generate new economic insights on resource stewardship and climate security. We are grateful for the support of the Esmée Fairbairn Foundation in establishing this role.



**I am delighted to have the opportunity to lead this important programme of work at Green Alliance. As a macroeconomist I have always believed that the best policies are guided by a similar principle of sustainability that also applies to environmental policy."**

**Julian Morgan**

## New expertise on the board

We recently welcomed two new trustees to Green Alliance's board who will contribute fresh insights and perspectives from the fields of finance and economics:



**Mariana Mazzucato** is professor in economics at the University of Sussex, where she holds the RM Phillips chair in science and technology policy. A frequent media

commentator on innovation and growth, she also holds roles at the European Commission and the ESRC.



**Catherine Howarth** is chief executive of ShareAction (formerly FairPensions), a UK-based NGO promoting responsible investment by institutions. Previously,

she founded West London Citizens, a broad-based alliance of community-based organisations working for social and environmental justice. She was also a senior researcher at the think tank, New Policy Institute.

## New individual members

### Welcome to:

Catherine Andrews

Alex Belsham-Harris

Harry Chichester

Yolanda Collins

Paolo Grasso

Katharine Harborne

Adam Herriott

Catherine Howarth

Claire Jones

Jack Lofthouse

Lauren Marriott

Kayleigh McGrath

Bhavika Shah

David Sharman

Katie Woodmore

Green Alliance is a charity and independent think tank focused on ambitious leadership for the environment. We have a track record of over 30 years, working with the most influential leaders from the NGO, business, and political communities. Our work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

**Green Alliance**

36 Buckingham Palace Road  
London SW1W 0RE

020 7233 7433

[ga@green-alliance.org.uk](mailto:ga@green-alliance.org.uk)

[www.green-alliance.org.uk](http://www.green-alliance.org.uk)

blog: [www.greenallianceblog.org.uk](http://www.greenallianceblog.org.uk)

twitter: @GreenAllianceUK

The Green Alliance Trust

Registered charity no. 1045395

Company limited by guarantee

(England and Wales) no. 3037633

Registered at the above address



“green  
alliance...



Printed by the environmental Waterless  
Offset process using vegetable-oil based  
inks on totally chlorine free paper using at  
least 51% post consumer waste.