ENGLAND 2050?

a practical vision for a national spatial strategy

electronic version

ENGLAND 2050?

a practical vision for a national spatial strategy

Electronic version

Note to electronic version

The electronic version of this document contains un-numbered inserts with extra large scale diagrams which may be bound into a printed version as fold-outs. The printed version of this document does not contain these inserts, but is otherwise identical to the electronic version.

tcpa

Town and Country Planning Association
17 Carlton House Terrace
London
SW1Y 5AS

+44 (0)20 7930 8903
tcpa@tcpa.org.uk
www.tcpa.org.uk

- **we are:** independent and open to all who want better places
- **we have achieved:** greener cities, new towns, and better homes
- **we create:** ideas, knowledge, publications, campaigns, and independent policies
- **we aim to:** secure homes, empower communities, and deliver a sustainable future

...through planning

England 2050? a practical vision for a national spatial strategy

Version 1.0.7E, Nov 2011

This document should be cited as: Green, N., Baker, M., Chang, M., Deegan, J., Goodstadt, V., Graham, M., Gwilliam, M., Ravetz, J., Vigar, G. & Wray, I. (2011) *England 2050? A practical vision for a national spatial strategy (electronic version)*, London, TCPA Regional Task Team.

England 2050? a practical vision for a national spatial strategy, has been researched and developed by the TCPA Regional Task Team to generate innovative thought.

Members of the Regional Task Team are Mark Baker, John Deegan, Vincent Goodstadt, Murray Graham, Nick Green, Murray Gwilliam, Joe Ravetz, Chris Shepley, Martin Simmons, Geoff Vigae and Ian Wray. Nick Green is the Convenor of the Task Team and Lead Author of this report.

This report is not official TCPA policy and the views and ideas expressed are those of the Task Team members and not the Association.

contents

list of figures & tables

foreword

England 2050 represents the culmination of a two year process led by a TCPA policy council task team to explore the future development of England. When the project was initiated England still had comprehensive regional planning. We are now in a new and localised world which in fact makes the case for a national approach to planning all the more compelling. England 2050 provides an illustration of the kind of approaches that England will inevitably have to adopt if we are to meet the enormous economic, social and environmental challenges of the 21st centruy. It provides a starting point for what we hope will be a creative debate about our collective future. This debate will not just have to deal with the right policy but also ensure that the governance of strategic planning for England is open and democratic. I am extermely grateful to the task team members* for launching us in the right direction.

Dr Hugh Ellis
Chief PLanner, TCPA

*The TCPA Regional Task Team: Mark Baker; Michael Chang; John Deegan; Vincent Goodstadt; Murray Graham; Nick Green (Convenor); Mike Gwilliam; Joe Ravetz; Chris Shepley; Martin Simmons; Geoff Vigar; Ian Wray

1 origins

...A carefully planned cluster of towns, so designed that each dweller in a town of comparatively small population is afforded, by a well-devised system of railways, waterways and roads, the enjoyment of easy, rapid, and cheap communication with a large aggregate of the population...

Ebenezer Howard, To-morrow: A peaceful path to real reform, 1898

If... the plan is a good one, its adoption and realization will produce for us conditions in which business enterprises can be carried on with the utmost economy, and with the certainty of successful issue, while we and our children can enjoy and improve life as we cannot do now.

Daniel Burnham & Edward Bennett, The Plan of Chicago, 1909

Summary

The point of this document is to persuade the reader that a national spatial strategy is crucial to England's future well-being. Economic and social disparities continue to be a defining feature of the geography of England. While high growth pressures present fundamental politcal and resource use issues for part of the south, entrenched social exclusion and economic decline scar signifanct parts of the north and west.. These national problems exist in the shadow of increasingly complex and long term global pressures. A number of recent independent reports and organisations, including the Stern Review, UK Foresight and the Royal Commission on Environmental Pollution have argued strongly for a long term strategic approach to the future.[3-5] The new planning system, however, stripped of both strategic capability and intent, is ill-equipped to deal with this or any other future.

This draft document is a practical illustration of how a national spatial strategy can help us handle that future.

Global issues, once remote, are now a permanent living-room presence. The world's population is forecast by the United Nations to grow to about 9.75 billion people by 2050, and will reach 7 billion by the end of 2011. Much of this growth will be concentrated in the poorer parts of the world, often those most badly hit by global warming.[6] North west Europe will come up against more frequent 'extreme weather events' as well as sea level rise. It will also have to deal with far-reaching demographic change, both internally and externally.

Food, water and energy prices are all likely to rise as increased demand puts greater pressure on supply. Energy supply in general, and the risks accompanying a 'Peak Oil' scenario in particular, are of concern here.[7] England needs resilience in the face of such shocks. Wars and political

upheavals, which may be relatively minor and situated elsewhere on the globe, still have the capacity to cause global disruption[8] to resources such as the energy supplies upon which England relies. As the global financial crisis has taught us, living in a hyper-connected world may have its advantages, but it also has its risks.

International issues will put local pressure on housing (through population pressures), energy supply (through energy prices and supplies) and food and water supplies (again through energy prices and supplies). These are all issues of national importance. Indeed, they are matters of national security. All this raises questions about how long term settlement patterns in England will develop, and how they should change, and this where the national spatial strategy comes into the picture (see figure *England 2050 time scale in context*).

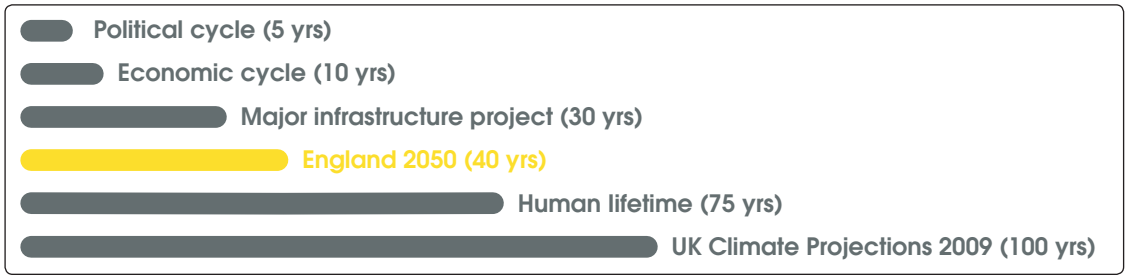
In their most recent report, UK Foresight argue that

> There is therefore a case for government to develop an over arching framework for managing land use change, that recognises the fundamental and cross-cutting importance of land across many different sectors, and which, by taking a long term perspective, considers new circumstances (notably relating to climate change, changes in population levels and economic growth) that will emerge over the next 50 years.[4]

England 2050 suggests plausible ways in which some of these questions might be addressed over the long term, using readily available evidence. The general approach is to set out the context and history, and then explore four matters with which spatial planning is particularly concerned: climate change; energy supply; the location of jobs and housing; and transport. The regional task team argues that a national spatial strategy with an explicitly spatial element is crucial to tackling the changes that will be wrought by these four issues.

The vision for a national spatial strategy is then described, and here the task team suggests how the future might look, depending upon whether we choose to follow the path of least immediate resistance in favour of business as usual; or whether we choose a strategy that confronts and addresses the long term problems that we will inevitably face. Since this is as much a political as a technical matter we also offer thoughts on the way forward. We have particular regard for how such a long term strategy might be put into practice by successive administrations of various political stripes. It also has the secondary intent of encouraging wider discussion of these issues of long term national importance. Inevitably, it sidesteps some of the trickier and more detailed issues (see table 1 overleaf).

Two scenarios are chronicled. Both are plausible, and elements of them can already be seen in the way we live now. The first, a basic 'business as usual' scenario that simply makes the point that the problems that England currently has with regard to geographical inequalities, congestion and so forth will continue to get worse.



England 2050 time scale in context

The timescale of England 2050? in the context of some other relevant timescales

The second scenario illustrates a possible future for England that is based on making the most of what it already has, and suggests practical ways of making things happen. In that sense, it is rather pragmatic. England itself is already a well-connected, urbanised country with a rich architectural and natural heritage. By making the most of this strong foundation, there is no particular reason why England should not become the balanced nation of well-connected sustainable city-regions set in a living and working countryside that we propose.

This is of course a long term project: making a national spatial strategy happen therefore needs long term political commitment. It needs the best expertise, perhaps in the form of a commission; and it needs the right democratic structures to ensure that it commands legitimacy in all sectors.

Scotland and Wales

Scotland and Wales both have national spatial strategies. While it is not proposed to examine them in detail here, the point needs making that these are now well-established; indeed, the Welsh national spatial strategy was updated in 2008, while the Scottish national planning framework was updated in 2009.[9; 10] In functional terms, north Wales and Cheshire are already strongly linked to one another, as are Cardiff and Bristol.[11] Our point here is that the lack of a national spatial strategy for England is symptomatic of a certain disengagement of policy from spatial reality.

The Hetherington Commission observed that England was not only the sole country of the British Isles not to have a national spatial strategy; it was the only country in Western Europe without some sort of national spatial strategy[12] that looks to the long tomorrow. One might add that a national spatial strategy for England that is properly coordinated with those of Wales and Scotland would be of benefit to all three nations, and hence to the United Kingdom as a whole.

Table 1: Some of the trickier issues that a national spatial strategy would face

This document cannot resolve all of the difficult issues that a real national spatial strategy would have to deal with. These issues are, for the most part, to do with the realities of winning popular acceptance of a long term plan that may not bring immediate and obvious benefits. The issues listed here may be expected to be particularly challenging.	
Geography	A national spatial strategy would need to be geographically specific if it is have the credibility necessary to provide the certainty that is part of its intent. In particular, growth poles and transport routes would need to be properly identified and agreed upon.
Public Participation & Accountability	This document does not explore in any great detail the vital need for a new national approach to be democratic and participative (beyond making the obvious point that it is absolutely crucial), but a national spatial strategy of the scope suggested by this prototype would acquire validity through a participative process that would necessarily precede its acceptance at a national, cross-party level and by final approval by parliament.
Evidence Base	This document marshals general evidence at a national level, but this needs to be augmented by technical annexes that carry far more detail. There is a sense in which a national spatial strategy might represent, in essence, the 'front end' of a much larger suite of documents.
Current Policy	A national spatial strategy would have to provide the overarching narrative to currently disparate and non spatial policy contained in draft National Policy Statements (NPS) and in the forthcoming National Planning Policy Framework (NPPF) which will replace existing Planning Policy Statements (PPS).
Other Forms of Regulation	A national spatial strategy would have to be aligned with other forms of market regulation.

Policy before May 2010: an unwritten National Spatial Strategy?

England does not have a written national spatial strategy. Instead the system relies on National Policy Statements, which deal with some aspects of major infrastructure and, a suite of less powerful guidance documents known as Planning Policy Statements (PPS), which deal with planning issues by topic and are soon to be withdrawn with the publication of the National Planning Policy Framework (NPPF). Both of these – NPSs and PPSs – are more by way of principle than strategy with only the Nuclear NPS being site specific. From 2004 comprehensive strategic planning was delivered through Regional Spatial Strategies (RSS). These statutory develoment plans set policy on a broad set of strategic issues. Local Development Plans set out how those broad regional goals would play themselves out locally. Taken as whole these documents did not constitute a national spatial approach but they did provide a very important layer of strategic understanding.

In *Sustainable Communities: Building for the Future*,[13] the Government (through the then ODPM) set out its broad strategy for housing growth. It identified a large new housing growth area in the Thames Gateway, 43 miles long by 20 miles wide, to the east of London. Further growth areas of comparable scale were identified in the London, Stansted and Cambridge Corridor (designed specifically to support the growth of the UK's most successful businesses in life sciences and biotechnology) and in the Milton Keynes – South Midlands Corridor. The latter alone had the potential to deliver 370,000 new homes. Recommendations in independent reports by economist Kate Barker reiterated this call for housing growth in the south of England.[14; 15]

Where the emphasis in the South was on growth, in the North and Midlands the emphasis was on solving the problem of low housing demand, particularly through the identification of nine 'pathfinder' areas, for which a £500m renewal fund was created. The emphasis on the problems of low demand influenced policies in the early rounds of RSS preparation. In the North West, for example, the region's annual average for new housing delivery was cut back to only 12,790 homes, a figure that had been increased to a minimum of 23,111 homes per year by the time the Regional Spatial Strategies were scrapped.

Policy for investment in new infrastructure echoed the picture of growing the South and contracting the North. Crossrail, a major new east-west London rail tunnel will bring together strategic rail networks to the west and east of the capital at a current cost of nearly £16 billion. Network Rail has put forward a massive bid for improvements to the UK's north-south rail freight network. It is designed essentially to underpin the growth and distribution of container freight from the south coast ports to areas of demand in the Midlands and North. A new high speed rail link between London and the north of England, dubbed HS2, has also been given the go-ahead.

Aviation policy is also designed to support growth in the south. The decisions to expand both Heathrow and Stansted airports took forward policies set out in *The Future of Air Transport*.[16] This identified an urgent need for additional runway capacity in the South East, a strong case for a second international hub in the South; and new runways at Stansted and Heathrow. But such changes are hugely controversial — the third runway at Heathrow has already been abandoned.

The logic of 'investing in success' is carried forward in the Eddington Transport Study.[17] Eddington identified the priorities for transport investment as urban areas with high congestion, high land prices and high wages; international airports and deep sea container ports; and key inter urban corridors which connect the above places, where these are congested. Inevitably, routes in

London and the South pass the tests. With only a few exceptions, places in the rest of England do not. The Department for Transport was, until May 2010, developing a new national transport strategy which takes forward Eddington's principles: Delivering a Sustainable Transport System.[18] Since there was (and is) no national spatial strategy to guide this work; national transport policy was (and is) simply being developed in a vacuum. Not surprisingly, most recent Highway Agency investment in widening motorways and installing expensive 'Active Traffic Management' systems (involving signal gantries and hard shoulder running) has focused on roads in the South. Conversely the heavily congested M6 route between Manchester, Liverpool and Birmingham (a critical transport artery for the north's manufacturers) has seen no investment since its construction in the 1960s.

More subtle are the revenue funding streams. National institutions like the national galleries, opera, BBC, and national museums remain overwhelmingly (and quite naturally) focused on London and the South, although parts of the BBC have no moved to the North West. So too do the great research Universities of Oxford, Cambridge and London, as well as the Government funded research institutes and main NHS research hospitals. Sometimes, the logic of investing in the south is simply historical inertia.

The introduction of National Policy Statements (NPS), along with a new Infrastructure Planning Committee, was intended to provide a framework for bringing forward nationally important infrastructure, but this was far from perfect.[19; 20] Remarkably the draft Ports NPS was market led and non spatial; an accepted implicit acceptance that investment would be focused in the South.

The logic of this approach remains the same: London and its region, as the hub of the national economy and as a leading city in the global economy, needs special attention. Many of England's greatest strategic assets – cultural, intellectual and physical – are in the South. The City of London remains enormously important to the UK's ability to earn overseas revenue. London and most of the South East have consistently returned high GVA growth rates.

However, there are limits to the logoc of such an approach not just in terms of the real social consequences for those areas left behind but also in focusing on an economy so dominated by financial services. The current banking crises has prompted Ministers to argue for a more balanced economy in which manufacturing plays a greater role. There are also real infrastructure and environmental constraints that have to be faced, not least water resources in the south and east.

Policy post-May 2010: Strategy Deferred?

In the time since the General Election of May 2010, the policy landscape as it relates to town and country planning has changed dramatically. New legislation in the Localism Bill will abolish Regional Spatial Strategies; planning decisions will be localised; and the strategic tier between the national level and the rural district council has been removed. Targets for both housing and energy along with the supporting expertise and mechanisms for gathering evidence will be eliminated. This alone is disturbing, but other bodies which have contributed to the strategic national view on issues such as the environment and demographic change have also been abolished: the most notable being the forty year old Royal Commission on Environmental Pollution. Financial incentives rather than strategic planning will now be the drivers for delivery. These may or may not meet housing need but they will undoubtedly drive growth most effectively in high demand

areas, and will therefore do little to combat regional economic and social inequalities. More likely, they will simply exacerbate them.

These changes indicate a sharp turn away from a long term strategic approach to planning just when we need such a policy infrastructure to tackle a deeply uncertain future.

References

1. Burnham DH, and Bennett EH (1993) (orig. pub. 1909) *Plan of Chicago* (facsimile edition). New York: Princeton Architectural Press.
2. Howard E (2003) (orig. pub. 1898) *To-morrow: A Path to Real Reform* (facsimile edition with commentary by Peter Hall, Dennis Hardy & Colin Ward). London: Routledge.
3. Stern N (2006) *The Economics of Climate Change*. London: HM Treasury.
4. UK Foresight (2010) *Land Use Futures: Making the most of land in the 21st century - Final Project Report*. London: Government Office for Science.
5. Royal Commission on Environmental Pollution (2007) *The Urban Environment*. London: The Stationery Office.
6. United Nations (1999) *The world at six billion*. United Nations.
7. ITPOES (2010) *The Oil Crunch - Securing the UK's energy future*. London: Industry Taskforce on Peak Oil & Energy Security.
8. Horgan (2009) *Winning the ultimate battle: How humans could end war*. London:Reed Publishing .
9. Scottish Government (2009) *National Planning Framework for Scotland 2*. Edinburgh: The Scottish Government.
10. Welsh Assemby (2008) People, *Places, Futures: The Wales Spatial Plan 2008 Update*. Cardiff: Welsh Assembly.
11. Green N (2008) *City-States and the Spatial In-between*. 77(5):.Town & Country Planning Association.
12. Hetherington P (2006) *Connecting England - A Framework for Regional Development: Final Report of the TCPA-Appointed Hetherington Commission on the Future Development Needs & Priorities of England*. London: Town & Country Planning Association.
13. ODPM (2003) *Sustainable communities: building for the future*. .Office of the Deputy Prime Minister / The Stationery Office.
14. Barker K (2004) *Review of Housing Supply - Final Report - Recommendations*. HMSO.
15. Barker K (2006) *Barker Review of Land Use Planning Final Report - Recommendations*. HM Treasury.
16. DfT (2003) *The Future of Air Tansport*. Department for Transport.
17. Eddington R (2006) *The Eddington Transport Study. Main report: Transport' s role in sustaining the UK' s productivity and competitiveness*. HMSO.
18. Department for Transport (2007) *Delivering a Sustainable Railway*. Department for Transport.
19. Ellis H (2010) *Failings in policy and process*. 79(3):130-137.
20. Hetherington P (2009) *Towards a joined-up strategy?*. 78(7/8):306-307.

2 difference and deep continuity

The English landscape as we know it is mostly a human construct.[1] The general pattern of settlement in England, established for at least two millennia, is the product of a 'deeper continuity' brought about by long slow process of inexorable positive feedback (see figure *Land Cover & Land Use*).[1] In southern England, for example, everyone lives within four miles of a church built before 1500. Of the 56 cities in England with populations greater than 125,000, 12 were founded by the Romans, 30 were established between 100 AD and 1086, when the Doomsday Book was compiled, and 12 between 1086 and 1500. Just two were established after 1500, both creations of the 18th century craze for seaside 'cures': Bournemouth and Blackpool. These long histories are not exclusive to the large cities: very many smaller towns and villages had been established by the time of the Domesday survey too.[2]

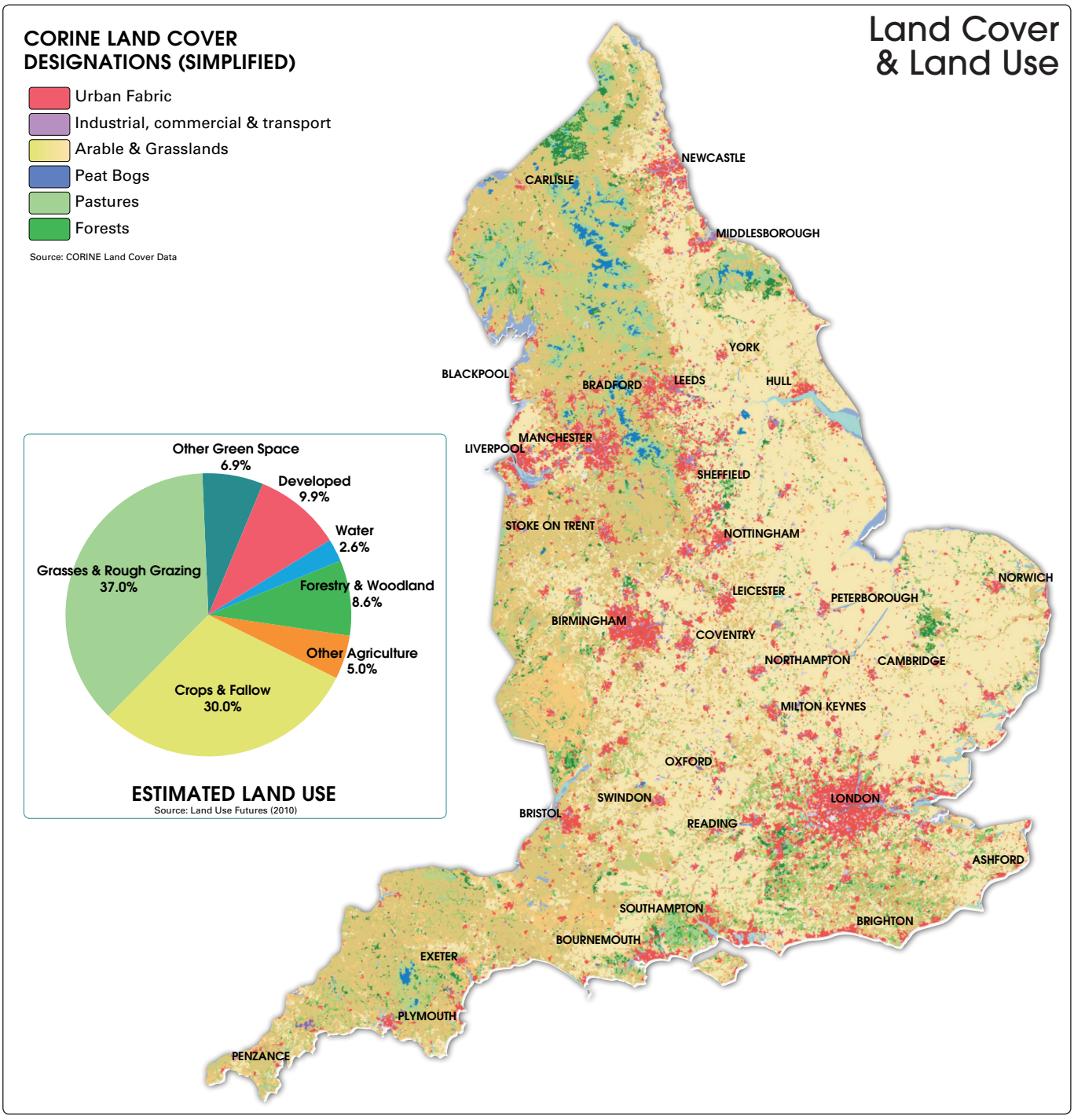
Most people will have an idea of what a successful city or town, or perhaps large village is like. Probably it will have a decent supply of jobs, and good facilities for education, recreation and the purchase of daily necessities. It will feel and be safe; a pleasant and interesting place in which to socialise. Its physical environment will be tolerably pleasant at worst, beautiful at best. Doubtless it will attract more people. An unsuccessful place would be the opposite of all these things; somewhere to abandon, opportunity permitting. There are exceptions of course: ugly towns in the right place may thrive, while beautiful ones in the wrong place might wither and decay.

But even if the general pattern of physical settlement has a certain fixedness — cities, once built, are rarely dismantled — the relative importance of different places has changed over time.[3] These changes have a direct and not always benign affect on the lives of ordinary people, as the urban environment around them comes good or goes bad in response. These ups and downs, with inevitable winners and losers, reflect a fluid urban hierarchy that has seen a number of different cities become pre-eminent (after London) (see figure *Four maps of an asymmetrical nation,* p.14). Until the 18th century, for instance, many of England's most prosperous provincial towns had grown with the medieval wool trade, but then came the industrial revolution. Previously unsung places such as Manchester and Liverpool flourished in the increasingly globalised industrial economy, while others foundered. London remained dominant throughout.

Growth in the newly industrialised cities in the first half of the 19th century was meteoric, transforming England from a rural to an urban nation, and shifting the country's economic centre of gravity northwards. By 1851, half the population of England and Wales was urban. This proportion grew steadily over the following century or so, peaking in the mid-20th century, before declining as people moved out of the cities. During the 20th century, the hierarchy changed again as northern cities stayed more or less stable, or slumped, while southern cities gained steadily in importance.[3]

At the same time, England has seen a dispersal of population, aided first by public transport, and then by the motor car in the search for more and better space. This seems to be an inherent part of the large scale physical evolution of settlement patterns, whereby population dispersal precedes the dispersal of jobs and employment.[4-6]

There are also two great rifts in the nation's fabric that need a closer look, one well-known, the other often overlooked. Both spring from the changes just described, and so they closely reflect one another. They are the north south divide and the urban rural divide.



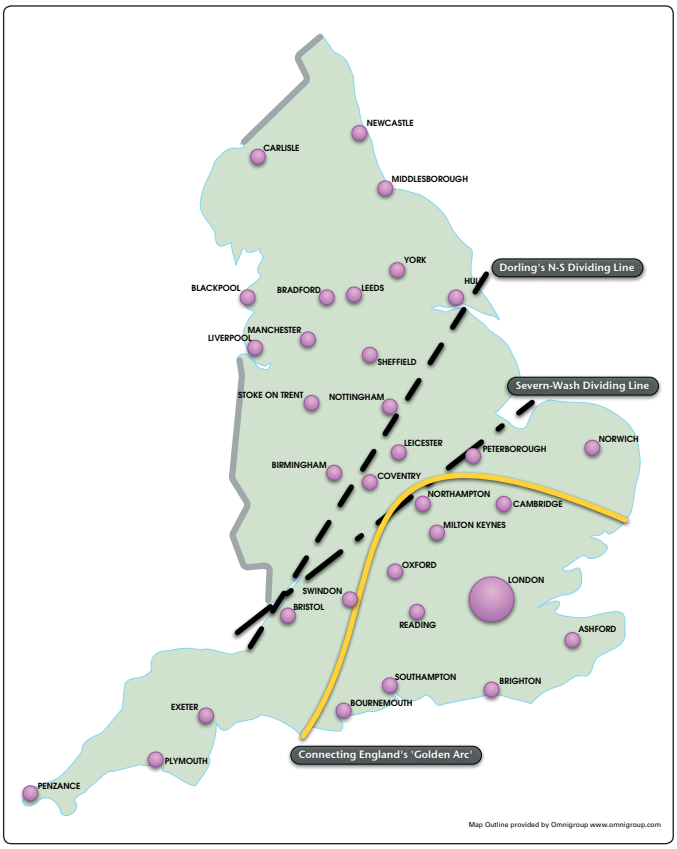
Land cover & land use in England

This simplified map of England, derived from satellite data, shows the extent of urbanization in England. Although approximately 90% of England is not developed, it may be that the dispersed nature of development gives the impression that England is more developed than it really is. Note that land cover is different from land use.
Sources: CORINE 2000 Land Cover Data; Land Use Futures, 2010, Final Report.

Across the Great Divide (1): 'North-South'

The traditional north-south divide (see figure *North-South Divides*) — roughly a straight line from the Bristol Channel in the South West to the Wash in the East — is something of a caricature, but it points to a broader truth: generally speaking, the northern areas of the country have lower rates of economic growth, higher rates of unemployment, poorer health and lower levels of educational attainment than are found in the southern areas of the country.[7] Both areas have pockets of wealth and patches of poverty, muddying the picture somewhat. The most sophisticated analysis is by Danny Dorling and Bethan Thomas.[8] They divide England into northern and southern sections, but the division is lumpy. There is the London metropolis, which extends from Bournemouth in the south west almost to Lincolnshire; and there is the provincial archipelago, comprising the rest of England, which has the variegated patterns of wealth and poverty alluded to earlier (see figure *Four maps of an asymmetrical nation,* p.14). They describe it thus:

> We draw a line separating the new London metropolis from the rest of the UK. Beneath that line lies the metropolis. Its core is the centre of the Capital, where the population is most densely concentrated, increasing, becoming younger and where finance is centered. That core is surrounded by the new inner London, an extension of what was outer London and which functionally includes cities as far away as Bristol and Norwich. London's suburbs now extend to North Somerset. Outer London reaches as far as Exeter and Dover. The edge of London is along the coasts of Cornwall and Suffolk.
>
> To the north of the line is the archipelago that has numerous centres surrounded by core areas, inner areas, the new suburbs of these northern and Welsh islands, their outer areas and remoter edges. The archipelago is an amalgam of places, which have most in common in not being in the London metropolis. They are the places… … where in general the population is less concentrated, is often reducing in numbers, becoming older away from its centres where southern youth venture North to university before returning South. They are the centres of industries that have died or are dying. They are places that now still exist because there remains a population there to be served.[8]

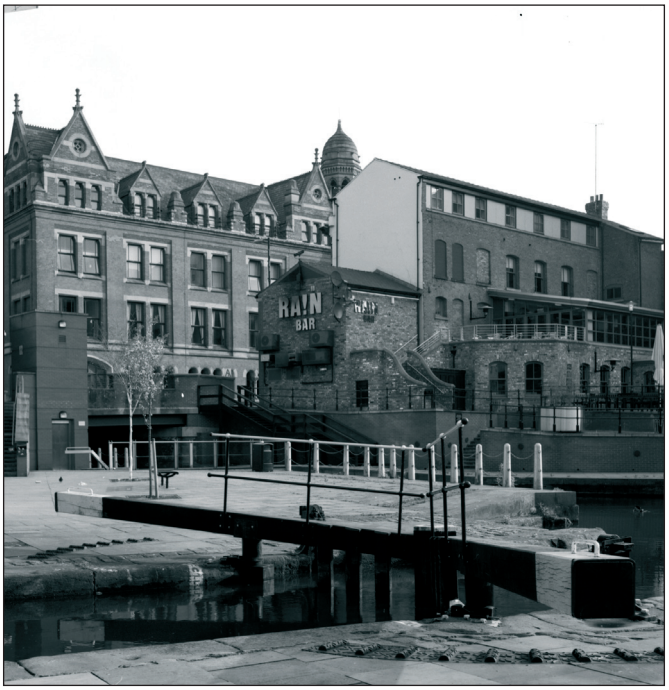


North-South divides

Three different versions of the North-South divide: The traditional line from the Severn to the Wash (dash-dot); Dorling & Thomas's version (dashed); the Golden Arc (yellow), set out in *Connecting England*.
Sources: Dorling & Thomas, 2004; Hetherington, 2006.

Pointing out that people in some areas are better off in certain respects than people living in other areas is hardly news. But it is the implications that matter, not the fact itself: a Londoner will have access to better public transport than the person who lives in the Lake District, who in turn has access to better countryside than the Londoner. So long as both are happy with their lot, such differences are

of little concern. The problems come when such divisions reinforce more iniquitous differences, such as those found between the urban and the rural.



Northern Renaissance (Manchester)

...but for how long? The bridge across the North-South Divide remains fragile.
Photo: Nick Green

Across the Great Divide (2): Urban-Rural

The division between the mercantile urban economy and the agricultural rural one was clear once, but in the last two decades has become so blurred as to be all but indiscernible.[9-11] Divisions still exist, though, and we can explore them by thinking of England and Wales in terms of rural regions as opposed to city-regions. In this analysis, non-rural areas neatly cover the classic city-regions (see figure *Four maps of an asymmetrical nation,* p.14).[11] These rural areas can be divided into three categories based around socio-economic divisions.[11]

Area 1, the region to the north and west of London, is characterised by a dependence on service sector employment. Unemployment tends to be low, economic activity rates are high, as are both car use and travel to work distances. Cycling and walking are correspondingly low. *Area 2*, equivalent roughly to the greater south-east, is effectively an extension of Area 1, but with lower rates of economic activity, higher unemployment and lower educational attainment. This area corresponds closely to the London Metropolis proposed by Dorling and Thomas. *Area 3* is, broadly speaking, the rest of England excluding Areas 1 and 2, and the major city-regions. These areas are highly variegated, just like the archipelago economy suggested by Pierre Veltz and Dorling and Thomas.

City, town and village dwellers may earn their livings doing much the same sorts of job, but differences persist, even in employment sectors that are not traditionally rural. Growth in knowledge intensive business between 1998 and 2005, for example, was over twice as fast in rural areas as in urban areas. Yet rural housing is more expensive, and rural wages lower than their urban counterparts.[10] It is easy to see how a home, and especially a first home, is far less affordable in the country than in a town (see figure *Some stats of rural life*). Maybe these disparities are just a cruel instance of the laws of supply and demand: most country dwellers want to stay put, and half of urban

Urban 21% Rural 46%
Growth in knowledge intensive business, 1998-2005

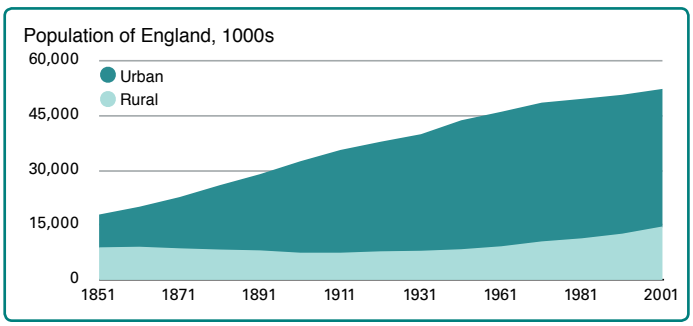
-£7000 difference in average rural wage compared with urban

+£8000 difference in average house price of rural compared with urban

+£16000 typical difference in cost of a rural first home in compared with an urban first home

Some stats of rural life

People leaving in rural areas often get less for more.
Source: Taylor, 2998, A living, working countryside



Counter-urbanization in England

The rural population has been growing relative to the urban population for the last half-century.
Source: Taylor, 2008, A Living Working Countryide

dwellers say they want to move the countryside. The Office of National Statistics forecasts that by 2028, the rural population will have increased by 16 percent, and the urban population by nine percent .[10]: a collective vote, perhaps, for the 'rural idyll' beloved of the English.[5; 12-14] It matters, though, not least because a population shift from urban to rural can have the effect of hollowing out cities, and leaving them as polarised, unpleasant sorts of places. In other words, such processes can give us the worst of both worlds.

Different but not imbalanced?

The worst of both worlds is clearly something to avoid, but to do that, we need to know what we are dealing with. Simply putting some maps side by side lays to rest any questions about whether or not an imbalance exists; it undoubtedly does (see figure *Four maps of an asymmetrical nation*). The real issue, though, is to do with which aspects of that imbalance are for some reason disagreeable. For some people, a reduction in wealth generated per person might be a price worth paying for living far from the Capital, but within a stone's throw of a National Park; and for not having to endure a long, uncomfortable journey to work on London's overcrowded public transport system. For others, the long, uncomfortable journey may be a price worth paying for living in London.

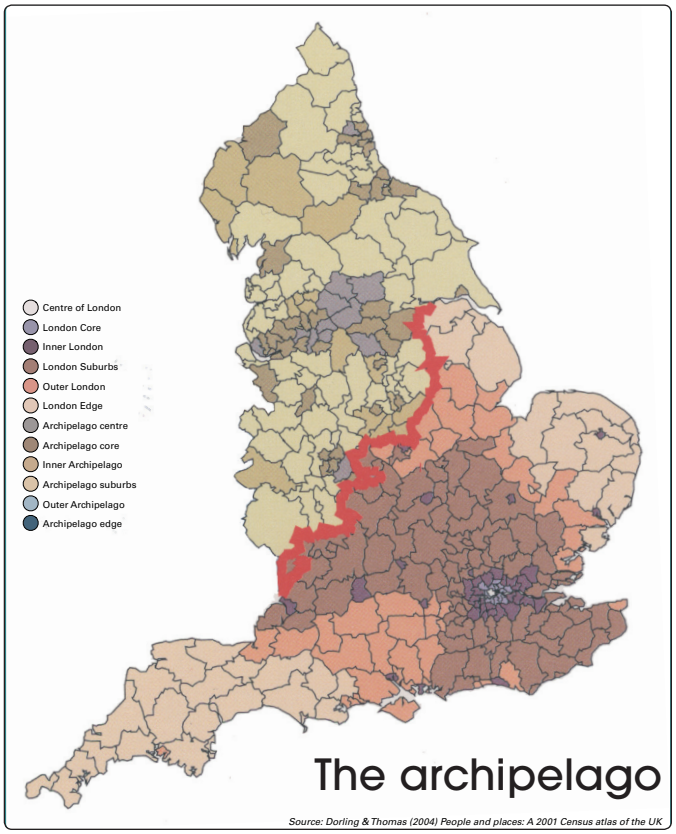
Many people have little choice about where they live and work. One role of a national spatial strategy should be to address this issue of geographic inequality of opportunity.

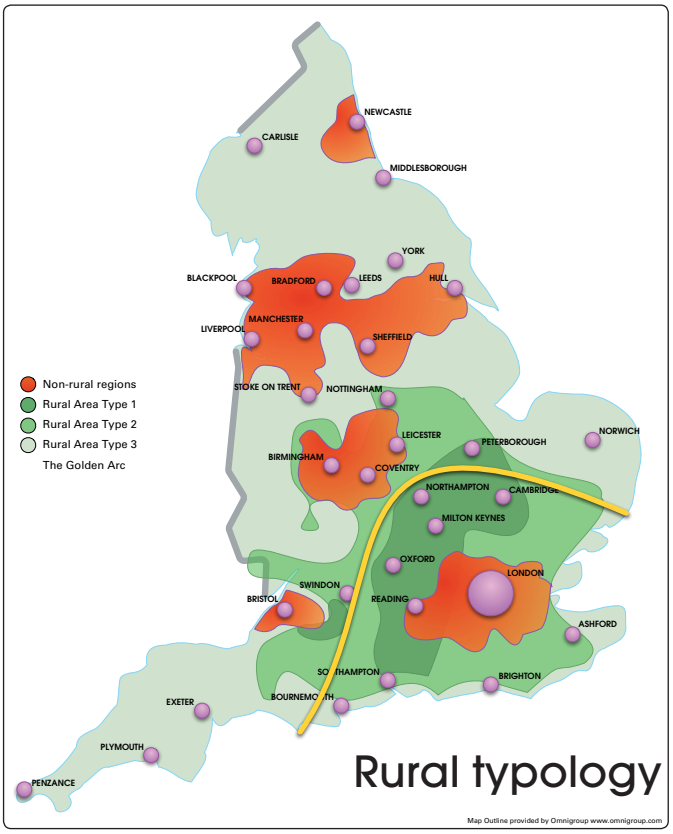
This will not be easy. The archipelago is so variegated that it can only really be defined by what it is not. Green's three categories of rural region are broad ones, but crucially, they help us to explain the north-south divide and the urban-rural divide in similar terms, reconciling the two.

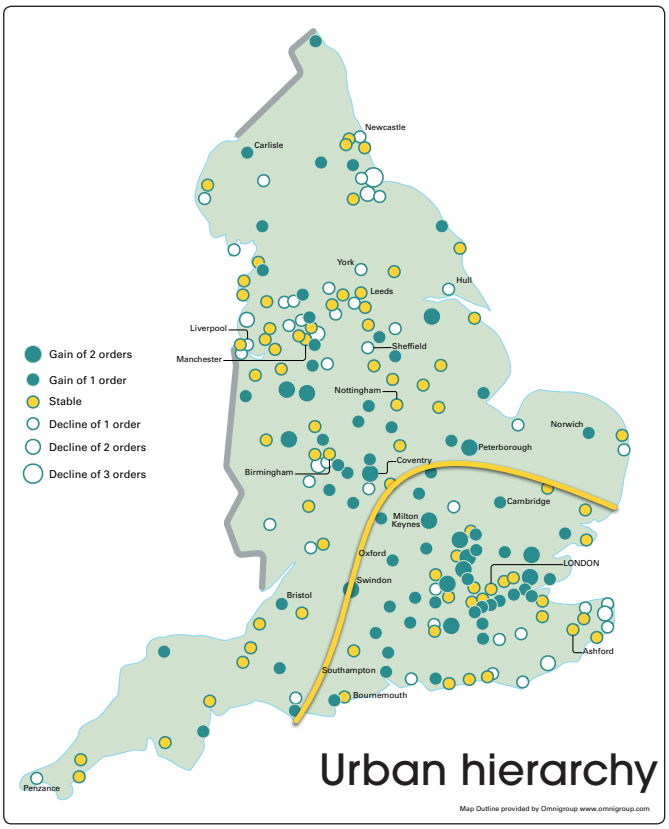
So if nothing else, they give us a better idea of what we are dealing with; to paraphrase a long defunct lawyer, we may be none the wiser, but we are better informed. That means we are ready to look more closely at the four key drivers of change with which a national spatial strategy must deal: climate change, energy, jobs & housing, and transport.

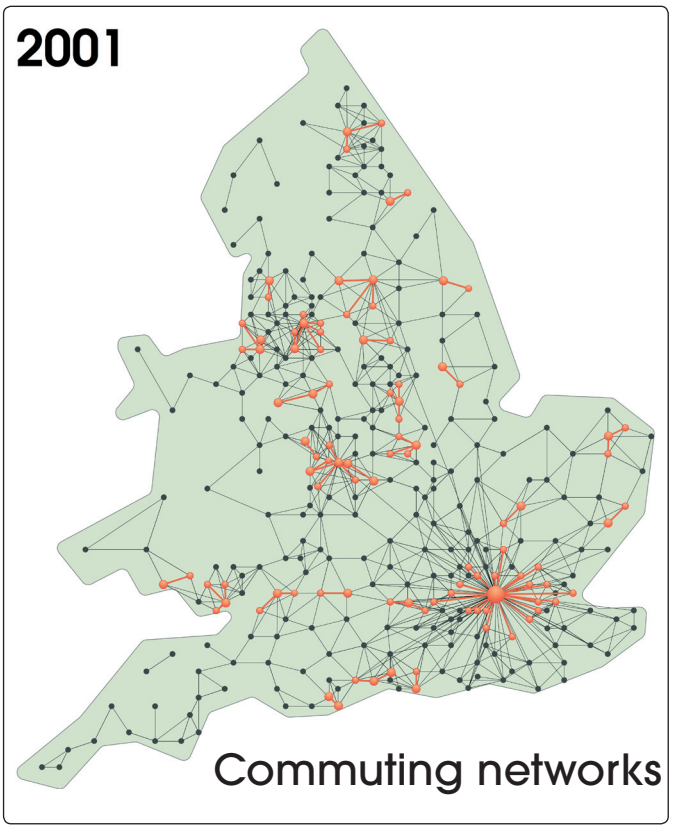
References

1. Hoskins WG (1985) *The Making of the English Landscape*. London: Penguin Books.
2. Darby HC (1976) *Domesday England*. Cambridge: Cambridge University Press.
3. Hall P, Marshall S, Lowe M (2001) The Changing Urban Hierarchy in England and Wales, 1913–1998. *Regional Studies* 35(9).
4. Hall P (1973) *The Containment of Urban England. London*: Wiedenfeld & Nicolson.
5. Champion AG (1989) Counterurbanization in Britain. *Geographical Journal* 155:52-9.
6. Gillespie A (1999) "The Changing Employment Geography of Britain." In: *The People: Where Will They Work?* London: Town and Country Planning Association. p.9-28.
7. Arup (2005) *Regional Futures*. Ove Arup & Partners Ltd.
8. Dorling D, and Thomas B (2004) *A Census Atlas of the United Kingdom 2001*.
9. Butt R (1999) "The Changing Employment Geography of Rural Areas." In: Breheny, (ed) *The People: Where will they work?* London: Town and Country Planning Association.
10. Taylor M (2008) *Living Working Countryside - The Taylor Review of Rural Economy and Affordable Housing*. Department for Communities & Local Government.
11. Green R (2009) *The town in the country, 2001*. 78(2):74-82.
12. Wirth L (1938) *Urbanism as a Way of Life*. Amercian Journal of Sociology XLIV.
13. Green N (2005) *Songs from the Wood and Sounds of the Suburbs: A folk, rock and punk portrait of England, 1968-1977*. Built Environment 31(3):255-270.
14. Parkinson M, Champion AG, Simmie J, Turok I, Crookston M & Park A (2006) *The State of the English Cities (2 vols.)*. ODPM Publications.





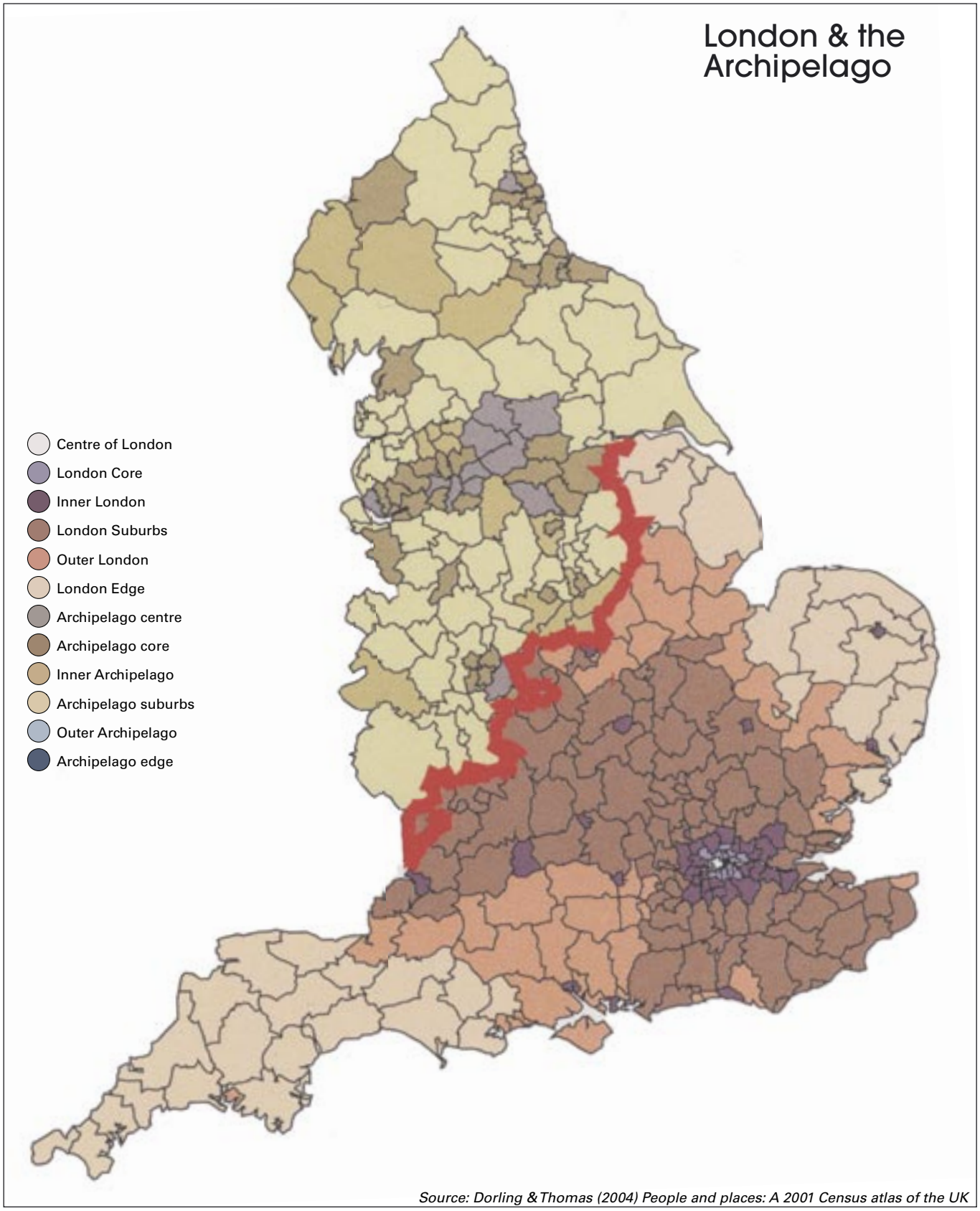




Four maps of an asymmetrical nation

Four maps showing (clockwise from top-left) the London Metropolis and Provincial Archipelago as proposeed by Dorling & Thomas; Different types of rural area as proposed by Ray Green; Commuting networks for 2001 (see chapter 6); the changing urban hierarchy from 1913 to 1998. In all four maps, the south-east is dominant (or has become so in the case of changing urban hierarchy). We can also see in Ray Green's map the relationship between the north-south divide and the urban-rural divide.

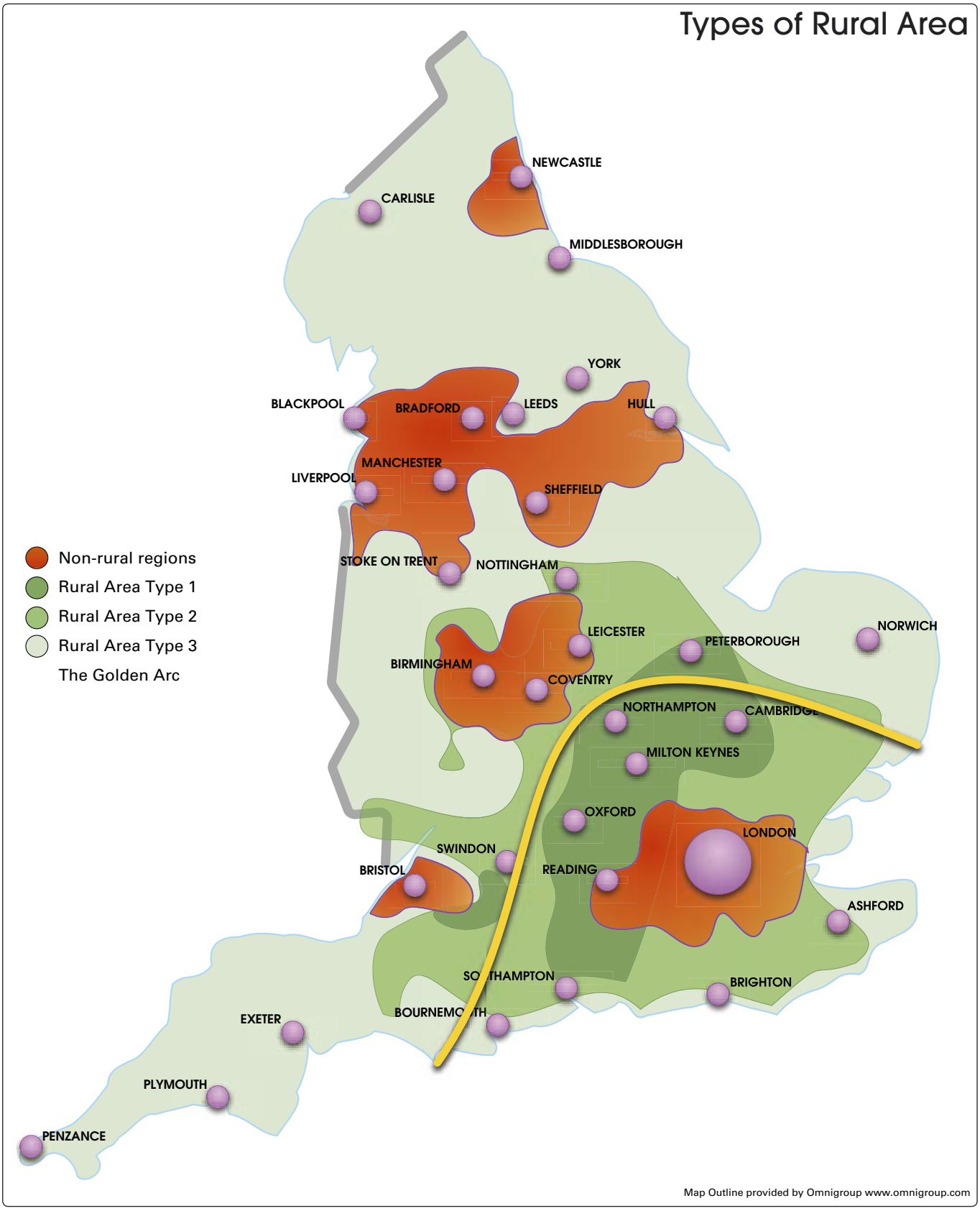
Sources: Various – see previous pages. See chapter 3 'Drivers of Change' for a description of the commuting map.



London & the Archipelago

As defined by Dorling & Thomas. See text for explanation. Map reproduced with permission.
Source: Dorling & Thomas, 2004, People & Places - A 2001 Census atlas of the UK

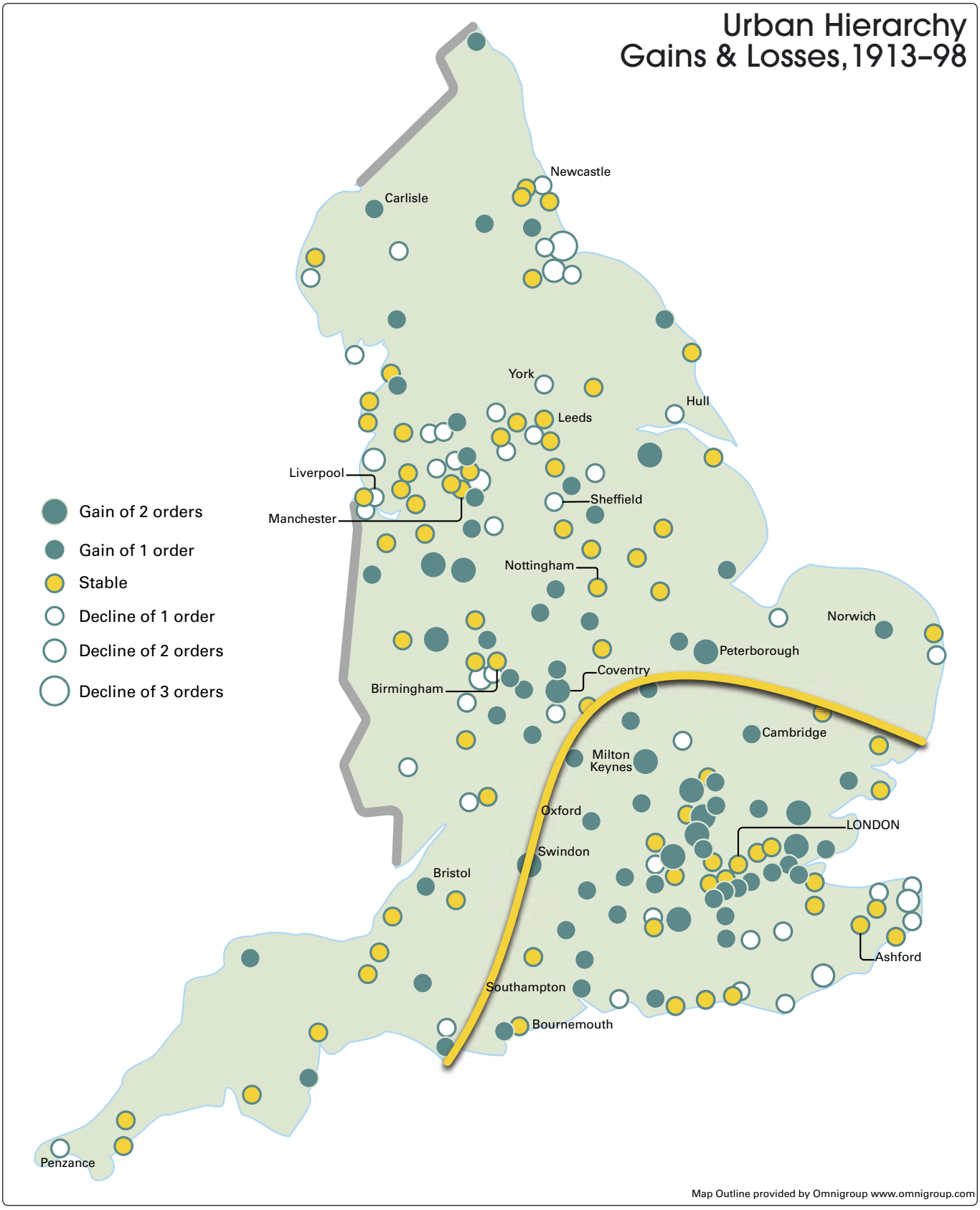
England: a short graph



England: types of rural area

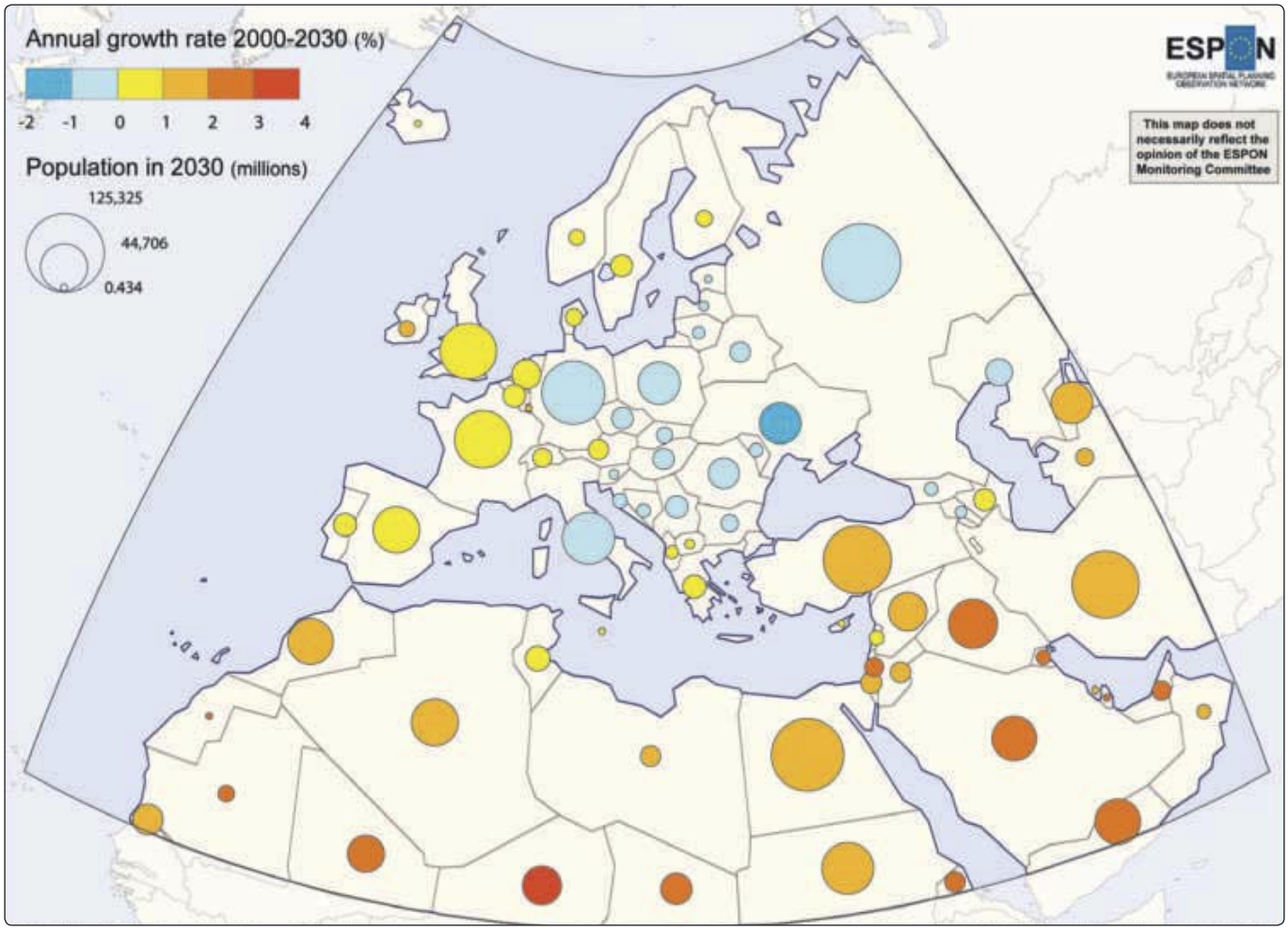
England divided into three rural typologies plus the city regions, based on census data analysis by Ray Green.
See text for full explanation.
Based on Green, 2009, The town in the coutry, 2001

ical overview



England's changing urban hierarchy, 1913–98

This map shows how towns' and cities' positions in the urban hierarchy changed during the 20th century. The general pattern has been for the south to rise up the hierarchy, whereas northern and coastal towns have either remained stable, or slid downwards.
Indicators included numbers of accountancy firms; bank HQs and branches; newspapers; hotels; theatres; universities; hospitals; railway stations amongst others.
Source: Hall, Marshall & Lowe (2001) The Changing Urban Hierarchy in England and Wales, 1913–1998



European trend scenario: population growth

Increases in population in the global south, combined with climate change, will increase immigration pressures on more northerly countries.
Source: ESPON, 2007, Territorial Futures - Spatial scenarios for Europe

Trend Scenario:
Spatial structure and urban hierarchy in 2030

Urban typology:
- Global City
- European Engine
- Strong MEGA
- Potential MEGA
- Weak MEGA
- Regional/Local City

Attraction and polarisation potential of metropolitan area

Area of concentration of flows and activities

European trend senario: spatial structure & urban hierarchy in 2030

A trend scenario, suggesting that the most central parts of Europe will continue to be at the top of heap.
Source: ESPON , 2007, Territorial futures - Spatial scenarios for Europe

3 drivers of change

The factors outlined in the previous section are themselves the consequence of global changes, and so a long term spatial strategy needs to take into account both 'local' and global drivers of change. The obvious ones are the global economy, the availability of natural resources and continuing environmental problems; but as important are the perceptions of risk that arise from these, and the way in which those perceptions are verified and then acted upon by policy-makers.

The key drivers that we believe are most relevant to a national spatial strategy are:

- The actual consequences of climate change (different from perceived risks);
- The perceived risks of climate change in the UK (eg flooding; water supply issues);
- Oil prices, which will rise and stay high, with consequences for energy supply and cost;
- The need for long term energy security;
- The global economy;
- The very long term tendency, both past and future, of jobs to cluster in the South East versus the social need for capital to disperse;
- Ageing population and declining tax base resulting in the need for immigrant labour to bridge the employment gap;
- The need for a measure of long term food security.

This list, though partial, points to three overarching forces:

first, the inevitability that England will be affected by global events that are beyond its control;

second, the consequent and continuing need to engage globally to mitigate the negative aspects of these changes and to exploit the positive aspects of these changes;

third, the need for a measure of carefully targeted self-sufficiency as an 'emergency back-up' in the event that the country becomes beleaguered in some way.

Questioning how we deal with these issues in the context of the long-run dynamics that we have just discussed, and then putting the case for a coherent approach is the whole point of this document.

Footnote

One of the problems faced by the more northerly countries will probably increasing immigration pressures, as people from the more southerly countries migrate to escape what may well be catastrophic consequences of climate change.

Climate 2050

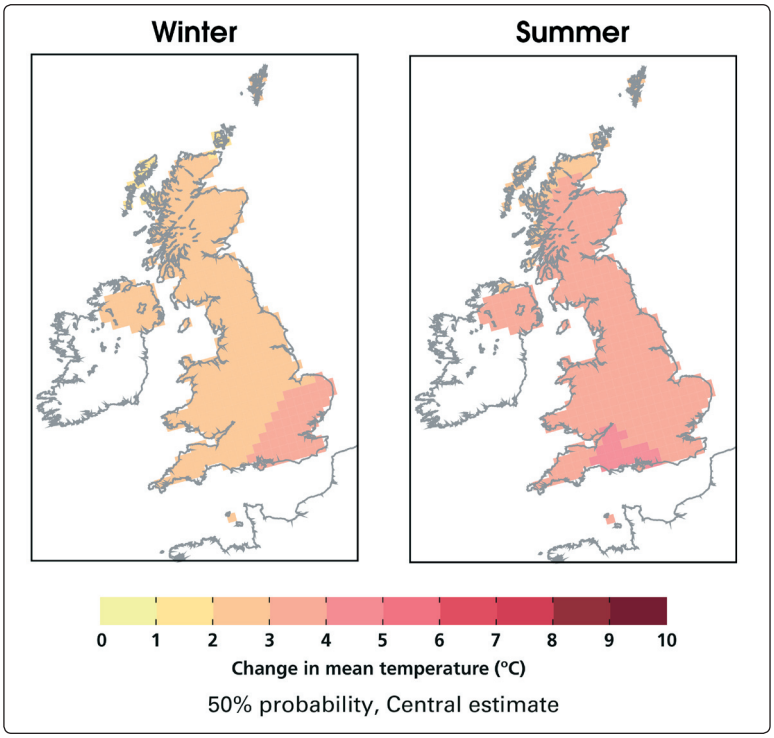
The most recent climate projections from the UK Climate Impacts Programme 2009 (UKCP09) simply reinforce the fact that long run observations suggest that England is getting both warmer and more prone to severe storms, and that this trend looks set to continue[1] (see figure *UK climate scenarios for 2080*). Over the last 45 years, all of the UK's regions have experienced increases in heavy winter rainfall. All but two — NE England and Northern Scotland — have experienced decreased summer rainfall. Windstorms of a severity not seen since the 1920s have also increased in frequency.[1]

The environmental consequences of climate change for the United Kingdom will probably be awkward, but not catastrophic in the way that they promise to be for those developing countries closer to the equator.[2] Climate change will play itself out differently depending upon latitude: with the south of Great Britain will get hotter than the north, with the consequence that the north may become more attractive since its climate will be more comfortable than that in the south.

The effects of climate change will be felt particularly strongly in urban areas, through an increase in the intensity of the urban heat island effect; and, as sea levels rise, in certain coastal areas (particularly the east coast).[3] There is also likely to be an increase in the frequency and magnitude of flooding events.

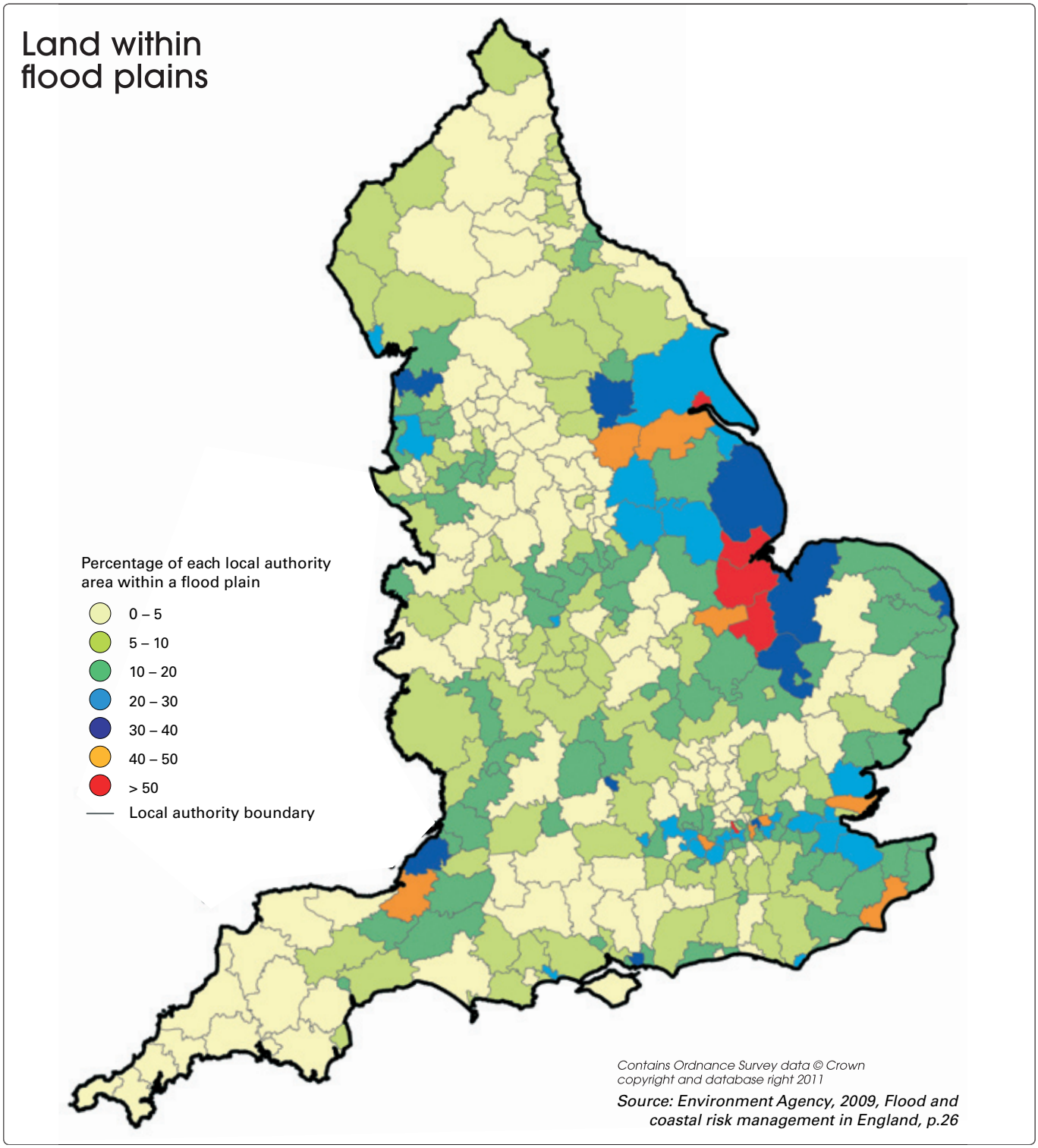
At greatest risk of flooding is the south east of England, with nearly half a million people at moderate or significant risk of flooding; other areas — parts of the Lincolnshire coast, for example — face a significant risk of flooding too.[4] Major urban centres such as Portsmouth and Hull are directly vulnerable but their future will be determined by the response of investors and the insurance industry who have a fine grained understanding of risk. Phased withdrawal from part of the coastline will also generate the need for strategic responses to demographic change,[5] while the increasing population will place further and heavy demand on already stretched supplies of water, particularly in the south-east.[6]

Mitigating the effects of climate change will only be part of the solution; as important, given the inevitability of a certain amount of change, is adapting to it. Many adaptations to climate change are to do with making a place more resilient to the extremes of weather that will become more frequent as the climate warms and imparts greater energy to weather systems. But many of those adaptations will also serve to improve the environment anyway (see figure overleaf).



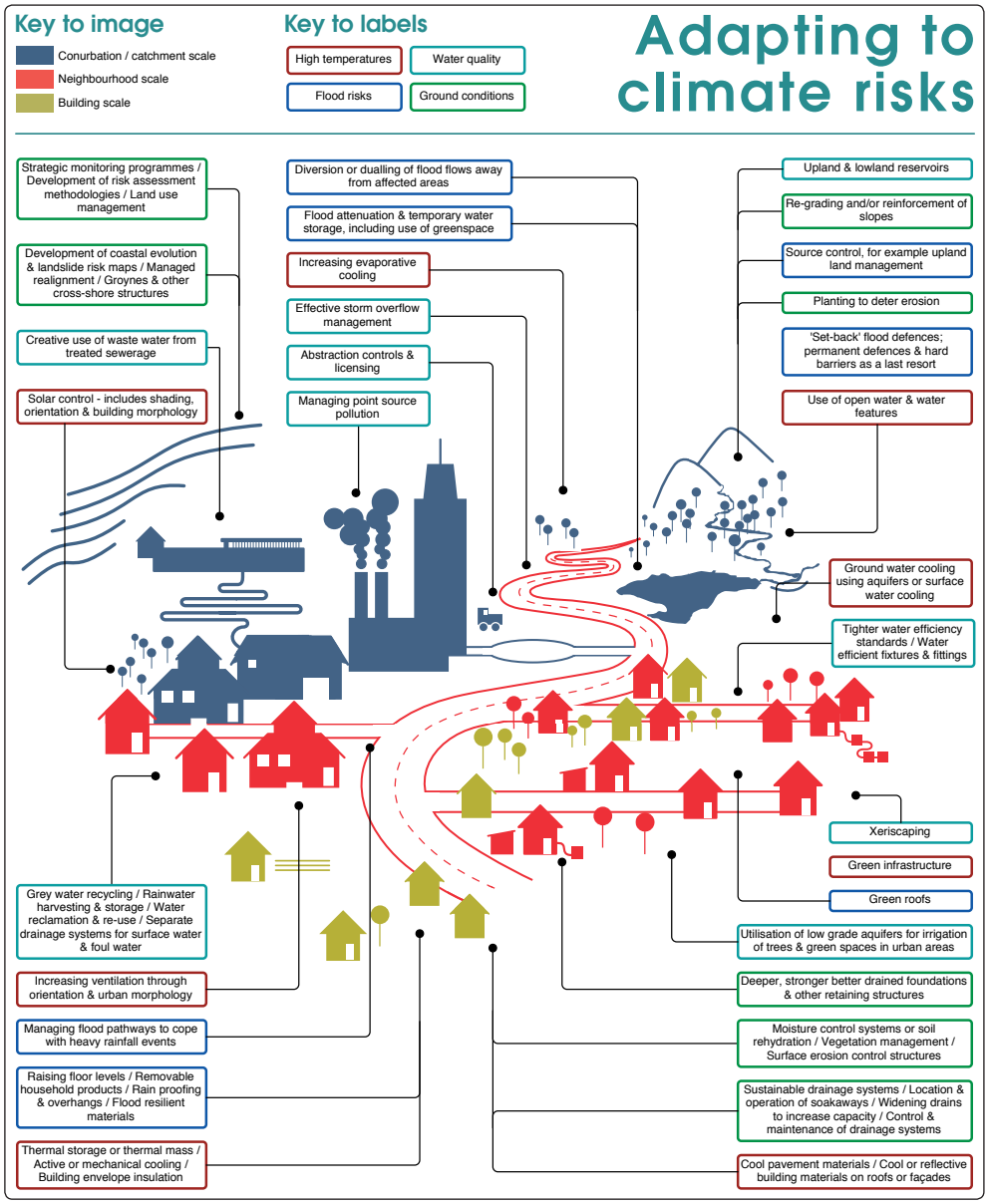
UK climate scenarios for 2080

Maps from UKCP09 showing scenarios for temperature change by 2080. The diagrams show the 50% probability level of changes to the average daily mean temperature (°C) in Winter and Summer by the 2080s.
Source: Murphy, 2009, UK Climate Projections Science Report: Climate Change Projections (fig 4.4)



Land within flood plains

Map showing the percentage of each local authority which falls within a flood plain.
Source: Environmant Agency, 2009, Flood & coastal risk management in England, p.26. Map reproduced with permission.



Local strategies for adapting to a changing climate

This diagram, compiled from four diagrams in the TCPA's publication *Climate Change - Adaptation by Design*, shows some of the measures that can be taken at the neighbourhood scale and below to adapt to and mitigate climate change. Such measures, applied across England, would not only make the nation's towns and cities more environmentally friendly; they would also be cleaner, safer and more pleasant than they are now.
Source: compiled from diagrams in Shaw et al (2007) Climate change: adaptation by design

Table 2: Summary of expected changes to the UK's climate

		Conf. level
Temperature	Annual warming by the end of the century of between 1°C and 5°C depending on emission scenario.	*High*
	Greater summer warming in the southeast than in the northwest.	
	Increase in the number of very hot days.	*High*
	Decrease in the number of very cold days.	
Precipitation	Generally wetter winters for the whole of the UK, and increases in winter precipitation intensity.	*High*
	Substantially drier summers.	*Medium*
Soil moisture	Decreases in summer and autumn, especially in the southeast	*High*
Sea level	Global average sea level will continue to rise for several centuries. According to the Intergovernmental Panel on Climate Change's 4th Assessment, global sea level will increase by the 2090s by between 20 and 60cm, depending on the emissions scenario (relative to the 1980–99 baseline)	*High*
	There will be significant regional differences in relative sea level rise around the UK.	*High*
	For some coastal locations and some scenarios, storm surges will become more frequent.	*Medium*

Source: Shaw et al (2007) Climate change: adaptation by design

Energy 2050

By 2050, it is unlikely that Britain's energy will come from just one or two sources. Much more likely is that it will come from a wide variety of sources, some national, some international: in other words, Britain seems unlikely to be able to supply its own energy demands for the foreseeable future.[11]

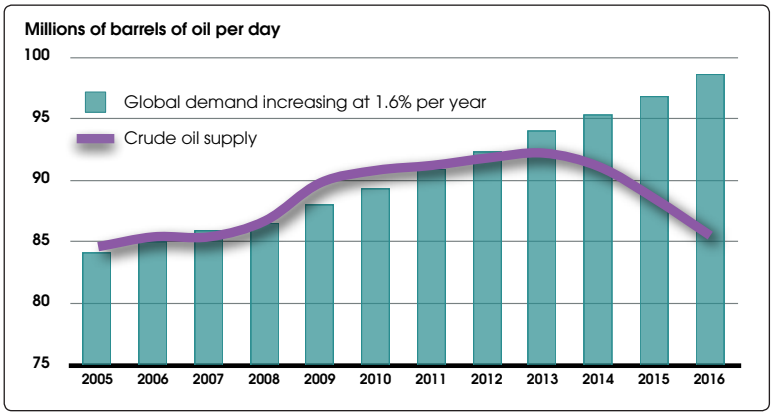
To be resilient in the face of future uncertainties, England will need to develop the ability to use the energy it has much more efficiently, so that it does not need as much in the first place; no easy task. However, the global context is crucial, and the key issue here is the fact that we are coming to the end of cheap and easy oil.[7; 8]

'Peak oil' is a succinct way of pointing out that like any other finite resource, the supply of oil cannot continue indefinitely. It is a controversial term, not least because while there is still plenty of oil in the ground, much of it is increasingly difficult and expensive to extract. Arguments tend to be framed either as a discussion about absolute quantities of oil remaining, or about the quantities of economically viable oil that remain. The idea has its origins in mid-20th century papers written by M. King Hubbert, who argued controversially that the fossil fuel age was a 'blip' in human history,[9] and that US oil production would peak between 1965 and 1970 (in fact, US oil production peaked in 1970).[10]

Globally, according to a recent report, oil can be expected either to peak or to plateau by about 2015, at which point economically viable oil reserves will decline more or less steadily (see figure *Global oil supply vs projected demand*).[7]

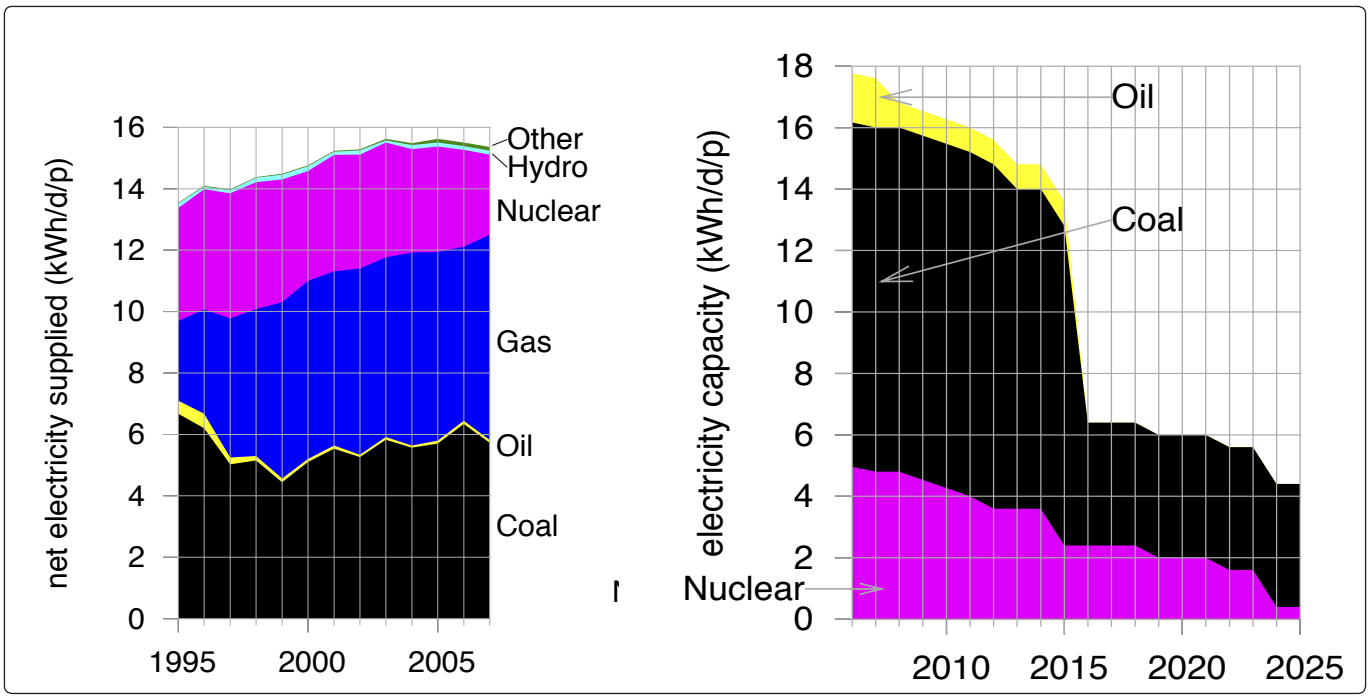
Oil depletion carries risks, both socio-political ones and geo-political. The geo-political risks arise from the simple fact that if oil is indeed becoming scarcer while demand increases, then the national oil companies are more likely to hang on to it and less likely export it, so constraining supply.[7] The socio-political risks are that if an energy gap arises, and power-cuts occur, civil unrest becomes more likely.[7] Neither scenario is especially palatable and both lead us to this question: what options do we have?

Point one is that England will be unable to derive all of its energy needs from renewable sources, either now or in the foreseeable future; it is also likely to face an energy gap at about the time that global oil supply peaks.[11] In view of the fact that our current energy supply balance is 89% reliant on fossil fuels, 9% reliant on uranium and 2% reliant on other fuels,[12] there is clearly an urgent need for action at a national level. Government estimates that by 2020, the UK will be able to supply just 20% of its own energy needs, while the remaining 80% would have to come from imports, leaving little or no control over either the supply or the provenance of the energy source.[13]



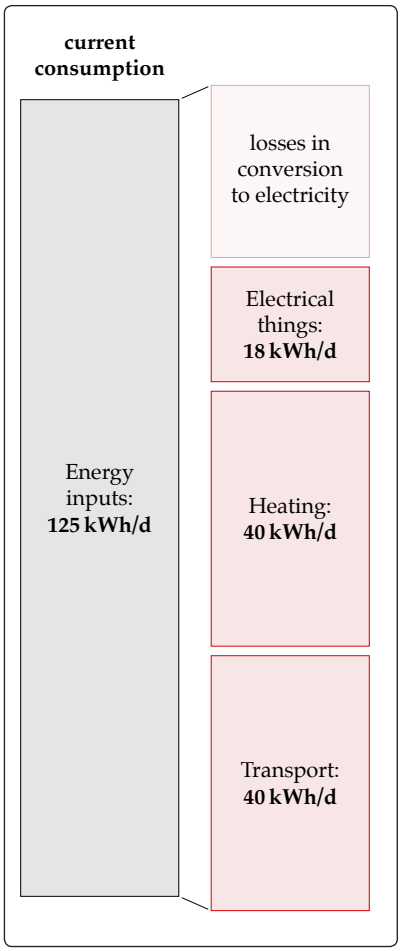
Global oil supply vs. projected demand
A best case scenario derived by Peak Oil Consulting for the UK Industry Taskforce on Peak Oil and Energy Security
Source: Based on ITPOES, 2010, The Oil Crunch, fig 4, p.13.

Point two is that the UK will need to develop a much more creative approach to



An emerging energy gap?

Left: UK net electricity supplied by source, in kWh per day per person.(Another 0.9 kWh/d/p is generated and used by the generators themselves.) Right: the energy gap created by UK power station closures, as projected by energy company EdF. This graph shows the predicted capacity of nuclear, coal, and oil power stations, in kilowatt-hours per day per person. The capacity is the maximum deliverable power of a source.
Source: MacKay, 2008, Sustainable Energy; fig K.2



Energy consumption in Britain, 2008

A 'cartoon' graph of 2008 energy consumption in Britain
Source: MacKay, 2008

ENERGY: SUPPLY, DEMAND & THE FUTURE

Mackay's hypothetical energy plan for Great Britain

The map opposite is reproduced directly from David MacKay's 'Sustainable Energy – Without the Hot Air.' It shows in diagrammatic form approximately how much land would be needed to put into practice a hypothetical energy plan for Great Britain using a portfolio of different energy sources (Plan M in the figure on page 20). A different portfolio of sources would of course produce a different map. The point is that shifting to alternative energy sources will not be easy.

The explanatory text that follows is quoted directly from the original source.

The grey-green squares are wind farms. Each is 100 km^2 in size and is shown to scale.

The red lines in the sea are wave farms, shown to scale. Light-blue lightning-shaped polygons: solar photovoltaic farms – 20 km^2 each, shown to scale.

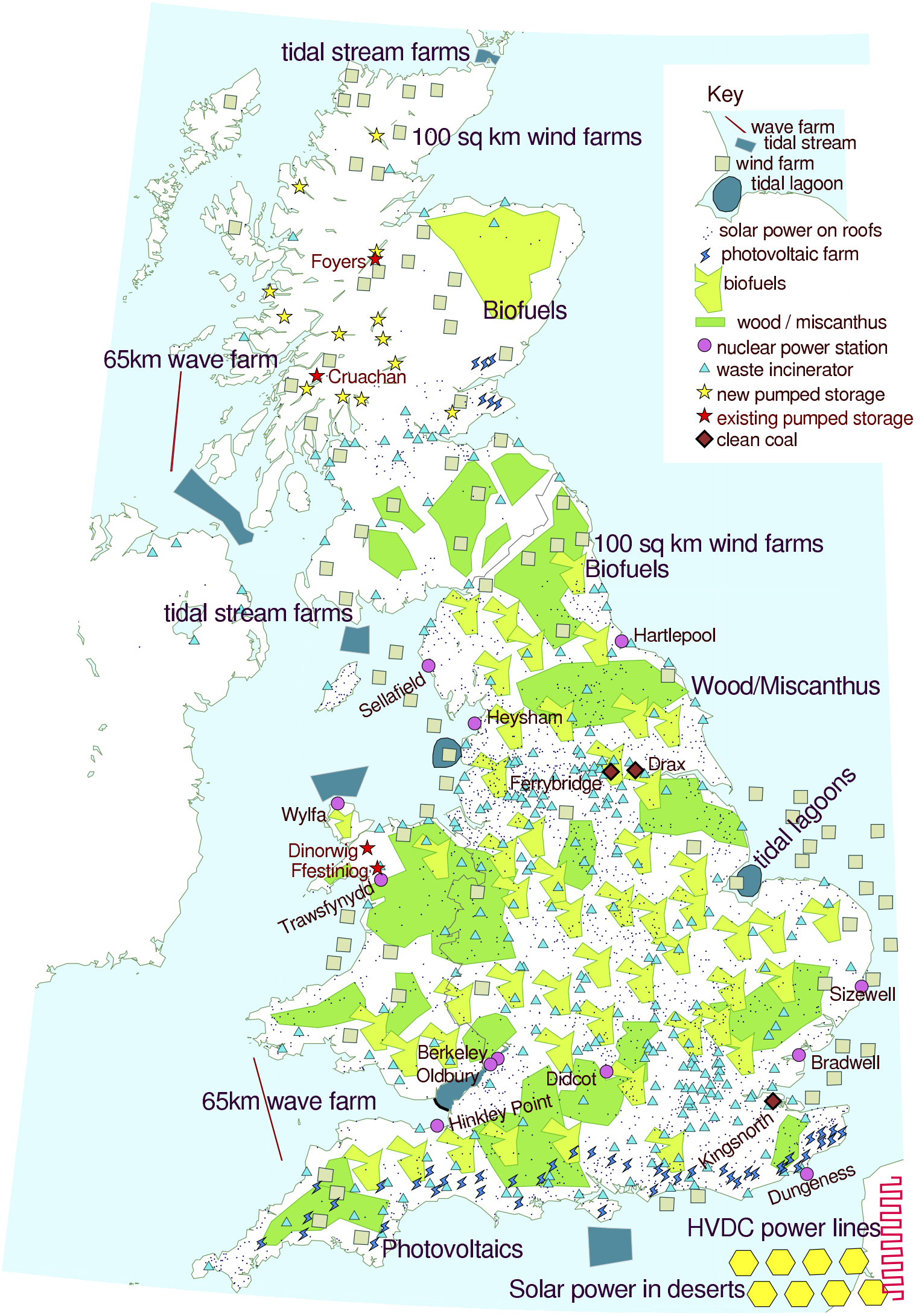
Blue sharp-cornered polygons in the sea: tide farms. Blue blobs in the sea (Blackpool and the Wash): tidal lagoons. Light-green land areas: woods and short-rotation coppices (to scale). Yellow-green areas: biofuel (to scale). Small blue triangles: waste incineration plants (not to scale).

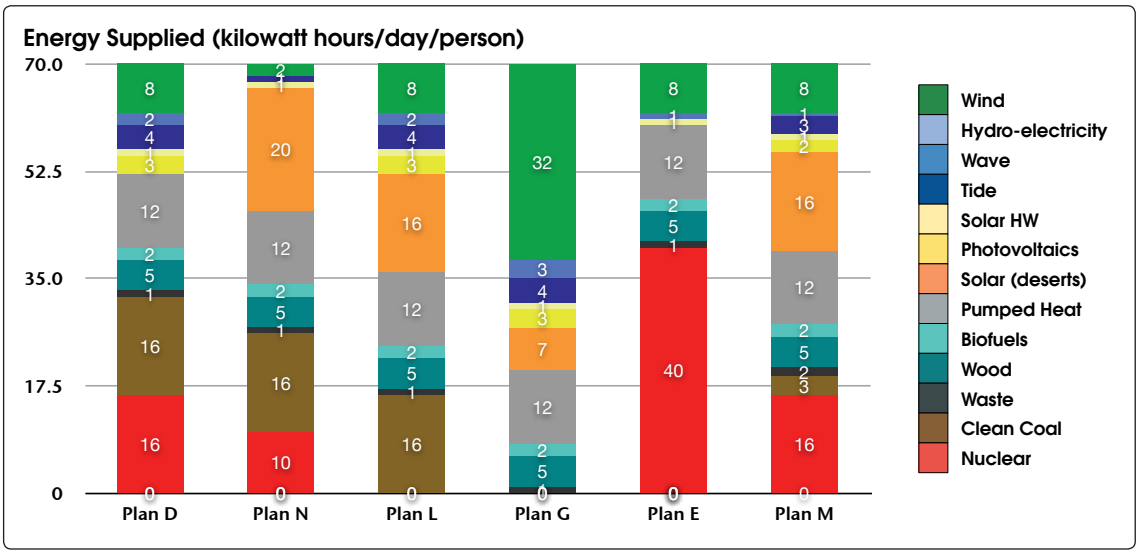
Big brown diamonds: clean coal power stations, with cofiring of biomass, and carbon capture and storage (not to scale).

Purple dots: nuclear power stations (not to scale) – 3.3 GW average production at each of 12 sites. Yellow hexagons across the channel: concentrating solar power facilities in remote deserts (to scale, 335 km^2 each). The pink wiggly line in France represents new HVDC lines, 2000 km long, conveying 40 GW from remote deserts to the UK.

Yellow stars in Scotland: new pumped storage facilities. Red stars: existing pumped storage facilities. Blue dots: solar panels for hot water on all roofs.

Source: Reproduced with permission from Mackay, 2009, Sustainable Energy - Without the Hot Air


tidal stream farms
100 sq km wind farms
Foyers
Biofuels
65km wave farm
Cruachan
100 sq km wind farms
Biofuels
tidal stream farms
Hartlepool
Sellafield
Wood/Miscanthus
Heysham
Drax
Ferrybridge
Wylfa
Dinorwig
Ffestiniog
Trawsfynydd
tidal lagoons
Sizewell
Berkeley
Oldbury
Didcot
Bradwell
65km wave farm
Hinkley Point
Kingsnorth
Dungeness
HVDC power lines
Photovoltaics
Solar power in deserts
Key
wave farm
tidal stream
wind farm
tidal lagoon
solar power on roofs
photovoltaic farm
biofuels
wood / miscanthus
nuclear power station
waste incinerator
new pumped storage
existing pumped storage
clean coal



Six energy plans that add up

Six energy plans for Britain, showing the different proportions of energy supplied from different sources. Whichever general approach is adopted in the end, a 'portfolio' approach that includes imported energy will probably be necessary. Plan M is the basis for the map reproduced in the insert.
Source: MacKay, 2009, Sustainable Energy

its energy supply: such an approach is outlined in the TCPA's own publication *Community Energy: Urban Planning for a Low Carbon Future*,[12] which proposes a portfolio approach to energy supply that includes combined heat and power, solar and wind power, power from biomass and small-scale hydroelectric supplies. Even this might be difficult to achieve, as Mackay has shown: his proof-of-concept for an energy plan for Britain relies on imported energy, and such a plan would have profound implications for land use in Britain.[11]

The land use implications of such an energy strategy are likely to be profound. Mackay's example uses a combination of local and imported renewables, along with nuclear power. Its message is clear: switching to renewable energy is a huge task, and it is one that will need a concerted long term technological and national and international political effort to achieve.

Point three is that opinions vary as to what can be achieved: while the TCPA supports the notion of micro-generation, others argue that it would make more sense to switch directly to air and ground source heat pumps.[14] No energy source is perfect, and whatever energy plan is chosen in the end is likely to be politically problematic.

Point four then, is that ensuring Britain's future energy supply is perhaps as difficult a political problem as it is a technical one, and that means that a long term strategic approach is critical.

Jobs & Housing 2050

Unusually for an industrialised nation, England was mostly urbanised by the mid-19th century, before the development of motorised transport.[15] The primary energy source was coal. It and other goods were transported by water, so proximity to either a port or the canal system was of central importance to the location of industry, which tended to establish itself in the North and the Midlands.[15] Population followed, drifting from rural areas to the expanding towns and cities.

A century later, the geography had changed: it was clear that industry was concentrating around the London region rather than in the traditional northern areas of Lancashire, the Midlands and Yorkshire. Crucially, it was the underlying structure of the industrial base itself that drove this southward shift. The plain fact of the matter, as identified by the Barlow Commission in 1940, and since reinforced by more recent analysis.[16], was that the newer growth industries were locating in the South-East, while those in decline stayed in their original more northern locations.[17]

Table 3: Population Projections by Country, 2006 – 2031

	2006	2011	2016	2021	2026	2031
England	50763	52706	54724	56757	58682	60432
Scotland	5117	5206	5270	5326	5363	5374
Wales	2966	3038	3113	3186	3248	3296
Northern Ireland	1742	1812	1868	1922	1966	1999
United Kingdom	60588	62762	64975	67191	69259	71101

Source: Holmans & Whitehead (2007) New and higher projections of future population in england

After the Second World War, the continuing shift to road and rail transport made inland locations more attractive than coastal ones for warehousing and distribution of goods. The geographical balance of Britain's ports has also shifted southwards. Between 1972 and 1992, Liverpool's share of British merchandise fell from 11 per cent to three per cent, but the combined share for Dover and Felixstowe rose from 10 to 29 per cent. Heathrow airport's share was 17 per cent.[15]

The effect of these changes on the nation's urban hierarchy has been to alter the nation's patterns of living and working. The ascendance of the private motor car, coupled with shifts in the type of work being done, has given rise to more dispersed employment patterns, all overlain on a steadily increasing population (see Table 3), and increasing numbers of one-person households.[6] This has all taken place in the context of the not quite simultaneous rise of information and communications technology. Between them, these two technologies have been responsible for many of the changes in settlement patterns that we have seen, and that we are likely to continue to see in the coming decades: these are deep undercurrents.[6; 18-22] This forces us to an unpalatable conclusion: this gradual dispersal is not something that will easily be reversed. Furthermore, scenarios for Europe to the year 2030 suggest the continuing dominance of the South East.[23]

The southern half of the country has maintained its pre-eminent position by virtue of the fact that its economy has been based in the service sectors rather than manufacturing. It remains the case that everywhere in England is experiencing a steady and seemingly long term decline in manufacturing industries, including London and the South-East, but it is also the case that the United Kingdom is the fifth largest manufacturing economy in the world, and that the northern regions of England play a large role in that. To dismiss manufacturing, especially at a time when finance and business services seem precarious, might therefore seem premature.

The problem is that the Midlands and the North have not had the 'safety net' of services industries that the South-East has. They have as a consequence found themselves economically adrift, while the whole process has played itself out in terms of migration: we have seen a steady pattern of international migration to London, and then migration from London to the adjacent regions.[24] In short, population is dispersing at the national scale, as well as at regional and local scales. Dealing with such long term patterns of change would not be easy without some sort of national overview.

A report by Ove Arup & Partners suggested that a trend-based prognosis to 2030 would see little change in this overall pattern: manufacturing employment would continue to decline; services would continue to grow.[24]This growth would be concentrated in the South, although the Northern cities of Manchester, Leeds and Edinburgh were expected to see some service sector growth too. These cities would be supported by small sub-centres, but even so, the patterns that we have already seen show few signs of changing. These issues are structural ones: most new investment in manufacturing simply does not go to the United Kingdom. This means that demand

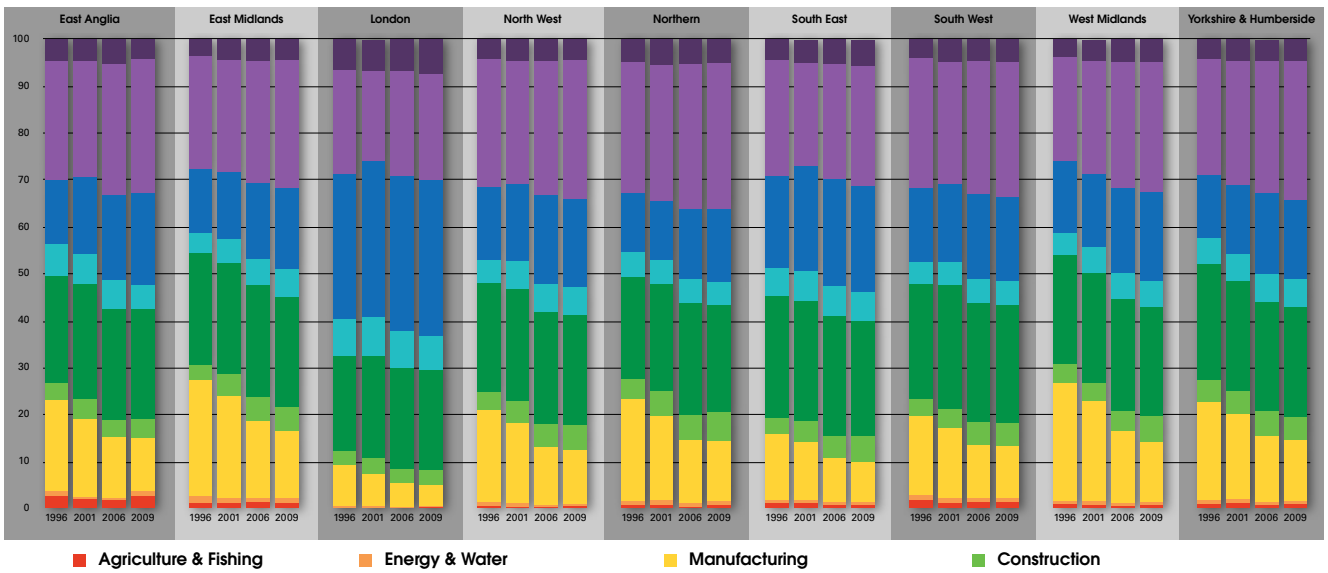
for both skilled and unskilled industrial labour will continue to fall and it will be the old industrial areas that continue to suffer as a consequence: in other words, the East and West Midlands and parts of Northern England.[24]

Perhaps the central problem of disadvantaged regions is that they become less self-sufficient and overly reliant on the public sector both for work and for income, a tendency that has been particularly noticeable in the more disadvantaged regions of England.[24] No problem there perhaps, except for the fact that by 2004, this process had perhaps gone as far as it could: the risk was that growth would slow down.[24] This seems all the more likely given the current squeeze on public spending.

The simple fact of the matter is that the most attractive environments for economic activity (and so population growth) are in the East Midlands and the South.[15; 24; 25] The English, as Rasmussen noted 80 years ago, as Hall confirmed 40 years ago, and as Arup reiterated in *Regional Futures*, like the idea of living in rural areas, are generally happy enough to live in the suburbs, and prefer to steer clear of living in the city.[24; 26; 27] Such locations can be found throughout England, but they do not always come with good job opportunities; relatively few such places can be found near the large northern cities, compared with the South East of England.[24]

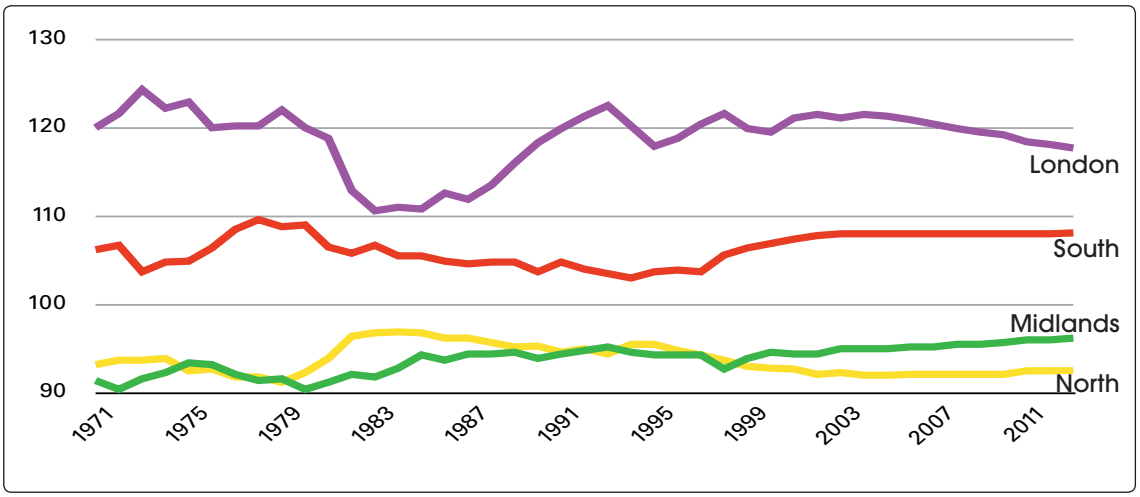
Across all regions manufacturing is shrinking, and the service industries are growing, a trend that is well over decade old (see figure *Employment by sector and region, 1996-2009*). The point, however, is that London and the South East have started from a lower baseline; they have had less to lose in recent times. Disparities in regional Gross Value Added per person remain shocking. Whereas the Midlands and the North have, since the early 1970s, hovered at a relative GVA per person of round about 90-95 (assuming a UK average of 100), the South has stayed above 100, while London, even at lowest point in the mid-1980s, has stayed above 110; mostly, London has been at 120 (see figure *GVA per employed person*).

The lack of opportunities in certain places show up statistically as a higher rate of unemployment, plainly visible in the graph showing the disparity between the employment in the Northern



Employment by sector & region,1996–2009

In all regions, manufacturing is shrinking, service industries are growing. *Source: ONS*



GVA per employed person (relative to UK)

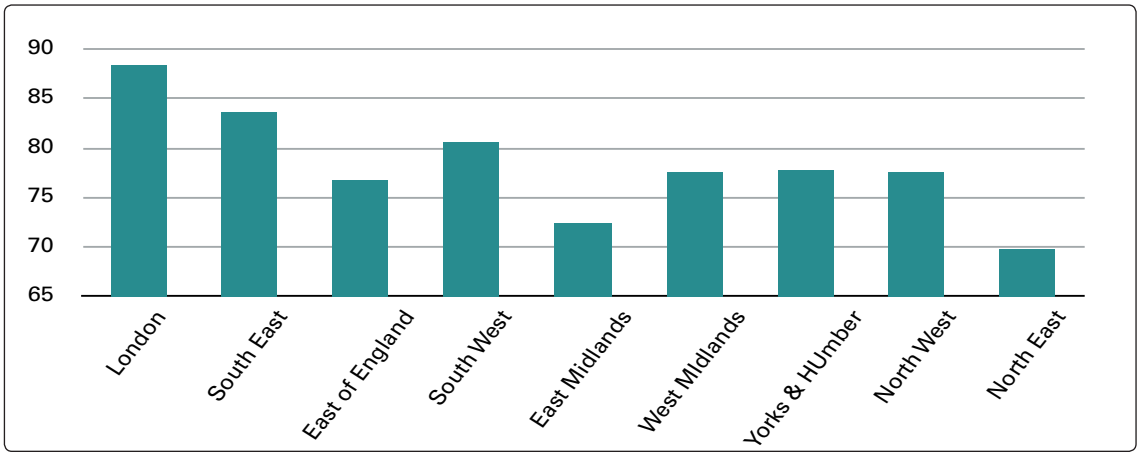
South includes South East, East and South West. Midlands includes East Midlands and West Midlands. North includes Yorkshire and the Humber, North West, North East). Values are all relative to the UK average of 100.
Source: Arup (2004) Regional Futures

regions and the South East. Once again, London and the South-East show far more strongly than the country's other regions: only the South West comes close.

How will jobs and housing appear in 2050? On current trends, England will be a more polarised, less resilient sort of place. As work patterns become increasingly dispersed, any form of public transport will be less viable and the private car will continue to be the dominant mode of transport. London and the South-East will be overheated, socially, economically and environmentally, and some of the larger northern cities, now outposts of London and the south-east, will benefit from the south-east's problems. But there is a caveat: they will have pockets of great wealth, and patches of deep poverty. This process of polarisation will probably be exacerbated by a resistance to the construction of new homes and new communities, again in the South-East, as local people come increasingly to fear the possibility that the South-East will become one large built-up area.

A dismal prognosis for 'business as usual' then; it takes little imagination to derive, for it is little more than a fairly straight extrapolation of the old, familiar trends. The simple fact of the matter is that since the early 1970s, people have been leaving the larger cities and heading for smaller towns and villages, rural areas and the coast. Even allowing for the evident (if partial) urban renaissance in the centres of cities such as Manchester and Leeds, the English retain a strong preference for a suburban lifestyle.[6, 19, 20]

This dispersal of jobs and housing has of course resulted in, and contributed to a change in transport patterns and behaviour. Some would argue that these changes have not always been for the better. There is a certain circularity about live-work patterns and transport: each will tend



Employment by region, 2004

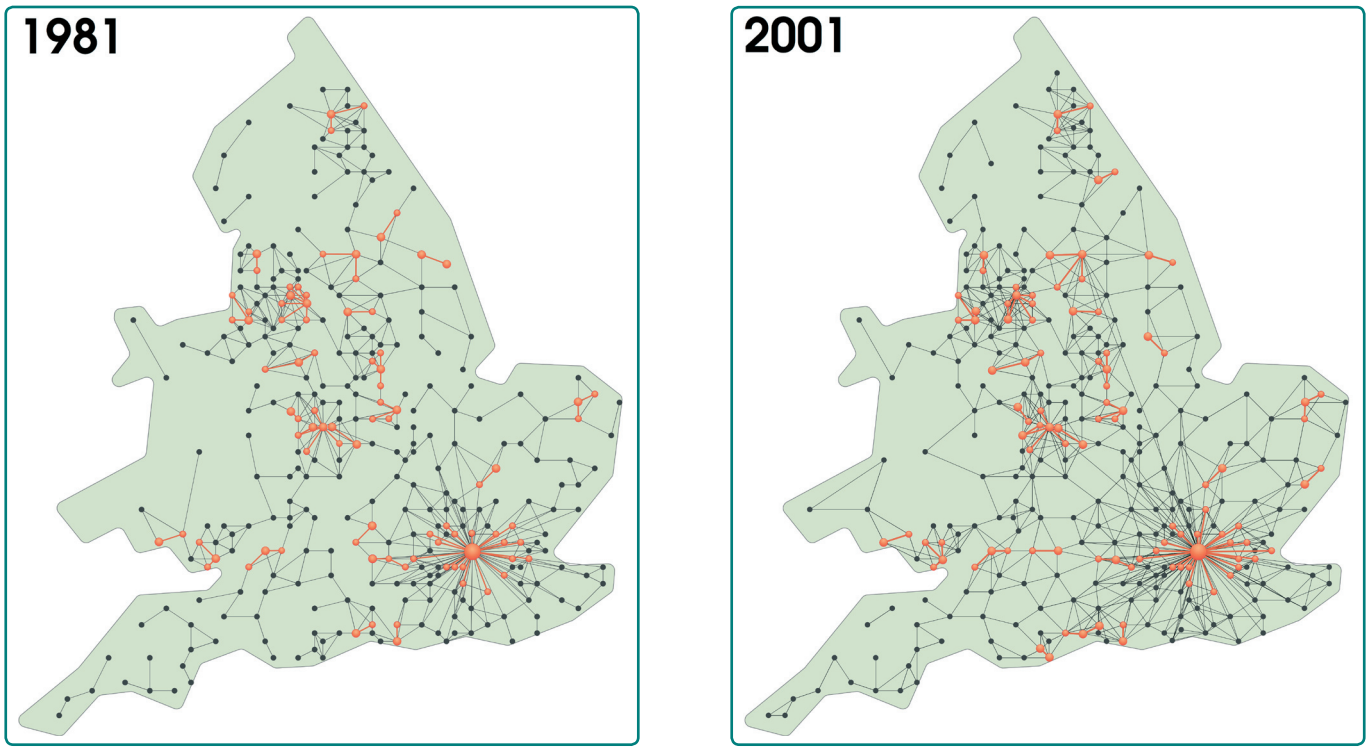
Employment by region 2004 (total employed / working age population).
Source: Arup, 2005, Regional Futures

to reinforce the other. We have seen, if briefly, how the economy influences live-work patterns and hence transport. So next, a different point of view: that of transport.

Transport 2050

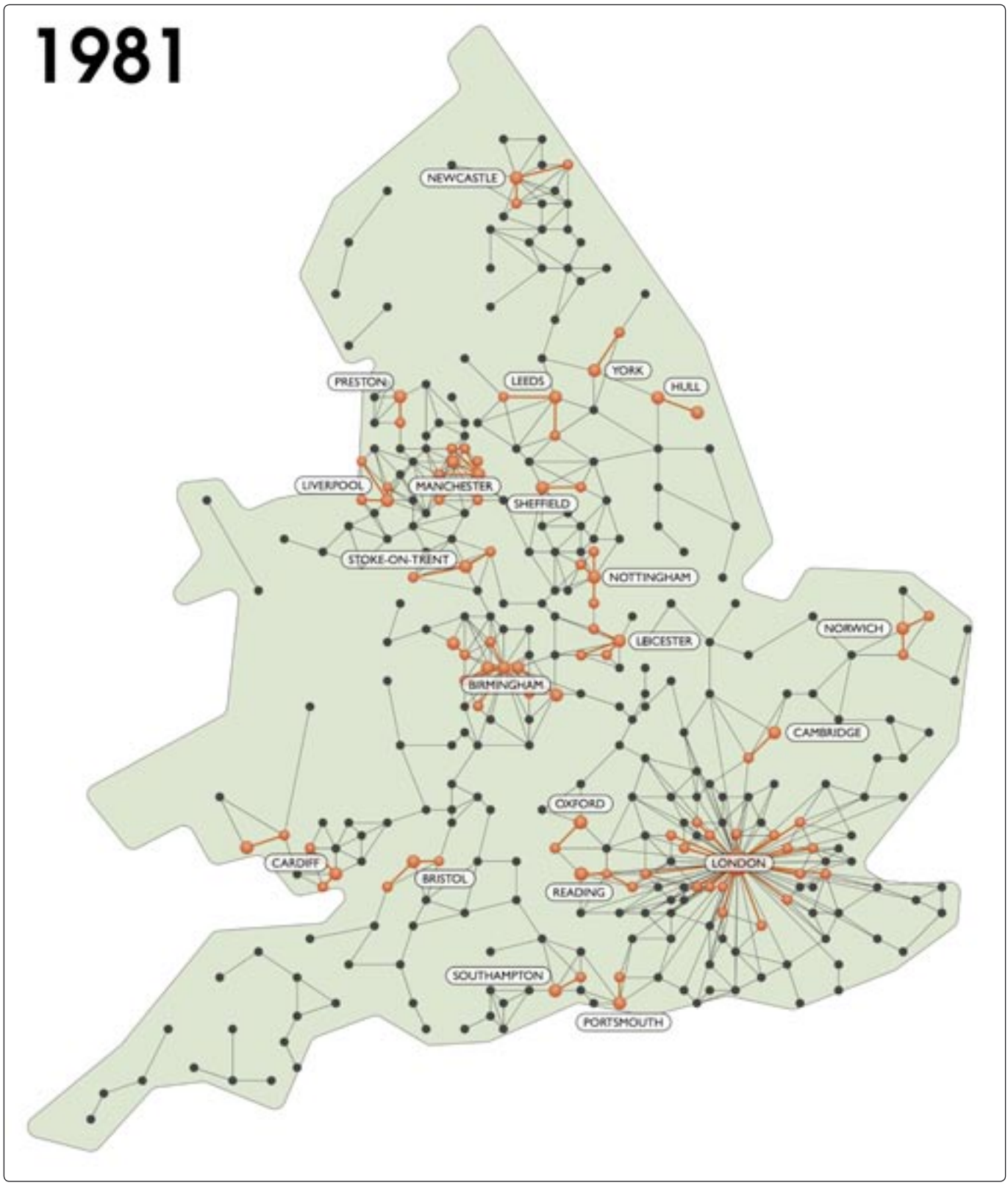
Invidious it may be, but the likely pre-eminence for the foreseeable future of the private car needs recognising.[6] It is a basic consequence of the tendency, already noted, for live-work patterns to become more and more polycentric (see figure *The dispersal of jobs and housing*). Of course, car-free city centre living is perfectly feasible, if public transport is good enough, and facilities are readily accessible;[28] besides, not everyone even wants to own a car. The problem becomes less tractable as settlement patterns become more dispersed, though, so the question is how to give people a choice of transport modes, so that car ownership is not obligatory.

Making this so is more easily said than done, and by way of example, we can consider the commuting situation in South-East England. At high levels of commuting, the South-East is rather monocentric, with straight commuting runs into London; ideal for public transport. But at lower levels of commuting, the picture becomes much more complicated. There are reasonably high flows between the second-tier towns and cities around London, which can support some sort of bus network. At the lowest levels of commuting, we have relatively small flows of people travelling between all of the different places, and some sort of private transport is in many instances going to be the fastest mode of transport; probably it will be the motor car, although it could equally be a motor cycle or, for the shorter journeys, the bicycle.



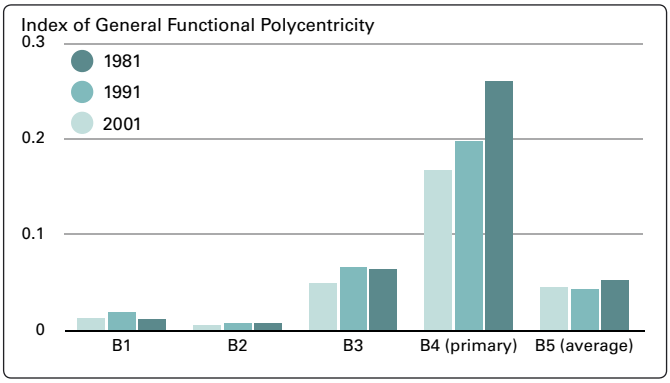
The dispersal of jobs and housing, 1981–2001

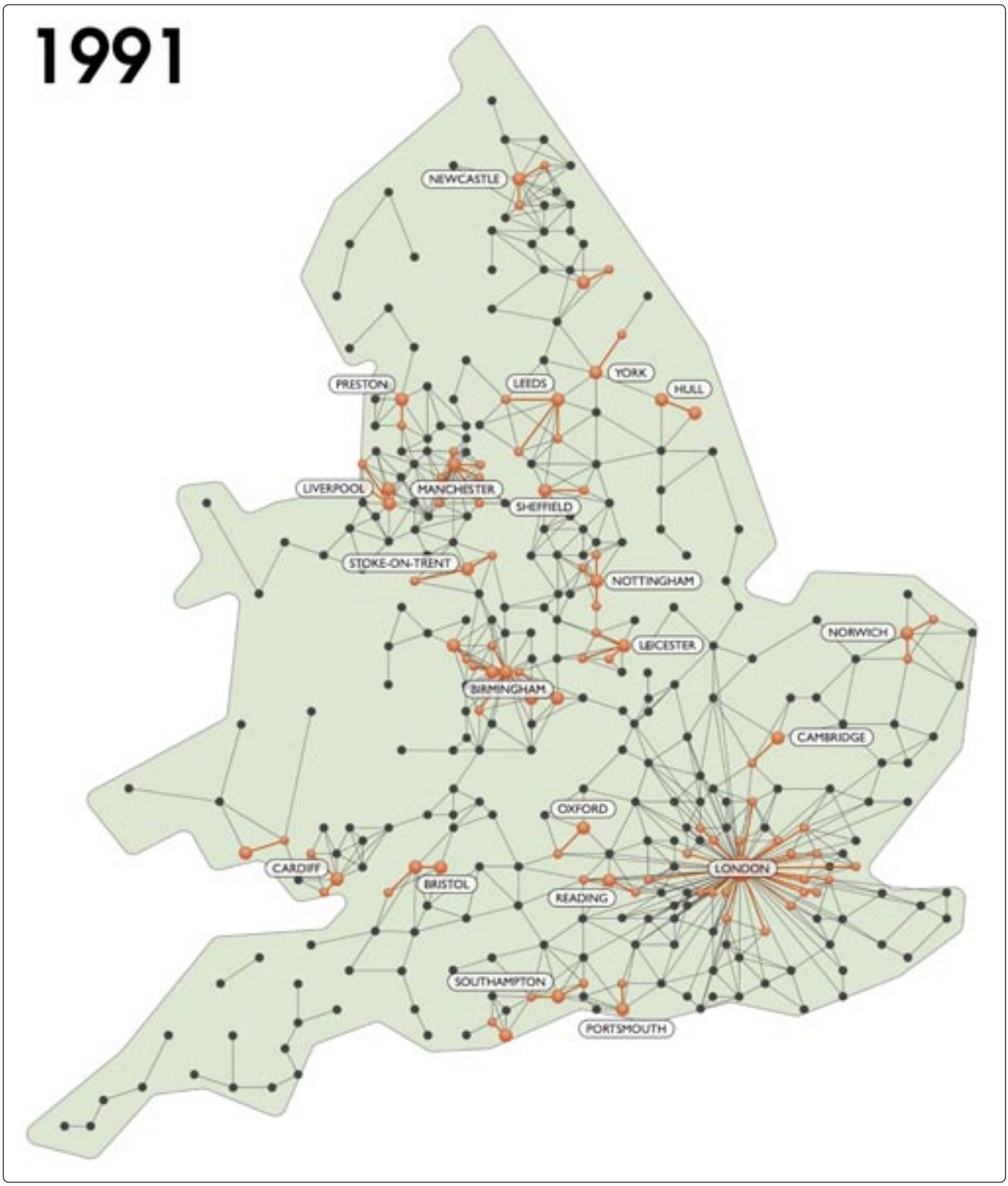
Cartogram showing commuting networks in 1981 and 2001. These cartograms show two levels of daily commuting flow: from 10,000 to 100,000 (black); above 100,000 (red). Nodes inidicate districts, exceptLondon, which shows the 33 boroughs. Two things are evident from these cartograms. First, England is becoming more connected, insofar as more people are commuting between more nodes. Secondly, at the lower level, the country is quite polycentric, but at the higher level, the country is quite monocentric around the major cities.
Source: Green, 2008

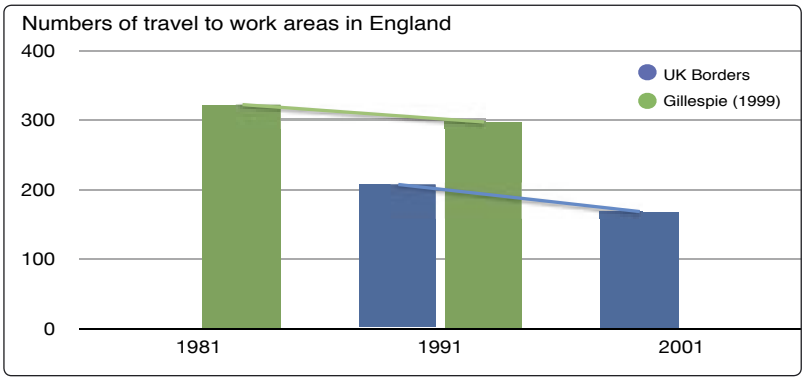


Commuting networks in England 1981 – 2001

Cartograms showing commuting in 1981, 1991 and 2001 (read from left to right). These cartograms show two levels of commuting: Band 4, shown in black, covering flows of from 10,000 to 100,000 per day; and Band 5 ,shown in red, covering levels above 100,000 commuters per day. The nodes show individual districts (except for London, which shows the 33 boroughs. Two things are evident from these cartograms. First, England is becoming more connected, insofar as more people are commuting between more nodes. Secondly, at the level of Band 4, the country is quite polycentric, but at the level of Band 5, the country is quite monocentric.
Source: Green, 2007

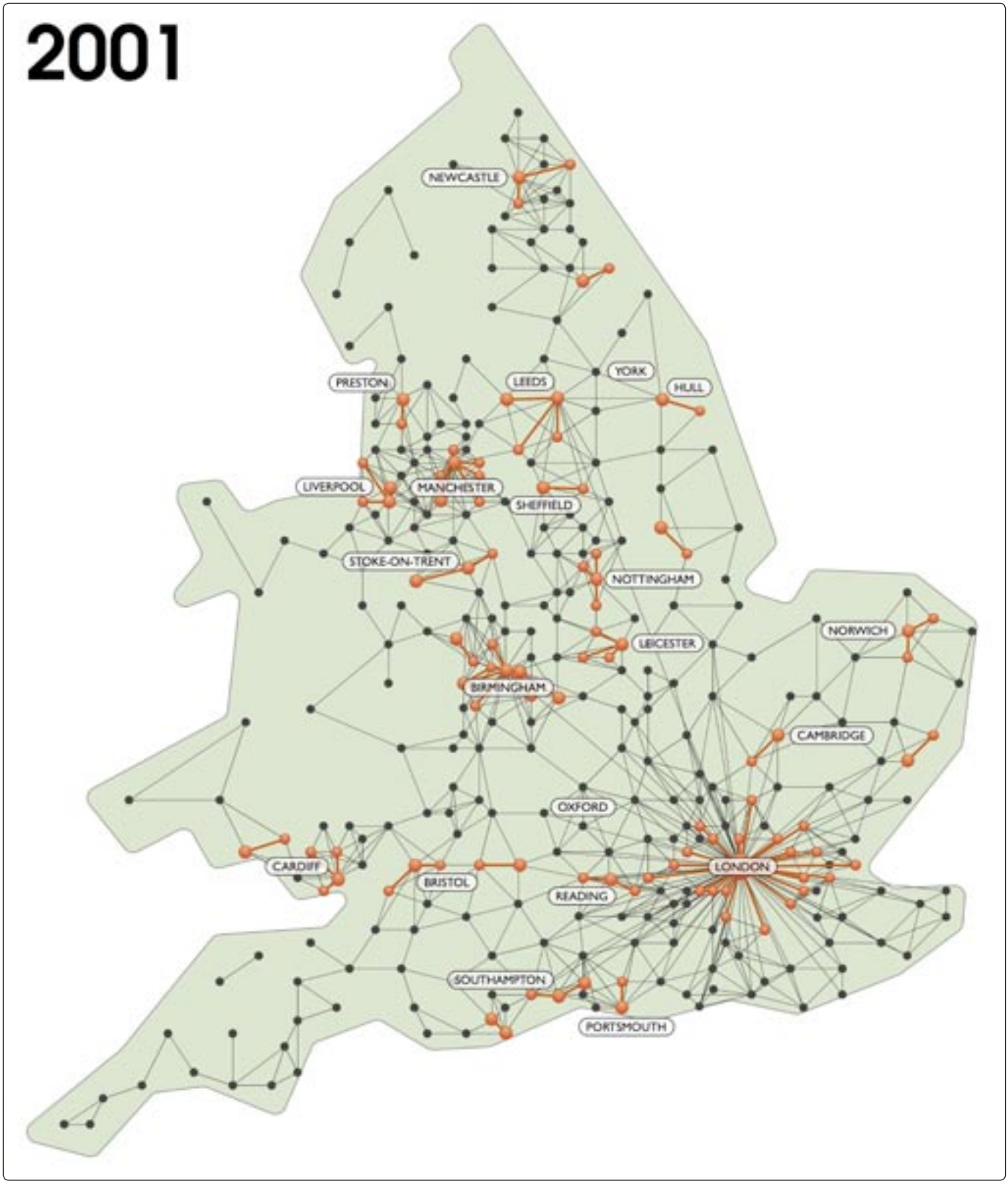




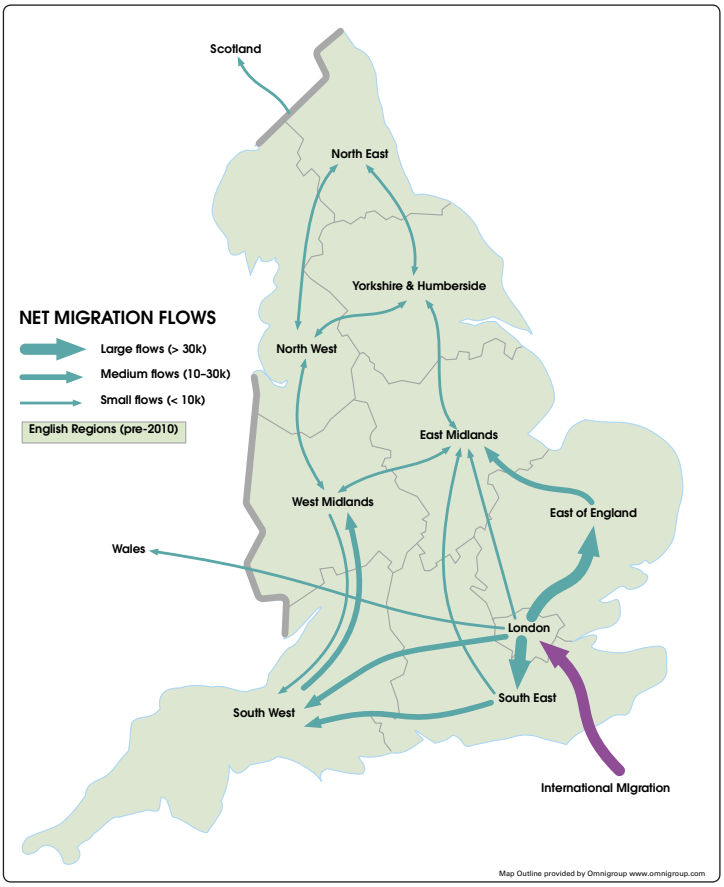


Polycentricity & Travel to Work Areas

A declining number of travel to work areas suggests that the working population is becoming increasingly dispersed. This graph shows the change from 1981-91 and from 1991-2001, albeit from different sources. What both have in common is that the number of TTWAs is declining.
Source:Gillespie 1999; UK Borders

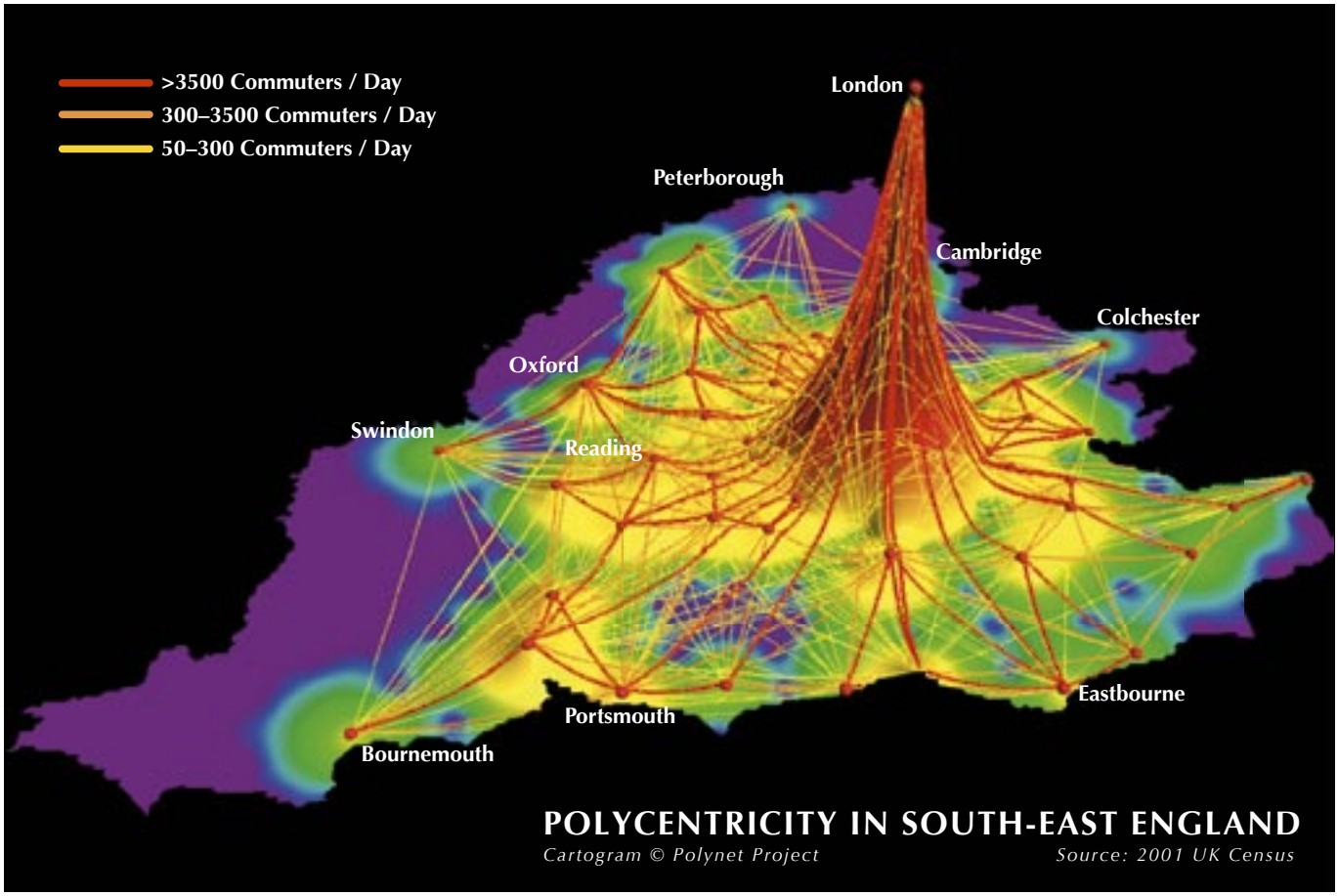


ENGLAND: PATTERNS OF LIVING & WORKING



Migration between regions, 1998–2002

This shows the migration flows between regions, from 1998–2002. London has both large flows outwards, to adjacent regions, but a reduction in London's population is counteracted by international migration to London. The general pattern suggests a dispersal of population.
Diagram based on Arup (2005) regional Futures, p.28 et seq



Polycentricity in South-East England

Cartogram showing different commuting patterns in South-East England, based on the 2001 UK Census. At high levels of commuting, the pattern is monocentric (centred on London). At lower levels of commuting, the patterns become more polycentric, as people travel between the smaller towns and cities around London. The height of the peaks represents the total number of daily in-commuters.
These patterns may be found around the other major English cities, and clearly have implications for transport policy.
Source: Cartogram by Nick Green for the Polynet Project.

Moreton-in-Marsh Railway Station, Gloucestershire

Local railways are a vital part of the wider railway network, but often outshone by higher profile projects. *Photo: Nick Green*

The point is that particular live-work patterns will tend to favour particular modes of transport, and since all modes of transport require some sort of investment, solving the problem revolves to some extent around the questions of what to invest in, and where?

We know that poor transport results in poor access to employment, and it follows that uneven development can be perpetuated, enhanced or reduced, by patterns of transport spending, whether on roads, buses, trams or cycle lanes. In other words, transport investment has an effect on whether or not people are disenfranchised.[6]

This basic fact means that the English regions outside London are at a disadvantage; and even more so now that regional strategies (except London's) have been scrapped. Nor (again, with the exception of London) do they have the powers of the devolved territories due to asymmetrical patterns of devolution, perpetuating an unhealthy dependence on the capital. This in turn leads to the neglect of any potential relationships with institutions outside of London, the practical upshot of which is that skilled labour continues to migrate to South-East England.

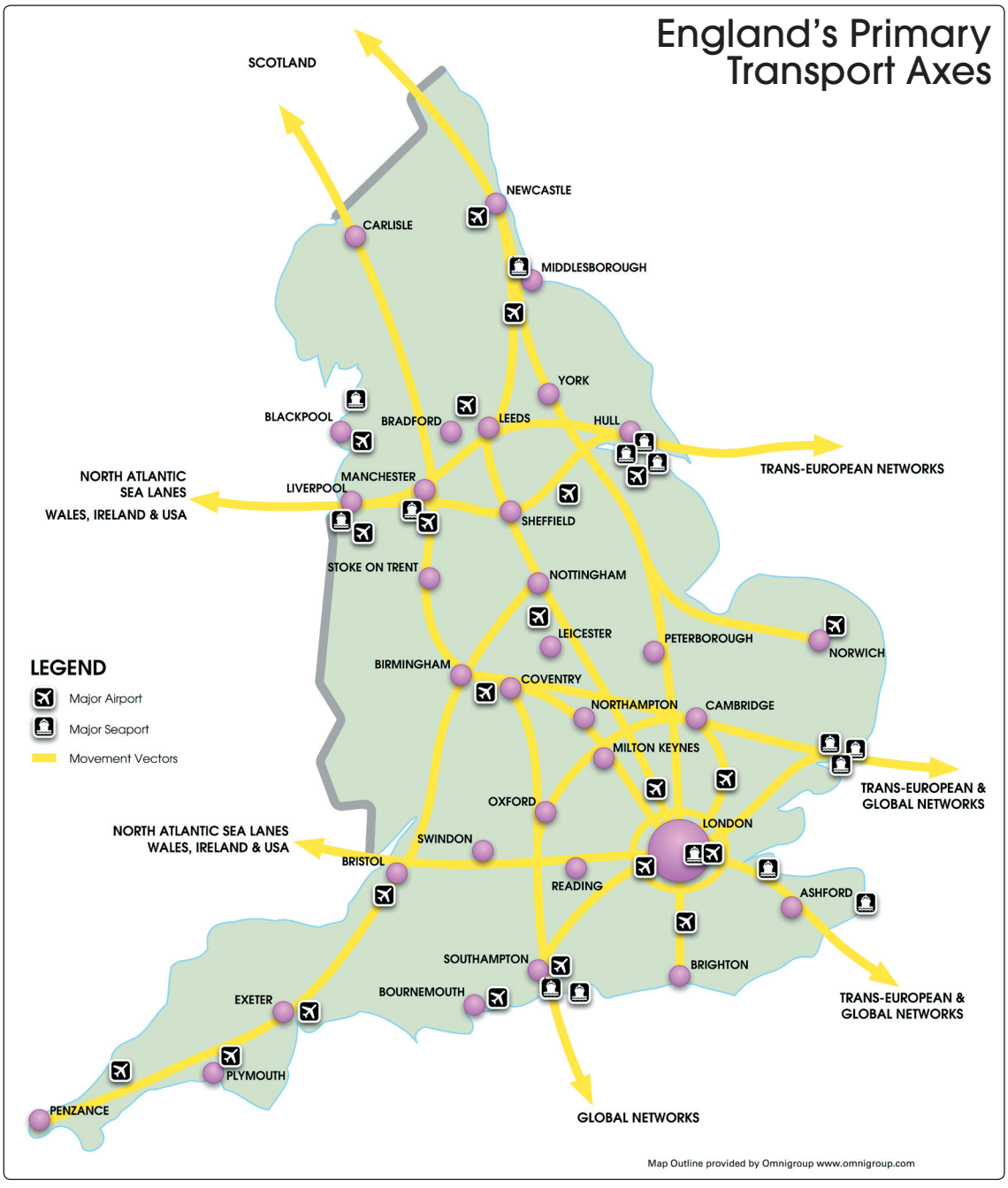
Nonetheless, all areas, including England, have invested well above inflation in transport since a low in 2000. Scotland heads the list, England sits in the middle, while Wales has invested less than England. Overall, recent UK transport investment has hovered at around 0.6% of GDP, although it was greater than 0.8% for each of years 1989-95. The differences lie in what the money has actually gone to; while the territories have invested more than England in new rail infrastructure, London, uniquely, has delivered on road user charging and bus investment, while Scotland has led on concessionary fares.

At the sub-national scale, there has been a certain amount of 'filling-in,' for example through meta-regions such as the Northern Way, or the growing tendency for the larger cities to think

of themselves as city-regions, or more recently, multi-area agreements. With the exception of London, these sub-national areas have, so far, shared a common weakness of limited power with regard to prioritising spending, generating policy, and raising and spending money.

London is unique in that it has delivered on the UK policy rhetoric, particularly of Labour's first term, and it is worth asking how and why it has managed this. The answer lies partly in the demands arising from limited devolution; did a lack of tax raising powers lead to the congestion charge? It has also combined this with other investment to do things not available to other English regions. For example, support for buses increased in London by more than 5000% between 1996/7 & 2006/07, but London consumes 63% of English bus subsidy for about 40% of the journeys.

Outside the Golden Arc, roads are more significant in travel terms than rail. While traffic in London increased by just 1% over the decade from 1996 to 2006, traffic in England as a whole increased by 15%. Even cities with excellent road connections have considered (and Manchester tried unsuccessfully to introduce) a congestion charge. Since the mid-1990s and the completion of the



England's primary transport axes

Cartogram showing England's notional primary transport axes, airports and seaports. England sits at the nexus of the Trans-European trade networks and the North Atlantic sea lanes, a position that gives it both economic and strategic importance.
Source: Derived by the authors from Eddington, 2006, The Eddington Transport Study; DfT, 2008, Delivering a Sustainable Transport System.

Table 4: Transport modes in 2050

Clearly, there is a need for transport policy to be more joined up, both along the lines proposed in CLE, and also along lines recently described by Peter Hall.[29, 30] Likewise, CO2 emissions from transport will probably increase across the central economic zone of Europe,[23] including much of England. These changes will take place against the backdrop of a rapidly changing energy landscape, and a consequent shift to electricity for ground-based transport.[7] Sea and air-based transport are more problematic. This is our prognosis for some of the different transport modes
Cars will almost certainly be electrically powered, and possibly semi-autonomous by 2050.[6] Along with vans, lorries and the like they will continue to be necessary when public transport cannot cope. The most obvious example of this scenario is when living and working patterns become highly dispersed and decentralised. However cars, no matter how they are powered, generate congestion in urban areas.
Personal Rapid Transit (PRT) systems, which lie somewhere between guided buses and the private car, may become more pervasive, particularly in dispersed, polycentric areas.
Buses will continue to operate in towns and cities where traffic congestion is a problem (as it always has been), and across rural areas too if adequately subsidised. Private means of transport, and in particular the car, will continue to provide strong competition to such rural bus services.
High-speed Coaches may have a role in the context of a high-speed luxury electric coach network running on motorways, perhaps as a supplement to high-speed intercity trains.[7]
Bicycles will become an increasingly popular form of transport in urban areas as cycling facilities improve and traffic congestion worsens. In rural areas, the popularity of cycling as a simple mode of transport (rather than a leisure activity) will depend on how safe rural roads are perceived to be. Electric cars may be quieter, but they go just as fast, and so for rural cycling to thrive, rural cycle lanes will be essential.
Trams & light rail will be crucial to the sustainable regeneration of city-regions, since they link high-speed rail networks, centred on cities, to the surrounding city-regions. They will also connect the smaller city-region sub-centres to each other.
Trains High fuel prices will make short-haul (in-island) flights unattractive. Instead, trains running on an upgraded network provide point-to-point travel, with the advantage of intermediate stops which may reduce geographical inequalities of opportunity/access. Being electric, trains are not reliant on any one energy source. Trains will carry more frieght than at present.
Aeroplanes will continue to exist in some form or other, but they will once again be the preserve of the rich, the military and government. As fuelprices rise, short-haul flights will become uneconomic compared to high-speed trains or coaches. For long-haul flights, prices will be high.
Sea Liners: Low-speed inter-continental travel may once more be primarily by wind-assisted ship. Although such trips would take longer, it would still be possible to work or relax comfortably on the journey. Container ships can also be wind assisted.
Airships: Lighter than air, so could be electrically powered. But they are slow, large, and fly beneath the weather and so will largely be confined to surveillance, airborne filming and the like.

motorway network, overall spending on roads has actually fallen; of what remains, 30% goes to London and the South East, and the bulk of that to London.

Urban transport spending in general has become more skewed toward London; spending on rail is high as a proportion of transport spend and it benefits London and the South East disproportionately. Aviation policies also disproportionately benefit London and the South East. In short, it is evident that in terms of transport, as with so much else, the nation is the polarised. In practice, that means that while the Golden Arc has good public transport, the rest of the country remains reliant on the motor car. Over the longer term, this may prove unsustainable.[29]

How to handle this? Over the longer term, the role of rail transport is crucial to the sustainable development of local economies; the trick, however, is not only to link the main regional centres to London more effectively, but also to link those regional centres to nearby and under-performing towns and cities. Thus both intercity rail lines and sub-regional light rail need properly targeted investment.[29]

Freight too needs considering. We saw earlier that the ports to the south have done better than those farther north, and this raises the question of whether or not a purely market-driven approach in general will benefit local economies. *Connecting Local Economies* concludes that it probably will not, and suggests a process of 'rail-gauge enhancement,' such as increasing the clearance beneath bridges over railway lines to enable taller trains, as a step towards shifting freight from road to rail.[29] Not only would this enable ports in the north of England to compete more effectively with those in the south, and move freight from the road network to the rail network; it would also enable higher capacity inter-city passenger trains, improving intra-island connectivity, and smoothing the shift away from short-haul flights.[29]

Clearly, there is a need for national transport policy to be much more joined up, both along the lines proposed in CLE, and also perhaps along lines recently described by Peter Hall.[29; 30] This is all the more important, given that CO2 emissions from transport will probably increase across the central economic zone of Europe.[23], including much of England. These changes will take place against the backdrop of a rapidly changing energy landscape, at the heart if which will be a shift to electricity as the future energy source for ground-based transport,[7] although biofuels will probably play an increasingly large role in air transport and shipping.[31] Nonetheless, inter-continental travel may well decline (our prognosis for some of the different transport modes is set out in table four on the previous page).

All of these changes however, more or less dramatic though they may be, will not on their own change things for the better. If transport becomes more expensive, and if work becomes more dispersed — admittedly a big 'if' — then those in need of work will also be in need of transport. The problem is that they will be the least able to afford it. As discussed at the beginning of this section, a job, no matter how good, is no job at all if you can't get to it. What this means is that the small, mundane, unglamorous and unloved local public transport schemes may well turn out to be more important than the higher profile schemes. For areas such as the North East of England, this is a central point.

The country is a whole is likely to be buffeted by global changes over the next few decades, and where people end up living and working will have much to do with how they end up living and working. The South East is already over-stretched economically and environmentally, but the combined forces of positive feedback and perceived economic necessity mean that it will in all probability remain pre-eminent. To be sure, some functions could be moved farther north, and some governance functions already have been. It is perhaps worth remembering that the City of Westminster, as a seat of government, was deliberately established some distance from the financial district of the City of London.

That is the point, of course. Getting around has never been easier than it is now, and wise investment is needed at all levels: local, regional and national. No easy task, especially at a time of economic crisis; but then no one said it would be.

References

1. Jenkins GJ, Murphy JM, Sexton DS, Lowe JA, Jones P & Kilsby CG (2009) *UK Climate Projections: Briefing Report*. Exeter, UK: Met Office Hadley Centre.
2. Vince G (2009) ' Surviving in a warmer world.' *New Scientist*. 25 Feb 2009 (2967).
3. Gill SE, Handley JF, Ennos AR, and Pauleit S (2007) ' Adapting cities for climate change: the role of the green infrastructure.' *Built Environment*. 33(1).
4. Environment Agency (2009) *Flooding in England: A National Assessment of Flood Risk*. Bristol: Environment Agency.
5. Royal Commission on Environmental Pollution (2007) *The Urban Environment*. London: The Stationery Office.
6. UK Foresight (2010) *Land Use Futures: Making the most of land in the 21st century - Final Project Report*. London: Government Office for Science.
7. ITPOES (2010) *The Oil Crunch - Securing the UK' s energy future*. London: Industry Taskforce on Peak Oil & Energy Security.
8. Shell International (2008) *Shell energy scenarios to 2050*. London: Shell International.
9. Hubbert MK (1949) ' Energy from Fossil Fuels.' *Science*. 109(2823).
10. Hubbert MK (1956) *Nuclear Energy and the Fossil Fuels*. Houston, Texas: Shell development Company.
11. MacKay DJC (2009) *Sustainable Energy – Without the Hot Air*. Cambridge: UIT.
12. Dodd N, King M & Shaw R (2008) *Community Energy: Urban Planning for a Low Carbon Built Environment*. TCPA & CHPA.
13. DTI (2007) *Meeting the Energy Challenge - A White Paper on Energy*. The Stationery Office / Department of Trade & Industry.
14. Shaw R, Marrion J & Webb R (2006) *Sustainable energy by design: a guide for sustainable communities*. London: Town & Country Planning Association.
15. Leunig T, Swaffield J & Hartwich O (2007) *Cities limited*. London: Policy Exchange.
16. Crafts N, and Mulatu A (2005) ' What explains the location of industry in Britain, 1871-1931?.' *J ECON GEOGR*. 5(4).
17. Hall P (2002) *Urban and Regional Planning*. London: Routledge.
18. Batty M (2001) ' Polynucleated Urban Landscapes.' *Urban Studies*. 38(4).
19. Breheny M (1997) *The People: Where Will They Work?*. London: Town & Country Planning Association.
20. Breheny M, and Hall P (1999) *The People: Where Will They Live?* London: Town & Country Planning Association.
21. Green N (2008) ' City-States and the Spatial In-between.' *Town & Country Planning*. 77(5).
22. Parkinson M, Champion AG, Simmie J, Turok I, Crookston M & Park A (2006) *The State of the English Cities (2 vols.)*. ODPM Publications.
23. ESPON (2007) *Territorial futures - Spatial scenarios for Europe, ESPON 3.2 Final Report Summary*. Belgium: ESPON Programme.
24. Arup (2005) *Regional Futures*. Ove Arup & Partners Ltd.
25. Leunig T & Swaffield J (2007) (ed. Hartwich OM) *Cities Unlimited - Making urban regeneration work*. London: Policy Exchange.
26. Hall P (1973) *The Containment of Urban England*. London: Wiedenfeld & Nicolson.
27. Rasmussen SE (1937) *London, the unique city*. Cambridge, Massachusetts: The MIT Press.
28. Banister D (2005) *Unsustainable Transport - city transport in the new century*. Abingdon, Oxfordshire: Routledge.
29. Hetherington P & Hall P (2010) *Connecting Local Economies - the transport implications*. London: Town & Country Planning Association.
30. Hall P (2010) ' Transport networks and dispersed cities.' *Town & Country Planning*. 79(3).
31. Skinner I, van Essen H, Smokers R & Hill N (2010) *Towards the decarbonisation of the EU's transport sector by 2050*. Brussels: European Commission.

4 the case for a national spatial strategy

If the last two chapters of this document have a single message, it is that England has problems of spatial planning that need fixing. The economic imbalances between the Golden Arc and the rest of the country are getting worse. The inequalities between the different regions, of both opportunity and outcome, are getting worse. Transport investment must be not only national, but local: a distant job is no job at all if you can't get to it. Climate change *will* make our cities hot and uncomfortable without measures to improve green and blue infrastructure. Energy shortages, or rather, electricity shortages, *will* affect all aspects of an increasingly technology-reliant society, including transport.

If we carry on as we are with 'business as usual,' we shall of course be doing something; but nowhere near enough. The problems that England currently has will grow slowly and inexorably worse. Economic imbalances, environmental degradation, congested, expensive and unloved transport systems are already plain to see. In a business as usual scenario, they will become dully familiar, a depressing backdrop to a nation that somewhere lost its way.

If a national spatial strategy is created, it will make England more equable, and less polarised; more efficient and less 'make do and mend;' more resilient and less fragile. In short, a better sort of place.

If a national spatial strategy does not garner long term support that covers all of the political spectrum, then it will not last long enough to work; or even matter.

If the will to do something more can be found, there is every reason to expect that our vision of a nation of linked sustainable city-regions, set in a green-blue infrastructure, will become a reality.

If...

5 the business as usual scenario

Facing the future

The very notion of a 'national spatial strategy' raises deep questions about how strategic and regional planning could and should be done. Research by Professor Mike Batty of the Centre for Advanced Spatial Analysis at University College London suggests that the large scale settlement patterns that we see in England might be expected to arise spontaneously as the simple consequence of how people make decisions about where to live and work.[1] The evidence certainly suggests that at the very least, these undercurrents are very strong.[2-5] For the spatial planner this raises awkward questions to do with how over the long term we can work with these undercurrents to and still get to our preferred destination.

In this chapter and the next chapter, we therefore present a couple of scenarios. Both scenarios are plausible, and elements can already be perceived in the way we live now. First is a basic 'business as usual' scenario. It is not apocalyptic, nor even particularly pessimistic; it simply makes the point that the problems that England currently has with regard to geographical inequalities, congestion, asymmetries of development and so forth will continue to get worse. Doubtless other problems will arise.

In the chapter that follows, we set out our vision of how England could be if it makes the most of what it already has. But first, 'business as usual.'

A dim prognosis

We must choose to follow a 'business as usual' strategy, as we choose to follow any other. But to assume that doing the same thing over and over again will somehow lead to different results is, as Albert Einstein pointed out, quite a good indicator of insanity. If we pursue a business as usual scenario then, almost by definition, things will probably carry on much as they are now, and that means a steady and inexorable deterioration of quality of life. It will happen quite slowly, so people will doubtless adapt; for future generations it will be the mundane, somewhat unpleasant and perhaps regrettable normality. The people will cope, but they will inhabit an embittered nation, unwilling but compelled to live with its own poor decisions.

South East England will continue to dominate, but it will become increasingly congested as transport networks reach their limits of capacity. Cars will almost all run on electricity by 2050, so noise and air pollution as a consequence of heavy traffic in towns should not be too much of a problem. The unreliability of energy supplies, which are largely derived from foreign sources as a consequence of inadequate and piecemeal investment in the early 21st century, combined with poor foreign policy, will increase the likelihood of power cuts.

If these extend over periods of 24 hours or more, then cars and buses remain uncharged, and lorries, trains and trams cannot run either. Since working from home often requires communications technology, productivity tends to decline dramatically during power cuts, damaging the national economy. More worryingly, deliveries of food and other supplies are curtailed as a consequence, and emergency measures need to be taken from time to time to quell the problems that arise from such uncertainties.

Increasingly dispersed working patterns have encouraged greater car ownership, and as a consequence the fine network of roads and lanes that connect up the towns and villages of the South-East are mostly congested, and generally seen as unfit for cycling or walking; even if the place of work is nearby, cycling is not seen to be a viable way of getting there.

It seems a plausible hypothesis that a business as usual scenario such as this would ultimately be damaging to England's economy; at any rate, it seems unlikely that increased congestion, lowered quality of life and less reliable energy supplies would improve it. Indeed, this scenario adopts the position that sustained long term growth at historic rates in the south east cannot help but produce increasingly onerous adverse side-effects, as well as a more polarised nation.

To make matters worse, these technological problems are all overlaid on environmental ones, for the shear density of development results in an over-stretched water supply that sees water shortages as an unwelcome fact of life. The fabled hosepipe ban, once a regular Summer inconvenience, is now permanently enshrined in law.

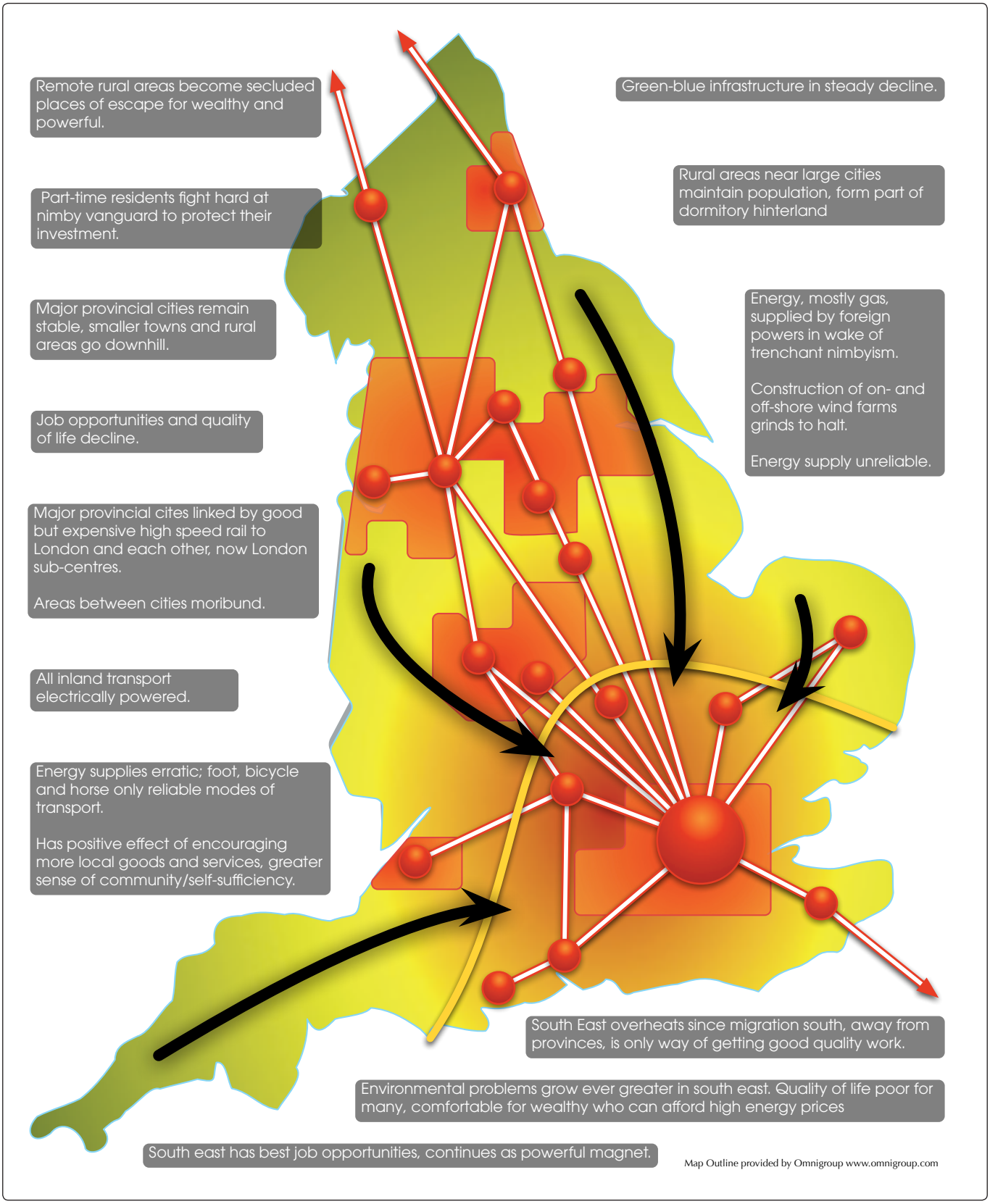
Meanwhile, the rest of the country has to play the role of 'back-office' to the South-East, but it struggles to do so, both practically and politically. The provincial cities, connected to London and one another by increasingly creaky rail lines, function as grudging extensions of London. The areas in-between, resentfully half-remembered, half-forgotten, have little option but to fend for themselves. They have done this by relying less on electricity, which is expensive and intermittent, and more on foot and bicycle. Government, both national and local, is distrusted. Local economies are small but reasonably self-sufficient in many goods and services, which has the positive effect of fostering a greater sense of community and self confidence. So the story is not wholly negative.

That's not the point, though.

The point is that if we want it to be, the story can be much, much more positive.

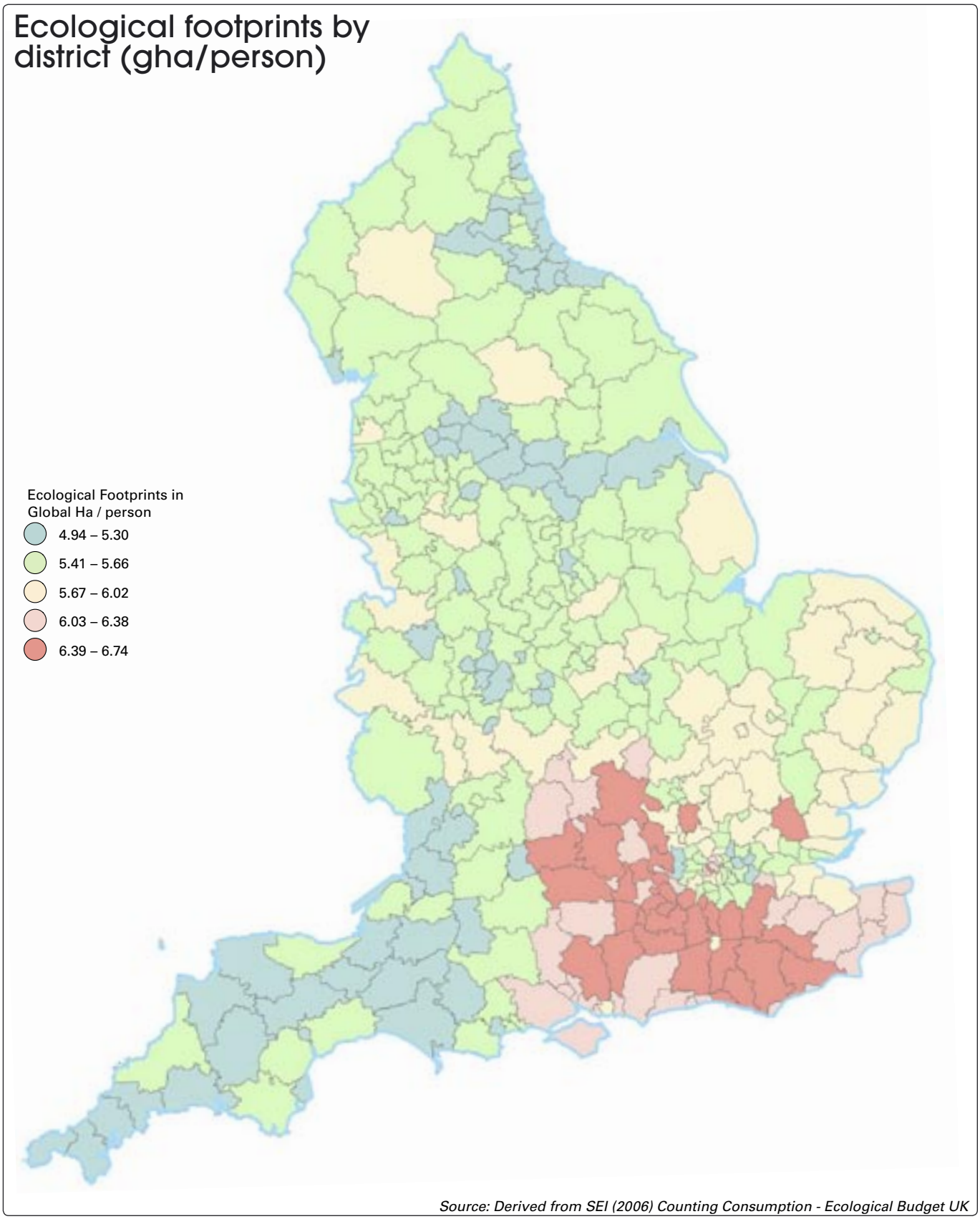
References

1. Batty M (2001) ' Polynucleated Urban Landscapes.' Urban Studies. 38(4).
2. Champion AG (1989) ' Counterurbanization in Britain.' Geographical Journal. 155
3. Champion AG (2001) ' A Changing Demographic Regime and Evolving Polycentric Urban Regions: Consequences for the Size, Composition and Distribution of City Populations.' Urban Studies. 38(4).
4. Green N .(2010) "The English Problem: Planning for a Peri-urban nation" presented at Managing the rural-urban interface - Strategies and Tools for Urban Development and Sustainable Peri-urban Land Use Relationships, Unversity of Copenhagen, Denmark. October, 2010.
5. Richardson HW, and Bae CHC (2004) Urban sprawl in Western Europe and the United States. Ashgate Pub Ltd.



England in 2050? Where we are heading

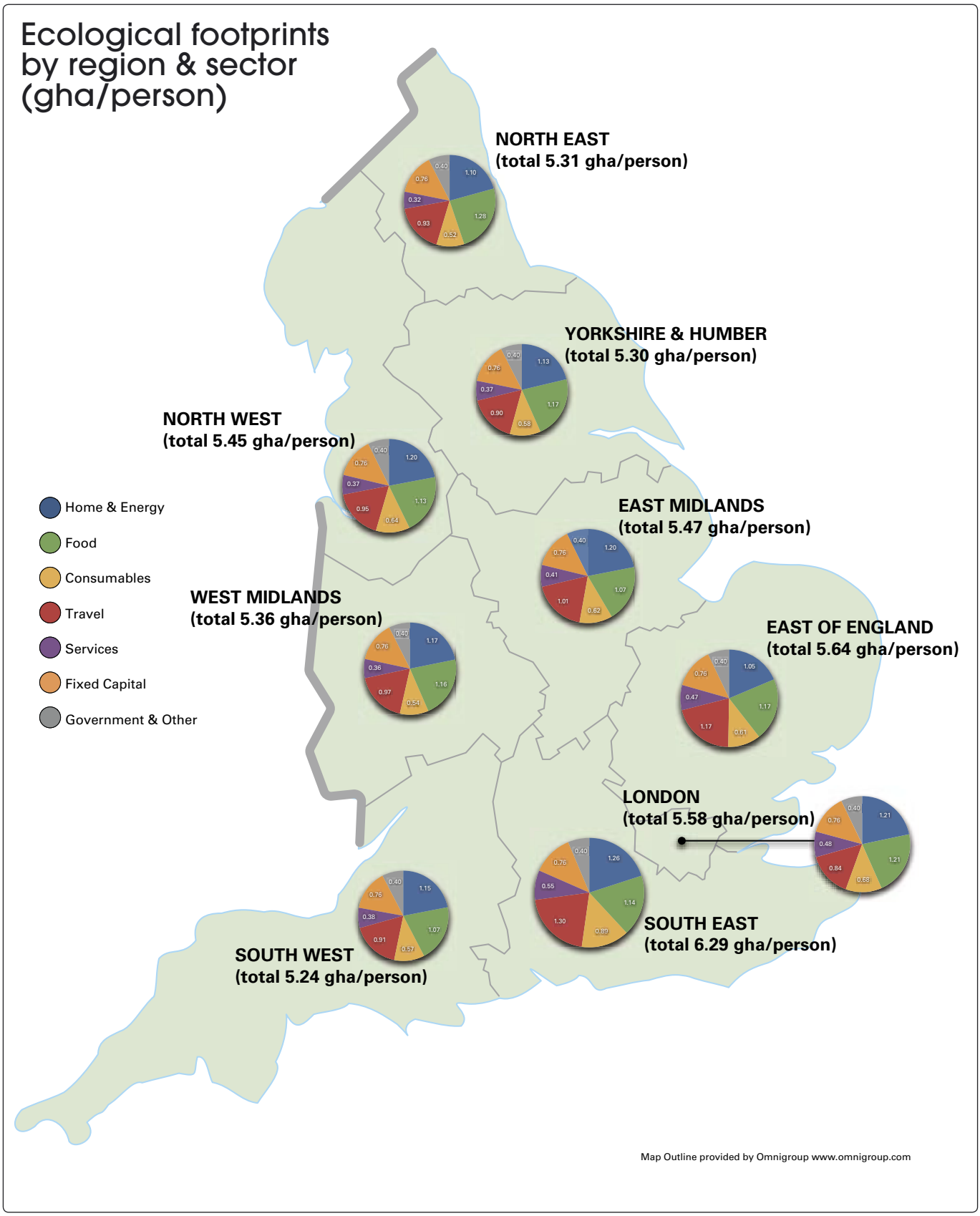
An overview of England 2050, if we carry on as usual. Not apocalyptic by any means, but not terribly good either. *Source: The Authors*



Ecological footprints by district / UA and by region and sector

The South-east already has a larger ecological footprint than the rest of the country, as shown in the diagram on the left, and this is unlikely to change in the business as usual scenario as the South-east overheats. Nonetheless, changes are needed throughout the country, as is evident from the diagram on the right. The global average ecological footprint is about1.2 Global Hectares per Person. The UK average is between four and five times that amount.

Source: SEI (2006) Counting Consumption - Ecological Budget UK



ECOLOGICAL FOOTPRINTS

6 England 2050?

Good foundations…

England is a reasonably well-connected, urbanised country with a rich architectural heritage and plentiful areas of outstanding natural beauty and national parks. This is a cause for optimism, for it gives a firm foundation on which to build. Besides, the English care little for grand plans from high authority; our point here is that a national spatial strategy need not be a grand plan. And despite their wariness of authority and 'grand projects,' they are willing to adopt new ideas that have obvious practical benefit.

Let us shift to 2050 and, through a lens of optimism, describe some of the common factors that will have come into play by then. Electric cars and the associated infrastructure, now a comparative rarity, will have been around for some decades by 2050. Other elements might be relatively recent, but for the most part, the technologies in 2050 will be familiar to us today. It is the context in which they are used that will have changed. By 2050 there is much more recycling and reuse, and no more landfill; the island is of limited size, after all. Reliable and cheap public transport, supplemented by electric cars where necessary is the norm. In a country that, by dint of necessity, is now somewhat less individualistic than it was 40 years ago, a balance has been struck between the freedom of the car and the slightly lesser freedom, but greater efficiency, of good public transport.

In other words, in this scenario, England 2050 has become a nation of linked sustainable city-regions set in a green-blue infrastructure.

But how?

…But making the most of them matters

At the heart of this scenario is the basic aim of making the most of what we have, and it can usefully be put as a question: What would happen if we thought nationally, linked things up here and there where necessary, but made the effort to take what we already have, and simply make it work properly?

Such an England in 2050 might be expected to be much as it is today, but better in numerous small respects, as the common factors set out above suggest. The road to this sort of future is likely to be one of pragmatism and compromise; but it is also properly planned and implemented, with a strong idea of why this approach is being adopted in the first case.

Factor Four policies[1] will provide the basic means for halving resource use and doubling wealth. In other words, by 2050, England will be using its resources four times as efficiently as it did at

the beginning of the 21st century. This radical approach, originally proposed at the end of the 20th century, will be broadly accepted as society realises that using resources more efficiently need not result in a lower quality of life. Such efficiency also makes the country more resilient, since by learning to use less 'stuff,' England becomes far less reliant on those who supply it, and more secure as a consequence.

Transport will change dramatically by 2050. Throughout Britain, the need to travel will be reduced by changing work practices (see below), and this will do much to solve some of the problems associated with travel. Furthermore, consistently high fuel prices will mean that flying is prohibitively expensive for the vast majority of people. Instead travel over land will be by train, tram, electric car or personal rapid transit. More intercontinental travel will be by sea, perhaps even by ekranoplan, an aeroplane-like machine that skims above the surface of the sea (or the ground); or perhaps by the modern, high-tech descendants of the sailing ship.

As a consequence, major international airports will probably serve entire mega regions, rather than sub-regions. By 2050, two of London's airports will have been closed down, leaving a single London Airport to serve the south-east. This airport will be used mostly by government, the military and employees of large multi-national companies, since flying is the preserve of the wealthy. Those wishing to fly long distances to see their families, or even to go on far away holidays, must save for their tickets. Other airports in the North and West of England and the Midlands are, along with London Airport, linked to the high speed rail network that ties the country's major cities to each other, and to Europe.

On the sites of the two redundant London airports, new settlements have been built, since they were able to take immediate advantage of the excellent infrastructure that was already there. As a consequence of these changes and a general reduction in the number of flights, much of the south east is now considerably quieter, and far fewer people have their daily lives blighted by the noise of low-flying airliners.

Geography matters in 2050. Economically, the London region remains dominant but less so as a combination of circumstances – not least environmental pressures – and better choices encourage people to move elsewhere to seek their fortunes. The North of England benefits from this, but so too does the South-West, along with Scotland and Wales.

The South-East of 2050 has been relieved of a lot of development pressure as a consequence of the redevelopment of the old airport sites as sustainable new eco-neghbourhoods; the improved opportunities elsewhere in the country also work in its favour. Major cities still dominate, but the tendency for population to disperse continues, albeit more slowly and the areas between the cities become more lively as a consequence. The early 21st century ideal of a 'living, working countryside'[2] is fully realised, and much of the land is now a multi-functional provider of ecosystem services. The improved public transport system benefits medium-sized towns and villages, as does the much improved network of cycle and lanes and pedestrian pathways. The consequent decline in car use and increase in cycling, walking and public transport use improves levels of trust, working against a tendency to an atomised society.

Live-work patterns will have changed dramatically by 2050, for the choice now is much more about where to live, rather than where to work. Working patterns are more localised than they used to be, and small firms are the backbone of the nation's economy. Crucially, although the south east is still economically dominant, working there no longer calls for living there. In fact,

for many people, the idea of 'working somewhere' rather than simply 'working for a company' (which could be located anywhere) seems rather archaic.

Very high quality video-conferencing has long been common place, and for most it is a good enough substitute for face to face meetings. Computers are highly energy efficient, very powerful, and extremely portable. For this reason, many business people work at home for at least some of the time. Long-distance business-related travel has declined as a consequence, and most commuting is over short distances. Public transport is highly sophisticated in terms of how it handles this dispersed population, and now follows a 'networked' model using highly advanced logistics to ferry people around between key interchanges; this was a model that had already been successfully implemented in dispersed cities such as Zürich, Toronto and London.[3]

New housing will all be built to zero carbon standards, and those who can remember the late 20th century wonder why they put up with such awful housing before. Still older housing, from the late 19th and early to mid 20th centuries comprises the majority of the housing stock, and it has been refurbished as far as possible; the social cost of demolishing swathes of housing was seen in the 2010s and 2020s as too high a price to pay, even if in theory it was better for the environment.

Nonetheless, a good deal of the late 19th and early 20th century terraced housing that makes up so much of the English suburbs in the large cities proves ideal for combined heat and power provision.[4] By 2050, it will provide versatile high quality, high-efficiency living space, more than capable of being adapted from house to flat and back again, as the local demographic profiles change over time.

Green and blue infrastructure, always one of England's great strengths, will tie the whole nation together in a continuous skein that includes wildlife corridors, a rejuvenated waterways network, eco-belts and more. It becomes more pronounced as you get farther from London, and the choice would, in effect, lie somewhere along a sliding scale - you can have this, not that; or that, not this. In the middle, say near Manchester, or Leeds, the cities, although large, are small enough to get out of quickly and easily, and into England's beautiful countryside. Farther away still, and you are in the wilds of Northumbria. Equivalent to the notion of the Green heart of Randstad Holland, it would thus cover the whole country. It would be created by joining up Areas of Outstanding Natural Beauty, National Parks and other green and blue infrastructure, and helping develop sustainable economies within these peri-urban, in-between areas. There would be very strict restrictions on development, with massively increased areas of green-belt (now upgraded to eco-belts) that are also be used for agriculture with a view to increasing food security.

Eco-belts will replace green belts. Besides their basic function of the containment of urban growth, eco-belts are also highly biodiverse natural bridges between town and country. Areas of green belt that had previously been developed, for example as old factories, are excluded from eco-belts, and new areas of undeveloped land have been added, so that while the total size of the eco-belts remains about the same as the old green belts, the natural quality of the eco-belts is far higher than that achieved by the green belts. These eco-belts provide a vital recreational outlet for city dwellers, as the trends already in evidence at the beginning of the century continue.[5] All farming activity carried out within eco-belts must be organic.

Agriculture and food production will have changed too, and biodiversity collapse due to large scale 'scorched earth agriculture' reversed through the enforcement of more environmentally

benign farming methods, perhaps including GM crops well outside of the eco-belts. Large supermarkets, though still dominant, are forced through a combination of planning regulations and tax incentives to be more locally sensitive, including in their use of local produce.

Many towns and villages also have thriving food markets, since the high cost of transporting food makes local produce cheaper. The longer growing seasons and warmer weather as a consequence of climate change mean that a considerable variety of produce is available, not all of it native to this island.

Much land is multi-functional, for example serving both as an area for recreation, and for flood-control; woodland may serve both to provide raw materials, to enhance biodiversity, to provide recreational space and to provide wildlife corridors linking up the green-blue infrastructure.

Energy supply in England 2050 is from a wide range of sources. These will be mostly renewable, but augmented by the nuclear power stations which were built in the first two decades of the 21st century, and still backed up with fossil fuels. Wind power is from both on-shore and off-shore sources, and power and other cables are either buried beneath the ground, where possible, or hung from streamlined pylons. As a consequence, the whole country enjoys much cleaner skylines. Tidal and wave power provides some energy, as does micro-generation. Passive and active solar sources are both local to England and, crucially, based abroad. But the biggest difference comes from the fact that as a consequence of far greater energy efficiency both at home and at work, less energy is needed. This reduced requirement for energy also lends a measure of resilience to energy policy.

So we have a plan (illustrated overleaf) and it needs putting into practice. How that might be done is described in the next chapter.

References

1. von Weizsäcker E, Lovins AB, and Lovins LH (1998) *Factor Four: Doubling Wealth - Halving Resource Use*. London: Earthscan.
2. Taylor M (2008) *Living Working Countryside - The Taylor Review of Rural Economy and Affordable Housing*. Department for Communities & Local Government.
3. Hall P (2010c) ' Transport networks and dispersed cities.' T*own & Country Planning*. 79(3).
4. Owens SE (1992d) ' Land-use planning for energy efficiency.' *Applied Energy*. 43(1-3).
5. UK Foresight (2010) *Land Use Futures: Making the most of land in the 21st century - Final Project Report*. London: Government Office for Science.

RURAL & PERI-URBAN MATRIX

Very Rural

Peri-urban – Suburban

Suburban – Urban

GREEN INFRASTRUCTURE

National parks & AONBs linked up by green-blue corridors

LINKED CITY-REGIONS

Sustainable city-region with integral eco-belt

Zero-carbon operation rapid transport link

Land boundary

SEA & AIR PORTS, FREIGHT

Major International airport

Seaport

England, Scotland and Wales remain tightly integrated by virtue of improved high-speed rail connections

National Spatial Strategies for England, Scotland and Wales co-ordinated.

Farther from London, England becomes relatively less developed (as is currently the case).

So while in economic and social terms the country is more balanced, and lacks the large pockets of poverty that existed at the end of the 20th century, the different regions and areas maintain their own sense of identity and place.

Northern seaports enjoy resurgence as reduction in Arctic sea ice opens up viable shipping lanes across North Pole.

Improved rail connections enable Northern seaports to be better integrated into Britain's economy.

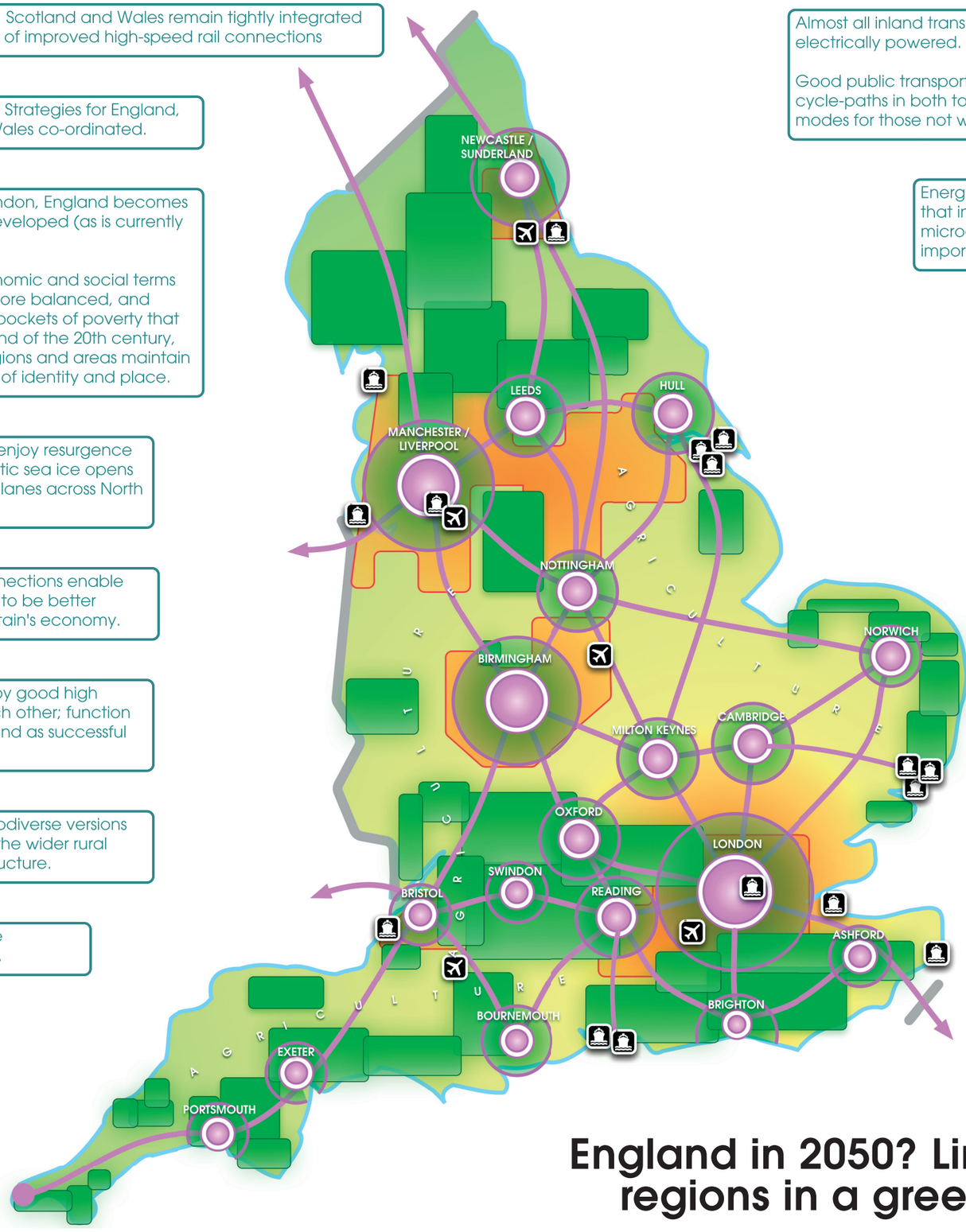
Major provincial cities linked by good high speed rail to London and each other; function both as London sub-centres and as successful cities in their own right.

Green belts upgraded to 'eco-belts' – highly biodiverse versions of the green belt which merge seamlessly with the wider rural area, forming crucial part of green-blue infrastructure.

Major provincial cities grow to form stable cores of wide sustainable city regions, each bounded by an eco-belt.

All large towns and cities have extensive green-blue infrastructure (squares, parks with small lakes, fountains, other water features) to deal with long term effects of climate change.

Green-blue infrastructure improves urban space both environmentally and aesthetically.



Almost all inland transport, including the car, is electrically powered.

Good public transport, and safe roadside foot and cycle-paths in both town & country offer choice of modes for those not wanting (or able) to travel by car.

Energy is supplied by a broad portfolio of sources that in all likelihood will include local microgeneration, offshore and onshore wind, wave, imported solar energy, nuclear and fossil fuels.

More even development across the country helps mitigate some of the environmental pressures on the South-east.

Remote rural areas well connected, made up of largely self-sufficient (in terms of jobs etc) networks of villages and towns.

Communication technology has built on the early 21st century advances (such as Skype) to make video conferencing a normal part of business life.

Major international airports are now regional in scope (eg the Midlands, North and West of England, London/South East). All are linked into the high-speed rail network.

Two of the three London airports have been closed, and the land redeveloped as new sustainable settlements.

South-east still at considerable risk of overheating economically and environmentally, but opportunities exist elsewhere, reducing possibility.

Improvement in high-speed rail networks across the country makes travelling to Europe from outside the South East easier, enabling closer links with Europe's economy to be forged.

England in 2050? Linked sustainable city-regions in a green & blue infrastructure

Map outline provided by Omnigroup.com

7 how do we do this?

The art of the long view, or how to handle uncertainty*

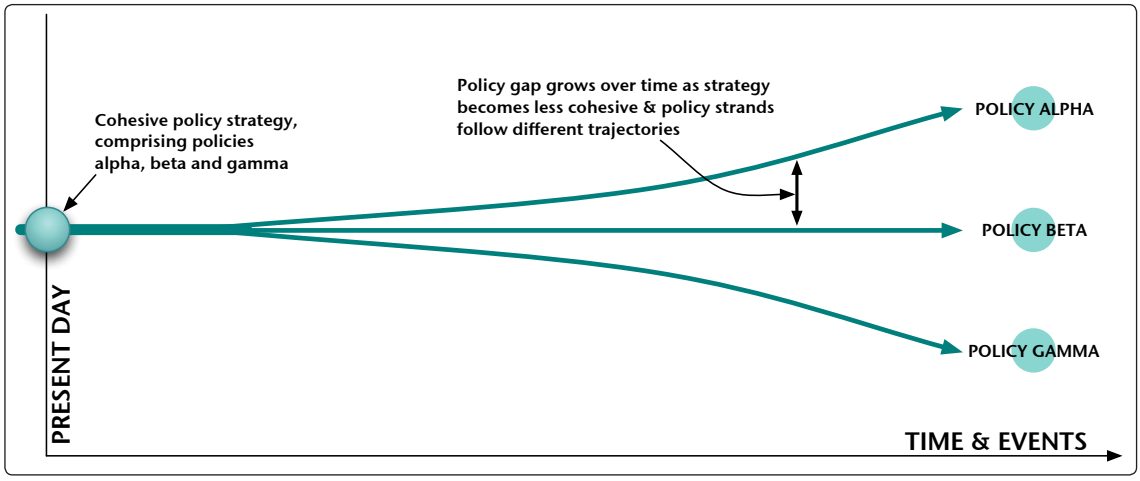
At its root, what we are proposing here is to do with the strategy and tactics needed to handle the uncertainties of the future. Strategy is visionary, not too sharply delineated, but always with the long term goal in mind. Tactics are to do with the day-to-day practicalities of achieving that long term goal. They are pragmatic, may well be quite short-term, and will necessarily change: the right tactic for today might be the wrong tactic for tomorrow. Through it all, the strategy remains the same.

It follows that if policies are somewhat ephemeral in nature, then policies designed to complement one another over the short term may follow increasingly dissimilar trajectories over the long term. This is neither surprising nor disconcerting. A 'policy gap' will arise, and once that happens, policies must either be rethought or discarded (see figure *Time and the decay of policy*).

Then there is the 'law of unintended consequences.' For example, a policy which limits the amount of new housing in a particular area may increase housing pressures in nearby areas, or push up prices locally, making it harder for younger locals in the wider area (including our original one) to get on to the 'housing ladder.' Such unintended consequences may undermine not only the original policies, but also those of adjoining localities. A national spatial strategy would provide the strategic oversight necessary to help militate against such unwanted outcomes.

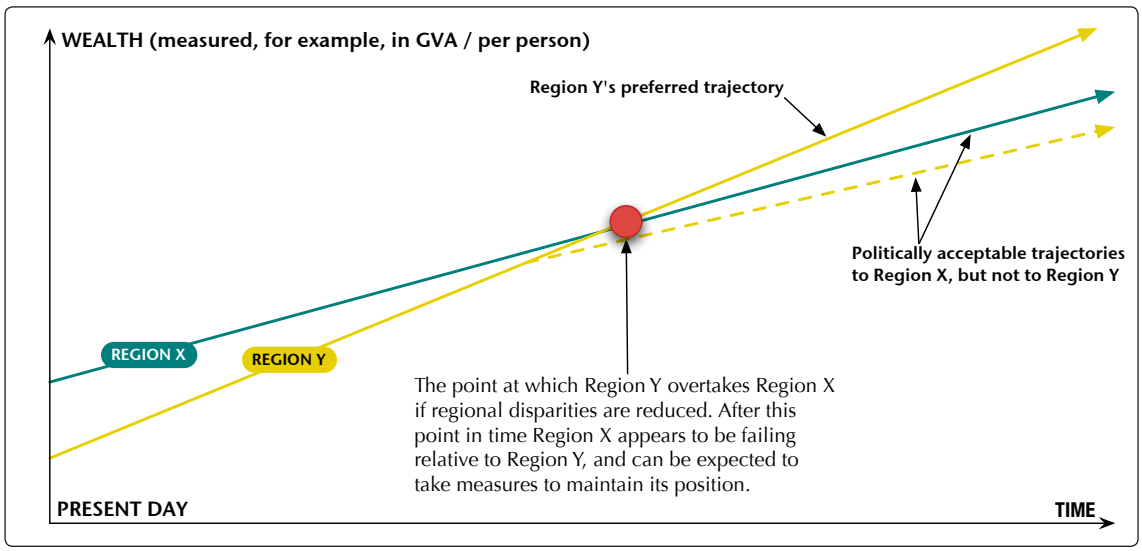
A national spatial strategy forces us to face less tractable problems, too. The economic disparity between different regions is a case in point: one region's success may make another region appear to be failing. So if the difference between regions in wealth per person is to be reduced, the relative rates of economic growth have to be different: The London region, for example, would have to grow more slowly than other regions if those regions are to catch up with London, but

*With due acknowledgement to Schwartz, 1995.[7]



Time and the decay of policy

Policies that began life as a coherent suite will become less cohesive over time.
A National Spatial Strategy would provide a long term strategic context in which to deal with such inevitabilities.



Relative growth & apparent failure

The faster growth rates necessary for lagging regions will make the more successful regions look as if they are failing. Consequently, we might expect the leading regions to attempt to maintain their own pre-eminence, perpetuating the existing hierarchy.

this makes London look as if it is actually failing relative to other regions. This generates a trajectory which if extrapolated linearly, results in the regions overtaking London (see figure *Relative growth and apparent failure*). Presumably this would be politically unacceptable, so it might be reasonable to assume that there exists a (hypothetical) minimum 'growth rate gap' that is politically consistent with the goal of maintaining London's pre-eminence, while allowing the regions to catch up to some extent. The point is that certain measurable differences between regions are likely to be all but impossible to eliminate; at best, it may be possible to reduce them.

The choice, then, is this. Either we carry on as we are without a national spatial strategy, in the full knowledge that short-term policies may have undesired and unintended consequences over the long term, multiplying uncertainties, and to all of which we turn a blind eye; or we can create a national spatial strategy.

Creating the strategy

Broad acceptance of a national spatial strategy is absolutely crucial: without long term support from society, it will fail. Given the importance of such a long term strategy to the social, economic, environmental and security interests of the nation, a Royal Commission would, in our view, be the appropriate mechanism through which a national spatial strategy would first be developed, and then maintained over the decades.

Such a Commission would be apolitical; an important consideration given the adversarial nature of British politics, and the ever-present risk of more stridently partisan modes of governance. While we accept that a national spatial strategy is necessarily political with a small 'p,' we believe that it should not become a party political issue if at all possible.

Some of the decisions that will need to be made will be politically difficult, and hence not vote winners. It may be that the only way to debate such issues without prejudice would be to set up something akin to the French Commission Nationale du Debat Public (CNDP), which was established in the mid-1990s precisely to deal with such controversial issues as large road and rail schemes.[1]

Significantly, the CNDP has no decision-making powers; it is simply a forum for debate, but crucially, it is one in which all of the actors are on an equal footing.[1] In the case of the express route

to Charles de Gaulle airport near Paris, the developers took their proposal to the CNDP, and having debated the issue, adopted a new route that had proposed by opponents to the original route. Admittedly, this was an unusual case. The point is that the Commission Nationale du Debat Public, in being both disinterested and not empowered to make decisions, provides a neutral arena in which hard held opinions can be discussed, and in which a genuine consensus can reasonably be the aim. As David MacKay point out in *Sustainable Energy - without the hot air*, Britain needs to find a way to say 'yes'.[2]

Implementing the strategy

A national spatial strategy would require the creation and maintenance of good statistical information, in order to be able to accurately monitor progress. This need was clearly identified in *Connecting England*.

Key indicators should be dynamic states to be maintained over time rather than fixed quantities to be attained far into the future. Dynamic indicators are a way of reconciling short-term political cycles with the long term cycles that underpin a national spatial strategy. Maintaining the rate of change might in some circumstance become more difficult over time as the low-hanging fruit is picked early on, forcing those charged with implementing the policy to think more innovatively as they have to solve harder problems. Such thinking is likely to encourage a culture of continuous improvement, especially when compared with an approach that is based around first meeting a fixed target and then dismissing the problem as solved.

For example, key indicators might include, and are by no means limited to:

- Rate of change of the wealth gap between regions or sub-regions: the wealth gap should be decreasing;
- Rate of change of the health gap (between the healthiest and least healthy citizens in a region or sub-regions: the health gap should be decreasing;
- Rate of change of graduate retention levels in regional cities: graduate retention levels should increase over time;
- Rate of change of national energy use per unit of GDP: a steady decline would indicate that the economy is becoming more energy efficient;
- Rate of change of proportions of energy delivered by renewable sources: a steady increase in the proportion renewable energy is sought.

The crucial point, however, is that such monitoring, and any advice that comes from the monitoring process, must be carried out by a politically neutral body. Statistics will always be political, of course; but for a national spatial strategy to work, they must not be politicised.

The question of spatial geography

That leaves the problem of spatial geography. The only uncontested borders in England are the national borders and the coastline. To be sure there are regions, counties, districts, parishes, wards, unitary authorities, metropolitan areas and the like, but all of these tend to owe their existence either to historic or administrative reasons. With the exception of regions (at the time of writing, May 2011) all of these areas can be expected to remain in place. For analysis and monitoring purposes, it is crucial that we have such areas. Imperfect they may be, but they do enable meaningful comparisons to be made between different parts of the country, and their

longevity makes it possible to compile the long time-series of statistics that are crucial to understanding the long-run dynamics of England. The plain fact of the matter is that if we lose this analytical capability — and UK statistics are actually very good — then we also lose the ability to understand how and why the country is changing over the long term. Such knowledge is crucial to the development of workable long term strategy.

Nonetheless, there is an alternative approach that may prove useful in the context of a national spatial strategy, and that is the notion of the functional area. Functional areas within England and Wales can be crudely expressed through graphs showing commuting networks at NUTS4 (District) level, and quite often these roughly reflect the regions; but quite often they do not.[3] Commuting, however, is not the only guide to the make up of functional areas, and research commissioned by the Local Government Association suggests that sub-regional geography is likely to vary depending on the economic function in question, but the authors conclude that while there is no definitive sub-regional map,the sub-region itself is England's key economic 'layer'.[4] Commuting maps, economic regions or sub-regions tend to cross boundaries. Evidently cross-boundary relationships between the different administrative regions cannot be ignored,a point recognised by the new Local Enterprise Partnerships (LEPs).

Nevertheless, the disparate functional and administrative nature of England makes it inevitable that issues affecting contiguous sub-regions or regions may not always be dealt with consistently, with the consequence that opportunities may be lost or wasted. Whatever sub-national boundaries are eventually chosen, they will probably be chosen pragmatically.[5] A city-region will have different dynamics from a group of rural local authorities, and something akin to the current LEPs may well be an acceptable compromise, at least politically. The *National Planning Framework for Scotland 2*, for example, has designated 'areas for coordinated action'.[6] Such areas still require a broader context if they are to work properly: that would be provided by the national spatial strategy.

The role of a national spatial strategy, then, becomes one of providing a framework within which these different sub-national administrations can operate; exercising power locally where appropriate, but not in anxious isolation. For they will be acting in concert with their neighbours, sure in the knowledge that their common future will be a whole much greater than the sum of its parts.

References

1. Marshall T (2009) ' Infrastructure planning in France - context is critical.' *Town & Country Planning*. 78(11).
2. MacKay DJC (2009) *Sustainable Energy – Without the Hot Air*. Cambridge: UIT.
3. Green N (2008) ' City-States and the Spatial In-between.' *Town & Country Planning*. 77(5).
4. Local Government Association (2007) *Prosperous Communities II - vive la dévolution!*. Local Government Association.
5. Hall P (2006) ' The slippery city-region.' *Town & Country Planning*. 75(4).
6. Scottish Government (2009) *National Planning Framework for Scotland 2*. Edinburgh: The Scottish Government.
7. Schwartz P (1991) *The Art of the Long View*. Doubleday.

bibliography

Arup (2005) *Regional Futures*. Ove Arup & Partners Ltd.

Banister D (2005) *Unsustainable Transport - city transport in the new century*. Abingdon, Oxfordshire: Routledge.

Barker K (2004) *Review of Housing Supply - Final Report - Recommendations*. HMSO.

Barker K (2006) *Barker Review of Land Use Planning Final Report - Recommendations*. HM Treasury.

Batty M (2001) ' Polynucleated Urban Landscapes.' *Urban Studies*. 38(4).

Breheny M (1997) *The People: Where Will They Work?*. London: Town & Country Planning Association.

Breheny M, and Hall P (1999) *The People: Where Will They Live?* London: Town & Country Planning Association.

Burnham DH, and Bennett EH (1993) (orig. pub. 1909) *Plan of Chicago (facsimile edition)*. New York: Princeton Architectural Press.

Butt (1999) orig. pub. 1999)"The Changing Employment Geography of Rural Areas." In: Breheny, (ed) *The People: Where will they work?* London: Town and Country Planning Association.

Champion AG (1989) ' Counterurbanization in Britain.' *Geographical Journal*. 155

Champion AG (2001) ' A Changing Demographic Regime and Evolving Polycentric Urban Regions: Consequences for the Size, Composition and Distribution of City Populations.' *Urban Studies*. 38(4).

Darby HC (1976) *Domesday England*. Cambridge: Cambridge University Press.

Department for Transport (2007) *Delivering a Sustainable Railway*. Department for Transport.

DfT (2003) *The Future of Air Tansport*. Department for Transport.

Dodd N, King M & Shaw R (2008) *Community Energy: Urban Planning for a Low Carbon Built Environment*. TCPA & CHPA.

Dorling D, and Thomas B (2004) *A Census Atlas of the United Kingdom 2001*.

DTI (2007) *Meeting the Energy Challenge - A White Paper on Energy*. The Stationery Office / Department of Trade & Industry.

Eddington R (2006) *The Eddington Transport Study. Main report: Transport' s role in sustaining the UK's productivity and competitiveness*. HMSO.

Ellis H (2010) ' Failings in policy and process.' *Town & Country Planning*. 79(3).

Environment Agency (2009) *Flooding in England: A National Assessment of Flood Risk*. Bristol: Environment Agency.

ESPON (2007) *Territorial futures - Spatial scenarios for Europe, ESPON 3.2 Final Report Summary*. Belgium: ESPON Programme.

Gillespie A (1999) "The Changing Employment Geography of Britain." In: T*he People: Where Will They Work?* London: Town and Country Planning Association. p.9-28.

Gill SE, Handley JF, Ennos AR, and Pauleit S (2007) ' Adapting cities for climate change: the role of the green infrastructure.' *Built Environment*. 33(1).

Green N (2005) ' Songs from the Wood and Sounds of the Suburbs: A folk, rock and punk portrait of England, 1968-1977.' *Built Environment*. 31(3).

Green N (2008) ' City-States and the Spatial In-between.' *Town & Country Planning*. 77(5).

Green N (2010) "The English Problem: Planning for a Peri-urban nation" presented at *Managing the rural-urban interface - Strategies and Tools for Urban Development and Sustainable Peri-urban Land Use Relationships*, Unversity of Copenhagen, Denmark. October, 2010.

Green R (2009) ' The town in the country, 2001.' *Town & Country Planning*. 78(2).

Hall P (1973) *The Containment of Urban England*. London: Wiedenfeld & Nicolson.

Hall P (2002) *Urban and Regional Planning*. London: Routledge.

Hall P (2006) ' The slippery city-region.' *Town & Country Planning*. 75(4).

Hall P (2010) ' Transport networks and dispersed cities.' T*own & Country Planning*. 79(3).

Hall P, Marshall S, and Lowe M (2001) ' The Changing Urban Hierarchy in England and Wales, 1913–1998.' *Regional Studies*. 35(9).

Hetherington P (2006) *Connecting England - A Framework for Regional Development: Final Report of the TCPA-Appointed Hetherington Commission on the Future Development Needs & Priorities of England*. London: Town & Country Planning Association.

Hetherington P (2009) ' Towards a joined-up strategy?.' *Town & Country Planning*. 78(7/8).

Hetherington P & Hall P (2010) *Connecting Local Economies - the transport implications*. London: Town & Country Planning Association.

Holmans A, and Whitehead C (2008) *New and higher projections of future population in England - a first look at their implications for households and housing* (Tomorrow Series Paper 10). Town & Country Planning. 77(9).

Horgan (2009) Winning the ultimate battle: How humans could end war. *New Scientist*. London:Reed Publishing .

Hoskins WG (1985) *The Making of the English Landscape*. London: Penguin Books.

Howard E (2003) (orig. pub. 1898) *To-morrow: A Path to Real Reform (facsimile edition with commentary by Peter Hall, Dennis Hardy & Colin Ward)*. London: Routledge.

Hubbert MK (1949) ' Energy from Fossil Fuels.' *Science*. 109(2823).

Hubbert MK (1956) *Nuclear Energy and the Fossil Fuels*. Houston, Texas: Shell development Company.

ITPOES (2010) *The Oil Crunch - Securing the UK' s energy future*. London: Industry Taskforce on Peak Oil & Energy Security.

Jenkins GJ, Murphy JM, Sexton DS, Lowe JA, Jones P & Kilsby CG (2009) *UK Climate Projections: Briefing Report*. Exeter, UK: Met Office Hadley Centre.

Leunig T & Swaffield JHartwich OM (2007) *Cities Unlimited - Making urban regeneration work*. London: Policy Exchange.

Leunig T, Swaffield J & Hartwich O (2007) *Cities limited*. London: Policy Exchange.

Local Government Association (2007) *Prosperous Communities II - vive la dévolution!*. Local Government Association.

MacKay DJC (2009) *Sustainable Energy – Without the Hot Air*. Cambridge: UIT.

Marshall T (2009) ' Infrastructure planning in France - context is critical.' *Town & Country Planning*. 78(11).

ODPM (2003) *Sustainable communities: building for the future*. Office of the Deputy Prime Minister / The Stationery Office.

Owens SE (1992) ' Land-use planning for energy efficiency.' *Applied Energy*. 43(1-3).

Parkinson M, Champion AG, Simmie J, Turok I, Crookston M & Park A (2006) *The State of the English Cities (2 vols.)*. London: ODPM Publications.

Rasmussen SE (1937) *London, the unique city*. Cambridge, Massachusetts: The MIT Press.

Richardson HW, and Bae CHC (2004) *Urban sprawl in Western Europe and the United States*. Ashgate Pub Ltd.

Royal Commission on Environmental Pollution (2007) *The Urban Environment*. London: The Stationery Office.

Schwartz P (1991) *The Art of the Long View*. Doubleday.

Scottish Government (2009) *National Planning Framework for Scotland 2*. Edinburgh: The Scottish Government.

Shaw R, Marrion J & Webb R (2006) *Sustainable energy by design: a guide for sustainable communities*. London: Town & Country Planning Association.

Shell International (2008) *Shell energy scenarios to 2050*. London: Shell International.

Skinner I, van Essen H, Smokers R & Hill N (2010) *Towards the decarbonisation of the EU's transport sector by 2050*. Brussels: European Commission.

Stern N (2006) *The Economics of Climate Change*. London: HM Treasury.

Taylor M (2008) *Living Working Countryside - The Taylor Review of Rural Economy and Affordable Housing*. Department for Communities & Local Government.

UK Foresight (2010) *Land Use Futures: Making the most of land in the 21st century - Final Project Report*. London: Government Office for Science.

United Nations (1999) *The world at six billion*. United Nations.

Vince G (2009) ' Surviving in a warmer world.' *New Scientist*. 25 Feb 2009 (2967).

von Weizsäcker E, Lovins AB, and Lovins LH (1998) *Factor Four: Doubling Wealth - Halving Resource Use*. London: Earthscan.

Welsh Assemby (2008) *People, Places, Futures: The Wales Spatial Plan 2008 Update*. Cardiff: Welsh Assembly.

Wirth L (1938) ' Urbanism as a Way of Life.' *American Journal of Sociology*. XLIV

index