can homeworking save the planet?

how homes can become workspace in a low carbon economy

Edited by Tim Dwelly and Andy Lake

THE SMITH INSTITUTE

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Preface
Paul Hackett, Director of the Smith Institute

This publication follows work that the Smith Institute has undertaken over recent years on the environment and the world of work. It also complements the debates we have held on well-being, new lifestyles, and promoting enterprise. Indeed, the subject of homeworking cuts across a range of policy agendas and is as relevant to the business community as it is to trade unions and the environmentalists.

As the authors demonstrate, working from home not only reduces the environmental costs of commuting but also the energy expended in building and fuelling office space. The potential contribution to reducing carbon emissions in this way is significant, and has arguably been overlooked for too long. Over 40% of all UK businesses are now home-based, according to BERR. Yet we are still planning our use of property as if we were still in the industrial age, designing-in unsustainable working practices for decades to come.

A fundamental rethink amongst policy makers is necessary, the authors argue, in order to realise the full benefits of a low carbon economy.

The case for homeworking goes beyond the proven environmental benefits. There are also other tangible advantages to both employees and employers from working at home. With commutes becoming ever longer and more unpleasant, homeworking offers the opportunity for a much less stressful working experience and a better work-life balance. Individuals can work more flexibly, while cutting out the need to commute regularly gives people more free time. The authors also provide evidence that for businesses there are real savings to be had from reducing the need for valuable office space, as well as higher levels of workforce satisfaction, improved staff retention and reduced absenteeism.

The trend is towards more homeworking and greater flexibility, with new technologies allowing individuals to connect their homes to the global marketplace. These changes are transforming society and present new challenges to the way we live and work. This collection of essays examines these challenges up close, and concludes that there are lasting individual and collective benefits to be had by moving to a more environmentally friendly homeworking economy.

The Smith Institute thanks Tim Dwelly and Andy Lake for editing this collection of essays, and gratefully acknowledges the support of BT and Places for People towards this publication and the associated seminar.

The Smith Institute, founded in the memory of the late Rt. Hon. John Smith, is an independent think tank that undertakes research, education and events. We provide a platform for national and international discussion on a wide range of public policy issues concerning social justice, community, governance, enterprise, economy, trade, and the environment.

Chapter 1

Can our economy work at home?

Tim Dwelly, Director of Live/Work Network

• Policy on homeworking currently emphasises flexibility and work-life balance

• But if homeworkers still have a main workplace to commute to, the environmental benefits are much reduced

• Separation of home and workplace was first encouraged in the industrial revolution for health reasons. Times have changed, but the separation still stubbornly persists

• Two thirds of homeworkers are not employees but self-employed. And over 40% of UK businesses are home-based

• The use of home as a workplace is therefore intimately connected to the nation's potential for enterprise

• Increasing the proportion of the workforce that works from home or in purpose-built live/work units would have significant environmental and economic benefits

• In times of high fuel costs, global financial uncertainty and climate change, a shift to mixed use of single buildings (workspace and home) would cut costs and reduce business risk

• It is not yet clear that politicians have recognised the potential of the home-based workforce as a critical component of the future low carbon economy

'Can we afford the carbon costs of building - and then fuelling - workplaces and homes as separate buildings?'

Can our economy work at home?

There is a consensus among policy makers of all political persuasions in the UK. Most now accept that we need to make major changes in the way we live and work, to meet the challenges of climate change and global financial insecurity.

But are the changes they propose up to the task? Is it sufficient to suggest that we carry on doing the same things as before, but in slightly different ways?

The government and opposition parties recognise the scale of the challenge. They know that to protect enterprise and employment while radically reducing CO_2 emissions requires a rethink. But so far, this new thinking has only proposed different kinds of normal housing, different kinds of normal office/workspace and different kinds of normal cars/trains/buses. Business as usual, with some new engineering and a lick of green paint.

Policy makers, we suggest in this pamphlet, remain locked in an approach to buildings and transport from another era. So while there may be a consensus on climate change as a problem, solutions still seem somehow outmoded, influenced by 20th century or even Victorian assumptions about property and the workplace.

Fundamental questions
If we accept that the industrial era is over, we should be able to ask more fundamental questions about how buildings are - and will be - used in the UK by those who work. Should we specify homes and workspaces as separate places at all? Is mass daily commuting viable, sensible or affordable? Is it really sustainable to plan for high density urban living when we are entering an era in which fewer of us will need to 'go to work' in the traditional sense?

In particular, can we really afford the carbon costs not only of commuting but constructing and then fuelling workspaces and homes as two entirely separate buildings?

Common sense suggests that someone who owns and fuels two separate buildings - and commutes between them - is more likely to pollute than someone who combines their workspace and home in one premises. Peter James in chapter 10 and Andy Lake in chapter 5 put some carbon numbers on this.

Having separate zones for homes (quiet, safe and clean) and workspaces (noisy, smelly, polluting) may have been necessary during the industrial era. But we are now in the era of broadband, the knowledge economy, iPhones, video-conferencing and online

commerce. Today you can genuinely run a global business from your home.

Even those companies and employers involved in manufacturing and services that cannot be done from home can make use of the home for some of their functions. Cars, kitchens and buildings can be designed at home. Electricians and plumbers can do their accounts and take orders at home. NHS direct staff can work from home. Financial advisers can be based at home. The list goes on and on.

Now that the industrial era is over, why are we constantly trying to import its assumptions about where we work and how we get to work into the new concept of a low carbon economy?

In this pamphlet, we have asked experts in a number of fields related to these fundamental questions to give us their thoughts. We want to encourage a wider debate about the best ways to create a successful low carbon economy in the UK. In particular we think that this will require an honest assessment of a number of approaches to policy in employment, housing and travel that do not seem to fully face up to the new realities. These policy areas include flexible working, employment, housing, transport and planning.

Flexible working - a half hearted response?
Some will argue that government is indeed responding to these issues. It is supporting flexible working, which includes an ability to work from home flexibly and to structure hours more around the needs of family life.

This is welcome. But we should not confuse it with making a substantial reduction to our carbon footprints as workers. This is because most homeworking employees are only temporarily away from their 'main workspace' - a building which remains fuelled day and night (and had to be constructed in the first place). The carbon benefits of employees occasionally homeworking are likely to be relatively small.

If however, employers use the potential of homeworking to reduce or remove their office or workspace infrastructure, as some employers like BT are increasingly doing, then significant benefits can flow. For more on this, see Caroline Waters' chapter 3.

There is a growing consensus amongst government ministers and opposition politicians on work-life balance. But even this concept is, arguably, symptomatic of a wider inability to break free of industrial era assumptions about separating 'life' and 'work'. Yet for those who have the opportunity, work can be fulfilling and just as rewarding as family life. Many simply do not see the two as radically separate and instead seek what might be

considered a **work-life blend**.

Policy makers tend to assume that there is a monolithic commuting workforce, which needs to be freed from the constraints and inflexibility of the workplace. Perhaps it is because so many of those who create these policies are themselves commuting employees with high stress workplaces and demanding old-fashioned employers?

Reduce control, increase motivation
Younger workers and the self-employed will increasingly want work to be more enjoyable and fulfilling, and will seek more control over the way they work and live to enable them to pick, mix and combine the two. Current policies generally fail to acknowledge this possibility. Yet the future of the UK economy does to an extent depend upon a motivated and productive workforce. Could the ability to control one's own workspace and working time be part of this process?

Increasing numbers of workers could be given greater choice over how they deliver what they are really paid for - their products/services rather than the number of hours they spend in the office. The potential of this freedom and the focus it brings on what matters most has perhaps not yet been understood by many employers. However, in the world of self-employment and micro-business, it is extremely well understood.

No sensible freelance worker will impose unnecessary and unproductive constraints on where and how they work. The question for large employers is why they would want to do this to their staff who might otherwise prefer to switch to a different employer themselves. This is not just an issue for middle class professionals but to many workers who are currently employed in building, finance, sales and many more sectors.

Big is not best
National and regional policy on job creation still tends to focus on large-scale job creation through big inward investment projects. The high profile failures of big microchip producers in the 1990s highlight the risks of such projects in a competitive globalised world economy. They came with much fanfare, yet went within a decade, resulting in thousands of jobs losses in areas such as Tyneside and Fife.

The UK has seen many examples of the damaging effects of over-reliance on large employers. From the coal industry in the north to the closing car factories of the Midlands, from famous name china clay companies in the Potteries to today's sudden banking sector decline.

Live/work quarters - clusters of properties that each combine workspace and home all in one - may provide not only a low carbon option for employment sites but a more flexible response to global economic forces.

This is not to say that everyone should be in a micro company. But how we help micros connect up with one another and become strong by **collaborating** and subcontracting to one another is a model that can work well in a low carbon environment.

A good example of this would be to consider the vitality of a modern employment site like Bristol Paintworks (where live/work, residential and creative workspaces are clustered together on a renovated industrial estate that was previously semi-derelict for years).

There are allocated employment sites that look just like the 'before' photos of Bristol Paintworks all over the country in cities, market towns and even remote villages. An employment site used by only a single or small number of large employers has the odds stacked against it in the event of company failure. A live/work quarter, in contrast, might for example see 30 or so companies use the same space. Often the owners will have low costs (no commuting, no separate workspace to buy/fuel) and will be more flexible to respond to market conditions.

Live/work units will also often bring higher skilled and higher paid work onto an employment site than, say, a large warehouse with a handful of workers paid minimum wage to operate it. Yet planners will often find the latter closer to their comfort zone in terms of what they consider as an 'employment use', while seeing live/work as some kind of incursion on a protected space.

This approach is now thankfully being questioned by influential voices such as Treasury adviser Kate Barker (see chapter 4).

Homes that work
Although blown off course by current turmoil in the property market, the government aspiration is for an extra three million homes to be built, to match supply with demand according the realities of the UK's emerging demographics.

While this may be perfectly valid from a housing perspective, the assumption remains that these homes will be just that - they will not be workspaces. Current focus in planning documents such as regional spatial strategies, is that these homes should be located in urban areas. This approach is believed to be sustainable because the houses will be close to work opportunities. Again, we risk failing to recognise where work is increasingly done

and where sales are made - online, irrespective of location.

With high quality video conferencing set to emerge in a very few years as a 'killer application' for workspace meetings, why are we still herding people towards places where they do not necessarily need to be to make a contribution to the economy?

Statistics show that people in social housing are less likely to work from home than home owners. Despite all the evidence showing that communities with higher levels of home-working are better off, most social landlords still use tenancy agreements that bar use of the property for business. This is another hangover from the industrial age when home and workspace were separated. But with such high numbers of social tenants out of work, it seems bizarre that one of the cheapest ways they could become self-employed is denied to them.

This leaves whole swathes of property in the UK effectively enterprise-free or at least enterprise-discouraged. With 41% of all UK businesses now based at home (BERR, 2005), this represents a tremendous waste not only of tenants' own potential but of millions of publicly-subsidised buildings.

Enterprise begins at home
The rapid rise in homeworking (as reported by Colin Mason and colleagues in chapter 2) is not, as yet, a trend that is being led by government, employers, planners or housing providers. This trend has happened despite them, not because of them. This suggests there is an open door waiting to be pushed by policy makers.

With the majority of the three million or so existing UK homeworkers being self-employed (two thirds of the total according to the Labour Force Survey), business really does seem to start at home in modern Britain. Given that this makes business start up easier and cheaper and given the enormous advances in technology that we can access at home, it is most odd that policy makers have done so little to recognise, support and enhance this trend.

Home-based business seems to be offering policy makers a win-win for both the economy and the environment. So why is policy making so dominated by the old economy approach to employment premises and enterprise?

One reason perhaps is that there are some **myths** around homeworking. One is that the whole issue of homeworking is primarily about employees. As chapter 2 demonstrates, in fact a significant majority of those who work mainly from home are self-employed. Add

in those who are company directors and the numbers swell. Homeworking, in other words, is hugely linked to enterprise in the UK. And the numbers are simply not dominated by women, low paid or otherwise, as perhaps tended to be the case before the 1990s

Another possible reason is that for policy makers it involves a way of working largely outside of their experience. Most policy makers in central, regional and local government - not to mention civil servants and think tank staff - work as employees for organisations with main offices. Most of them commute. It is little wonder that the world of the full time homeworker is under their radar. Those who do work from home are assumed to either be relatively senior people finishing their reports in peace or possibly (in huge contrast) people who are too powerless to do otherwise.

This is what may have led to the emphasis by government on employee flexible working and work-life balance initiatives. All good things, but based on misconceptions about who mainly works from home.

Will employees remain dependent or strike out alone?
A typical response from policy makers to the hard facts about most homeworkers being self-employed is: 'Yes, but with the new right to request flexible working and public sector employers planning a big shift towards homeworking, the proportions will soon change'.

This may be so. An increase of just 3% in the number of homeworking employees would create an equal number of employees and self-employed amongst the homeworking population. And in the longer term as employees greatly outnumber the self-employed, it is having more of them working more of the time from home that will make the biggest difference – providing changes are made back at the office too.

But there are three reasons to doubt it will be this simple. First, major employers (with some notable exceptions) have often not delivered on the strategies for more flexibility. The head office and its culture is a very hard habit for managers to kick. Secondly, it is by no means clear that the UK housing stock - especially with recent shifts to high density urban flats as the preferred output - is very well suited to many potential homeworkers.

Third and very importantly, once an employee works from home, they become controllers of their own space and time. It is in some respects a small step from this to become genuinely self-employed

This phenomenon is analysed in a book that prefigures this debate from across the ocean,

Free Agent Nation (2000). Daniel Pink, former speech writer to Vice President Al Gore, charts the inevitable rise of the free worker in the USA - the self-employed person whose world of work and lifestyle is in stark contrast to the 'organisation man' of the late 20th century. Noting that a quarter of the workforce in the USA is freelance in some way, he takes readers on a tour of the new economy that this is creating. Unsurprisingly to those who live and work this way, he lists the essential resources that support this free agent part of the economy - hub facilities, networks, cafes...

Other commentators, from Charles Handy's 'clover leaf' organisation and portfolio workers to the recent report *Management 2018*, see this as an inexorable trend. Flexible working involves employing more free agents in innovative ways.

To some extent this is already happening, for example in the National Health Service. Many health professionals work out of their homes as direct employees, agency employees and increasingly as independent self-employed specialists such as physiother-apists and psychotherapists. Boundaries are becoming blurred, both contractually and locationally.

With the free agent culture in the USA, it is little wonder that America has such a large live/work property sector, one that is so far proving more resilient in the property down-turn than purely residential housing. There are surely lessons the UK can learn here.

But as Daniel Pink asks: in the free agent economy, how can we replicate the advantages of the old economy - the water cooler moments, the buzz of ideas, the human interaction - without abandoning the convenience and sustainability of homeworking? Here is where the thinking needs to sharpen up. The homeworking shift is clearly not going to work well if it merely creates a diaspora of isolated, lonely homeworkers.

Bringing homeworkers together
In this pamphlet we suggest that, given that homeworking will continue to increase, a priority should be to help homeworkers avoid isolation and enable them to increase their ability to network and share knowledge, skills and opportunities.

Some of this happens already. In vibrant urban neighbourhoods with popular cafes, it is not uncommon to see informal business meetings take place around a wireless laptop. But in more disadvantaged urban areas and more remote rural towns and villages, some kind of intervention may be necessary to replicate this buzz.

One starting point may be a live/work scheme which puts home-based enterprise 'on

the map' in the area. Another is a hub facility that can offer services to home-based entrepreneurs and employees. The two can be linked, with live/work developers agreeing to a planning requirement that they construct a hub facility on their sites.

The 'hub' approach recognises that many people just don't have a home that is appropriate for all aspects of their work. Many will sometimes need more space or peace (for example during school holidays). Hubs can offer a second or backup office facility with the advantages of a professional space without the full cost. And with most users taking advantage of hubs on an occasional when-needed basis, the building can support a much larger number of workers than an equivalent office space (in the same way that a gym with space for 30 people might have 300 members).

In contrast with development agencies' ongoing preference for business parks and large 'big ticket' regeneration schemes with major employers to the fore, hubs are much more like beehives. They support businesses that are each small contributors to the economy on their own, but powerful and dynamic when linked together.

Interestingly, there are a number of major employers who have been taking a similar approach. This involves reducing the number of local offices and having those that remain function as employer hubs for a geographically dispersed, mobile or homeworking workforce. Ofsted, the Met Office and BT are amongst organisations operating in this way.

Some argue against homeworking on the grounds that homes are simply not suitable for work. But a simple response to this could be: why aren't they? Why are we continuing to develop housing that does not enable homeworking? Why do we emphasise high-density? Why are affordable housing providers discouraged from providing spare rooms?

Going with the grain
It is not wild speculation to suggest that, with or without global warming, many people in the UK will increasingly prefer to:

• spend less time and money commuting
• have more control over when and how they work
• be judged on what they do not how long they do it for
• spend money on one property not two (if self-employed)
• spend more time in, and money on clothes they want to wear rather than
  work 'uniforms'
• be close to their families to have more choice over their leisure time
• avoid roads and railways at their busiest

• go shopping, take exercise and other leisure activities when they want to
• define their own idea of a working day, week or year

The most positive aspect of the inevitable growth in homeworking in the UK is that it is going with the grain. Those who do it are generally doing so by choice and in growing numbers. There is a huge opportunity for government to tap into this, because those who work mainly from home are not only at the forefront of UK enterprise, they are making one of the biggest personal contributions possible to reducing their carbon footprint.

Homeworking will not save the planet on its own. But if we are serious in the UK about creating a genuinely low carbon economy, we will need to take the contribution of homeworking much more seriously.

Chapter 2

Business begins at home

Colin Mason, Professor of Entrepreneurship, Professor Sara Carter, Research Director, Hunter Centre for Entrepreneurship, and Dr Stephen Tagg, Reader in the Department of Marketing, at University of Strathclyde

- Over three million people now work mainly from home, 11% of the workforce

- Of these, two thirds are self-employed and a majority are teleworkers - it is technology that seems to be driving the increase in homeworking

- According to a major study of Federation of Small Business members, cost control, convenience and the type of work are the reasons for choosing home as a business premises

- Only 10% want to move out of their combined home/workspace to traditional workspace

- There are strong links between areas of economic prosperity and the incidence of home-based business

- e-commerce businesses are much more likely to be located in the home

- Home-based businesses are not especially dependent on their local market

- 10% of businesses in the survey generate revenue of over £250,000

'Around two thirds of all homeworkers are self-employed. The home is now a focus for enterprise in the UK'

Business begins at home

One of the most significant trends in the post-industrial era has been for the home to become an important focus for work. The boundaries between work and home are now increasingly blurred, reversing the forces of the industrial era in which places deemed suitable for each were clearly demarcated and physically separate.

The most recent published figures available from the Labour Force Survey (2005)[1] indicate that 3.1m people now work mainly from home, 11% of the workforce. This represents a rise from 2.3m in 1997 (9% of the workforce), a 35% increase.

The majority of homeworkers (2.4m or 77% of the total) are 'teleworkers' – people who use computers and telecommunications to work at home. The number of teleworkers has increased by 1.5m between 1997 and 2005, a 166% increase. Clearly, it is the growth in the number of teleworkers which is driving the increase in homeworking.

Home as a place of business
Homeworking comprises two distinct types of economic activity: employees and business owners. The Labour Force Survey separates out employed and self-employed homeworkers. This indicates that just under two-thirds of all homeworkers are self-employed. Although self-employment is only a proxy for business owners, these figures nevertheless clearly indicate the extent to which the home is now a focus for entrepreneurial activity. Indeed, the *Enterprise Nation* website argues that 'the home is now the most popular location for start-up'. Yet, much of the policy-making attention has focused on home-based employees. Businesses which operate from home have largely been ignored.

Estimates of the number of home-based businesses are particularly sensitive to definitions and data sources. Nevertheless, it is clear that they comprise a significant and growing segment of the small business population in the United Kingdom:

• an analysis of Global Entrepreneurship Monitor (GEM), a telephone-based household survey, reveals that 66% of businesses operate from home.[2]
• the Government's annual small business survey gives a lower figure of 41% but this is based on the proportion of businesses for which the home was the main location for start-up.[3]

1 Ruiz, Y and Walling, A "Home-based working using communication technologies" in *Labour Market Trends* (2005)
2 Thompson, P, Brooksbank, D, Jones-Evans, D, and Kwong, C *Who are the home-based entrepreneurs? Evidence from the UK* paper to the 30th ISBE conference, Glasgow, 7-9 November 2007. In this study a home-based business is defined as where the respondent's postcode for their home address is the same as that for their business address.
3 *Annual Small Business Survey 2006/7*, Department for Business, Enterprise and Regulatory Reform (2007). See Table 58.

- research by Enterprise Nation indicates that there are 2.1m home-based businesses which comprise 47% of all small and medium sized enterprises.[4]
- census data indicates that 56% of the self-employed (which does not correspond exactly to business owners) were home-based in 2001.[5]

This paper[6] draws upon information collected in the 2005 biennial survey of the membership of the Federation of Small Business (FSB)[7] which provides the most comprehensive profile to date of home-based businesses in the UK.[8] A home-based business is defined very simply as a respondent who ticked the 'home' option in response to the question 'From what type of premises do you operate your business?'[9]

The significance of home-based business

Home-based businesses account for over one-third (36%) of all small businesses in the FSB sample, with home by far the single most important location for small businesses, exceeding those businesses which operate from retail premises (21%), a factory, workshop or business unit (19%) or office premises (18%).

The majority of home-based businesses operate from exclusive space within the home – either a room that is solely used for business purposes (48%), attached or external premises, for example a garden hut, (16%) or an extension to the house (6%). The proportion of home-based businesses is lower than reported by GEM or in the Government's small business survey. However, this is likely to be explained by the nature of those surveyed, with FSB members biased towards full-time businesses. Other estimates of the size of the home-based business population are likely to include higher proportions of part-time and hobby businesses. This needs to be borne in mind in the remainder of the discussion.

Full-time versus part-time

The majority of home-based businesses operate on a full-time basis, with nearly three-quarters of owners of home-based businesses working more than 40 hours a week in their

4 Enterprise Nation *Home-based Business Report* (2007). At: http://www.enterprisenation.com/Resources/n/o/i/ENPDF.pdf
5 Dwelly, T et al *Under The Radar: Tracking and supporting rural home-based business* (Live/Work Network for the Commission for Rural Communities, 2006)
6 A longer version is available from the authors.
7 The FSB biennial surveys are among the largest non-government business surveys in the UK. They are designed to reflect and represent the current attitudes and opinions of a very large number of small business owners and, in turn, to inform local, regional and national policy towards the small business sector. For more information see Carter, S, Mason, C, and Tagg, S *Lifting The Barriers to Growth in UK Small Businesses* (Federation of Small Business, 2006)
8 Data were collected by a postal survey questionnaire distributed to 169,418 FSB members in September 2005. In total, 18,939 usable responses were received by the cut-off date, an 11% response rate.
9 The full list of available responses to this question were: home; retail/shop unit; office; warehouse; factory, workshop, business unit; quarry, mine, brickworks, etc; agricultural buildings; and other commercial premises.

business (see table 1). However, home-based businesses are more likely to operate on a part-time basis than other businesses, with 13% of owners of home-based businesses working for less than 30 hours a week compared with only 4% of other owners.

The owners of home-based businesses are also more likely to have other sources of income, notably other employment (9% cf. 4%) and pensions (13% cf. 6%), and are less likely than other business owners to rely on the business as their only source of income (61% cf. 71%). This suggests that home-based businesses are part of a portfolio of income generating activities for a significant minority of owners.

Table 1: Number of hours spent working in the business in a typical week

	Home-based businesses	Other businesses	All businesses
	%		
Up to 30 hours	13.2	4.0	7.3
31-40 hours	16.3	11.2	13.0
41-50 hours	26.9	31.8	30.0
51-60 hours	23.0	29.5	27.2
Over 60 hours	20.6	23.7	22.6

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

Reasons for operating from home

For the majority of businesses, a home location is a deliberate choice made either for cost-minimisation reasons (65%), convenience (54%) or because the nature of the business did not require commercial premises (44%) (see table 2).

Lifestyle considerations, such as to accommodate family needs (28%) and to avoid the need for commuting (28%), are only of secondary importance as reasons for operating the business from home. Providing flexibility in the choice of where to live is also a minor reason for starting a home-based business, cited as very important by 16% but unimportant by 51%. Most respondents saw the home as being the permanent location for the business. Only 10% said that a home location was temporary and that the business would move to commercial premises when it was bigger.

Table 2: Reasons for starting a business from home

	Very important		Not important	
	number	%	number	%
To contain costs	3154	65.3	291	5.4
More convenient	2756	53.5	428	8.3
Nature of the business does not require commercial premises	2303	44.2	686	13.2
To avoid the need for commuting	1338	28.5	1313	27.9
To accommodate family needs	1364	27.5	1419	28.6
A low risk start – testing the waters	894	19.6	1671	36.7
To be flexible in the choice of where to live	686	15.8	2222	51.2
Business started as a hobby and grew	518	11.6	2788	62.7
The business included living premises (e.g. hotel)	446	10.5	3361	78.9
Temporary measure – business will move to commercial premises when larger	456	10.2	2300	51.7
Worked at home in my previous job	386	9.1	2982	70.9
Lack of alternative commercial premises	302	7.1	2907	68.0

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

Notes: (i) respondents were given a one to five scale, one denoting not important and five denoting very important, (ii) businesses could give more than one response; (iii) number of responses varied per reason.

The geography of home-based businesses
Home-based businesses have a distinctive geography. At the regional scale the proportion of home-based businesses is above the national average (36%) in just three regions - South East England (41%), South West England (41%) and Scotland (37%) (see table 3).

Home-based businesses are least significant, in terms of their proportion of the small business population, in Northern Ireland (18%), the North East (29%), Yorkshire and The Humber (29%) and the North West (30%). Indeed, there is a close correspondence between those regions with low proportions of home-based businesses and those with the lowest rates of new firm formation. Superimposed on this regional contrast is an urban-rural dimension, with the proportion of businesses which operate from home significantly higher in rural areas than in urban areas.

Areas with the highest proportions of home-based businesses therefore comprise a dual population. They include both affluent towns and cities and their rural hinterlands within a radius of 75 miles of London and a group of remoter rural counties, for example the Highlands and Islands and South West England. Areas with the lowest proportions of home-based businesses comprise the major provincial cities along with older de-indus-trialised towns and cities in the North of England, West Midlands and Scotland. The link between economic **prosperity** and home-based businesses is supported by evidence that only 11% of small businesses in the 1000 most socially deprived areas operate from home compared with 36% in the rest of the country.

Table 3: The geographical distribution of home-based businesses: regional analysis

	Home-based businesses	Other businesses	VAT registrations in 2006*
	%		per 10,000 population
North East	29.1	70.9	22
North West	29.8	70.2	32
Yorkshire and The Humber	29.1	70.9	31
East Midlands	34.7	65.3	35
West Midlands	34.2	65.8	34
East of England	35.5	64.5	39
London	34.1	65.9	57
South East	40.8	59.2	43
South West	41.0	59.0	37
Wales	32.9	67.1	28
Scotland	36.7	63.3	28
Northern Ireland	17.5	82.5	33
United Kingdom	35.7	64.3	37

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

What do they do?

Home-based businesses are distinctive in terms of industry sector. They account for the highest proportion of total businesses activity in computers and related activities (58%), business services (54%), agriculture, forestry and fishing (48%), personal services (45%), construction (44%), financial services (42%) and transport (42%).

Home-based businesses are least significant (but certainly not absent) in the motor trades (12%), retail (14%) and manufacturing (17%) sectors. This highlights the diversity of home-based businesses, comprising both traditional trades, which predominantly operate *from* the home and which primarily serve local markets, and newer ICT-based knowledge services, which operate *in* the home, and more likely to be serving non-local customers.

However, the notion that e-commerce is alone driving the growth of home-based businesses is not confirmed. The proportion of home-based businesses which derive over half of their turnover from e-commerce remains small. However, the proportion is two to three times larger than for the remainder of the small business sector – indicating that businesses that are focused on e-commerce are much more likely to be located in the home (see table 4).[10]

Table 4: Engagement in e-commerce

Source of sales	Home-based businesses		Other Small firms	
	Any sales	Over 50% of turnover	Any sales	Over 50% of turnover
	%			
eBay	6.9	0.8	7.5	0.2
Own web site	38.6	6.3	38.8	2.4
On line portals	6.7	1.5	6.2	0.5
3rd party web sites	19.0	1.5	16.1	0.7

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

Contrary to what might be expected, home-based businesses are not excessively dependent on their local market for sales: only 47% derive more than half of their sales locally compared with 56% of other small firms (which may reflect the greater concentration of retail businesses). Indeed, home-based businesses are more likely than other small firms to derive a high proportion of their sales from regional and UK markets.

Home-based businesses in general are less likely to engage in any exporting. However, the proportion of home-based businesses deriving more than half their sales from overseas customers – although very low (6%) – is actually greater than for other small firms indicating the presence of a small proportion of home-based businesses that are highly export-orientated.

10 However, this does not preclude the likelihood that a high proportion of home-based businesses make intensive use of the Internet to undertake their activities.

Home-based businesses are younger, on average, than other small firms, with 29% up to three years old, compared with 21% of other businesses. However, there are also a significant proportion of long-established home-based businesses, with 38% being more than 10 years old, suggesting that a location in the home is not an impediment to long-term survival or that home is only a temporary location when the business is being established.

Finally, home-based businesses are smaller than other small businesses. In terms of turnover, 72% of home-based businesses have annual sales of £100,000 or less, compared with just 27% of other small firms, and 48% have sales of £50,000 or less, compared with only 13% of other small firms (see table 5). To some extent this is a function of the part-time nature of a minority of home-based businesses. It also reflects their lower cost base, which enables them to cover costs on a smaller volume of sales. It is also due to a right-censoring problem – businesses that have out-grown the home are, by definition, excluded. However, it is important not to overlook the tail of home-based businesses that have achieved significant scale, with 10% generating revenues of more than £250,000.

Table 5. Annual turnover of home-based businesses

turnover	Home-based businesses	Other Small firms
	%	
Less than £25,000	23.2	3.6
£26,000 - £50,000	25.0	8.4
£51,000 - £100,000	24.1	14.8
£101,000- £250,000	16.4	24.8
£251,000 - £500,000	7.1	20.0
Over £500,000	3.3	28.5

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

Job creation
The small size of home-based businesses can also be seen when their employment is considered (see table 6). It should be noted that the majority of home-based businesses create jobs for more than just the owner/s. Of course, those employed by home-based businesses do not necessarily work in the home of the business owner and might instead work onsite or in their own homes. Here again, a tail of bigger home-based businesses that employ 10 or more (9%) is evident.

However, it is important not to read small size as indicating lack of ambition or vitality amongst home-based businesses. More than half (57%) had increased their turnover in

the previous year – the same proportion as for other small firms - and the proportion reporting declining sales was smaller (25% *cf.* 28%). Admittedly, the proportion of home-based businesses wanting to remain the same size was higher than for other businesses (31% *cf.* 22%). However, 58% of home-based businesses wanted to grow their businesses (10% to grow rapidly), little different to the proportion of other businesses (63%).

But reinforcing the locational inertia theme, only 21% anticipated the need to seek new premises. Moreover, for home-based businesses growth was less likely to result in additional jobs. Nearly two-thirds (64%) expected to remain the same size in employment terms over the next two years (cf. 46% amongst other businesses) and only 31% expected to expand their workforce (cf. 44%).

Table 6. Employment in home-based businesses[11]

Number of employees	Home-based businesses	Other Small firms
	%	
0-1	26.8	8.1
2-4	49.9	24.0
5-9	14.6	26.3
10 and above	8.6	41.6

Source: *Business start-ups and closures: VAT registrations and de-registrations in 2006* (Department for Business, Enterprise and Regulatory Reform, 2007)

Who are the owners?

The FSB survey shows that home-based business owners are better educated than the owners of other businesses. This is consistent with the earlier evidence which highlighted the high proportion of home-based businesses in knowledge-based sectors.

One-third of home-based business owners have been educated to degree level or above (34%) compared with just over one-quarter of other business owners (26%), and 30% have professional qualifications, compared with 25% of other owners.

Second, owners of home-based businesses have had fewer years as business owner-managers than other business owners. Amongst home-based business owners, 30% had been owner-managers for five years or less, compared to 21% of other business owners. In contrast, 63% of other business owners had been owner-managers for more than 10 years compared with just 52% of home-based business owners.

11 includes owners and proprietors and both part-time and full-time employees

Owners of home-based businesses are not significantly older than other business owners: 7% are under 35, 54% are 35-54 and 39% are 55 and over, including 8% who are 65 years old and over, little different from the age group of other business owners (6%, 57% and 36% respectively).

Two points can be made from this evidence. First, we can infer that a significant minority of home-based businesses comprise a pre-retirement cohort, although as noted earlier, only 13% are actually drawing a pension. Second, only a small proportion of individuals are using a home-based businesses as a means of working beyond the official retirement age.

Finally, 14% of home-based businesses are 100% owned by one or more women, which is higher than other types of small business (10%). However, the majority of home-based businesses are either 100% male owned (44%) or equal male-female ownership (33%).

Conclusion

Our objective in this chapter has simply been to contribute to the evidence base on home-based businesses and in so doing to challenge some of the stereotypes that exist by providing a detailed profile of home-based businesses in the UK. Our key findings are as follows:

- Home-based businesses account for a significant part of the small business sector. This study – which uses a database that would be expected to under-report home-based businesses - nevertheless has found that 36% of small businesses operate from home, which suggests that the true figure may be bigger than this.

- It is a simplistic stereotype to dismiss home-based businesses as part-time, small and marginal and therefore of no economic significance. The majority employ other people and just over half are generating revenues of over £50,000 per annum. And around 1 in 10 of home-based businesses have achieved a degree of scale

- There are also many businesses, not separately identified in the study, for which the home was a critical incubator but have subsequently moved into commercial premises in order to expand

- Home-based businesses are heterogeneous, further undermining attempts to generate simple stereotypes. Although business services and computer and related activities dominate the home-based business sector they only account for just over one-quarter of the total. In fact, home-based businesses are found in virtually all sectors. Moreover, contrary to what media coverage would imply, home-based businesses based on e-commerce (including ebay) account for a small minority of the total.

The significance of the home-based business sector and its expected increase in importance has implications for many areas of policy making:

Housing market

The growth in the number of home-based businesses is likely to lead to a *growing demand* for types of property that can accommodate home businesses. For many people, design and layout may therefore become essential criteria in the selection of appropriate accommodation.

Housing type and tenure are significant obstacles to the revitalisation of socially deprived areas, because of their constraining effect on home-based business activity. Business activity will be constrained in cities with a high proportion of housing stock that is inappropriate for operating a home-based business, for example high rise apartments, tenements, terraced housing, town houses, and in areas dominated by particular types of tenure. This is notably an issue for social housing, where tenancy rules may prevent tenants from running businesses from home. Live/workspaces, a new category of property specifically designed for dual residential and employment activity, are being actively developed as strategies for both urban and rural regeneration.[12]

Spin-off effects

Since home-based businesses lack access to the backup resources of a parent organisation, they need access to other sources of such assistance to operate effectively. These can also increase both social and economic activity in their neighbourhoods. These *resource needs* are of four types:

• complementary business services such as copy and printing shops, office supply stores, postal services, overnight delivery services and IT support
• formal meeting spaces, access to business support facilities (internet access, video conferencing, printers, copiers), co-working space, 'head down' space and 'touch down space'
• informal meeting spaces
• social spaces to congregate with like-minded peers to counter time spent in isolation.

It has been suggested that many of these functions are being performed by coffee shops, sometimes labelled 'the new entrepreneurial office'.[13] Coffee shops provide informal workspace (eg for meetings and as a place for 'head down' work) for home-based

12 Dwelly, T *Homes That Work* (Live/Work Network, 2003). At: www.liveworknet.com
13 Lonier, T and Bamford, C H "Leveraging external resources by urban entrepreneurs: Starbucks as the new entrepreneurial office" in *Frontiers of Entrepreneurship Research 2003* (Babson College, 2004)

business owners. They also perform a social and psychological function by enabling such individuals to create a community with other self-employed workers, equivalent to the corporate water cooler. But they may not be enough on their own.

Government regulation
The growth of home-based businesses has implications for various types of legislation and regulation which were designed for a world in which the workplace and the home were separate. The applicability of many *tax* regimes (such as capital gains tax and business rates), planning issues, municipality by-laws and regulatory issues to home-based businesses is often unclear. This creates huge uncertainty for the owners of home-based businesses and encourages them to stay under the radar of state agencies for fear of regulation, being subject to tax or higher charges, being restricted in their activities or even being forbidden.

Government in general and local authorities in particular therefore need to accept home-based businesses as a *legitimate* form of economic activity and one that is both distinctive and economically significant.

The perception appears to be that local councils are opposed to people running businesses from home whereas they should be actively involved in supporting the home-based business sector, making it a focus for local economic development policy.

Chapter 3

Lower costs, higher productivity - lessons from a homeworking employer

Caroline Waters, Director of People and Policy at BT

• BT has pioneered employee homeworking for many years, with 16% of UK-based employees now full-time home-based, and flexible working options available to many more

• This switch has achieved a £500m reduction in BT's property portfolio

• Homeworking staff are over 50% more satisfied

• Their absenteeism is down by 20%, and they are up to 30% more productive

• The switch has enabled BT to recruit and retain key staff more successfully

• It has also cut an estimated 1,800 years of commuting time - saving 12 million litres of fuel and reducing CO2 emissions by 97,000 tonnes

• Other employers will increasingly have to consider such approaches to remain competitive

• But they must first tackle old-fashioned approaches to managing staff, replacing attendance and visibility with smart approaches that measure workers' outputs

'The ability to communicate one-to-one or one-to-millions, across the office or across the world, resulted in a whole rethinking of the 'where' and the 'how' work was undertaken.'

Lower costs, higher productivity – lessons from a homeworking employer

BT has been at the forefront of flexible working for many years. In the late 1960s, its research department, then part of the GPO was foreseeing new technologies that would enable employees to work remotely from their place of work.

From the 1980s this was fast becoming a reality and by 1986, BT had offered contracts to its first 300 homeworkers. Today, utilising the latest convergent technologies and a rich portfolio of products and services, BT is able to increase the efficiency and flexibility of its workforce this way. We live by our maxim 'In today's business environment **work is something you do, not somewhere you go**', with 14,500 of our 92,000 UK employees now working from home. But why is BT so passionate about the subject?

The need for change
BT introduced flexible working policies because of clear business needs. The BT futurologists could foresee a changing society, a more aggressive market place with increasingly demanding customers. They could see an approaching age of constant availability, a time when business would have to provide service to customers, when and how they wanted it, or face losing their business.

This was nowhere more the case than in the telecommunications industry. Globalisation, combined with the liberalisation of markets, was creating home grown and international competition with a sharpened need for cost effective labour and processes. It was also creating a hunger for more accountable businesses, with discerning consumers insisting on being able to make informed purchasing and investment decisions, choosing business partners who could demonstrate socially responsible and inclusive behaviour.

Technological advances underpinned and enabled these changes. They dramatically altered methods of communication and, in turn, working practices and procedures. The ability to communicate one-to-one or one-to-millions, across the office or across the world, resulted in a whole **rethinking** of the 'where' and the 'how' work was undertaken.

Today business is held to account by the 'citizen marketeer' who can build or destroy products, services or even brands. In an instant and transparent world, society demands that companies who pursue profit regardless of their impact on society and the environment will not survive.

All of this has provided today's workers with unprecedented access to a vast range of

career and life choices. The need for an extended working life to match increased life expectancy has only increased this. Attracting and retaining key talent is, therefore, about helping people to achieve personal fulfilment through choice and a reasonable work/life balance.

This has been BT's rationale in introducing flexible working, of which homeworking is a key element. It has become essential and fundamental and at the heart of our business strategy.

BT not only sees the benefits from the flexible approach it offers its employees, but also from selling flexible working solutions to customers. This is increasingly core business for BT. By openly transforming our own business capability we demonstrate to customers that homeworking works and provides a range of benefits to the business, the individual and the environment.

Benefits to business
BT tells its customers that we find that homeworking:

• increases productivity
• reduces travel time
• ensures key people are always in reach and in touch
• reduces costs and overheads
• increases the power to attract and retain premium skills
• reduces absenteeism and work-related stress
• encourages a happier, more motivated workforce
• reduces negative impacts on the environment.

Homeshoring – the latest way forward
BT's latest homeworking transformation focuses on the last bastion of office based work – the call centre. The reason why 'the contact centre has not left the building' was the inability to real-time manage contact centre agents remotely. Modern technology can now route customer calls to a variety of locations depending on the availability of the remotely based call advisor.

Trials are currently taking place within BT's call centres in the remote northern part of Scotland and in the support centres of its international conferencing services, where agents host and facilitate conference calls for internal and external customers. Results so far are encouraging with call handling time decreasing by 20%.

Anthony Marrero is part of the BT conferencing trial. He is based in Virginia in the USA and has taken up the opportunity as part of his plans to 'wind down' his working life and better utilise his leisure time (a practice actively encouraged by BT). 'I'm semi retired. Working from my home part time allows me a schedule that not only supports BT but also fits with my personal priorities.'

Internal success has encouraged BT also to sell this proposition externally. The Broxtowe Estate in Nottingham, for example, sees collaboration between UK Virtual Call Centres, Broxtowe Education, Skills and Training Centre, Cisco, the Greater Nottingham Partnership and BT. Together they are working to deliver a trial of community-based homeshoring.

As an area of relative economic deprivation, low geographic mobility and high unemployment, Broxtowe is a prime site for job creation. With a relatively static population of more than 14,000 it provides a large, sustainable community as a talent pool to resource the project.

Workers are typically returning mothers or people with caring responsibilities, who have been unable to find a job which is flexible enough to cater for their personal commitments. Many of them probably would not have considered call centre employment, but have actually found the work fulfilling as well as allowing them to work from home and manage other responsibilities through working carefully scheduled split-shifts. The local community centre provides a hub for training, community support and face-to-face meetings as and when necessary. The Broxtowe recruits are currently taking calls from customers of Boots, the Nottingham based high street chain of chemists.

Graham Hardy is head of central customer care at Boots. He explains 'This project meets a community and a business need head on. It is an exciting pilot to see if it's possible for people to deliver a great experience for Boots customers, whilst working from their homes. It is important for Boots with our 136 year association with Nottingham to continue this creative way of accessing and involving a wider population.'

Now across the UK, BT has engaged in excess of 1,000 homeshoring agents on a number of trials. They are actively developing homeshoring propositions with a variety of customers in order to help transform their businesses. This new advancement can potentially revolutionise the way call centres are resourced and managed. It can provide an alternative to the current trend towards offshoring and invite many more people back to the workplace who previously may have been forced into unemployment.

Cost and efficiency

BT estimates increases in productivity among homeworkers of between 15-31%. This is due to various reasons. Remote working requires a better degree of planning, role clarity and end-to-end process. It also helps employees focus on priorities, removing them from the distraction of the office.

The reduction of travel time means that workers are more readily available online and less fatigued by long commutes. BT finds that people effectively deliver a longer working day and are more productive with less time spent on the move. This extends to travel to customer and team meetings as well as journeys to work with telephone and web conferences reducing time required to an absolute minimum. It also makes the 'office' a place where people can meet in a relaxed environment that ignites their creativity.

Mark Leibling, head of human resources systems for BT Group says 'I really enjoy being able to be in my office at 9am. My commute is only 30-seconds. This means I have time to take my children to school and still have more time to be productive at both ends of the day.'

Costs and overheads have dramatically decreased. The most notable of these have been the staggering **£500m reduction** achieved in BT's property portfolio. In the BT buildings that remain, it is common to see hot desk areas and conference rooms rather than the traditional personalised desks. This facilitates the occasional attendance for face-to-face meetings but minimises fixed costs.

BT has also found that flexible working is a positive advantage in attracting and **retaining talent** in a fiercely competitive sector. In recruitment it means that geography is not an issue and BT records numerous cases where a flexible approach allows employees, whose personal circumstances have changed, to be able to continue working in the organisation. BT is particularly proud of the fact that 97% of women returning from maternity leave continue in employment. The ability to homework is a key enabler here.

To illustrate the importance of retention, the recruitment and training of a customer service engineer in BT's Openreach business costs in the region of £28,000. Retention of such an individual therefore saves considerable expenditure. It also retains the intellectual capital which the company has invested over time.

Absenteeism has also decreased in the region of 20% on average, perhaps aligning to less travelling and shorter working days. This further increases productivity and encourages a healthier and fitter lifestyle. Those with chronic conditions are afforded a better lifestyle

and are again more likely to continue working with the company.

Karen Macdonald started her BT career as an engineer in Scotland in the late 1970s. Following her diagnosis with multiple sclerosis and the gradual worsening of her condition, she is now a wheelchair user. Changing her role to a customer fulfilment specialist and becoming a permanent homeworker has provided her with the ability to make a full contribution to the business. It also gives her more time with her young family. She says: 'Thanks to homeworking I have independence and self respect. I am able to distribute money into the local economy and be at home to support my children as they go to university. This is the best of all outcomes.'

And then of course there is the benefit of a happier and more motivated workforce. These can be extremely positive from an individual's perspective.

Benefits to the individual
BT is eager to help employees create a working experience which allows them to achieve a healthy work-life balance. Homeworking can make this a reality.

People opt for homeworking for a variety of reasons. For some it is simple personal preference. But as the case studies here illustrate, for others it provides an enabler or even a lifeline, supporting them in juggling their work requirements with their personal needs and commitments.

Like Karen, personal assistant Sue Wilson found occasional homeworking a real benefit when an arthritic condition made travel to work difficult. Three years later, following a double hip replacement, her mobility has improved significantly. She still however works regularly from home, recognising the benefits to her work/life balance.

Managing childcare responsibilities better is another common example of how home-working can relieve the day-to-day pressures of everyday life. With an increasing number of mothers returning to the workplace and a greater incidence of lone parents, achieving the balance can be difficult unless employers provide greater flexibility in the way they structure work.

Steve Brodie is a data centre infrastructure manager for BT Operate. He is also a single dad with two children. 'BT introduced an option for me to work from home and my life improved hugely. I organise my career around being a parent.'

Typical responsibilities go beyond children. With an **ageing population** in the UK, one person in seven now has caring responsibilities for elderly or disabled relatives or friends.

Personal assistant *Lisa Crowley*, has found homeworking a huge benefit, taking the pressure off having to care for her elderly mother who has crippling arthritis, recently worsened by skin cancer. Lisa says: 'What is reassuring is that I don't feel that I have to justify not coming into the office. My manager and colleagues are aware and supportive of my situation. This makes such a difference to me and my mum.'

Making the switch

So what is involved in turning an office worker into a homeworker? It is in fact a relatively simple process. A full-time homeworker ceases to be allocated dedicated office space. They are fully equipped with the necessary equipment and technology that enables them to perform their job at home. Usually this is a high speed broadband connection, a telephone line and a laptop.

Security and safety are of vital importance with all computing equipment provided with secure access and individuals being required to ensure that they work in no lower standards of safety than they would expect if they were in the office. They are given reasonable allowances for furniture, office equipment and stationery, heating and electric and a virtual post-box for postal deliveries.

Their contractual headquarters is changed to their home, although their contract may include provision for the agreement to be reviewed after a period of time or if their role substantially changes. Otherwise they are treated as any other worker in terms of employee communications, performance management, discipline and other human resources practices.

Robert Cole, head of customer satisfaction for BT's public sector customers has responsibility for managing a variety of business improvement programmes. Robert talks about how he manages and interacts with his team. 'We are a small team of five people but are spread out across the UK. We could not do our work without the flexibility that homeworking affords us and we don't forget the need to keep in touch. We have weekly team calls, fortnightly one-to-ones by phone and face-to-face meetings every six to eight weeks.'

Again the use of the technology is key to success. And the results? BT measures employee satisfaction through an annual attitude survey, which records a 55% improved job satisfaction amongst homeworkers. This is further substantiated by an independent

survey, commissioned by Damovo UK, the business communications provider, which recorded 73% perceived improvements in work/life balance.

Benefits to the environment

BT believes the third major beneficiary of homeworking is the environment. It estimates that it has saved 1,800 years in real-time and £10m in cost through saved commuting. This would equate to 12 million litres of fuel and a reduction in CO_2 emissions of around 97k tonnes.

The *Saving the Climate at the Speed of Light* report by the World Wildlife Fund and the European Telecommunications Network Operators (of which BT is a member) concludes that by using existing communications solutions, some 50 million tonnes of CO_2 emissions could be avoided across Europe by avoided business travel.

The report estimates that:
• 20% of EU business travel replaced by video conferencing would save 22.3 million tonnes of CO_2
• 50% of EU business replacing one meeting a year with an audio conference would save 2.2 million tonnes of CO_2.

Increased homeworking has the potential to cut the worse peak traffic by up to 10% within 5 years. Such a reduction could save 14.5 billion miles a year. This equates to 17m cars foregoing a trip from Land's End to John O'Groats.

There are also social and community benefits. People working from home are more likely to have time to make a contribution to their local communities, bringing dormitory towns back to life and helping remote areas thrive again.

Barriers to success

So why are many other companies still reluctant to follow BT's example in promoting homeworking? Perhaps the key lies in the barriers, many of which BT has encountered on the journey it has made over the last 20 years.

To successfully implement a policy of homeworking, there needs to be a clear under-standing of the benefits, together with an accelerated shift in working cultures. Employers need to recognise and embrace this.

The most common problems encountered are resistance and scepticism, particularly prevalent in middle management. An organisation must encourage trust between

employer and employees and foster management styles that are open, ready and willing to adapt.

Managers who believe they have to see 'workers working' are probably failing to implement basic essentials of good people management, defining clear roles and responsibilities, setting SMART (Specific, Measurable, Achievable, Realistic and Time-bound) objectives and properly managing performance.

The enablers to do the job need to be provided - good reliable technology with the right level of technical training and support. Security and safety are of prime importance and organisations must ensure excellent communication strategies to avoid people feeling forgotten or isolated. If done properly, people can feel as much a part of a team thousands of miles apart as they were if they were in the same room.

And finally there is the benefit of happy workers. Recent employee attitude surveys in BT have shown that the engagement of fixed homeworkers averages 71%, while that of their fixed office colleagues averages 65%.

Now is the time for employers to step up and embrace flexible working. The technology exists and the benefits to the enterprise, its people and the environment can easily be measured. As society changes and we understand better how people want to work and interrelate, it is the organisation that must now look to meet the challenge.

The business, environmental and moral case for flexible working - with homeworking at its core - is clearly established. Now is the time to remove the final barriers.

Chapter 4

Changing lives need changing places

Kate Barker, Author of the Government's Review of Land Use Planning

- Homeworking and live/work property look set to become much more commonplace in the UK

- There is now a greater acceptance of this way of working amongst employers, employees and businesses

- But policy around the use of property, and planning policy, still lag behind this significant ongoing lifestyle change

- Employment land should increasingly be used to cater for a very different world of work

- Live/work property uses should be embraced, but more effort should be put into defining what constitutes genuine live/work use

- Allowing greater flexibility between work and residential use of property is also critical

- Planners should think ahead to how land and buildings can be most sustainably used to fulfil combined working and living uses and move away from the zoning approach of the past

'A considerable further increase in homeworking looks likely. As this occurs, it will create demands to use the built environment in a different way. Planning policy should be ready to support this change.'

Changing lives need changing places

Technological developments are changing not just how we work, but when and where we do it. These changes are by no means fully worked through.

Alongside technology has come a shift in attitudes about where work is done. In the mid-1990s, I attempted to combine a full-time role as CBI chief economist with being the mother of two small boys, hampered further by a commute of over 90 minutes each way.

One obvious coping strategy was to work at home whenever possible. This enabled me to do exciting things with the three hours saved, such as collecting the boys from school. However, my office would transfer external calls to me as if I were in the office. At my end I would keep up this pretence, because we worried that working from home would be viewed as a lack of commitment. Many people then seemed to hold views similar to those recently expressed by Boris Johnson: 'Working at work may be unproductive, my friends, but working from home is simply a euphemism for sloth, apathy, staring out of the window and random surfing of the internet.'

Today however most of us - including many employers - have a very different attitude. To some extent this too is linked to technology. There is for example more reliable remote access to office systems. And it is probably easier to monitor time and even effort which someone working at home has put in. It may also be linked to increased trust, as experience reveals that those working partly from home are equally as productive as those in the office, and can be more so.

In addition, the tendency for commuting times, at least in the south east, to increase (and often for commuting to become less pleasant) has increased the incentive for individuals to prefer an element of homeworking.

Good data on the extent of homeworking is not easy to find, and it is likely to be quite a fast-changing picture. The Workplace Employment Relations Survey for 2004 suggested that 28% of employers then offered homeworking – up from 16% in 1998.

It suggests that over the same period the proportion of employees working at home *occasionally* rose from around 19% to around 20%. A different source, the census, showed that the proportion of those working mainly from home had doubled in the ten years between the 1991 and 2001 censuses, to around two million. (This figure includes the self-employed, who currently make up a clear majority of homeworkers according to the Labour Force Survey.)

How much further might this trend go? Clearly for many occupations there is little or no scope for shifting the location of work – obvious examples would be the majority of production jobs, or health and social care. So there are some clear limits. And there is another one – which is that up to a point people need to go to their place of work, and indeed enjoy being there. We might not agree with Boris Johnson's scepticism about homeworking, but most of us would agree with his equally strong view that the office environment is not something we would wish to give up completely (and employers equally would not wish to see this happen). But from where we are, there is still a lot of scope for this trend to go further – for example the occasional day becoming a regular one or two days a week.

There are early signs emerging of a more profound change in attitudes. These reflect a combination of worries over climate change and the rising cost of transport resulting both from taxation and, at the moment, a higher oil price. Moving around less is suddenly being perceived as virtuous as well as convenient and economical.

Carbon and homeworking

While the benefits to work-life balance of homeworking are readily apparent, those regarding a reduced risk of adverse climate change are less so. It is much more likely that specially designed live/work property will contribute towards lower CO_2 emissions than homeworking will. Whether or not the gains from travelling less outweigh the potential cost of heating and lighting a home for a longer period each day will vary between individuals.

If homeworking grows as expected, so will the importance of improving the energy efficiency of the existing stock of houses, already the source of more than a quarter of the UK's CO_2 emissions (according to data from DEFRA). And employers will need to reconfigure offices to ensure efficient use of space, in order to reap energy use reductions overall.

There are several potential implications for planning. These relate to:

• homeworking
• live/work property
• employment land
• social changes
• infrastructure provision.

Simple regular homeworking ought to be accommodated readily within the present system. Generally, working at home one or two days a week, with no business visitors, raises few problems and would not usually incur any part of the dwelling becoming liable for business rates. But if individuals are to do this comfortably, then there will be some space considerations. To be most productive requires a dedicated space - although this is not necessarily large, nor does it imply a whole room. Some of the recently built flats might struggle to accommodate this comfortably if occupied by a couple, and would certainly do so each of them required workspace. We need to avoid building dormitory flats for dormitory towns.

Making live/work work
Live/work raises more specific problems. At a national level, live/work is supported by the draft of Planning Policy Statement 4 (currently out for consultation). But turning this good national intention into good practice at local level may not be straightforward. Local authorities should be encouraged to include provision for live/work in their plans, and to look positively on planning applications for well-founded live/work schemes. Here it is important to have clear criteria for what would be a live/work development, particularly with regard to the proportion of the buildings classified as for business use, and, for a larger development, to the provision of common services such as a 'hub' or business advice centre.

There are obvious dangers if this designation becomes misused. However, planning authorities should not, in guarding against these dangers, become too over-prescriptive about the type of businesses which can occupy live/work development. Considerations of nuisance are obviously important, and in some locations regular visits by clients could raise travel issues. But it may be more appropriate to have a set of guidelines, and take decisions case-by-case, rather than ruling out too many whole use-classes.

But live/work should not be all about new development. Not everyone wanting to run a business from home wants to be near other entrepreneurs. Nor do they necessarily want to make where they live contingent on the success of a business. This would occur if the nature of the business required planning permission to convert to business purposes, but then this proved difficult to reverse. This can also be an issue for those in designated live/work developments, where often if the business fails it implies a house move, with all the attendant dislocation.

Anticipating the best future use of land
The discussion above implies a number of potential implications for employment land and indeed for planning and other policies more generally. It is of course more generally

true that the changing nature of employment, with the shift away from businesses that are likely to prove bad neighbours, has reduced the need for the separation of business use to an extent. But more specific factors here include:

- reconsidering the quantitative need for the provision of designated office accommodation – employers could be challenged on their space needs and flexible working practices
- taking a positive attitude to live/work planning applications which met a recognised set of good practice criteria - these may vary according to the specific location
- taking an 'impact test' approach to allowing changes of use in both directions between live/work and residential within the existing stock (unless part of a designated live/work development). This would enable individuals or families to move into live/work with less risk of losing their home, or having to move, if the business fails
- considering how far the 'impact test' would allow more flexibility with regard to change of use for part of dwellings
- producing clear guidance on the issues around business rates and planning permission which can arise as individuals wish to use their dwellings more flexibly. At present it is not easy to put this picture together as planning questions and rating issues are often described in different places
- there are also other issues around possible financial incentives/disincentives to develop live/work. Less planning gain may arise from a live/work development, and this should be taken into account.

With mixed-use development becoming more usual in new build, allowing the existing stock to move in that direction may help to cut travel time and decrease the need for office provision. The English planning framework is already becoming less prescriptive about separating use classes, and the rapid changes in both working patterns and in attitudes towards travelling are an opportunity to consider taking that further.

How will homeworking communities flourish?

Social changes are likely to result from these shifting economic incentives and the views of both employers and employees may bring new trends which go beyond travel and the use of homes. We may see an altered relationship of working people with the communities within which they live, and increased demands for facilities close at home.

Walking to cafes, pubs, newsagents, small local grocers may become established as lunchtime habits, and planning will need to be ready to respond to any upsurge in demand for small-scale outlets. While this may sound idealistic, it could give suburbia the chance to rediscover its sense of place, and for leisure activities to move away from town centres.

Finally, **infrastructure provision** may become less burdensome, if households start to make fewer journeys. However, this may also bring its own problems. If demand for commuter trains lessened, for example, the average costs of carrying passengers and therefore fares could rise, perversely increasing incentives for homeworking (but with capacity pressures apparent on many lines, this problem seems rather distant). Or traffic congestion may become hard to reduce below a certain level, as commuters travel more whenever congestion lessens, and vice versa.

Conclusion

To conclude, while it is uncertain today how far the trend towards working from and at home will go, there is clear potential for considerable further increase. As this occurs, it will create demands to use the built environment and indeed places in a **different way**. Planning policy should be ready to support this change, and the draft of PPS4 points towards the right sort of flexibility here.

Policies around business rates also need to be clarified and publicised alongside any planning implications. But this could be a real positive for people and for places. The day may well come when the five times a week, three hours a day, of commuting I and many others have done for so many years is looked back on with the same amazement that we have today for the hours worked in Victorian factories.

Chapter 5

Moving work to the people, not people to work

Andy Lake, Editor of www.Flexibility.co.uk

- The world of work is changing, with impacts on both workplaces and homes

- Homeworking is already making a significant contribution to limiting the carbon impacts of economic activity

- The current emphasis on public transport in transport policy is both expensive and inappropriate, as shifting the workforce around by alternative high-carbon modes is not sustainable

- Transport policy should work with workplace trends and promote 'virtual mobility', homeworking and localised working

- The home should be seen as a key centre for productive activity, and planning policies should support the integration of home and work activities

- We need to rethink current approaches to 'sustainable communities'

- We need new approaches to urban density, approaches that 'design in' rather than 'design out' the ability to work, study, care for others and produce our own food at home

- In this context, homeworking can make a significant contribution to 'saving the planet'

'Companies and public sector organisations are investing vast amounts in real estate that spends most of its time empty or significantly under-utilised. This both hits the financial bottom line and damages the environment.'

Moving work to the people, not people to work

The world of work is changing. New technologies mean that work no longer has to be centralised in offices and factories as before. There is an increasing blurring of boundaries between home and work life, as we have ever more things to do in an increasingly complex, demanding and opportunity-filled world. 'Going to work' as in going to a place, is becoming an increasingly outmoded concept. Work is **not where you go**, it's what you do.

Having the UK working population travel billions of miles each year to spend time using computers and telephones, which can be done from anywhere, is an intrinsically unsustainable thing to do.

Yet government approaches to planning for the future and for tackling climate change are based on assumptions largely rooted in the old world of work, in the Industrial Age. Planning policy is still predicated on the separation of home and work and the need to shift people between them every day. Transport policy, investment and research focuses almost exclusively on shifting a marginal number of people – far too few to make a difference – from cars to other forms of more 'sustainable' mobility.

We need a new approach, one that focuses on the integration of home and work and the localising of service provision.

The way we work is changing for good

The numbers of people working from home reached 3.7 million in Autumn 2007 (Labour Force Survey). These are people who work mainly from home, and does not include the people who are working less regularly from home.

The numbers working from home is growing by some **13% a year**. This is the leading edge of demand, showing a growing demand amongst the UK population to alter their place of work.

Perhaps this is not for all of their working lives. There are people moving in and out of working from home all the time. So the pool of people who work at home, have worked at home in the past or will work there in the future is greater than this.

Separating home and work is largely an invention of the Industrial Age, when much, if not, most work could be expected to be noisy, dangerous, toxic or smelly. Office-based work also grew on a factory model, based on perceptions of economies of scale to be achieved by concentrating the workforce and the resources they used into one location.

Amongst the consequences of this was to push the costs of getting to these centralised workplaces onto individuals, society and the environment. We have accepted this hitherto as an inevitable consequence of economic growth.

But we are moving out of the Industrial Age. It is not just a question of moving towards a more service-based economy and the growth of the 'knowledge economy'. Even manufacturing is not what it was. Many companies in the manufacturing sector offshore manufacturing processes, and what remains located here are functions such as design, research, marketing, sales, HR and senior management. The office jobs might once have been co-located on a factory site, but now in the 'information age' can be located just about anywhere. Including being home-based.

Factories and distribution centres in the UK are increasingly automated and are much less labour intensive. These kinds of workplaces provide far fewer jobs per m^2 than 20 years ago.

Employers that adapt to the new approach
Meanwhile offices are undergoing transformation as forward-thinking employers, including some government departments, seek to use offices more intensively. Traditional office premises are massively under-utilised, with costs both to the financial bottom line and to the environment.

The Office of Government Commerce has launched its *Working Beyond Walls* guide as a means to get the government sector to utilise its property assets more effectively. Ofsted, the teaching inspectorate, runs as a home-based enterprise, the largest in government.

Companies like BT, IBM, Sun and Microsoft enable their employees to work from wherever is best to get the job done, and have radically reduced their office base as a result. The AA has for several years been running 'virtual call centres', with its call handling operatives working from home. **Homeworking** is a key component in all these implementations.

With homes being used more for working, and the way workplaces are used undergoing significant change, what are the implications for public policy, and how can the potential environmental benefits be maximised?

### Carbon count: homeworking versus the office
Robust studies are just beginning to emerge that compare the impacts of home-based working with office-based working.[1] The findings so far indicate significant carbon savings from working from home. This is largely down to three reasons:

1 See Peter James' chapter in this volume; also Dwelly, T, Lake, A and Thompson, L *Tomorrow's Property Today* (2008)

- workplaces are typically under-utilised and have a high carbon footprint per employee
- the carbon cost and biodiversity impacts of building two separate premises for home and work exceed that of incorporating a workspace into a residential dwelling
- the transport energy involved in commuting is a significant component of an individual worker's carbon footprint, and is eliminated by working at home.

The typical traditional office business is only occupied for 30% of the time (assuming occupation between 8am and 6pm, Monday to Friday) as the following figure illustrates:
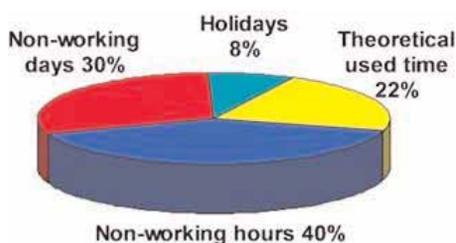
The figure also highlights the fact that within that 30% occupied time, any individual worker will have 8% of their working time as annual holiday.

Workplace occupancy surveys prior to implementing smarter working typically show overall desk occupancy levels of around 40-45%. This is because people are working out of the office, at meetings, are sick, on leave or work part-time.[2]

This means that companies and public sector organisations are investing in vast amounts of real estate that spends the majority of its time empty, and when in use is significantly under-utilised. This both hits the financial bottom line and damages the environment.

The 'smart working' alternative
Smart working organisations are introducing new and more flexible ways of working that use buildings more efficiently, support new working environments and solutions that enable staff to work effectively from remote sites including the home - and greatly reduce the need for both commute and business travel.

A recent study by Oxford University's Transport Studies Unit[3] evaluated the comparative impacts of teleworking versus office carbon impacts. This proposes a typical carbon cost

2 See *Shrinking the Office* (2007). At: www.flexibility.co.uk/flexwork/offices/office-shrinking.htm
3 Banister, D et al *The Costs of Transport on the Environment – The Role of Teleworking in Reducing Emissions* (2007)

of using a room for home-based telework as being 173kg CO_2 per year if one day per week, and 865kg per year if five days per week (costs of heating and lighting a room plus equipment energy use).

This is about **half the carbon** per person of working in a modern office, a quarter of the carbon cost of working in a poor-performing office.[4]

It might be argued that a separate workspace in a home of $14m^2$ would in one sense have comparable impacts to $14m^2$ of space in a separate office. But the home office is only likely to be heated, lit and ventilated **when in use**. The economies of scale expected in offices are found not to exist, as lights, air conditioning, printers and IT services are on all the time.

Moves towards eco-offices may mitigate this but workspaces in eco-homes can be expected to match such progress.

It is interesting that much environmental thinking focuses on improving the environmental performance of both homes and offices. It would be ironic if traditional mindsets about the nature of work insisted on **entirely avoidable** transport energy consumption to move workers between low carbon homes and low carbon offices.

Transport reduction is key
It is in reducing transport demand that home-based working can perhaps do most to 'save the planet'. Other essays in this report provide more detail on the impacts of home-based work on transport.[5] The following table, from the report *Tomorrow's Property Today* shows the headline savings:

Table: Average savings from avoiding commuting

	Average employed homeworker	Full-time homeworker
	(1.5 days per week)	(5 days per week)
Distance saved per year	1175 miles	3915 miles
CO_2 saved per year	364.5kg	1187 kg
Time saved per year	61 hours	202.5 hours

Note: Calculated on basis of 45 working weeks per year

These are significant potential savings. Yet the transport impacts of home-based working

4 Goodall, C *Carbon Emissions and the Service Sector* (2007). At: www.lowcarbonlife.net
5 In addition, the results of a Department for Transport study are available online. Lake, A, Cherrett, T *The Impact of Information and Communications Technologies on Travel and Freight Distribution Patterns: Review and Assessment of Literature* (2002). At: www.virtual-mobility.com

are not taken seriously in public policy, where most of the focus remains on the collectivist forms of mass mobility: railways, trams and buses.

'Sustainable transport?' Think again!
There have been a handful of government initiatives focusing on 'transport substitution' by using new technologies, for example by working remotely, videoconferencing, electronic service delivery and ecommerce (within the framework of the Smarter Choices programme[6]).

But this is a Cinderella area in public policy, chronically underfunded by comparison with the favoured Ugly Sisters of rail and bus transport.

Apart from London, where around 50% of workers do so, only around 10% of people travel by bus or rail to work. According to government forecasts, by 2041 there will be a 44% increase in the number of cars owned in the UK and a 24% increase in the number of trips. This is against a background of a population increase of 11%. Even doubling the current number of public transport trips would barely take the edge off the projected increase in road transport.

In this context, it should not be forgotten that railways and buses, though not as polluting as cars, are still resource-intensive and extremely **polluting** forms of transport activity.

It's not only the carbon cost of running them. The amount of land-take and construction for new **infrastructure** development, rolling stock and new vehicles does not bear thinking about if we are seriously thinking of reducing the carbon footprint of economic activity. The carbon-reduction return-on-investment of such construction activity would take many decades to achieve.

For many rural areas, public transport is only a distant memory. As a means of getting to work, public transport is out of the question for most people living in rural areas, unless topped and tailed by a substantial car trip. Extending public transport to most of these areas would have a huge carbon cost.

Generally left out of the equation in consideration of public transport are the intrinsic 'rebound effects' of using it. In essence, public transport is a form of mobility that takes you from where you are not, and delivers you to not exactly where you want to be. So

6 See www.dft.gov.uk/pgr/sustainable/smarterchoices 'Teleworking' is recommended as a 'smarter choice' to reduce travel.

every public transport trip necessarily generates additional trips at either end (unless you live or work at a bus station, perhaps). Increasingly – and in many cases necessarily – these trips are by car.

There is little that can be done about this, unless public transport provision becomes so ubiquitous that we can all step out of the house and find a bus stop or train station within comfortable walking distance. And then travel from there via a seamless network that takes us wherever we need to go, in a time-effective manner. But of course we are entering dreamland here. It's plain that this is not going to happen, and as a nation we could not afford such a network in any case.

In terms of CO_2 per passenger km, buses are about 75% as polluting as cars, and trains about 50%.[7] Shifting people from car travel to other forms of high-pollution mobility is analogous to encouraging the local hooligans to move round the corner and terrorise the next street, on the grounds that there are 30% fewer houses there. It's a comparative benefit, but it can't really be the main objective of policy.

An increase of 50% in the rate of homeworking, by contrast, would deliver an extra 3 billion commute miles eliminated *completely* – and around 900,000 tonnes of CO_2.

Increasing the uptake of public transport is, at present, a necessary part of approaches to more sustainable travel demand management. It is part of the basket of measures that apply. However, it needs to be relegated from its dominant position in government and local authority thinking, and be considered as a 'necessary evil' – the least favoured option in the basket when compared to walking, cycling, and 'travelling without moving' or 'virtual mobility'.

In the jargon, transport is a 'derived activity' – that is, apart from cycling or driving as a leisure pursuit, for most of us it is the end activity that is important, not the travelling. The journey is a derived activity from shopping, working, playing, or being at school, being on holiday. So the more of these activities we can perform without moving, or without moving far, the better from a sustainable transport point of view.

The point of this is that with the right land use and enterprise policies, we can stop thinking about how to shift millions of people to their desired activities, and start to think about how those desired activities can be located or accessed much closer to home.

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7 UK Energy Research Centre *Personal Carbon Trading: Excluding Public Transport* (Working Paper, 2006)

Designing-in commuting

Currently we have programmes like the 'sustainable communities' plan to create growth areas of housing and 'eco-towns'. In many ways these are fig leafs covering the nakedness of business-as-usual in planning and development.

Essentially, these programmes have failed to challenge a reliance on commuting. Most are within commuting distance of London, and despite the token nod in the direction of live/work accommodation, hundreds of thousands of new dormitory homes are on the drawing board. The Thames Gateway is being planned with big new public transport infrastructure, but this investment is necessarily predicated on income from millions of new commuter journeys into London each year.

The trouble with these approaches to new housing is that they require roads and public transport infrastructure in only marginally different proportions to current practice, in order to shift millions of people about pretty much as before. New names, but really 'same old, same old'.

A new approach to land use and mobility

The new world of work means that:
• we just don't need people to go charging all over the country back and forth to work (as a place) any more – at least nowhere near as much
• we don't need to allocate so much land for workplaces
• we do need to rethink how we conceive of the home – the home as a centre for multiple activities, including work, study, healthcare, food production and increased social interaction

For as well as the world of work changing, the nature of society is changing. Most strikingly, we are moving from a three-generation to a four-generation society. Much of the debate on the impacts of an ageing society is cast negatively in terms of the needs for increased care and increasing dependency. But how we build and regenerate our communities will make a big difference to the quality of life and the participation rates of all members of society.

People will increasingly expect to work beyond 'retirement' age and to participate in a range of productive and social activities. However, our current approaches to land use and transport planning will mean that a growing proportion of citizens will face mobility barriers that limit their capacity to be active.

Essential components of designing accessible and enabling communities are to:

• plan for older citizens being able to work from home or run a business from home
• plan service provision within walkable distances
• provide infrastructure for independent retirement rather than dependence.

The costs of not doing this are environmental as well as social, if we anticipate service provision being brought to a dependent population and a dependent population being transported to distant service centres.

The same principles apply for people with disabilities and for people with other mobility challenges, such as living in remote rural areas, being too poor to own a car, needing to combine part-time working with a domestic or local commitment.

Our aim should be to create 'can do' homes and communities. Envisaging the home as a productive centre rather than as a focus for passivity is critical to the mix required for having vibrant and empowered communities.

Getting smart on density
Current thinking in planning generally advocates higher densities in new developments. The danger is that, unintelligently applied, this designs out homeworking.

Across much of the country, people need to look for a home in the £500,000+ price range, and probably an older rather than a new property, in order to have the space to run a business from home.

In urban areas where land values are high, though, larger family homes are being pulled down and replaced by flats. Larger urban gardens – designated in the planning system as brownfield or developable land – are buried under denser developments. Density is achieved, but commuting to work is enforced. And this trend for garden-grabbing is a catastrophe for urban biodiversity and aspirations for increased home and local food production.

There needs to be a new approach to 'smart density'. Higher densities in urban areas can be achieved, but the internal spaces and layouts need to accommodate more flexible uses during the life course, including working from home and looking after dependants. And there needs to be adequate garden provision (individual or communal) and space for outbuildings.

Imagine no homeworking – a 'what if?' scenario

The contribution that home-based working already makes to reducing carbon is often ignored. Imagine this scenario. The government passes a law to prohibit all home-based working so it decrees that all economic activity must be carried out in a separate work-place from the home. The consequences would include:

• an extra six billion commute miles on UK roads each year
• over 35 million additional m^2 of employment floorspace would be needed to accommodate the displaced homeworkers.

These figures provide a rough-and-ready estimate of the contribution home-based working is already making to reducing the nation's carbon footprint, and to reducing the costs of infrastructure development.

They are likely to be underestimates too. The figures are based on average commute distances and the existing number of people working mainly at home. They do not factor in occasional homeworking by employees or the greater balance of home-based business in rural areas.

From the economy's point of view, the impact of a clampdown could be even more scary. Two-thirds of those who work from home are running a business. Many of these businesses would probably fold if faced with the costs of separate office/workshop/retail accommodation and regular commuting.

Happily, the government has no such intentions (we trust). However, this scenario illustrates the carbon-avoidance intrinsic to homeworking, and should act as a stimulus to encourage the growth trends of this way of working, removing regulatory barriers and positively planning for the new world of work.

Conclusion: move work to the people

Can homeworking save the planet? Leaving aside the bigger philosophical questions like 'for whom?', the conclusion is that homeworking can play a significantly bigger part than most people think.

Compared to a wholesale switchover to renewable energy, reversing economic growth or reducing the population, the impact of homeworking may be limited. But in this essay I have shown that homeworking already plays a significant carbon-limiting role in the UK. Its role is more significant and has far more potential than the quixotic, and massively expensive, attempts to boost public transport.

On the assumption that as a nation we want to remain economically prosperous, we need options that can maintain economic growth while reducing the carbon impacts of our economic activity.

Embracing the new world of work, carrying out more of our collaborative and transactional activities electronically, building fewer offices and building homes that we can work in are all part of the mix. The model for economic development should include a strong emphasis on 'spaceless growth'– growing companies without growing the floorspace, and using the floorspace we have far more effectively.

Encouraging 'virtual mobility' wherever possible needs to be moved from the margins to the centre of transport policy. The aim of a modern transport policy should be to eliminate as much routine and carbon-intensive travel as possible (by whatever mode), while facilitating necessary and special-purpose journeys. Homeworking and promoting smart working are core components of this.

Most of all, homeworking needs to be put at the heart of developing and regenerating locally-focused communities. The implications and challenges for planners, developers, policy-makers and business strategists are immense. But if we are serious about reducing the carbon footprint of the way we work, then we have to make the most of opportunities to move work to the people, rather than shifting people to work.

Chapter 6

Developing for a live/work future – how developers can pioneer change

David Cowans, Group Chief Executive of Places for People

• New technology makes working anywhere increasingly viable, including the home

• But a purely residential location is not necessarily appropriate for growing small businesses

• Live/work property looks set to become a mainstream place of work

• It offers sustainability not only by lower carbon use (one property is built and fuelled not two) but by sustaining businesses by lowering their costs

• But developers will not convince planners of their ability to deliver these benefits if they treat live/work as if it were a standard residential product

• Live/work schemes and quarters need hub facilities and appropriate management services

• Only those developers grasping the unique nature of genuine live/work can lead the essential growth of this new low carbon property type

'The advance of technology has made remote working a viable option throughout the country. As broadband speeds accelerate, affordable video conferencing will enhance the live/work option further.'

Developing for a live/work future - how developers can pioneer change

The world of work is altering very fast. More people are seeking a different work/life balance and employers are increasingly realising the benefits to productivity and to recruitment of offering flexible working practices to employees.

This is reflected in the growth of homeworking. Working at home is frequently seen as a lifestyle choice for employees, those who need to work from home for a variety of reasons (caring, disability or childcare) or those just starting out in a new business.

In this context, what provision is there for the self-employed or for the small or medium businesses which are of increasing value to the country's economy? Working from a spare bedroom or a shed on a business park will often fail to provide the solution they seek to their business needs. This issue also needs to be considered from a **business start-up/ business survival rate point of view**. Combining home and business costs can make a crucial difference to new businesses. This is where the live/work concept offers a valuable solution not only to the user, but to us all, as it contributes to the sustainability agenda.

The traditional model of working in one place and living in another looks set to give way to a model of working and living in the same place. This reduces the resources used in creating two buildings and also reduces the level of commuting.

What is live/work?
Although the design and style will vary, the essentials remain constant - a live/work unit is a single unit, part of which is dedicated workspace, the remainder living accommodation. The two areas are separate but under the single control of the occupier. Often the workspace can be separated from the home so that co-workers and visitors can come into the workspace without disturbing the home. Depending on design, the workspace part might also be available to co-workers when the occupier is, say, on vacation.

What makes this possible is the advance of IT, in particular broadband services. Remote working is now a viable option throughout the country, with business journeys being minimised. The imminent spread of affordable video conferencing, as broadband speeds pick up, will enhance the live/work option further.

Businesses will still need to network
A valuable dimension of live/work developments is their ability to create groupings of similar businesses and/or communities of entrepreneurs. These groups have the potential

to create synergies of thinking and creativity in the development of their own businesses and in business to business trading.

Not essential to every live/work project, but a valuable asset to building a professional workspace, is the provision of a hub facility. This can provide shared services to live/work occupiers as well as the wider community. Again the form of hubs will vary. But they generally offer meeting spaces, where clients can be met, and networking spaces, as well as providing office services such as accountancy, call services and a reception. For example, Places for People pioneered live/work at its Creative Lofts project in Huddersfield in 2002. This live/work scheme consists of 21 apartments of different sizes and designs in a grade II listed building and is adjacent to the Huddersfield Media Centre. This provides a business hub with a café, meeting facilities and exhibition space which, with over 200 people working for 80 businesses, forms a vibrant meeting and informal business space and can be used to launch products and ideas.

The contribution to sustainability

Whatever the design of live/work, its sustainability contribution compared to traditional housing is clear. Live/work means that the working and living requirements of a household are combined with a commensurate reduction through the **sharing of costs**. For a starter business, having stable and predictable costs can offer significant business advantages. This makes the business itself more sustainable.

Through live/work, rental and/or mortgage costs are also shared. The single unit means **reduced carbon cost in production of the building** as well as reduced costs in use. Energy costs are less and commuting costs vastly reduced. This means reduced cost in time, money, carbon emissions and societal pressures such as lower traffic at peak commuting times.

The contribution to sustainability goes wider. Redundant buildings often in commercial/ industrial areas can be brought back into use and can bring a distinctive feel to a project, forming an attractive selling point. Creative Lofts (a former mechanics institute in Huddersfield), Bristol Paintworks and Hayle Foundry in Cornwall are just some examples.

Live/work in itself contributes to the **viability of local neighbourhoods** through the use of local services such as post offices, catering and printing. Neighbouring live/workers will network and provide services to each other reinforcing the viability of the community.

The live/work community can also forge crucial links between local higher education establishments and business development. The live/work environment can create a bridge

between graduates moving from higher education and the creation of new businesses close to a university campus and with the support of higher education services.

Services offered by the hub benefit not only the live/work units but also the wider community in the locality. This is potentially of particular benefit to rural communities, recognised by the fact that the Government's brief to Matthew Taylor MP, for the review on rural economy and affordable housing, included investigating the potential for increasing the provision of live/workspace within rural communities.

The discussions Places for People are having with private developers encompasses many of these features: mixed tenure live/work developments with renewable energy, a hub building providing shared business services often connected to university services and potentially car clubs.

The future for live/work

The sustainability benefits of live/work are clear. So why is live/work not being more widely developed? There are a number of reasons, including the fact that the live/work concept is not widely understood nor sufficiently distinguished from homeworking. Live/work proposals can be seen by local authority planners and others as a device to gain residential planning permission where it would not otherwise be available. In Hackney the debate has centred on this issue, as many live/work units have changed use to become wholly residential over time.

Additionally, developers of traditional housing generally maintain their interest only until the property is sold. This means that they rarely have a long-term involvement in the future management of the places or an interest in its longer term economic sustainability. On the other hand, organisations that retain a long-term interest in the area can often fail to understand the commercial needs of potential live/work customers, so that support services are not available to support the development. Both characteristics limit the development of live/work on any scale.

For developers of whatever type, the planning framework is altering. In planning terms, live/work is classified as *sui generis*. In other words it does not fall into any particular use class and each application should be judged on its merits. Live/work was supported in the Barker review of land use planning and is recognised as an eco-friendly mechanism for creating synergies between housing and economic development land uses. This is reflected in the draft of PPS4: *Planning for sustainable economic development* which encourages local authorities to support live/work units in order to achieve residential uses and employment uses together on the same site to make better use of land.

Mixed tenure has changed the face of development, and mixed use through live/work can be seen as a natural continuation of that trend. For instance what could be more suited to the proposed eco-towns than live/work? As lifestyles continue to change and small businesses play an increasingly important role in shaping our economy, the demand for live/work is bound to increase, across all tenures.

What do developers need to do?

Live/work must be seen as a discrete product which adds value to a community, whether new or existing, rather than a bolt-on or afterthought to a development proposal. The would-be developer needs to research the concept thoroughly as well as understand the market. For instance, live/work might form part of a regeneration package, but it is not likely to be the catalyst for regeneration alone. Just as in the normal residential market, location is key. However, with this product, product design and services are also crucial. Developers who take a long-term interest in the management of the place are perhaps more likely to work to ensure the economic success of the place.

Live/work must be viewed as an employment initiative rather than predominantly a residential project. This will make it more readily acceptable to planners and local communities and more importantly likely to be successful economically. It is also fundamental to project viability through the use of employment land. In terms of job numbers, live/work schemes can compare well to industrial park 'sheds' which are not necessarily labour intensive, attractive in design or socially useful.

Affordable housing requirements will need to be negotiated with planners, recognising that the proportions and tenure type required for mainstream residential housing are not likely to be appropriate for live/work projects. The intermediate market for rent and shared ownership are suitable, particularly where the prospective occupier has to spread their housing and business costs. However, the customer for social housing to rent is unlikely to have the finance available to support business use, unless the scheme has been designed to support employment training and starter businesses with the requisite support to make this successful.

The prospective developer needs to consider the long-term management arrangements and the provision of a workplace hub. This is a specialist field, as is the marketing of this product, and it may be that the developer, whether private or housing association, needs to create partnerships with others to support the development. Local business support agencies or university business schools could be helpful in this area. A hub reinforces networking and a sense of community which becomes self-sustaining and can lead to successful word of mouth marketing of the scheme.

Marketing opportunities are good – the promotion of sustainable lifestyles linked to economic generation has much to offer not only to individuals but also to the local community.

Taking live/work forward

By its very nature live/work is a hybrid form of development, but one that is increasingly recognised as an important contributor to the growth of an increasingly small-business-reliant economy. The rapid development of technology has freed people to work remotely, choosing to balance their work with their life. In terms of sustainability, live/work has much to offer not only in energy and lifestyle costs but also to local communities.

From all of these perspectives, live/work offers much to developers and housing associations looking to extend their offer. However, to do so successfully, they must carefully research and plan their proposals. Partnerships between developers, housing organisations and business support agencies are likely to be the way forward.

In 10 -20 years' time, I believe that live/work will be a widely recognised way of working and living with a wide spread across both rural and urban communities. After all we only have to look back a hundred years or so to see that living above the shop or a workshop in the garden was commonplace. The availability of new technology means that live/work again has an important role to play in the today's marketplace.

Chapter 7

Designing homes that work

Richard Simmons, Chief Executive of the Commission for
Architecture & the Built Environment

• The live/work unit isn't a new concept, but one from before the Industrial
  Revolution when workplaces and homes began to be zoned separately

• Returning to a greater integration of uses makes environmental, economic and
  modern lifestyle sense

• But the design response to creating dual use buildings has tended to be restricted
  to special live/work units, for self-employed professionals

• The planning and tax systems have perversely applied rigid rules to live/work,
  a type of property use that should be inherently flexible

• The benefits of live/work should be more widely applied as a mainstream approach
  to building design and land use

• Homeworking should be enabled and collaborative hub facilities provided in all
  neighbourhoods to help them thrive

• Buildings should increasingly be designed to enable a flexible economic use

*'Climate change is accelerated and social exclusion perpetuated by the planning
system's continuing use of a 20th century regulatory approach to 21st century
working practices. Changing our approach can improve labour market equality,
economic efficiency and environmental stewardship.'*

Designing homes that work

In 2003, the BBC ran a story about an employee, Louise Blakemore, whose weekly travel to work time came to 30 hours. She lived on the Isle of Wight and worked in Television Centre.

The story ran to coincide with the RAC Foundation announcing figures showing that the average UK resident spent an hour and a half each day travelling to and from work. While that time may seem like nothing to Louise, and about average to the rest of us, merely two or three generations ago it would have been unimaginable.

Separating residential use from economic activity is an anomaly in the history of human civilisation. It served as a much-needed response to rapid urbanisation that regulated development in order to protect people from the exploitation, noise, smell and pollution associated with industrial-era work.

However, historical patterns of development and living favoured workspaces that integrated living space and vice versa. A farm, for example, is a live/work unit. From crofters to Chatsworth, the administration of productive land has almost always taken place in the same building where the family slept. The Domesday Book, that precursor to the Valuation Office Agency, is packed full of live/work units, except that they're called mills, monasteries and manors.

The industrial revolution changed the relationship of people to their work. As people moved away from the fields seeking the benefits that agglomeration and clustering could bring to these new ways of working, the city became what it is today: an economic, cultural and social hothouse, and the source of many environmental problems.

As the nature of work changed and an understanding developed that the worst effects of industry were impacting those least able to escape them, the planning system's approach to use classification introduced necessary environmental controls.

However, the nature of work has changed again. While the planning system should always seek to remove the greatest health and environmental risks, we now face other risks that separation of uses exacerbates. Notably, climate change is accelerated and social exclusion perpetuated by the planning system's continuing use of a 20th century regulatory approach to a 21st century workforce and set of working practices.

The role of building design

How can design and architecture help remedy this? First it is necessary to recognise that design is a process by which we decide the way we want things to be. How we construct our cities, plan our infrastructure, manage and maintain our public space, public buildings, homes and neighbourhoods, can facilitate how we live our lives.

Equally, if our approach to these factors is outdated or badly thought out, barriers are put up which hinder people's quality of life. Here at the Commission for Architecture & the Built Environment, design is not only about architectural icons. It's about improving places for people to live, now and in the future. Changing our approach as planners and designers to how we accommodate economic activity can improve labour market equality, economic efficiency and environmental stewardship. At the very least, it should enable these things, if not actively promote them.

The benefits of encouraging live/work and homeworking are well-understood and well-rehearsed. They support the triple bottom line of sustainability, by boosting productivity, opening the world of work to those that are traditionally excluded – especially women and older people not yet ready to retire - and reducing traffic congestion. They also enable the development of more decentralised and local economies, so that the place you live is also the place you invest in. However, while we recognise that integrating our sleeping place with our place of work is to be encouraged, so far we have not been sure how.

Ministers' remarks and local development frameworks are full of warm words about encouraging more homeworking and live/work, but concrete interventions are few and far between. The eco-towns prospectus, for example, wants to encourage working from home, but the recent consultation on eco-towns implementation contains little detail, either on a building or neighbourhood level, beyond the need for shared business facilities.

Rigid approaches to live/work fail

Even where more substantial policy interventions have been made to increase the number of live/work units and people working from home, success has come at a cost. The response of the planning system in the 1990s was to focus exclusively on self-employed entrepreneurs, either in creative or high-technology industries.

Developers and local authorities alike made mistakes. Understandably, Southwark used live/work to get residential units through the planning system and Hackney used them to boost its performance on commercial development. Hackney's supplementary planning document on live/work did many good things, encouraging private investment in

run-down buildings in areas suffering from neglect. But there was no practicable way to guarantee that those using the flats were not in use violation. Creating special status for live/work units in local plans, as Hackney did, while well-intentioned, opened the system to abuse from those who wanted cheap living space, creating legal headaches for residents and borough alike.

Alternative approaches also had a downside. Not creating a specific class in the planning system, beyond sui generis, meant that the only way to be sure live/work units were used for regular work purposes was to make them available to those with a business plan or a VAT registration. Using the tax system as a mechanism to identify those who were serious about running a business automatically shut out all contract employees, all virtual assistants and all creative types who didn't see the point of writing a business plan.

In the end, trying to respond to the live/work agenda in this targeted, specific, regulatory way closed down choices for those it was designed to help. In attempting to design planning and tax systems for those wanting to integrate economic and domestic activity, we created an approach every bit as rigid as the ones we hoped to free them from.

Beyond warm words

Somewhere between the macro-level warm words and micro-level regulatory approaches, there is a mid-level solution. This balances freedom from and freedom to. While environmental controls and tax laws are necessary to keep communities free from the negative impacts of industry, it is important to recognise that they can also prevent communities from economic self-actualisation and that holy grail of current public policy, the work-life balance.

Meanwhile, as planners and designers were looking the other way, focusing on these regulatory approaches, the homeworking revolution carried on regardless, becoming a reality for larger numbers of people. As Tim Dwelly and Yvonne Bennion's 2003 report for the Work Foundation *Time To Go Home* noted, nobody planned it, but it happened anyway.

While live/work has recently focused on those self-employed in the IT and creative industries, the number of those that the 2005 Labour Force Survey identifies as home-workers – that is, working mainly in their own home or in different places using the home as a base – reached 3.1 million, around 11% of the workforce. This number has grown 13% each year since 1997, and doesn't include mobile-working that doesn't use the home as a base, or those who infrequently work from home. These numbers are only set to rise further if and when the government implements Imelda Walsh's proposals to extend the right to request flexible working to a projected further 4.5 million people.

These statistics don't even include many more people who may not identify themselves with this model. Yet what about those who bring work home outside of office hours, or keep their tools in the van in the driveway but go out to work? Can we also include the woman who is glued to her 'crackberry' on her commute into the office? Shouldn't we also be thinking about solutions for the 59% of UK homes that are already homework enabled - that is, have a computer with an internet connection?

What about the women who may be delaying having children, uncertain how to balance the full-time work she needs to support them with the care she personally wants to give them? Shouldn't live/work units be about accommodating current and future models for homeworking, rather than focusing exclusively on knowledge economy workers running their own business? Isn't this narrowband approach to live/work just as detrimental as not thinking about it at all?

A wider approach to the live/work concept
By widening the concept of live/work, taking if you like a 'broadband' approach, we can address the needs of more types of workers and types of work. This may sound like it makes the problem more complex, but recasting the concept in this way actually makes the solution simpler.

Flexibility of models and flexibility of the system are key to the planning and design response to this challenge. Achieving a culture change in the planning system and in the eyes of designers is more important than changing regulations. A shift from using a regulatory approach to one which builds in a long-life and loose fit is less open to abuse. It is more likely to cater for people's changing needs over time. This approach requires flexibility to be at its core.

We already take this approach to other kinds of change: the Lifetime Homes Standard, for example, is predicated on the idea that your physical circumstances change and your living space ought to be adaptable to it. Equally, low-carbon living requires a long-life, loose fit, low resource use approach. Surely the final leg of the triple bottom line – economic sustainability – also means having the flexibility to work when separate office or workshop space isn't available?

Built in flexibility
Building in flexibility requires us to understand that the one certain thing the future holds is uncertainty. Technological change opened up working from home from a low-paid, low-level manual job – such as the mechanic working out of his own garage or the mother sewing while the kids are at school – to the sort of IT-enabled consultant roles live/work

units currently cater for.

Nassim Nicholas Taleb's recent book *The Black Swan* emphasises the nature of large-impact, hard-to-predict events beyond the realm of normal expectations. The current uncertainty in the economy in particular emphasises the need to accommodate sudden unpredictable changes. I'm willing to bet many more self-employed financial consultants are out there this year than last, following redundancies in the financial services.

Current economic circumstances also serve to remind us that it is important not to add a larger regulatory burden to struggling housebuilders and developers by creating parallel policies to those for an ageing society and climate change. Instead, we need to get the detail right on existing policies which businesses are already prepared to deliver in the next 20 years, so that it can accommodate this third dimension, the economic.

By introducing flexibility into planning and design, from the individual unit to the neighbourhood level, we can begin to answer these changing economic, demographic and environmental needs.

Rethinking the home as a potential workspace

On an individual building level, there is a need for generous space standards in all homes, not just those intended as live/work units. The Lifetime Homes approach of making homes adaptable as residents' circumstances change has gained traction, with the government considering making the standard mandatory over time.

This is a significant shift: far from being homes that cater for specific kinds of people, the idea is to make space for adaptation as and when needed. Whether these adaptations be renovating the garden shed to make it habitable as a workroom, or schemes which provide space over garages for expansion, the impact-based reforms to householder consents proposed in the 2006 Planning White Paper will make it easier for people to do so.

The other concern on the individual building level is privacy. The current trend for open plan living leads to a decline in acoustic standards. For all that you can not visit a show home without seeing the so-called third bedroom styled as a home office, few people can afford the space to close the door on the family. A University of London study of how the built environment affects people's mental health found that privacy was a major factor in quality of life. So building in the possibility of adapting an open plan home to one with more doors and walls is the first challenge for designers.

However, as with Lifetime Homes and with the Code for Sustainable Homes, the solutions

can't end at the doorstep. Merely designing individual buildings to allow for different forms of homeworking is not a comprehensive solution. Just as low-carbon neighbourhoods and lifetime neighbourhoods are necessary if we are to meet the twin challenges of climate change and demographic change, we also need neighbourhood and city level interventions to facilitate the new forms of work we know are developing.

It would be a mistake to create inward-looking neighbourhoods that serve as live/work ghettos rather than trying to take simple steps in all neighbourhoods. This isn't only a question of creating a dedicated facility where workers can 'touchdown' with a laptop, as in the Sunlight Centre in Medway, but also thinking carefully about collocation of services. Is there a space in the new polyclinic for the district nurses or midwives to come to and use as a base? Do schools have facilities for recent leavers to build their dotcom empire? Can older people, retired but not yet ready to leave the world of work, access those facilities too?

Connectivity
The key issue to address here is connectivity, not only in communication and transportation networks, but also in the sense of good urbanism. Neighbourhoods that foster social interaction are already a top priority for public policy, but we need to remember that these face-to-face interactions are essential to productivity as well as wellbeing.

Justin Wolfers and Eric Zitzewitz studied how flows of information at Google affected employees' performance in internal prediction markets. For a company that specialises in technology-enabled information sharing, the researchers were surprised to find that spatial relationships mattered most for how information was shared and performance varied. The old adage that most email subject matter is setting up meetings may be anecdotal, but if true, it is certainly understandable.

Most people need the **human interaction** that generates new ideas and creative solutions. A recent DWP survey of 1,000 people over 55 asking how they felt about retirement found that the things they will miss the most about their jobs when they retire will be: work friends, being challenged, office banter, and a reason to get out of the house. Fostering those social connections is a key challenge for creating live/work neighbourhoods.

This approach is already taken in creative quarters, where the bars and cafes of Shoreditch are as much as part of the fabric of the artists' and creatives' workday as the workshop and the Macbook. Where the social spaces meet the workplace is where ideas get bounced around and tested, rejected or bought.

The most innovative offices also already do this, because they know it works. Pfizer's UK headquarters in Walton Oaks won a RIBA award in 2002 for its innovative design. The building is centred around a massive, naturally ventilated thoroughfare called the Street, which has shops, hot desks, cafes, meeting rooms and a gym. The company knows that its R&D depends on functional and collaborative relationships between its geneticists, epidemiologists and chemists, so it has created a space that actively encourages the daily casual interactions that form the basis of such relationships.

Funnily enough, city centres already feature something similar to the Street, called the High Street. Many of the UK's busiest commercial centres are also where the highest concentration of bars, cafes and shops can be found. Promoting more social and commercial interactions in residential streets, making them public places for people to meet and to linger, will do much to achieve these 'live/work' neighbourhoods.

Live/work isn't for everyone. Workers in many of our industries and sectors will never be able to participate. Take-up for homeworking is still very low for sales staff and may never be a reality for the UK's massive service industry, notably in retail.

Even among those whose work seems suited for home and mobile working many may not be temperamentally suited to the distractions of the home or may need those water cooler moments to grease the wheels of the work day. The key lesson we should learn from the mistaken approaches of planners to live/work in the past is surely exactly this: that we cannot regulate how, when and where people work.

Current approaches emphasise very specific kinds of people and very specific architectural and planning responses. A better approach is to make changes that make live/work at least a possibility for as many people as possible. Our role, as planners and designers, is to set a framework which creates opportunities and potential for people to choose better working practices for themselves.

Building in the flexibility to cope with change is already top of the agenda on the environmental and social sustainability agendas: why not approach economic sustainability the same way? Business gets a more productive workforce, the planet gets a break from all that pollution from commuting, and people may be, dare I say it, happier.

Chapter 8

Homeworking property – a new framework

Susheel Rao, Director of Aiyana, and Sustainability Adviser to the Duchy of Cornwall

• We need to rethink our approach to the environment – it is not a resource for the economy, but the life support for our social and economic lives

• Homeworking can be pivotal in allowing us to live more integrated lives

• How homeworking is set up makes a big difference to its environmental and social impacts

• Current approaches such as the Code for Sustainable Homes do not go far enough in optimising homes for homeworking

• A new approach is needed, to ensure that working from home does not result in eroding the benefits from reducing commuting

• The new approach needs also to go beyond the home, and specify what other facilities are needed in the local community to maximise the benefits

• New models of development will include both provision for live/work units and 'ordinary' homes that are more flexibly designed to enable homeworking – as in the Duchy of Cornwall's new development in the Newquay Growth Area.

'The current minimal standards do not encourage best practice in tailoring homeworking environments for optimal environmental performance. Nor are they informed by any real understanding of homeworkers needs, eg in terms of running a business. There is a clear need for new and better standards.'

Homeworking property - a new framework

Sustainability and homeworking are both topics of the moment. They are closely linked, as homeworking can contribute to a more sustainable future and reduce our impact on the planet. It is therefore important that we ensure that all new developments meet homeworking requirements in a more sustainable manner.

This paper will look at:

• why homeworking is a sustainability issue
• homeworking and the development sector
• how the current development sustainability standards address homeworking
• what might be beneficial to include in new standards
• how homeworking should be addressed by developers.

Why homeworking is a sustainability issue

Perhaps the first thing to consider is what is meant by sustainability, before looking at why homeworking is a sustainability issue.

Sustainability is a word used by many people often meaning different things. Unfortunately it is often used interchangeably in meaning with mitigating the impacts of climate change and achieving a low/zero carbon future. These are important to sustainability, but are not the whole of it.

Sustainability is about the environment, society and the economy, in that order. For something to be truly sustainable, it will allow the environment to function well. Within that, society will be working well. And finally within the societal constraints, there is a flow of goods and services.

In Western society, we are used to looking at things the other way round. We tend to see the economy as primary, see people as are there to support the economy, and see the environment as a resource (note how many things - from people to plants - we routinely call 'resources').

To create a truly sustainable future, we will have to turn this thinking round. We need to recognise that we only have one planet, and in order for us to flourish, we need to do so within the revenue of the planet, rather than eroding its capital.

Sustainability is about ensuring that we continue to flourish on our planet, and that the

planet also continues to flourish.

In approaching life and sustainability that way, we recognise our dependence on our planet, recognising our interconnectedness with the planet and all that is on it.

Homeworking's role in sustainability
Given the approach to sustainability outlined above, how does this relate to homeworking? Homeworking enables the closer integration of our economic lives into our family life and local community life. It also provides the opportunity to take a more responsible approach to our use of resources.

Homeworking has an intrinsic advantage in sustainability terms. But we need to recognise that the benefits are not automatic. Probably the most important factors involved are:

• how to reduce carbon, in particular relating to how buildings and equipment are used
• how to reap positive benefits from how people interact with others.

Other papers cover in some detail the use of carbon, and compare homeworking with commuting to an office. The overall conclusion is that homeworking results in lower carbon emissions *per se*. However, the extent of this does depend on how the homeworking is set up.

For example, is the whole house heated because the office (and other essential areas of the house) is being used? Maximising the benefits is partly about changes to design, and partly behavioural.

Use of office equipment at home is also a factor. Is homeworking something someone does part of the week, so that they go to a separate office to do major printing, filing etc? Or do they work full-time at home, in which case there is a risk of replicating the office at home.

Part-time and full time homeworking each have advantages and disadvantages, and providing for both ways of working is a challenge in new development. Either way, there needs to be changes in styles of working (eg reducing paper processes) and the design of separate offices needs to reflect the greater capacity for homeworking.

Another interesting factor is how people interact with others when they work from home. People working from home 1-2 days a week may find it a welcome relief to be able to get on with work and not be disturbed. When people are working from home full time, then

where do they get their social interaction?

Are they able to go out at lunchtime and meet people nearby, or do they just change their driving patterns? In principle there is greater scope to connect with people in their local communities, people from whom they are separated when they commute to a distant workplace.

Finally, perhaps the most important factor relating to homeworking and sustainability is how the people feel about it themselves, and how this translates into their approach to the local community and environment.

Homeworking and development
As can be seen from the above, a number of the issues relating to homeworking and sustainability are about how people use the space they are in. This is important for the development sector, since how any major new build is designed and implemented can affect:

• the carbon emissions
• how people interact with others
• how efficiently a building is used.

Of course, all new developments now have to meet building regulations, which have quite stringent requirements, and the government has the aspiration for new developments to be carbon neutral by 2016.

It is important to consider reducing demand for energy. Where working from home is anticipated, then it is important to design the heating and any ventilation systems so that it is possible to create a pleasant environment in the workspace, without having to heat the whole or significant parts of the house. Included in this, is how the workspace connects to bathroom and kitchen space.

For a live/work unit, it is expected that all required facilities will be within the work area. More interestingly, in homes where people work from home (in a study or integrated space), is how the heating is zoned to reduce the need to heat the whole house or flat.

In larger developments, there is the opportunity to create a **positive environment for homeworkers**. This may mean creating walkable neighbourhoods, with shops and cafes in the local area. Or it may be more proactive, through creating a live/work quarter with associated hub - with office service facilities, office and meeting space, informal meeting

space and café. Such a hub building can provide services both for occupants in the live/work units and those who work from home in more conventional accommodation.

There is also the opportunity to enable people to meet each other easily, both during the day and at other times. This has the benefit of fostering a community feeling in new developments as well as enhancing business networking and collaboration etc. There are a large number of ways that this can be encouraged, whether through facilitating clubs and organisations, through providing social activities during the early stages of development to encourage people to meet, or through a community website which helps enable virtual connections initially.

What is provided within a development is generally determined by what the developer believes is required by the market, and that which is required by the planning authority. The current approach to development is to create more dense development, which has the advantage of allowing walkable neighbourhoods with facilities to be more viable. But this has the disadvantage of encouraging more flats and smaller units, which tends to mean that there is less space to work from home. There also tends to be smaller gardens, so less space to adapt to future needs, or create space for homeworking with an office in the garden.

This doesn't need to be the case, although it is often the easiest approach for a developer to follow. Buildings can be designed so that they are adaptable over time, whether that is through the ability to join units together, or through conversion of space, such as a loft conversion. Another smart, though perhaps less cost effective solution, is providing basement space. This can be used as office space or extra living space. The advantage with a loft conversion or a basement is that they are easier to have their own separate heating zones and can include both bathroom facilities and the ability to make a cup of tea/coffee. Another solution is for the internal walls to be easily moveable so that occupants can redesign the interior to meet their needs.

Current standards on homeworking
The two main areas where sustainability standards for homeworking may potentially be addressed are in planning and at the building control/building regulations level.

Sustainability is addressed specifically in *Planning Policy Statement 1: delivering sustainable development*, as well as related PPS's such as PPS3 (housing), PPS13 (transport) and PPS22 (renewable energy). There is no specific PPS on homeworking, or homeworking and sustainability, although homeworking is addressed to a degree when considering different land uses. PPS4 (employment) does however support live/work uses of employment land.

Building regulations, however, do not address live/work units separately. Rather they are seen as a combination of domestic and non-domestic buildings, and need to meet the regulations accordingly. Homeworking requirements are not specifically addressed, for instance in energy performance.

Therefore, the predominant sustainability standard in the residential construction sector is the Code for Sustainable Homes. This is a government-led initiative which has replaced the Building Research Establishment's EcoHomes standard (part of the BREEAM family, which still are relevant to non-domestic buildings).

It is currently a voluntary initiative and goes beyond current building regulations. All government funded projects are expected to use the standard. The standard has six levels, with mandatory minimum requirements for energy consumption and water consumption.

Within the Code for Sustainable Homes there is one credit available for the provision of a home office. To achieve this credit the following is required:

• suitable quiet room: this can be providing the appropriate services in room designated as a bedroom. For studio, one or two bedroom homes, the space may be provided in the living room or master bedroom
• appropriate size: minimum wall length of 1.8m, to fit desk and filing unit, with space to move around once the furniture is in place
• sufficient services: This is defined as two double sockets, two telephone sockets (or double telephone socket), or one where the dwelling is connected to cable or there is broadband at the address, plus windows and adequate ventilation.

This is looking specifically at the building, and not the surrounding area, and these are minimal requirements to allow someone to set up a home office should they wish to. They are designed so they can be included in any home without unduly affecting the overall space provision.

But these requirements are not designed to encourage developers to provide dedicated space for homeworking. They also do not consider the impact of homeworking on heating the building. They simply reflect provision of adequate space to set up a home office, rather than also ensuring the heating (and other services) are designed so that energy bills and use are minimised.

These minimal standards do not encourage best practice in tailoring homeworking environments for optimal environmental performance. Nor are they informed by any real

understanding of homeworkers' needs, eg in terms of running a business. In my view, there is a clear need for new and **better standards**.

Creating a new standard

Any new standard for sustainable homeworking needs to be straightforward to implement and have different levels in order to challenge a developer to improve. However, depending on where the standard sits within the planning and design process, the standard would be more or less specific. Planning policy statements tend to be more general, and advisory, while building regulations are more specific.

Currently, the most straightforward approach would be to work with the developers of the Code for Sustainable Homes to introduce a more appropriate set of criteria for homeworking. This could both encompass what is already there and also include:

• reducing energy consumption relating to homeworking (for example zoning of heating systems)
• more detailed guidance for live/work units
• desirable proximity to local amenities relating to homeworking and walkability within the area.

Currently the Code for Sustainable Homes looks specifically at the building, and no longer addresses public transport or local amenities, although it does provide for cycle storage. Therefore, with the current approach it is unlikely that the broader issues relating to homeworking would be included. How **buildings are used** should become more important, not just how they are designed.

A more pragmatic approach would be to produce a checklist for developers to use that covers all the issues related to homeworking from a developer perspective, giving an indication of what is a minimum requirement for more sustainable homeworking, to what may be considered current best practice.

Within this, it would be also possible to promote the additional benefits that might accrue, such as creating a more cohesive social network within a new development. Such a checklist could be promoted through local planning departments, regional development agencies and development bodies such as the House Builders Federation and the Good Homes Alliance.

How developers are treating homeworking

As EcoHomes and the Code for Sustainable Homes have been adopted by more and more

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developers, many have begun to address homeworking needs. This is primarily because to achieve the credit on homeworking is relatively simple.

Luckily some developers are doing more. They are beginning to address positively both homeworking and also the idea of live/work units. There is some general concern and scepticism within the development and planning communities, particularly relating to how to ensure the live/work units remain live/work, and also due to business rates issues.

Yet more enlightened developers are addressing homeworking in two ways:

• providing workspace in the home
• providing specialist live/work units.

The most enlightened are looking at how they can integrate both of these together.

The Duchy of Cornwall's proposed development in Newquay, the Newquay Growth Area, is looking at how it can integrate homeworking and live/work.

Within the masterplan, and the strategy documents (particularly the sustainability strategy and building code), there has been provision for live/work within the growth area.

The current application for phase two of the growth area makes provision for a live/work quarter in a central location with an associated hub building. There is also an option for more live/work units being delivered over a number of years. This allows for lessons learnt in each phase to be taken into account with the later development.

A key part of the phase two development is the hub building. It is envisaged that this will provide office space, both individual offices and hot desk space, services such as photocopying and a place for people to meet and chat.

An important aspect of this is that the hub building will be open not just to the live/work unit occupants, but also to surrounding residents. It will provide a resource for those who wish to work from home, or wish to work away from their business premises. It will also provide a focus for meeting people, both business meetings and social meetings.

It is the focus of the hub building, and the access this provides to both full and part time homeworkers that will facilitate the creation of a homeworking/non-office based community. This will allow people to have access to services and facilities, as well as a social network, alleviating isolation that can be felt by homeworkers.

Conclusion

Creating more sustainable communities is important for the planet and for the creation of places people actually enjoy. Homeworking can play a critical part within this, providing it is well thought out, and well planned.

As discussed in other papers, homeworking inherently is likely to have a lower carbon impact due to the reduction in travel. However, it is still important to ensure that buildings used for homeworking are designed to meet the real needs of the user and also to reduce the energy requirements.

Specifically, particularly for those working from home full or near to full time, heating and ventilation systems need to have zone controls, so that only the area used for homeworking is heated during the day.

As important as ensuring that the building is fit for purpose is that developments are designed to minimise the potential for homeworkers to feel isolated, with local amenities and services, such as hubs. These can serve as a focus for homeworkers, providing office facilities and services, as well as a place for social networking.

The current sustainable development standards do not sufficiently address homeworking as a sustainability option. While an option is to encourage greater inclusion within current standards such as the Code for Sustainable Homes, a more practical option would be to develop a checklist for developers demonstrating what needs to be included for successful, sustainable homeworking, and what is desirable. This could then be both promoted to local planners and developers, as well as also being presented to those with responsibility for updating the Code for Sustainable Homes.

Chapter 9

Alternative view: homeworking won't stem rising car use

Stephen Glaister, Director of the Royal Automobile Club Foundation

• Innovations in communications, from the penny post to videoconferencing, have tended to stimulate travel rather than reduce travel

• The relationship between homeworking and travel is complex

• The contribution homeworking can make to reducing travel is modest – at best counteracting the projected increase over the next 15 years

• The uptake of homeworking has been too slow to have a big impact – a revolution in homeworking would be needed

• Greater mobility is an essential part of improved quality of life and it can lead to people living further away from their fixed place of work

• People use time saved from routine travel to make other trips

• The benefits for business are more tangible than benefits for the environment

• The private sector is slowly becoming more aware of the potential to reduce travel by using new technologies

• The way forward is to increase road capacity and implement more road pricing – a politically challenging agenda!

'Unless there is an unprecedented revolution in the attraction and effectiveness of homeworking, the contribution it can make is small in relation to the domestic transport problem facing the nation.'

Alternative view: homeworking won't stem rising car use

If homeworking stimulated by new technology is to make a contribution towards 'saving the planet', based on past experience it has a significant mountain to climb. Major innovations in communications, which have enabled homeworking, all appear to have increased rather than decreased our travel. The mail, the telegraph, the telephone, the fax, email, broadband, video conferencing, voice and video–over-internet telephony have all contributed to increased mobility.

Each of the developments although a major advance, has not moderated the relentless increase in mobility that we have experienced. Conventional wisdom suggests that home-working reduces congestion, CO_2 emissions alongside providing numerous non-transport benefits. These benefits are, to a certain extent, real. But the interactions between homeworking and travel are complex and not well understood.

Unless there is an unprecedented revolution in the attraction and effectiveness of home-working the contribution it can make is small in relation to the domestic transport problem facing the nation. Looking at economic and demographic trends towards 2041 (and in this subject it is necessary to think long term), the RAC Foundation's recent *Roads and Reality*[1] study finds that:

• growth in population, numbers of households and incomes will drive rising demand for travel
• by 2041, car ownership will be 44% higher, while car traffic will increase by 37%
• 600 lane kilometres of new road capacity per annum will be needed to keep the UK moving.[2]

It is time the nation woke up to the need to deal with these realities and the role that homeworking is likely to play.

Relentless increase in mobility
In recent years we have seen the demand for road, rail and air travel – for both people and goods and services – increase relentlessly. So far it seems likely that innovations in electronic communications have been complementary to transport, not a substitute for it.

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1 RAC Foundation *Motoring Towards 2050: Roads and Reality* (2007)
2 These forecasts are entirely consistent with the Department for Transport's most recent road traffic forecasts, which show roughly a 1% per year traffic growth

At one level this is not surprising. Each of these new technologies has increased our productivity and quality of life. People can choose how and when they work and information, education and training have become easier for everybody to obtain at a vastly reduced cost. This has fostered changes in attitudes and conventions: for instance, the rapid increase in female participation within the regular work force.

Further, as better communication technologies save people from wasting time commuting, it makes sense that they spend some of this saved time, along with their newfound wealth on other trips. Greater mobility is an essential part of improved quality of life and it can lead to people living further away from their fixed place of work. Travel Statistics for Great Britain reveal a remarkably stable number of trips per person per week over the years, as most of the traffic growth is attributable to increasing average trip lengths.

Modest impact of homeworking on the roads

The uptake of homeworking to date has been slow. High quality electronic communications have been available for a number of years yet only about 12.8% of those in employment permanently work from home.[3] Currently 25 million people continue to commute daily to and from a fixed place of work, 71% by car. Future projections indicate that this is unlikely to change as the workforce is expected to be more 'mobile' than homeworking[4] in their nature.

Many believe in the potential offered by innovations such as homeworking and so-called Soft Travel Demand Management (STDM). The experimental evidence is not yet comprehensive but the greater part of the research available[5] indicates these options might deliver, at best, a 15% reduction in car traffic. That is, optimistically, 15 years' worth of traffic growth at the forecast rate. Under this scenario congestion would be kept at current levels in the medium term, requiring an enormously expensive national public information campaign to sustain. The limits to smarter choices are plain to see.

Businesses like to get together

Counter to the homeworking revolution there is also a great amount of research, which identifies the benefits of businesses and people operating in the same area, known as the economies of agglomeration. There is something special about being close to do business. For some industrial sectors, being physically close to a variety of service providers is a significant benefit, which commands a price. Why else would the tenants of city centre office buildings, operating in internationally competitive markets, be willing to pay

3 Labour Force Survey, October to December 2007
4 RAC Foundation and British Chambers of Commerce *Business Travel: Choice or Necessity* (2007).
5 Department for Transport *Towards a Sustainable Transport System*, White Paper (2007).

the rental, employment and other costs of being in a central location? Sir Rod Eddington recognised this in his report[6] to Chancellor Brown on transport in relation to productivity, stability and growth and the Department for Transport are currently sponsoring worthwhile research into 'wider economic benefits' in the appraisal of transport investments.

This phenomenon is real - which is no surprise because otherwise there would be little reason for towns and cities to exist! Homeworking therefore has to compete against strong and well-established benefits of conventional working. Maybe that is one reason that it has had a limited impact to date.

Better communications stimulate **more business** - which generates more travel. This being said the private sector is aware of the potential, desirability and limits to homeworking. A recent Company Car Driver survey completed in conjunction with the RAC Foundation[7] found that:

• almost one third of company car drivers made a new year's resolution to travel less for work.
• 40% of company car drivers would welcome greater encouragement of homeworking and 25% would like to see more flexible working hours to help them avoid congestion
• 50% of companies are 'not at all' supportive of drivers taking up flexible working practices such as working from home, online working or using public transport.

Despite scepticism from some businesses, small medium enterprises (SMEs) appear to be taking the lead in this area by finding innovative ways to tackle unnecessary travel. In the Foundation's recent study of the issue[7] over half of SMEs are already using technology to reduce their travel footprints. 50% use telephone conferencing, and 30% use Internet tools such as Voice over Internet Protocol (VoIP) and Instant Messaging.

Savings and rebounds
The potential value of increased homeworking to future transport policy depends on what we are trying to achieve. Homeworking can reduce commute trips by road, spread out the peak, reduce congestion and improve limited road and rail capacity, which serves one policy objective. The Energy Saving Trust has calculated that if all commuters left the car at home one day a week this would save enough miles in a year to drive to the moon and back 35,000 times. This is the equivalent emissions reduction of taking over 1.7 million cars off the road and would reduce the UK's total CO_2 emissions by almost 1%.

6 The Eddington Transport Study (HMT, 2006)
7 *RAC Foundation and Company Car Driver Survey.* At: www.companycardriver.co.uk

But if the saved commute trips are substituted with other trips, which may be more varied and complex and therefore harder than commute trips to serve by public transport then this approach is unlikely to reduce overall miles travelled or carbon emissions. There are also other complexities to consider, such as the implications for the efficiency of freight distribution that serves homes rather than workplaces. Heating is one of the major sources of carbon emissions and therefore the trade off between heating a number of individual employee homes rather than one large office space also needs to be considered.

In principle homeworking could be important for policies aimed at reducing carbon emissions, but research indicates that benefits are more forthcoming in tangible **business functions**. Benefits citied include an improved quality of life for staff, reduced commuting stress, greater employee flexibility, office savings for employers (overheads and space), improved employee productivity, less absenteeism and staff turnover, access to a wider labour market and continuity of operations in extreme events.

The RAC Foundation has contributed to the homeworking debate for many years and remains **broadly supportive** of homeworking as one tool within a package of options to deal with transport and the wider issues facing the UK. The Foundation has previously observed that 'The increasing capacity of the information society coupled with a growing desire to shift the so-called 'work-life' balance might mean that the trend is to reduce the dependence on daily commuting or work-based journeys through homeworking'.[8]

Homeworking has a role - but managing road capacity better is the key
Should central government and local authorities be doing more to take advantage of homeworking? Working from home practices are generally well promoted by local authorities, through the established business travel planning process. However more can be done, whether it is through highlighting the advantages of homeworking, supporting a non-five day week through public transport and other incentives or through providing tax incentives and clarification on legislation.

Homeworking clearly has potential, *in principle*, to make a modest contribution towards reducing the growth of **peak time congestion**. The potential for reducing carbon emissions is less clear.

What it can offer *in practice* is not clear. The evidence is poor and previous innovations in communications technologies, whilst enormously beneficial in their own right, do not appear to have reduced travel with many actually increasing it.

8 RAC Foundation *Motoring Towards 2050: An independent Enquiry* (2002)

Central and local government should, of course, investigate, take a realistic view and implement policy changes that would help. However, it is important that the aims and objectives of promoting homeworking are clearly stated.

It is unlikely that future developments in homeworking will do much to alleviate the long-term problems associated with road infrastructure and carbon emissions, set out in the RAC Foundation's *Roads and Reality* report. The politically demanding 'solution' continues to be a package of more intelligent pricing for the use of our roads together with a significant investment in new capacity.

About the RAC Foundation
The RAC Foundation explores the economic, mobility, safety and environmental issues relating to roads and the use of motor vehicles, and campaigns to secure a fair deal for responsible road users. Independent and authoritative research for the public benefit and informed debate are central to the RAC Foundation's standing.

The RAC Foundation has been involved in a number of fora, which promote homeworking as a partial solution to transport congestion. The Foundation sits on the board of WorkWiseUK.

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Chapter 10

Homeworking and carbon reduction - the evidence

Peter James, Professor of Environmental Management, Bradford University and Co-Director, SustainIT

- Homeworking has a direct and measurable impact on carbon from activities such as the use of buildings, use of technology and travel
- There remains some concern that possible 'rebound' carbon impacts may eliminate the benefits of home-based working – but these tend to be exaggerated and are mostly not supported by the evidence
- Data from UK and European studies show significant net carbon savings from reduced travel amongst home-based workers
- It is, though, complex to draw up a typical 'carbon balance sheet', as the context for homeworking is very diverse
- Surveys show that homeworkers have greater uptake of local services
- Travel reduction issues are now reasonably understood and resolved – the key area of research now is impacts on home and work energy
- Domestic dwellings consume considerably less energy per square metre than air conditioned offices
- The carbon cost of ICT use can be lower amongst remote workers than amongst their office based colleagues
- Measured productivity and performance improvements from homeworkers provide a form of 'clean economic wealth'
- Lifestyle changes also have carbon impacts
- Employers and government can take measures both to promote homeworking and to maximise the carbon benefits of it

'Homeworking is already creating positive carbon benefits, and these are likely to increase as current economic and social trends create a more supportive context.'

Homeworking and carbon reduction - the evidence

Homeworking has a number of primary impacts on carbon emissions. These include changes in:

• building energy consumption, especially the cooling, heating and lighting of homes and offices
• information and communication technologies, including the number, type and use patterns of devices such as laptops and printers
• lifestyle, including diet, and leisure activities during, before or after working hours
• transport, especially commuting travel.

But a full carbon analysis of homeworking cannot end there. The changes above can, in turn, give rise to secondary, or rebound effects. Some of these are directly connected to the primary change, for example when a car commuter stays at home and other people use the vehicle. But others are more systemic (such as impacts of additional business profitability and expenditure if homeworking improves productivity).

A number of studies have suggested that homeworking, and other forms of teleworking, can create considerable environmental benefits, including reductions in carbon emissions. For example, the Smart 2020 report, calculated that homeworking and other forms of teleworking could reduce global carbon emissions by around 0.5% by 2020.[1] In the case of the US, it estimated that if the number of homeworkers rose to 30 million, this could reduce emissions by 75-100 million tonnes of carbon dioxide equivalent.

However, a few studies have been more pessimistic, and argued that the scale of any environmental (and carbon) benefits is relatively negligible, because of high rebound effects and/or other factors.[2] A populist version of this view also remains common, for example, in these recent comments by Frank Tudor, Director of Supplier Relationship & Performance Management at the Department of Work and Pensions: 'I'm not convinced. I think it just shifts the carbon from the office to the home – it probably costs more in carbon to heat my home for eight hours a day than it does to travel to and be supported at work.'[3]

1 Climate Group *Smart 2020 – Enabling the Low Carbon Economy in the Information Age*. (2008).
At: http://www.theclimategroup.org/assets/resources/publications/Smart2020Report.pdf
2 For example, Schallbock, K, Utzmann, I, Alakeson, V and Jorgensen, B *Telework and Sustainable Development*
(Forum for the Future, 2003). At: http://www.forumforthefuture.org/files/DigitalEuropeTeleworkcasestudy.pdf.
3 Quoted in Loney, M T*eleworking: Truly Green or Just Naive?* (2008): Matt Loney's Blog (2008).
At: http://community.zdnet.co.uk/blog/0,1000000567,10007520o-2000331758b,00.htm.

The creation of a definitive 'carbon balance sheet' is very difficult. The reasons why include:

• contextual factors which vary for individual homeworkers (eg energy efficiency within their homes and offices, personal comfort preferences)
• dynamic factors which create changes over time (for example fuel prices influencing levels of home heating or number of trips taken)
• lack of information about some crucial aspects of homeworking (for example patterns of home heating when people work at home)
• difficulties in calculating rebound effects.

Nonetheless, as the following sections show, the considerable research which has been undertaken in recent years does enable a reasonably robust case to be made that home-working is **already creating positive carbon benefits**, and that these are likely to increase as current economic and social trends create a more supportive context.

If, as has already happened with transport, present concerns about the net effects of teleworking on energy consumption in home and offices also turn out to be exaggerated – as they probably will – then the scale of the net benefits will be very considerable.

Transport - scope for less commuting

The transport impacts of homeworking have been the most studied. Whilst there are clearly travel reductions when people work from home rather than commute to work, a key question is whether some or all these savings are offset by 'rebound' effects such as:

• non-work travel previously undertaken as part of commuting trips
• use of the cars which become available for other purposes when people do not commute
• changes in the location of people's homes as a result of not having to spend so many days commuting
• increased travel for work purposes

Increased business travel can occur because staff who are on the road a great deal may gain time savings from avoided commuting journeys and/or by starting from home and avoiding some of the congestion which is typical of roads surrounding major office locations. Some of this additional time 'capacity' may then be used to fit in additional work journeys. On the other hand, homeworking can be accompanied by a reduction in business work travel by substituting conferencing and other forms of communication for physical meetings.

Some early US studies concluded that these rebound effects did indeed offset most or all of commuting reductions. However, they were based on distinctive circumstances of the late 1980s and early 1990s (for example uncrowded roads, very cheap fuel and driving to telecentres as well as working from home) and/or based on limited data. Indeed, one recent literature survey characterised this work as 'partly anecdotal, partly speculative modelling, but mostly repeated assertion by experts'.[4]

Most recent UK and European studies have concluded that homeworking reduces travel, and therefore associated carbon emissions[5]. One exception is that by Schallaböck et al which identified a potential transport saving of up to 1.6 per cent of all passenger kilometres travelled in the 'best case', and a potential transport expansion of up to 2.5 per cent in the 'worst case'.

However, it conceded that both scenarios were unlikely. Perhaps most persuasively, a review of all relevant literature, including Schallaböck's, for the UK Department of Transport concluded that teleworking could reduce UK car commuting trips by 3-12%.[6]

This is certainly substantiated by our own research. The EU Sustainable Teleworking study surveyed, amongst other activities, employees at 42 organisations in six different countries, including BAA and BT in the UK.[7] They found substantial reductions in commuting, and rebound effects of between 6-40% of the initial commuting reductions.

Subsequent surveys at BT have improved the questions and methodology, and provided opportunities for tracking trends over time. Table 1 is based on the 2008 BT survey, and shows that rebound effects were found to be under 10% of the original commute savings. This was lower than reported in the earlier surveys, but was based on a larger sample, and more refined questions, and can therefore be considered to be more robust.

The effect at BT was that homeworking avoided CO_2 emissions which were calculated to be 6,980 tonnes, on a net basis. As an even larger number of unregistered staff are known to work at home, the actual level of savings is probably substantially higher, and perhaps double.

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4 Lake, A and Cherrett, T *The Impact of Information and Communications Technologies on Travel and Freight Distribution Patterns - Review and Assessment of Literature* (2002). Final Report to DTLR, HOP Associates at www.virtual-mobility.com
5 For an overview see: Banister, D, Newson, C and Ledbury, M *The Costs of Transport on the Environment – the role of teleworking in reducing carbon emissions* (2007). At: http://www.tsu.ox.ac.uk/research/pubs/1024-banister-etal.pdf
6 Cairns, S, Sloman, L, Newson, C, Anable, J, Kirkbride, A and Goodwin, P *Smarter Choices – Changing the Way We Travel* (Department for Transport, 2005). At: http://www.dft.gov.uk/pgr/sustainable/smarterchoices/ctwwt/
7 SUSTEL *Is Teleworking Sustainable?* (2005). At: http://www.sustel.org/documents/Reports/final%20report%20-%20july%202004%20v2.pdf

Table 1: Avoided CO_2 emissions from commuting amongst registered BT homeworkers

Daily kg of CO_2 emissions avoided by non-commuting (per person)	7.814
Daily kg of CO_2 emissions generated by rebound travel (per person)	0.621
Daily kg of CO_2 emissions avoided by homeworking (net, per person)	7.193
Average number of days per week working at home for the whole day	1.9
Annual kg of CO_2 emissions avoided by homeworking, net, per person, per year (of 46 weeks)	628.67
Number of registered homeworkers at BT	11,104
Annual tonnes of CO_2 avoided by homeworking, net, all registered BT homeworkers	6,980

Source: James, P *Homeworking at BT – The Economic, Environmental and Social Impacts* (2008)

The 2008 BT survey also provided new evidence on rebound effects. For **in-work travel**, most respondents reported that this had stayed the same. Of the remainder, slightly more reported an increase than a decrease (31% and 27%). The main reason for increased travel was changes in job/role. The main reason for decreased travel was attending fewer meetings. Overall, although the survey shows an ambiguous link between homeworking and in-work travel , there is no evidence of a significant increase.

Of course, in the medium-long term, the ability to commute for fewer days can create a potential opportunity for people to move further from work to take advantage of lower property prices or other factors. Homeworking can also lead to other changes in the **location** and/or size of dwellings. The 2008 BT survey found that homeworking had had these or other effects on 13% of homeworking respondents – a similar level to that found in 2006. About 4% of respondents stated that 'home working has enabled me to move some distance to take advantage of lower property prices' and 3% that 'homeworking has been a factor in extending my current home'.

These figures are relatively low and suggest that there are a number of powerful constraining factors on relocation, including:

• connections with family and friends
• reduced access to alternative employment opportunities and/or work-related networks, creating a degree of risk

- long-distance travelling can be vulnerable to disruption and, in some countries, disproportionately expensive per mile compared to short distance journeys.

Relocation rebound effects may therefore be a specific problem, for example, in areas with very high differentials in property prices over short distances (such as parts of south east England) and/or relatively cheap and uncongested medium-long distance transport (no obvious UK examples!). Additionally, they may be diminished over time if organisations take advantage of the potential of homeworking to reorganise (and reduce) their office locations and sizes.

Any commute effects from changing location can also be offset by further positive rebound effects. For example, the BT surveys have shown that homeworking leads to greater use of local services. In the 2008 survey, 53% of homeworkers said that this had occurred.

Hence, there is good reason to believe that, for most UK homeworkers, transport rebound effects are within a range of 10-30%, and probably at the lower end. It should also be noted that this does not take into account any avoided rebound effects arising from avoidance of car commuting – such as extra car trips which might have been taken during lunch hours.

Indeed, Professor David Banister, of the Transport Studies Unit at the University of Oxford, has said it is 'not clear to what extent an assessment of the environmental impacts of teleworking should include all identifiable re-bound effects on other forms of travel by the teleworker or other household members... It is arguable that trying to identify all conceivable rebound effects in each case risks an over-simplistic and over-deterministic analysis of travel behaviour, by focusing only on an immediate short term effect and taking an artificially narrow view of causality.[8] (Banister et al 2007).

Of course homeworking could influence the use - and therefore economics - of public transport if much of the travel reduction is due to reductions in rail commuting, as can be the case.[9] However, this seems unlikely at present, or foreseeable, congestion levels. Like the road system, public transport in the UK is very over-crowded at the peak periods when homeworking would have the greatest impact.

In fact, the effects of homeworking on congestion are likely to be another source of positive carbon impact. Even when car using homeworkers work from home for only part of the day, the ability to avoid periods of peak congestion means that their vehicles are likely to be avoiding the 'stop start' movements which greatly decrease fuel efficiency.

8 Banister, D, Newson, C and Ledbury, M, op cit
9 SUSTEL, op cit

Haddad and Lyon[10] found, for example, that part-day homeworking often displaces the timing of the evening commute home from work in particular. Similarly, when public transport is overcrowded at peak periods, the spaces which are freed up by homeworkers' avoidance or shifting of travel can help to minimise this overcrowding, and make the option more attractive to car commuters.

Buildings and carbon use

With the question of the beneficial impact of homeworking on transport carbon increasingly resolved by empirical research, debate is moving on to its effects on the consumption of electricity and fossil fuels for cooling, heating, lighting and ventilating buildings.

Some sceptics argue that homeworking pushes up domestic consumption, whilst in most circumstances not creating significant reductions in office consumption as the latter's systems are not geared to the absence or presence of individual workers.

Table 2 presents some data on energy consumption (as a proxy for carbon emissions within homes and offices) in order to inform this debate. The figures are taken from two sources (Carbon Trust 2003 for offices, and Letcher with Chambers 2005 for dwellings) which are slightly different in terms of methodology and are therefore only indicative. They do not take account of embedded energy within building materials, which can, of course, be reduced in the longer term if homeworking leads to a net reduction in workspace requirements. This occurs both when organisations reduce their office space requirements, and when people run businesses from home or live/work units and therefore do not need a separate office at all.

Table 2: Energy Consumption of UK Homes and Offices

Building Type	Energy Consumption (kwh/m2)
Office – naturally ventilated, cellular (2003 average)	205
Office – naturally ventilated, open plan (2003 average)	236
Office – air conditioned, standard (2005 average)	404
Office – air conditioned, prestige (2005 average)	568
Dwelling (UK 2005 average, all stock)	261-368
Dwelling (built to 1998 Building Regs)	128-216
Dwelling (built to 2005 Building Regs)	75-124

Source: Carbon Trust, *Employee Awareness Posters* (2003) and Letcher, M with Chambers, C *Towards Low-Carbon Housing Developments* (2005)

10 Haddad, H and Lyon, G) *An exploration of demographic, work, home and commute aspects of part-day and whole-day homeworking* (2008) Invited paper presented at Third International Specialist Meeting on ICT, Everyday Life and Urban Change, March 16-19 2008, Bristol, UK. At: http://www.transport.uwe.ac.uk/ICTs-meeting/Haddad_and_Lyons.pdf

It is clear that homeworking will increase energy consumption for many people. However, the extent of the increase is uncertain, especially in the light of recent increases in energy costs. In the case of home heating, some key variables are:

• levels of insulation, appliance efficiency etc, which will influence the amount of energy consumed for each additional period of heating
• thermal storage within the building (additional heating in the day can reduce heating consumption at night because the building 'saves' heat)
• age, size and location of homes
• the extent to which the whole home, or just individual rooms, are heated additionally because of homeworking
• personal comfort preferences, with some individuals working best in light clothing 'hothouse' environments, whilst others find stimulus in cooler temperatures
• time of year, with heating more likely to be used in winter and adjacent periods than at other times. (This could be offset in future if higher summer temperatures result in increased use of air conditioners, fans etc).

Similar considerations apply to lighting, although it is less likely that there would be any 'whole house' effects with this.

Many similar uncertainties apply to office related impacts. Some variables which research has identified include:

• presence of air conditioning (which, as Table 2 shows, can almost double energy consumption). This is unusual in UK homes but not uncommon in offices
• internal configurations, especially the difference between cellular and open plan
• owner occupied versus tenanted property – with the latter having higher space densities (and therefore, in general, lower energy consumption per employee) than the former[11]
• levels of floor space per employee - according to one source, average square metres per UK office worker fell from 17.8 in 2002 to 16.2 in 2008[12]

Although these factors make it difficult to develop any rule of thumb about the net building-related energy use arising from homeworking, some general points can be made:

• as Table 2 shows, domestic dwellings consume considerably less energy per square

11 Bootle, R *Property in Business – A Waste of Space,* Capital Economics (2008). At:
http://www.bco.org.uk/uploaded/Property_in_Business_a_waste_of_space_how_things_look_now.pdf
12 Ibid

metre than air conditioned offices – and much less if they have been built recently. So that relatively small energy efficiency measures in response to reduced office occupancy could offset a considerable proportion of any increased energy consumption within the home

• home energy use can be influenced by general measures to encourage more energy efficient buildings and appliances – hence, even if the homeworking carbon budget for this was negative, it does not follow that this should be discouraged on carbon grounds, as other effects might be positive, and negative ones could be squeezed down over time

• the higher energy prices are, the lower any increased domestic consumption from homeworking is likely to be (for example people are more careful to avoid heating the whole house when they are only working in one room).

ICT usage and homeworking

ICT accounts for around 2% of global carbon emissions.[13] The effects of homeworking on ICT use are therefore significant. The SUSTEL[14] study found that homeworking often led to an increase in the amount of ICT equipment as people often got additional equipment to work at home, without reducing the amount at work. This increased the amount of embedded carbon, and probably also led to an increase in carbon associated with electricity consumption in use as office equipment would not always be switched off when a worker was absent.

However, the study did find that the carbon effects were much less negative when workers used laptops at both home and office, and when electronic networks were well developed so there was less need for printing documents in multiple locations.

A more recent study of this topic is that carried out for Sun Microsystems' Open Work flexible working programme, which found that equipment energy consumption at a Sun office was 130 watts per hour per worker – twice the approximately 64 watts per hour of home office equipment energy consumption.[15] One reason was the that office employees tend to use workstations and monitors while more home employees use laptops as well as thin clients, both of which require less power than traditional desktop PC/monitor combinations.

13 Climate Group, op cit
14 SUSTEL, op cit
15 Sun *Microsystems Study Finds Open Work Program; Saves Employees Time and Money, Decreases Carbon Output (2008).* At: http://www.sun.com/aboutsun/pr/2008-06/sunflash.20080609.2.xml

Electricity consumption connected with telecommunications use (including the internet) is relatively negligible compared with the consumption of computers and peripherals, and home use often substitutes for use in an office.

Lifestyle changes and their carbon impact

The BT surveys and other research exercises have shown that homeworking influences many aspects of lifestyle. One aspect examined in the 2006 survey, for example, was influence on health. Twice as many people working from home to some degree felt that the effects were positive (39%) as negative (17%). The main reasons cited for positive effects were less work and personal stress, less driving, more exercise and better diet. All of these have connections with carbon, many of which are positive. For example:

• reduced stress levels (which link to other survey findings of better quality of life and work life balance) may influence leisure travel, some of which is driven by a need to escape the pressures of everyday life
• homeworking may make it easier to cycle or walk during the day, so that people do not need to pursue more energy-intensive forms of exercise
• a better diet may involve more purchases from local sources, thereby reducing food miles (though, on the other hand, it could involve more time to cook, using exotic ingredients).

Wealth creation - is homeworking more profitable?

Achieving low carbon economies – and sustainable development generally - requires considerable investment, especially on new technologies such as renewable energy. Hence, creating 'clean economic wealth' is vital to support this investment. One relatively easy way to generate this clean wealth is through greater eco-efficiency, such as higher economic outputs from constant or reduced levels of environmental impact. The productivity and other performance benefits from homeworking which have been highlighted in other chapters (and which were also confirmed in the BT surveys described above) have exactly this effect.

The space efficiency benefits created by the more radical reconfigurations of office environments which can be enabled by greater homeworking are – given the considerable environmental footprints of buildings – also a significant form of clean economic wealth. A recent study on this topic, for example, concluded that what they termed 'advanced working practices' (which included moves to greater homeworking) could create property savings worth £14bn, or 1% of GDP.[16]

16 Bootle, R, op cit

The overall carbon budget of homeworking

One of the few studies which has tried to construct an overall carbon budget for home-
working is by Bannister, Newson and Ledbury. This found that, on very crude assumptions,
increases in home energy from heating, lighting and computing offset around 80% of the
carbon reductions arising from reduced commuting. This does not take into account any
changes at the office, so can be seen as an achievable minimum in an average scenario.

While most of the studies cited focus on employees, most current UK homeworkers (those
working mainly from home) do not have a separate office to stay away from in the first place.

Around two thirds of homeworkers are self employed (the Labour Force Survey shows).
These home based businesses - and those who occupy live/work units as their place of
work as well as home - will clearly make an even more significant contribution to lower-
ing carbon as they do not have an alternative or residual workplace in a distant office.

This is a subject which could merit further research, given that many economic commen-
tators expect a trend towards self-employment to be enabled by ICT advances and by fac-
tors such as lifestyle choice, cost of commuting and instability of traditional employment.

Even for those who are employees, significant changes in the work environment (such as
from greater space efficiency due to hot desking) leads to more substantial reductions in
the carbon budget.

The previous analysis has also demonstrated that the carbon budget of homeworkers is
not fixed, but can be influenced by broader economic and social trends, and by individual,
organisational and policy actions. At present, a number of broader trends – especially
high energy prices, ever more congested roads discouraging rebound journeys, and
financial pressures on employers to make maximum use of working space - appear to be
accentuating the positive carbon impacts of homeworking, whilst very few are having
the opposite effect.

How employers can increase the carbon benefits of homeworking

Organisations can take positive measures to increase carbon benefits from homeworking.
These include:

• maximising the efficiency, and responsiveness to occupancy, of work premises when
  implementing remote working
• careful design of travel expense schemes, to discourage long distance changes in
  domestic location

- encouragement of energy efficiency actions by homeworkers, through information and awareness raising, and possibly financial support
- providing very energy-efficient ICT equipment, and preventing duplication of devices between work and home
- promote more extensive homeworking amongst employees and outsourcing and 'homeshoring' to home-based contractors.

Key policy measures from government which could increase net carbon benefits from homeworking include:

- greater encouragement of energy efficiency measures within homeworkers' residences (for example by assisting employer schemes to provide financial support, encouraging new kinds of carbon offset schemes based on investment in employee energy efficiency)
- reflecting the full environmental costs of energy production and use within its pricing (for example by maintaining the 'escalator' in diesel and petrol taxes)
- incentivise home-based and live/work businesses by removing VAT and (the threat of) capital gains tax and business rates on business space in/connected to a dwelling.

Conclusions
Calculating the carbon impacts of homeworking is difficult, and is always likely to vary between individuals, and over time. It is almost certain that, at worst, homeworking is carbon neutral. So carbon impacts should not be a reason to oppose its introduction, especially given that the productivity and other performance benefits associated with it create 'clean economic wealth' which provides additional resource to address sustainability goals.

It is highly likely that, in most circumstances, homeworking is positive in carbon terms, and often considerably so. This is particularly the case where home-based working is full-time or for the majority of the week, and where there is no permanent alternative office building.

Broader economic and social trends are tending to increase net positive effects, and these can be further increased through supportive measures by individuals, organisations and Government.

It is therefore evident that homeworking is part of the solution to, rather than a problem for, sustainable development, and that its contribution could increase substantially over coming years.

Chapter 11

Planning for a live/work economy:
how can planners respond to the trend that
sees housing becoming a place of work?

Gideon Amos, Chief Executive, and Fiona Mannion, Senior Policy and
Projects Officer, at the Town and Country Planning Association

- The live/work phenomenon that began in the 1990s has had a powerful regenerative effect in parts of London
- Post-industrial forms of economic activity do not have the same nuisance factor as the dirty and toxic forms of the last two centuries
- But many local communities and the planners who serve them remain concerned about retaining dedicated employment land. They do not want bogus live/work that is a back door to purely residential development
- The Use Classes Order has historically separated home and work land uses and most communities still value the opportunities it affords to shape land uses and activities in developed areas
- The emphasis should be on developing clusters of live/work units with shared 'hub' facilities rather than single units to foster strong modern business networking
- Emerging national policy is starting to support live/work – the main issues remain at local level
- Regional and local strategies should have policies based on local criteria to encourage home-based enterprise development
- Despite the 'cleaner' nature of modern work, there will still be significant issues about protecting amenity for planners to deal with – it can't be a free-for-all
- Overall we need a more supportive and enabling planning framework at all levels to encourage live/work and other forms of home-based working

'Advocating more complex mixing of uses and homeworking will demand, far from less intervention, better planning and more attention to detail from masterplanners, designers and those who regulate them.'

Planning for a live/work economy: how can planners respond to the trend that sees housing becoming a place of work?

In planning for a low carbon economy, homeworking has an important role to play. But is making planning provision for homeworking capable of bringing about the jobs and investment we want to see in our local communities?

Most homeworking takes place without the need for planning permission, for instance where a spare room or out-building is used as an office. It is only when a more clearly defined workspace is needed, perhaps with separate access and capacity to employ staff, that it is necessary to have planning permission specifically for the employment land use, or for a live/work unit.

Over the past 60 years or so, we have evolved a planning system that embeds the idea that work and residential uses do not mix. Therefore, to consider how much the planning system is capable of influencing homeworking and economic development, use classes are perhaps the most obvious place to start. Arguments have been made over the years about simplifying the use class order system. Brian Waters in the Smith Institute's *Planning for the Future* in 2007 argued for fewer use classes assessed on specific impacts rather than uses.[1]

In addressing use class orders it is worth recalling that a simple change in planning approach will not always bring about the desired outcome. Too many plans attest to the difficulty of achieving the planned development. For example, the dream of returning heavy industry to the major cities and conurbations ensured that vast tracts of inner London remained empty and derelict for years. Meanwhile after the credit crunch and bank bail outs of 2008, plans for millions of new homes also look to many like wishful thinking.

The separation of land use is not an entirely new concept. Nineteenth century leases for residential properties were and are often replete with covenants preventing any number of obscure business practices being carried on in the home. The celebrated Calthorpe Estate in Birmingham prevents its leaseholders from growing strawberries as deleterious to the reputation and therefore the financial value of the area and its property.

Much of this aversion however was aimed at preventing the noxious and genuinely unhealthy side effects of the majority of industrial processes of the age and early planning policy was bound up with providing this protection.

1 Waters, B "Liberating control of the use of land and buildings" in *Planning for the Future* (The Smith Institute, 2007)

Moving on from the dangers of living near work

But today the UK has largely de-industrialised. With clean electrical information technology taking the place of steam-driven coal-belching industry, many of these protections can be simply dispensed with. However, people will expect others to remain.

Constraining employment uses to one particular part of town is (or should be) largely a thing of the past. Mixed use development is widely encouraged especially in urban centres. Notably the Thatcher government contributed to this trend by completely eliminating the distinction between office and light industrial uses with the creation of the B1 use class.[2]

So is it time to eliminate a further element of the Use Class Order – the rule book that allows communities a say on what land uses actually occur in a given site – to eliminate the distinction between residential and employment uses?

Generally unconstrained mixing of land uses is not always favoured by the market. Protecting an investment is a powerful objective and a planning system that allows a residential area to remain just that can be highly valued. As most housing developers will tell you, eliminating any form of potential nuisance – workshops in the house next door might be an example that homeworking allows – is seen as the way to maximise value and sales.

Local authorities too, with their elected mandate, are quick to point out concerns that can surround live/work - including protection of employment land and preventing nuisance for those in residential areas.

Nonetheless, live/work schemes in the UK began to take off in the 1990s, when a number of high profile schemes were proposed as part of regeneration projects such as the Peabody Trust projects in London Fields and Westferry.

Some of the first live/work permissions were in the now successfully regenerated Hoxton district of the London Borough of Hackney. For the occupants, live/work was obvious and right for a neighbourhood where artists and cultural industries had taken root in underused premises only a stone's throw from the heart of the City of London.

Live/work permission is usually granted *'sui generis'*, that is as a land use in its own right, rather than one falling into the residential, employment or other land use classes. Prior to

2 Statutory Instrument 1987 No. 764, The Town and Country Planning (Use Classes) Order 1987.
At: http://www.opsi.gov.uk/si/si1987/Uksi_19870764_en_2.htm

these new live/work permissions, planning permission would have been needed to change a building in employment use (B1 office, B2 general industrial or B8 storage or distribution) to residential (C3) or vice versa. An alternative route to permission is to permit part of a building with a B1 designation and other parts with a C3 permission.

The achievement of early planning permissions meant that property owners earned some massive land value increases on the newly residential buildings they had bought – at employment land prices. As a result the council developed a new supplementary planning guidance (SPG). Many owners will have sold on to a second wave of incoming businesses/residents at the higher prices. The move may or may not have made a few millionaires but it did mean massive improvements economically and in the urban environment. What was previously a largely empty and derelict neighbourhood has been completely transformed.

Apart from some residents irate about the increased noise and nightlife (one could question why they moved into the area) and perhaps only a small number of small businesses that were forced to relocate as rents rose by staggering percentages, it is hard to see who lost out in this local live/work revolution.

Live/work on employment land

To encourage economic development planning bodies allocate land for employment purposes. But this process on its own can never be enough to deliver economic growth. Even where in-depth plans are made for growth this is usually based on past patterns. These can prove fragile in times of economic crises. The Government's draft P*lanning Policy Statement 4: Planning for Sustainable Economic Development* (PPS4) aims to provide the tools for regional and local planning authorities to plan effectively and proactively for the economic growth they need to help create and maintain sustainable communities.[3]

Once a local authority has identified its overall economic vision and potential employment generating sectors, it can then consider whether the business infrastructure to support this is in place and whether it can attract and support the skills and learning required. Given the importance of the small and medium enterprise sector, micro-business home-working and live/work clearly has an important place within any such regional strategy and probably in most local strategies too.

The London boroughs who first pioneered live/work saw it as a means of promoting mixed-used development and creative industries in regeneration areas. Some developed supplementary planning guidance, as previous policies sought to protect employment

3 Cooper MP, Y *Planning Policy Statement 4: Planning for Sustainable Economic Development, Consultation Paper,* (2007)

land – including its lower price – from encroaching residential use and development which forced up the land value, making business premises hard to afford. There was also a recognition of the other benefits of homeworking, including less travel, less office space and energy used, bringing empty properties back into use and allowing flexibility in working patterns.[4]

There are now a lot more examples of live/work schemes across the country, but there are still some concerns that remain for local authorities. Unless the area is completely deregulated, local authorities need enough enforcement power to stop people making homes in places designated for employment while in fact working at jobs elsewhere. Obtaining employment land for live/work can mean large land value profits, so the incentive is a big one.

It is clear from most walks of development that isolated individuals in a sea of land used for warehousing or some other unpopulated use will fare badly. Live/work on former employment land, as anywhere, needs to be well planned as part of a genuine community, ideally within reach of a neighbourhood centre with local facilities.

In rural areas, this might mean once tatty village halls becoming meeting spaces or a venue for those who otherwise work entirely at home. Here, as in market towns and urban neighbourhoods, the emphasis should be on developing clusters of live/work units with 'hub' facilities rather than single units.

If the aim with live/work policy is to maximise local economic gain, helping home based businesses to interact and collaborate makes sense. Live/work schemes offer the potential to provide a focus for this, with shared business support facilities and hubs promoting informal as well as formal networks. This can be seen with recent developments of 'creative clusters' such as in Sheffield.[5]

A modern approach to measuring live/work benefits
One of the challenges facing live/work is how local authorities quantify the economic contribution they make. If they use floor space or employment generation (number of jobs) to determine this contribution, then live/work may suffer in comparison with more traditional employment practices. This is simply because there is often a single user and the workspace is only part of the property.

4 Spriggs, M *Live/Work Networks* (Unpublished, 2000)
5 Fisher, S "Planning and creativity - the case for reviewing use classes to enable creative industries to flourish" in *Planning for the Future* (The Smith Institute, 2007)

However, if we consider that most new businesses start from home and wish to encourage this, or recognise that small businesses can grow in terms of turnover, collaboration, skills and knowledge then a more sound case can be made.

In the current economic downturn live/work and homeworking could provide a helpful shelter from the storm, as they require fewer overheads, less travel and more flexibility through hiring contractors and associates rather than staff.

Up to now, derelict warehouses from previous economic eras have been converted into new uses, such as residential, retail, galleries and studios as well as live/work spaces. So too could live/work, where appropriate, provide a way to bring buildings and land back into use that may be left empty from the current economic downturn.

For both residential and employment areas, ensuring that live/work units remain for their intended purpose is also a long-term management issue. Many local authorities have introduced minimum floor space standards to deal with this, for instance no more than 75% residential use. Inflexible local floor space standards have been criticised though, because if the residential use is too low mortgage lenders will be reluctant to give a loan, which is cheaper than a commercial one and will therefore deter buyers.[6]

Tower Hamlets also uses section 106 agreements to prevent units from becoming purely residential in an employment defined area. If the live/work units are used for residential purposes then there is an implication for affordable housing if the 15 unit threshold is breached.[7]

Section 106 agreements can also be used to address affordability. This is an important part of the live/work ideal to encourage economic growth, particularly as many people are setting up their own businesses. As with large housing developments, larger live/work schemes should be encouraged to deliver affordable units as part of the mix.

Bringing home the work – employment in residential areas
Working from home has been steadily increasing over the last few years and a DBERR survey featured in *Planning* (2008) stated that over 40% of all businesses are now home-based,[8] and approximately 11% of the total workforce in the UK works from home.[9]

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6 Dwelly, T, Lake, A and Thompson, L *Tomorrow's Property Today: Sustainable live/work development in a low carbon economy* (Live/Work Network, 2008)
7 David Lock Associates Report on Live/Work Units (2000)
8 Spriggs, M *Live/Work Networks* (Unpublished, 2000)
9 Ruiz, Y and Walling, A "Home-based working using communication technologies" in *Labour Market Trends*, (2005)

This is being supported by expansion in broadband services and communications technology as well as rising property costs and a reaction to the costs and stresses associated with commuting.

However, there is still very limited statistical information on homeworking and live/work units. And it is important to recognise the distinction between live/work units and people who work from home, perhaps using a spare room as an office space. Working from home in this way perfectly permissible without any permission being needed and is much more common in residential areas than live/work units.

As many businesses and social enterprises now start from home, it has become increasingly pertinent to look at how the planning system is able to accommodate this trend. What should be done for those that require planning permission in order to scale up from the spare room to a bigger facility, and thus support economic growth? At present, areas with the highest proportions of home based businesses are more affluent towns and their surrounding areas and more remote rural communities such as the Highlands and Islands in Scotland and South West England.[10]

The Matthew Taylor Review, *Living Working Countryside*, highlighted the importance of this type of working for rural areas to create a more diverse and sustainable rural economy. He particularly drew attention to allowing people to extend their homes for non-residential use that would not have any greater impact on local amenity than a domestic extension.[11]

The draft PPS4 asks authorities to 'take account of the changing spatial working patterns that advances in information and communication technologies allow, such as live/work units or the use of residential properties for home working.'[12] It is likely that this emphasis will remain or even be strengthened in the final PPS4, taking forward the *Barker Review of Land Use* recommendation of live/work uses.[13]

If local small scale economic growth and new business formation is the backbone of the economy, then surely multi-use homesteads – once common on rural farms and larger estates – should be encouraged by planning authorities. Wherever this can be achieved without interfering with the freedoms of the residents around to enjoy a reasonably

10 Department for Business, Enterprise and Regulatory Reform *Business Start-ups and Closures: VAT registrations and de-registrations in 2006* (2007)
11 Taylor, M *Living Working Countryside: The Taylor Review of Rural Economy and Affordable Housing*, (Department of Communities and Local Government, 2008)
12 *Planning Policy Statement 4: Planning for Sustainable Economic Development*, Consultation Paper (2007)
13 Barker, K *Barker Review of Land Use Planning* (HM Treasury, December 2006).

private life, policies should be supportive. Publicly subsidised development could also lead the way with exemplar live/work units.

Getting the policy right

Support for live/work is emerging in national planning policy. The most pressing issues are perhaps at the local level, with a reluctance to promote homeworking and live/work units where appropriate. Encouragement can include the provision of business hubs which can offer facilities such as meeting rooms, flexible workspace, wifi, IT support, printing and copying, postal services, overnight delivery facilities and (above all) an informal meeting space to help businesses network.

However, promoting live/work comes with its challenges too. In densely developed neighbourhoods in urban areas, noise and disturbance from deliveries, couriers, emissions, waste, visitors, staff and so on can disturb residents, their health and wellbeing as well as devaluing land and property. There can also of course be an undesirable loss of residential units.

Local communities will continue to expect a local authority to hold the ring in the battle for different land uses in different buildings. Good planning will continue to be the key to success as it is in the increasing number of mixed use major developments.

On the other hand, there are opportunities with social housing and homeworking as recommended in the *Taylor Review*, which notes that home-based work in social housing can 'promote enterprise, reduce worklessness and encourage people currently operating in the informal sector into the formal sector.'[14]

At present, many tenancy agreements stipulate that homes cannot be used for business purposes, or where there is scope to do so tenants are unclear on the issue and are therefore either dissuaded from homeworking or encouraged to work under the radar.[15]

While caution should be exercised around social housing receiving further stigma through poor design and nuisance for tenants from noise, a lot of the adverse perceptions of homeworking can be negated through the dominance of new forms of work using information and communication technologies which cause little disturbance.

14 Taylor, M *Living Working Countryside: The Taylor Review of the Rural Economy and Affordable Housing,* (Department of Communities and Local Government, 2008)
15 Dwelly, T *Disconnected: social housing tenants and the homeworking revolution* (Joseph Rowntree Foundation, 2002)

Conclusion

Homeworking is an established part of our economy and is likely to **continue to grow** as people set up their own businesses and seek the flexibility and convenience homeworking offers.

The benefits can include encouraging enterprise and innovation, cheaper mortgages from residential as opposed to commercial loans, regeneration and reduction in carbon use from less travel, office space and energy use.

National policy discussion increasingly recognises the role of homeworking and looks set to encourage local authorities strategically to pick out areas that are suitable for live/work schemes and provide spaces for meetings, extra workspace and informal networking. This is welcome and local planning authorities can and should be proactive in encouraging homeworking and live/work units where appropriate.

Perhaps one of the greatest challenges for live/work advocates is to bring local authorities up to date on the concept and realise what it has to offer. Rural authorities especially can benefit from homeworking through its broadening of the economic base and revitalising of communities.

However, advocating more complex mixing of uses and homeworking will not need less intervention. It will require **better planning** and more attention to detail from master-planners, designers and those who regulate them. Fully deregulating land use classes is unlikely to make this possible.

The closer the knit, the higher density of different uses and the greater the encouragement for commercial activities in residential areas, the more planning will come under pressure to deliver reasonable levels of amenity for all concerned.

This can be achieved through skilled masterplanning at the outset and with tough well regulated conditions at the end of the process. In this way local authorities can make homeworking and live/work a success in any neighbourhood. Deregulating land uses will be called for by some, but local people will continue to expect the planning system to deliver a decent place to live and work - good design, planning and management can achieve this.

Recommendations

1. National policy should continue to move in the direction of supporting live/work. But the emphasis should shift to **local authorities**, expecting them to do more to encourage live/work and homeworking where appropriate with knowledge of their local communities

2. The new integrated **regional strategies** (which will bring together regional economic and regional spatial strategies) should identify the economic and other features of how live/work will be relevant in each region. Policies on local criteria for live/work should be put in place to build a framework within which live/work can be most successful

3. Where possible clusters of live/work developments with **hub facilities** should be promoted in order to reap greater benefits through providing additional business spaces and informal networks. Local authorities should seek to work with private developers to create exemplar live/work schemes

4. In key areas there should be a significant increase in the supply of live/work units at **low or subsidised cost** to provide employment and vital micro-business and small and medium sized enterprise business development opportunities

5. Local authorities should publicise their approach to home based business, rectifying any misplaced concerns among local people over enforcement, regulation and taxation where this is possible. But they should also make very clear to live/workers what is required of them in terms of work use of their property.

6. Social housing providers should **allow home-based business** within the bounds allowed by the planning system for all householders. They should also ensure that tenants understand their landlord's policy on running a business from home.

Chapter 12

From workplace to anyplace:
the key to saving the planet

Dennis Pamlin, Global Policy Adviser to World Wildlife Fund

- The kinds of low-level flexible working currently being promoted will make little difference, and are open to criticism as possibly producing rebound effects that counteract the benefit
- Incremental approaches to carbon reduction do not address the challenges of climate and demographic change
- More radical approaches to changing lifestyles and infrastructure are required – but this doesn't mean retreating into caves
- The right approach is to enable 'low carbon feedback', where increased use of low carbon solutions creates exponential benefits
- Innovative use of IT offers many opportunities to switch to a low carbon economy, based on low carbon infrastructure
- Smart working is a key component of this – but has to be seen as a transformative solution that changes the nature of work
- Strong leadership and supporting measures will be needed to achieve this.

'A move from workplace to anyplace, carried out in the right framework, would be one of the most important steps we can take to create a low carbon and resource efficient society.'

From workplace to anyplace: the key to saving the planet

Flexible work, when it results in eliminating a few trips to and from work, is easy to dismiss. The savings at this level are not that significant and taking into account other trips that might increase, increased energy use in the home, or any of a million things that people might do if they work flexibly, we might even find ourselves in a situation where the emissions are even higher than in the initial case before people started to work flexibly.

But those who take such a sceptical view, emphasising possible rebounds and short term limitations of homeworking, may be missing the point. The significance of flexible work is best understood when put into the context of the **direction we need to take** as a global society.

From marginal to significant carbon reductions

Many see the current financial crisis as a threat towards a low carbon economy. But for traditional environmental thinking in the west, it might actually help politicians and business leaders to look at climate change and other environmental challenges in a different way. Often the need for CO_2 reductions and reduced use of natural resources is seen as a hunt for a low cost, win-win situation where most things remain the same.

The assumption is that the current system is quite optimal and that we need to look everywhere for the cheapest possible reductions to carbon. The changes we need are however much more radical: they are not linear but exponential.

If the target were to reduce emissions by 10-20% in a situation where the economy and demographic situation was stable, a marginal and linear approach might make sense. In reality we are facing something much, much more challenging, but also more interesting.

We need around 50% global reductions of green house gases by 2050. If we share this responsibility in a fair way, that translates to reductions of **about 90%** in the rich parts of the globe. This needs to happen in a situation where, as emerging economies like China and India move rapidly to bring people out of poverty, the global population will grow from six and a half to around nine billion people. And they will become older.

In the more developed regions, one fifth of the population was aged 60 years or over in the year 2005. By 2050, that proportion is expected to reach one third. In the less developed regions, 8% of the population is currently over age 60. But by 2050, older persons will make up one fifth of the population.[1]

1 See http://www.un.org/apps/news/story.asp?NewsID=13379

These trends make it clear that carbon emissions are just the tip of an iceberg. We need to fundamentally rethink our current use of natural resources. Solutions that **not only** reduce CO_2 but also reduce the need to use up natural resources at all are therefore the most important.

The scale of this challenge is so big that most decision makers, both in business and politics, especially in the west, seem to ignore the magnitude of the change needed and pretend that we can continue to live like we do, and think that a 90% reduction of carbon emissions can only be achieved by a magically unknown technology that makes fossil fuel 100% clean, or that we need to get back into the caves to avoid dangerous climate change.[2]

Looking at homeworking and flexible working from a **transformational perspective**, where a carbon free and resource efficient society is the goal, we can see what needs to be done in a very different context.

In this context, solutions will not be isolated actions to reduce emissions. Instead they will be solutions that generate 'low-carbon feedback', not only reducing CO_2 but helping to **accelerate further emission reductions**. This is where smarter and more flexible work, including home-based work, comes to the centre of the discussion.

Changing structures, not products
Most economic models today assume that everything stays the same when we introduce a change to the system such as smart working - we do the same things slightly differently. This is obviously not the case. But if we are looking for rapid CO_2 reductions and exponential uptake of solutions that can reduce CO_2, something much more substantial is required.

A solution that makes it possible to work without being in an office building (thereby also reducing the need for office space and transport infrastructure) is more difficult to include in macroeconomic models than the amount of petrol saved by more fuel efficient cars.

In a similar way it is easier for models to calculate energy efficiency improvements to airplanes compared to a switch to virtual meetings. Yet these not only reduce the need to fly, but reduce the use of airports and other high-carbon supporting infrastructure.

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2 The significant time spent on discussing carbon capture and storage is probably partly due to the fact that some people want to pretend that this technology, if it ever will work and not be too expensive, will help to reduce CO_2 significantly allowing them to continue to build coal power plants.

We need to use more sophisticated approaches to analysing these factors, moving beyond linear models. Linear models can still provide interesting information, but action based on these must be taken with great care. Otherwise we risk locking in existing structures and focusing on incremental reductions. Put simply, they just won't deliver enough to save the planet.

The danger is that incremental approaches will result in situations where emissions increase and/or lock us into an infrastructure dependent on fossil fuels, creating a 'high carbon feedback'.

High-carbon and low-carbon 'feedback'
If we compare smart working with investments to make cars more fuel efficient, the difference between high and low carbon feedback becomes clear. Investments in more fuel efficient cars are not bad in themselves, but they have all the problems that limited flexible working has, plus some much more serious problems.

More fuel efficient cars will often result in the same kind of rebound effects that occasional flexible work may produce (although Peter James' paper in this volume show that measured rebound effects tend to be low in the research literature).

As long as rules and regulations are not promoting a low carbon lifestyle and when higher income is correlated to higher CO_2 emissions, the savings that more efficient cars produce will not make much of a difference, or may even be negative. People will in most cases either drive more, or spend the extra resources on things like vacations where they fly and emit a lot more CO_2 than they saved.

The strange thing is that rebound effects are often used to question flexible work, but almost never to question more fuel efficient cars.

IT SOLUTIONS AND THREE TYPES OF LOW-CARBON FEEDBACK
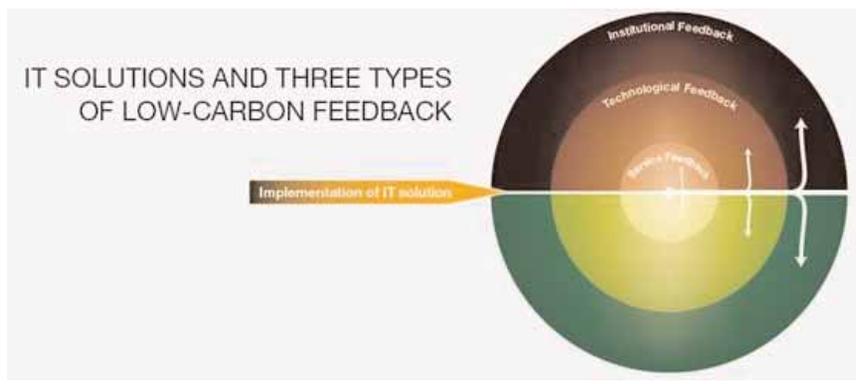
As any system is dynamic when seen over time, the systemic effects when introducing solutions that are transformative in nature will increase as society changes. With IT solutions often working as powerful catalysts, influencing all parts of the economy, it is important to focus on their most strategic applications. Innovative IT is central to smart working. When an IT service can contribute not only to an accelerated reduction of CO_2 emissions but also a transformative change of the economy, we will see significant low carbon feedback to a system. Smarter working, supported by IT, has such an impact.

The WWF has carried out research to look at the key IT solutions that could contribute to the 'first billion tonnes' of carbon reduction. Smart work is one of the key solutions identified that have this kind of systemic transformative effect, leading to further reductions through low-carbon feedback. The other IT driven solutions, some of which are also closely related to smart working, include smart city planning, smart buildings, dematerialisation services (ie replacing physical goods and interactions with electronic ones), smart industry (using IT to ensure low carbon design of plants and processes) and intelligent transport.

Looking closer, low carbon feedback - the CO_2 response to transformative changes in the way we live and work - can be categorised in three ways:

1. Low-carbon service feedback
This will take place if implementation/use of a low-carbon service makes it easier for more of the same service to be deployed. Key questions:

• will more people make use of this service and/or make it more attractive to others (network economy)?
• will more users of this service accelerate reductions of CO_2?

Example of smart working:
Increased use of smart working will give this solution momentum, increasing the carbon benefits. This is because monetary/environmental savings will grow as more and more people work this way. The first who work flexibly will often still have a separate office space. But as the numbers grow, the need for office space is reduced, as is transport infra-structure. Then when smart working becomes mainstream in one company, it is easier for other companies to follow suit. They can follow the example of others, with approaches already in place and easy to use.

2. Low-carbon technology feedback
This will take place if a low-carbon service supports a technological structure which, in

turn, will enable and strengthen potential growth/increased use of other low-carbon services. Key questions:

• will the service support an infrastructure which would support other sustainable services/increase connectivity to enable CO_2 reductions?
• will the service help to develop technology that can also be used in other sustainable solutions to reduce CO_2?

Example of smart working:
More smart working will trigger investments in high quality broadband and thereby contribute to an infrastructure that allows laptops and mobiles to be connected for virtual meetings as well. This would support a situation where not only transport and buildings' carbon emissions are reduced. It could also deliver emission reductions from solutions like smart buildings. The infrastructure that allows people to work anywhere can also be used to make appliances and buildings more energy efficient.

3. Low-carbon institutional feedback
This will take place when a low-carbon service supports or enhances an institutional structure (e.g. a company or public organisation) which, in turn, will enable the uptake of other low carbon services. Key questions:

• will the service support a shift from goods to service?
• will the service help to create interest groups that support a low-carbon development path?

Example of smart working:
If smart working solutions are implemented in society, this could support a change in strategy, from a perspective that considers work as a place to be to one that sees it as an activity that takes place regardless of place. When a company changes strategy this way, it can apply this thinking to other parts of its operation. This can help change the way economic change is considered by legislators, who seek input from different stakeholders. Currently the voice of those representing low-carbon business models is not heard loud and clear. Many are busy trying to survive and lack lobby organisations in the world's capital cities. If this changes, this will be significant.

For example, if representatives from the airline industry and automotive industries are the only ones present when incentives for companies to reduce CO_2 from travelling are being developed, it is likely that we will only see offsetting, more efficient engines and more roads on the agenda. Actions to ensure higher bandwidth and incentives for virtual

meetings and flexible work will probably not gain equal support. With more and more organisations embracing smart working, this voice will grow louder.

Think different, live smart

As long as we live in a society where increased income is correlated to increased carbon, smart working and other smart low carbon solutions will face challenges, both from vested interests and those reluctant to countenance a meaningful change to workplaces, means of transport and other structures they have become accustomed to.

The challenge we face in breaking the link between income and CO_2 emissions should not be underestimated. To provide the nine billion people that will live on this planet in a few decades with solutions that allow us to live good lives without undermining our ability to survive on the earth long term is perhaps humanity's greatest challenge.

With strong leadership supporting low-carbon feedback, as outlined above, the shift to smart working – in which home-based working is a key component – will be a key driver towards a low carbon economy. A move from workplace to anyplace, carried out in the right framework, would be one of the most important steps we can take to create a low carbon and resource efficient society.