Commission for
Rural Communities
Tackling rural disadvantage

Mind the Gap:
Digital England –
a rural perspective

The Commission for Rural Communities acts as the advocate for England's rural communities, as an expert adviser to government, and as a watchdog to ensure that government actions, policies and programmes recognise and respond effectively to rural needs, with a particular focus on disadvantage.

It has three key functions:

Rural advocate:
the voice for rural people, businesses and communities

Expert adviser:
giving evidence-based, objective advice to government and others

Independent watchdog:
monitoring, reporting on and seeking to mainstream rural into the delivery of policies nationally, regionally and locally

Contents

Foreword

Digital Britain needs to be an inclusive Britain. Access to broadband brings great benefits to rural areas, improving quality of life through increased access to services and more flexible labour markets. New technology is enabling wider business opportunities to be seized by entrepreneurs in rural areas. But rural broadband provision must keep pace with urban.

Just as we thought the digital divide was being addressed, new services and demands are putting increased strain on existing infrastructure. Lord Carter's report, Digital Britain, calls for the UK infrastructure to meet the demands of a modern, knowledge-based economy, this resonates strongly in rural communities. But providers' investment must take account of social impacts and benefits as well as economic criteria. I urge Government to lead the way in bridging the gap for rural communities on Next Generation Access and offer the CRC's support as rural watchdog, adviser and advocate.

Internet use is now higher than ever before in rural areas, and demand continues to increase, driven by online shopping, banking and entertainment. Yet users are frustrated by the lack of speed and reliability of existing services. Those not in a position to access broadband, many of whom are already socially disadvantaged, are excluded from what, for a large section of the population, are now basic services, such as applying for road tax and other Post Office services, downloading music and social networking.

Digital technology can also tackle social and economic disadvantage in rural areas. It can help older people to improve their quality of life and support independent living by providing access to services, information and purchases and transform healthcare delivery through online appointment and prescription booking and telecare services.

Rural entrepreneurs are able to help economic recovery through the innovative use of new technology, but this is dependent on infrastructure. Online education benefits employees, businesses and students and we recommend that rural schools offer access to bandwidth to the wider community and new rural housing be designed and equipped to enable home working.

First generation broadband is unlikely to deliver the Government's welcome commitment to universal service at 2Mbit/s by 2012. Equitable roll-out of Next Generation Access is potentially a colossal financial undertaking, and will be more complex and take longer in more remote areas. There must be a firm undertaking from Government, with a comprehensive strategy and implementation plan to include rural areas.

CRC is committed to working with Government and others to ensure rural communities are not always following in the footsteps of their urban neighbours.
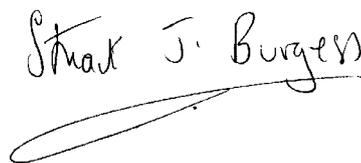
Stuart Burgess
Rural Advocate and Chairman
Commission for Rural Communities

Executive summary

The Commission for Rural Communities (CRC) believes that digital technology is vital for the sustainability of rural communities and economies. Through the use of digital technology, rural communities can access services on an equitable level with their urban neighbour, thereby reducing disadvantage and social injustice. Rural businesses thereby equip themselves to compete in the wider marketplace, whilst services are delivered more efficiently with associated cost savings. However, lack of access to digital technology and the right broadband speed continues to exacerbate the rural digital divide.[1]

Today's technology is so tightly woven into the fabric of society that digital deprivation can rightly be considered alongside, and strongly linked to, more traditional social deprivations, such as low income, unemployment, poor education, ill health and social isolation. To consider lack of access to digital technology as somehow less important underestimates the pace, depth and scale of technological change, and overlooks the way that different disadvantages can combine to deepen social exclusion.

The rural picture – the current state of rural digital inclusion

It is true that the digital divide has been reduced in many rural areas but there is still a long way to go before equality is achieved. More and more rural communities now have access to digital technology, the State of the Countryside report 2008[2] highlighted that internet access is now higher in rural areas than ever before and been accessible to 70% of homes since 2005, albeit at limited bandwidths.

Internet use and the demand for acceptable bandwidth continues to increase in rural areas faster than in urban areas.

Much of the demand in rural areas is driven by the need for online shopping, banking and communication. Approximately three-quarters of rural internet users say they use the internet for transactions; this is higher than the UK average of 69%.

Those in rural areas are also more likely to watch films or television online, because other forms of entertainment such as live music, theatre and cinema are not as accessible or available.

Currently, the incidence of rural home working is as much as three times greater than for urban areas. Most rural businesses are also small and medium sized enterprises (SMEs) – a key source of innovation and rural wealth creation. Many would be forced out of business or have to relocate if adequate and competitive broadband provision was not available. Many rural businesses are already adversely affected by inadequate broadband connectivity and the negative effect of the digital divide is increasing. Collectively, the greater the negative impact on rural business, the greater the impact on the country's economy as a whole.

[1] Digital divide: A term used to describe the perceived gap between those who can access and make effective use of ICT and those who cannot, due to linguistic, economic, educational, social or geographical reasons.

[2] State of the Countryside report 2008, Figure 2.3.6

Of the 17 million people over the age of 15 at risk of digital exclusion, 9.3 million (44%) are over the age of 55. This is especially important in rural areas, where the median age is 6 years older than those in urban areas.

Over the last 5 years broadband internet has become the 'fourth utility' for most of the UK population.

BT and Virgin Media are aiming to deliver enhanced services in urban areas but this Next Generation Access (NGA) is currently out of reach of many rural communities as the investment case for rural areas is made against a backdrop of purely market driven and commercial drivers, not social arguments.

What are the rural issues?

Lack of access to digital technology, inadequate broadband and mobile telephone coverage combined with lack of engagement with digital technology all contribute to a complex set of issues for rural communities and lead to disadvantages including:

• limited access to government services, and to the full range of social benefits available through interactive services, such as cheaper bills and healthcare diagnostics;

• limited job search opportunities and options such as online training, as well as limiting the social and recreational uses of the internet;

• increased isolation felt by many older people; and

• lack of high-speed broadband coverage stifles business innovation, social opportunities and innovative and integrated service delivery.

The CRC has identified a number of key areas which we believe must be tackled as a priority:

• education and lifelong learning;

• business development;

• social and community cohesion; and

• equitable access to services.

Rural proofing the Digital Britain interim report

The existing and any future digital divide requires a more complex set of policy responses and solutions which go beyond simply increasing levels of hardware provision and infrastructure and then assuming the 'gap' to have been 'bridged'. The Digital Britain interim report (January 2009), undertaken by the Department for Business, Enterprise and Regulatory Reform and the Department for Culture, Media and Sport sets out to pave the way and create collaborative working between Government and enterprise for an effective programme and partnership for the digital economy.

CRC has rural proofed the interim report on behalf of rural communities to determine its effectiveness and applicability for rural England.

Universal connectivity in rural areas

The Digital Britain interim report aspires to ensure universal connectivity take-up and use. CRC fully supports this aspiration. However, there are a number of issues which we believe are particular to rural localities and should be examined further:

- How can a Universal Service Commitment (USC) of 2 Megabytes per second (Mbps) be achieved for rural consumers, both domestic and business based?

- Will the USC be of sufficient quality to deliver high quality public services?

- Will the USC satisfy existing demand for existing services and if so, for how long?

- Assuming that by 2012 those areas covered by first generation broadband will need to move to higher speed services, what is the scale of the challenge and how might it be addressed from rural areas?

Next Generation Access

If the country as a whole is to remain economically competitive with the rest of the world it must have a broadband provision that is both fit for purpose and future proofed. Next Generation Access (NGA) services will soon be a reality in many areas but the current driver for this provision is economic benefit to the supplier and not benefit to the end user. To that effect, provision will be rolled out where most return can be made and not necessarily where there is greatest local economic, or indeed social need. It is logical that a fundamental driver is one that is of profitable benefit to the provider but that it is not an equitable system of benefit to the country as a whole.

Data gathered as part of this report indicates that 60% of people living in areas most likely to see next generation broadband investments are almost exclusively in deeply urban areas; geographically tightly focused and densely populated areas.

CRC fully supports the case for NGA but we also recognise, particularly in this time of economic challenge, that the equitable roll-out of NGA across all areas, both urban and rural is potentially a colossal financial undertaking. As with the history of roll-out of other essential utilities we recognise that NGA roll-out will be more complex and will take longer in more remote areas. Rural communities will accept this if there is a firm commitment from Government to 100% roll-out and a strategy and implementation plan for full and successful delivery.

This report seeks to ensure that there is an effective and sustainable broadband future for rural England. The country as a whole is now at a technological cross-roads. If the roll-out of next generation broadband is undertaken in the right way we will all benefit. If the wrong choices and roll-out mechanisms are employed we run the risk of falling behind in the technological race with the rest of the world. It is a very competitive race and one that we will not get a second chance at winning. Put simply, we cannot afford to take that risk. Rurality must be fully considered and included in the provision of next generation broadband. A great deal of good work has already been undertaken both by Government and the public sector. We must all work together to ensure we remain economically competitive, socially secure and with quality services and support mechanisms for all, regardless of locality.

Our recommendations with an indication of the organisation we feel would be best placed to lead on them is included in chapter 8 (page 53).

1

Introduction

As part of his role Dr. Stuart Burgess, the Rural Advocate and Chair of the CRC, presented advice on steps to build stronger rural economies to the Prime Minister in June 2008. The Government's response was published in February 2009 as part of a summit held in York on ''Releasing the Potential of Rural Economies: Innovation''.[3] That report presented evidence of the 'unfulfilled potential' for rural economies to contribute to the economic growth of the country.

In this report we recognise that digital technology has a significant role to play in helping to realise that economic potential, in terms of supporting innovation, creativity, productivity and marketability. In addition, rural communities and individuals can enhance their quality of life and wellbeing by accessing digital technology to improve access to services and learning and skills training. Where improved digital inclusion has been demonstrated,[4] we have seen:

- digitally included individuals are likely to perform better academically (increase of 25% in GCSE grades per subject);
- computer/internet use commands increased salary premiums (3-10%);
- government services can make significant savings through mediated interactions. For instance, an NHS Direct online initiative was predicted to save the NHS £68 million in 2008;
- companies can increase their customer base and sales volumes (online spending is on average 20% higher than offline); and
- there is a positive impact on GDP to the economy (upwards of 1.54% over three years).

For the future, digital technology will be imperative in embracing innovative and cost intelligent service delivery solutions, opportunities for combining service delivery and addressing much needed service delivery efficiency savings.

During February and March 2009 the CRC undertook a 'rural proofing' analysis of the Digital Britain interim report including research and consultation with rural communities and other stakeholders. More than 50 documents were submitted to CRC for consideration through partners and the Rural Services Network. Discussions, visits and workshops also took place involving stakeholders, our Commissioners and Hilary Benn, Secretary of State for Environment, Food and Rural Affairs. We also commissioned independent analysis of rural connectivity issues from a technical viewpoint; which is, we believe, the first time this has been done for Next Generation Access on a consistent national basis. The Rural Advocate undertook a visit to Cumbria in January. By combining the two approaches of 'on the ground' consultation and technical analysis, we provide in this report our findings on the impact and opportunities raised in the Digital Britain interim report for England's rural economies and communities.

[3] www.ruralcommunities.gov.uk/events/releasingthepotentialofruraleconomiesinnovation

[4] UK Online Centres – Economic Benefits of Digital Inclusion, building the evidence

2

The rural picture – the current state of rural digital inclusion

Rural is defined by the Office of National Statistics as any settlement with a population under 10,000. This is further broken down into three categories: town and fringe, 'villages' or 'hamlets and isolated dwellings'. The last accurate count of population was the 2001 Census which showed that there were over 9.5 million people in rural England. 2005 estimates[5] show that of the 9.6 million people living in rural areas 4.8 million (almost exactly one half) live in rural towns, and one half in villages or hamlets and dispersed settlements.

Rather than existing independently, rural and urban areas help to shape each other. Nobody lives in isolation, rural areas depend on towns and cities for many key services, including specialised healthcare and education and leisure. Whilst urban people rely on the countryside for food and non-food products, and value the landscape and environment found in the rural areas for leisure and recreation.

In our State of the Countryside report 2008 we highlighted the fact that internet access is now higher in rural areas than ever before and has been accessible to around 70% of homes since 2005. In May 2008, Ofcom[6] published a report which assessed television, radio, internet and communications habits across the regions and nations. The report found that rural households are now more likely to have broadband connections than those who live in urban areas, indicating that 59% of rural households had broadband services, compared to 57% in urban homes. This is notable because just four years ago, people who lived in urban areas were twice as likely to have a broadband connection as those who lived in the country (largely due to technical/infrastructure and competition issues). The advantages are becoming clear to those who live in rural areas. Although initially lagging, take-up (demand) of broadband services in rural areas as a proportion of the population, exceeded that in urban areas in 2007/08.

We have evidence of the risks for rural areas in the roll-out of first generation broadband. Rural towns and villages did not (and still do not) benefit from the levels of competition common in urban areas (''free broadband'' offers for example).

Over the last 5 years broadband internet has changed from a luxury to a 'fourth utility' for most of the UK's population. This move has benefited government as the delivery of key public services has been transformed and businesses have benefited through faster electronic transactions.

Rural areas have seen enormous benefits from existing digital access:

• businesses have relocated to villages and market towns from urban areas for business owners and employees to enjoy a better quality of life;

• people have moved out of cities on the basis they can work from home, continue to access public services and shop online; and

• rural manufacturers and retailers have tapped into worldwide markets, generating new sales.

[5] State of the Countryside report, 2008

[6] Ofcom, *Nations and Regions Communications Market Report 2008*

Broadband has helped to slow down a migration from rural to urban areas and brought new jobs and businesses into rural areas. Economically active rural residents have supported local shops and schools, helping to safeguard rural services.

Case study 1

Reverse business relocation

An international bulk haulage network relocated to a remote rural area thanks to a project providing fast, broadband links. International Dry Bulk Terminals Group manages the movement of dry bulky goods between ports across the world. Millions of tonnes of grain, sand and flour are handled by the company every year. The group shares information on ships, safety and port management via the web. They wanted to relocate from Brighton where the cost of living was high, and found a rural area, which was offering good value broadband. The business is located in remote countryside, 50km from the nearest city, Carlisle. The aim of the project was to relocate to a rural area and introduce remote working. This would have been impossible without broadband access. The business is relatively small, employing 2 people but represents an important trend – footloose, knowledge-based service sector businesses relocating to rural areas and bringing high-income jobs into rural areas.

www.drybulkterminals.org

Case study 2

Rural mature student develops new skills

''I took a career break to look after my young son and moved from London to rural Kent. After a few years I wanted and needed to re-enter the job market and realised that it would be easier to do this by following a post graduate (degree) course. I could not invest physical time in a full time university degree but managed to follow a 2-year Open University course, which I completed online and at home. This fitted in with my home arrangements and school runs. I subsequently found a job – in my new field of expertise – in the local area.''

Helen Wright

But those who are still not in a position to benefit, through lack of broadband provision or poor service, are still suffering from the digital divide and resulting social exclusion and are in danger of having to 'catch up' all the time.

Technical limitations have prevented some rural areas from realising these benefits. An ageing infrastructure coupled with low customer density is a disincentive to investment and competition to supply services which we see in other rural and urban areas, leading to so-called first generation broadband 'not spots'. These 'not spots' continue to be a challenge in some rural areas.

New services and demands are developing rapidly, leading to increased strain on existing broadband infrastructure in rural areas. BT and Virgin Media are aiming to deliver enhanced services in urban areas but the investment case for rural areas is made against a backdrop of purely market driven and commercial drivers, not social arguments.

The risk is that as rural residents and businesses demand more, the market will fail to meet this demand and instead invest in a 'digital cities' strategy meaning that those living and working in rural areas may not maximise their life chances or that businesses will fail to reach their full potential.

- Demand for adequate broadband exists in rural areas and is rising faster than in urban areas.
- Businesses will fail to meet their potential if the digital infrastructure is not fit for purpose.
- More people in rural communities will be socially excluded from society due to lack of access to digital technology.

3

What are the rural issues?

Lack of access to digital technology, inadequate broadband and mobile telephone coverage combined with lack of engagement with digital technology all contribute to a complex set of issues for rural communities and residents. Many of these are inter-related and hard to separate, but CRC has identified a number of key issues which we believe must be tackled as a priority. We have also looked at examples of Government programmes aimed to improve service delivery and provided real experiences of rural residents and businesses that have used them. We have illustrated each of these with relevant case studies to reflect how rural residents and businesses are using first generation broadband and the issues faced by those who cannot get broadband over four broad categories:

- **Business sustainability**
  Rural SMEs need broadband and mobile telephone coverage, to grow their businesses or to just maintain competitiveness in the current economic climate.

- **Education and lifelong learning**
  Where employees are restricted in the degree of 'on the job' learning, businesses cannot nurture local or existing talent through e-learning. Students in both full and part-time education are disadvantaged if they cannot get adequate broadband at home, whilst an ageing population needs access to broadband to maintain their skills and continue to engage fully in society.

- **Equitable access to services**
  Increasingly, access to government services and to the full range of social benefits is available through various interactive services, for example cheaper bills and healthcare diagnostics, and public service efficiencies created through increased online service delivery.

- **Social and community cohesion**
  Using broadband and mobile technology to communicate and use the internet enables communication between isolated rural settlements, sharing good practice and overcoming isolation.

Business sustainability

In 2005, England's rural areas hosted at least 476,000 VAT or PAYE registered enterprises. They earned £304 billion and employed 2.96 million people. This represents at least 27% of England's enterprises; 13% of employment, but only 9% of the country's business revenue or turnover. In some rural areas businesses are contributing proportionally less economic output than would be expected thus showing the existence of unfulfilled potential from firms and workforce in rural areas.

The National Endowment for Science, Technology and the Arts[7] (NESTA) called for innovation and creativity as the armoury to fight the global recession. Only through innovation can economies attack the economic downturn.

There may not be many opportunities for growth due to the recession, but just maintaining the status quo requires more innovation and effort. Flexible working allows businesses to accommodate better employee

work life balances, attract highly skilled staff or allow home-based working. In addition, the current recession has dictated that where market shrinkage has occurred, the need for business diversification has increased. Where broadband speeds are reduced so too are the options for such business diversity.

Case study 3

Professional working from home

''I am a Chartered Clinical Psychologist working freelance with an office in my home in Selling. While I do not see clients from home, I do carry out administration related to all areas of my work from my home PC. I am reliant on email to communicate with clients and referring agencies in a timely manner, as well as needing to access clinical information, research outcome studies, training resources, supervision and clinical psychometric tools available online. Many reports to doctors, solicitors and other referring bodies are most easily sent by email and many organisations require information to be submitted in this way. I also have a website with a colleague and need to be able to respond rapidly to requests for information and appointments through the site.

My experience of broadband services in this area is that the signal and connection often fail altogether or processing speeds are frustratingly slow to the point where work can be compromised. This makes working from home a difficult and unreliable situation.

Financial Implications for April 2009: Potential contract of work not secured due to not responding to enquiry within 24 hours circa £800, driving to Folkestone on 2 occasions to complete project work with colleague as internet at home unreliable circa £30, Phone calls and postage due to unavailable internet circa £25. 1 month's loss of £855.''

Dr J Ross-Gower, Selling, Kent

Investing in internet-enabled IT services has given UK companies major competitive advantages.[8] Business adoption[9] and optimisation[10] of internet and communications technology, particularly advanced ICTs, generates productivity gains, increases employment and turnover. Advanced technologies often exploit broadband and include remote access, mobility, trading online, supply chain and customer management.

Larger rural businesses will and have ultimately invested in broadband at some level. But this is giving them a competitive advantage over their smaller counterparts. SMEs and micro businesses in rural areas lose out to larger businesses who have invested in high-speed broadband and also to competitors operating from urban areas with adequate broadband. Those without broadband cannot even use simple business tools (a website) and means of communication (email). This damages small businesses, reducing their scope to compete and expand.

During challenging economic times businesses need to innovate.

Adequate broadband provides a fuel for business competitiveness through innovation.

[8] CBI/Nominet report: UK Competitiveness: The Role of IT Services, July 2008

[9] Adoption refers to the investment in, and utilisation of, ICTs by businesses.

[10] Optimisation refers to businesses fully exploiting the ICTs they invest in, so that they obtain maximum productivity gains and increased competitiveness.

SME trading internationally

''Speaking as the proprietor of a one-man engineering consultancy the lack of a reasonably fast internet line is a significant limitation. My business is international in its own small way: last year, over 40% of my turnover was with mainland Europe and about 30% outside the EC. Several of my clients are able to provide VPN (Virtual Private Network) links, which enable me to control a computer in their offices remotely from my desk in Hawkesbury. One of my clients allows me access to their server in the Netherlands to upload and download files. This sort of technology potentially allows overseas work to be done without leaving home, which saves CO2 emissions at the same time as making my services more competitive. Unfortunately, our local internet connection is too slow to be able to use these facilities effectively.

A small advantage of a decent internet connection would be good-quality internet telephone. A telephone call to my client in Malaysia, for example, is a bit of an investment via BT. Unfortunately the quality of the internet connection is marginal for a conversation, and hopeless for a teleconference.

In short, a business broadband connection to my office would have a positive environmental impact. It would also enable me to continue to make a modest contribution to the UK balance of payments.''

Mike Seabrook, VTX Systems Ltd. South Gloucestershire, www.flowexperts.co.uk

There is also evidence to suggest that graduates will have difficulty finding work in the current economic downturn. A survey by High Fliers Research (*The Graduate Market 2009*) of 100 firms, found recruitment targets had been cut by 17% for this year. The report says ''swingeing cuts'' in recruitment, after years of a buoyant jobs market, make it one of the worst years to graduate for two decades. In their latest report (*The UK Graduate Careers Survey 2009*) it found that 52% of graduates surveyed thought the prospects of getting a job were very limited and 36% did not expect to get a graduate job this year. Nearly half (48%) feared they may be made redundant within a year of work.

There are significant differences in internet users' and non-users' perceptions on prospective employment. In the current economic climate, one of the most significant differences was in their confidence to find information about jobs, do their current job, and find a new job should the need arise. Internet users' confidence in their ability to find work outstripped non-users by 25%.[11] With good high-speed broadband infrastructure these graduates living in rural settings could be encouraged and enabled to job search in their own locality or to set up businesses from home.

There is the potential to see a drift of economic activity out of rural areas into market towns and urban areas if high speed broadband is not available.

[11] UK Online Centres: Does the Internet Improve Lives? April 2009

Case study 5

Market research business

Dipsticks Research (www.dipsticksresearch.com) is a busy market research company, which had headquarters in a village in west Northumberland. The business moved their offices from the Northumberland village of Keenley to the market town of Hexham due to continued expansion and inadequate access to suitable technology. ''We wanted to access the types of broadband technologies that were only available in urban areas so that we could continue to support the company's growth and improve efficiencies in general. In a fast moving industry, we have always used the latest technology to give us an edge, but our rural location meant we could not grow and reach our potential.'' Since the move, Dipsticks have continued to expand their online capabilities and now operate a highly successful consumer research panel of over 80,000 members – panelbase.net. The successful growth of panelbase.net would have been severely hindered by inadequate technologies so the company is sure that its decision to move was a good one. Panelbase.net is one of the fastest growing research panels in the UK and has held the top position in the www.surveypolice.com global leader board for almost a year. The company continues to invest heavily in technology and services many of the biggest brands in the media industry from its location in a northern market town.

Angus Webb, CTO

Increasing regulation and subsequent additional reporting requirements in the agricultural sector have been mitigated in some cases by the use of new internet based services to disseminate information to farmers and record information from farmers.

The Whole Farm Approach, developed by Defra, aims to reduce the burden of form filling for farmers. Intelligent forms reduce inputting the same data repeatedly. Monitoring requirements have also become more complex, so more information is required. Farmers on dial up are disadvantaged as they have to use a paper version.

Case study 6

Farming business support agency

''Latest regulations that are affecting the majority of agricultural holdings are linked to a bandwidth hungry mapping site that farmers are supposed to check to see if they fall within the regulations. Many farmers simply cannot access the site and therefore do not know if they are within the new regs! We will soon be delivering support services that relate to the new regulations - therefore in this respect the issues relating to internet access will affect us.''

David Naylor, Business Link

Case study 7

Farming enterprise

I am very concerned that most businesses in my neighbourhood cannot access broadband or a reliable dial-up service to access Defra online services for cattle passports etc.

County Durham-based farmer

The CRC wants to see more rural businesses able to take advantage of the positive benefits of digital technology.

> The CRC recommends that existing and future business incentives apply to digital technology and infrastructure development. i.e. installing fibre optic cable should be an approved business expense and therefore tax deductable.

Education and lifelong learning

E-learning benefits for rural SMEs

The nature of much employment in rural areas is in small and micro businesses (11 – 49 employees and 1 – 10 employees), which means that employees are less likely to receive training through their employer. In 2006 the first ever analysis of the National Employer Skills Survey confirmed that fewer rural firms had formal commitments to employee training, but where they had were more likely to have offered more training days to their employees. Small employers in rural areas may be particularly reluctant to release staff for training given that long travel times to training providers will increase the time away from work and there is no central funding to cover these additional costs. Access to online training allows staff to develop their skills in the workplace or at home, with minimum impact on the business. Students in full or part time education will spend study time at home and require fast broadband download speeds to access learning materials. Poor education and low skills levels can lock people into low income jobs and perpetuate deprivation, as well as contribute to outward migration as younger people leave rural areas to seek work elsewhere. Where this is the case, there is often also an increased likelihood of household incomes needing to be supplemented by benefits.

CRC want to see the barriers to distance online learning reduced.

> The CRC would like BIS, DWP and the UK Commission for Employment and Skills (UKCES) to ensure that digital technology investments made through FE/ HE colleges, publicly-funded private training providers and Job Centre Plus meet the needs of rural employers, employees and would-be employees.
>
> The CRC recommends that where possible e-learning support for SMEs and vocational studies should provide support for access to digital technologies e.g. laptops on loan, discount grants for broadband infrastructure development. This will reduce the technological barriers to distance and on the job learning.

Nearly one in four 19 year olds in rural districts failed to achieve a basic level qualification (NVQ2 or equivalent) and around one in four adults living in villages and hamlets have no qualifications.[12]

Online learning tools are now commonplace. Distance learning is increasing in popularity. Learndirect, Open University and BBC Learning are ever increasing their online offering. School home communications through outfits like Parentmail are also becoming more frequent with

[12] Rural Disadvantage Reviewing the Evidence, 2008, CRC

primary and secondary schools communicating increasingly with parents and pupils electronically. As more learning resources are available online, it is likely that those households with adequate broadband connections will benefit more than those with slow or inadequate connections.

There is evidence that ownership of a computer at home is linked with better GCSE results: Schmitt and Wadsworth (2004)[13] found a statistically significant relationship between households owning computers and higher GCSE results. The UK Government has established the Home Access Programme to help reduce the digital divide by engaging parents and children in online learning.

The Home Access Programme[14] allows certain low-income families to apply for a Home Access Grant to purchase a package consisting of hardware, connectivity and support. Part of the pilot activity involves working with accredited suppliers to provide these Next Generation Learning @ Home packages, which meet pre-defined requirements and are available for all to purchase. This initiative is intended to bridge the digital divide where currently more than one million children still do not have access to a computer at home and 35 per cent of families have no access to the internet. This should create a level playing field for learners where every child has equal access to the internet at home to assist with their learning.

Case study 8

Homework

''My child was disadvantaged because so much schoolwork was posted online. Other pupils in the class were getting better results. At the time, we could not get broadband, which meant my child could not access PowerPoint presentations of lessons. At up to 5Mb, they are too big to download on dial-up. The community wireless scheme was able to provide us with a connection, so we can now download homework and my child is much happier.''

Parent

Case study 9

'Not spot' school children

''Our children attend the local primary school and we were recently sent a letter stating that all homework for year 5 pupils will be emailed home from now on. This means that our children will be hugely disadvantaged because we are not in a position to receive emails let alone encourage the children to work on their school projects online and then submit their work back to the class teacher via email.''

Katie Hinckley

The CRC wants to see rural communities have greater access to the broadband opportunities which schools can offer through the extended school services agenda, particularly the broadband infrastructure available to schools.

[13] http://about.becta.org.uk/content_files/corporate/resources/news/2008/september/home_access_report.pdf

[14] http://schools.becta.org.uk/index.php?section=oe&catcode=ss_es_hom_02

> CRC recommends DCSF supports rural primary and secondary schools to offer broadband opportunities to the wider community.

Equitable access to services

The CRC believes that rural people should not be disadvantaged because of where they live. In particular access to services can be a serious problem for those rural residents who are on low incomes, elderly or without private transport. Around 1 in 5 (2 million) people who live in rural areas actually live in poverty and the population is ageing at a faster rate than urban areas.[15]

A lack of services affects more than the immediate recipients; without key services the sustainability, economic viability and attractiveness of rural areas are at risk. Local Strategic Partnerships (LSPs) are being challenged to deliver more for less as well as inclusive, fair and equitable services. There are clear links between digital exclusion and social exclusion and when deployed effectively technology can clearly help in providing improved, efficient and innovative services to those most at need.

The Digital Britain interim report highlights that enhanced delivery of public services requires universal access take-up within the home – particularly for those services directed at sections of society most in need of them. The UK has the highest number of public services available online, some 89%, compared to around 70% in France and Germany. This will be particularly pertinent to those on lower incomes, older people or those remote from the physical distribution points for public service and other currently excluded communities and groups.

Ofcom[16] suggested much of the demand in rural areas was driven by the need for online shopping, banking and communication. Buying goods online is more popular in rural areas where there are no well-stocked high streets, as in urban areas. In total, about three-quarters of rural internet users say they use the internet for transactions, higher than the UK average of 69%. Those in rural areas are also more likely to watch films or television online, because other forms of entertainment such as live music, theatre and cinema are not as accessible or available.

> There is considerable inequitable access to services in rural areas. Without intervention, polarisation of service access and quality of delivery for people living in rural areas will continue. This will therefore impact upon the lives of 20 % of the population as a whole.

Shifting public sector services online as part of the e-government agenda has reduced the costs of transactions with citizens and supported wider access to information and services. ''Government anticipates public spending on e-government and digital literacy programmes to yield returns of between 1.1 and 1.5% of GDP increase in 2008-10'', according to the UK Online Centre's report 'Benefits of Digital Inclusion: Building the Evidence.'

[15] State of the Countryside report 2008, CRC

[16] Ofcom, *Nations and Regions Communications Market Report 2008*

Face-to-face delivery costs are higher in rural areas because more staff are needed to deliver public sector services in sparsely populated rural counties. An increase in service users with access to good quality internet-based services can shift the balance towards more online transactions with subsequent savings for the taxpayer. Rural areas potentially have the most to gain as some rural residents currently have to travel long distances to meet with council officers and other public sector organisations or service providers.

The CRC wants everyone living in rural areas to be able to access services at the same level as their urban counterparts.

Social and community cohesion

Community cohesion lies at the centre of what makes a strong, vibrant and safe community. It is an important issue for all of us, whether we live in the heart of a big city or in a leafy village. Within rural areas it is particularly important because of the geographical factors which can lead to isolation. Community cohesion is about inclusion, and building good relations between different parts of the community. It is about a wide variety of factors including the relationships between young and old and between residents with differing interests. Community cohesion is also about the interdependency between the environment and how people live and work with and within it.

It is evident that there is massive frustration amongst those who are not in a position to receive broadband. They are excluded from what for a large section of the population are now basic services, e.g. online shopping, applying for a tax disc online, online banking, downloading music, BBC iPlayer and social networking sites. Apart from the obvious economic disadvantages it is also having profound social implications. One of our case studies highlighted that his grandchildren are not visiting after school because they cannot access the internet for homework. Parish websites are not updated due to lack of broadband and residents cannot access the information because they are not connected. There is also compound social exclusion for older people who live in rural areas and who could benefit hugely from broadband provision.

Those without access to the internet are typically those who are also already socially disadvantaged: they tend to be elderly, in the DE social class, are likely to live by themselves and have low qualifications. Of the 17 million people over the age of 15 at risk of digital exclusion, 9.3 million (44%) are over the age of 55. Within 20 years half of the adult UK population will be over 50 and there are now more people aged 65 and over in the UK than there are children under 16.

Effective use of technology can offer older people in rural communities very real opportunities to improve quality of life and support independent living for longer. Older people in rural communities can access services, information and make purchases at a time when post offices are closing down, bus services are being reduced and government services are increasingly moving online.

Case study 10

Retirement boost for surfing Grandad[17]

A grandad from Cornwall is making the most of his retirement, thanks to a government website and a little help from Looe Enterprise UK online centre.

Pensioner Frank Brooks, 63, from Looe, had no idea he was eligible for further benefits until he looked them up on the internet. Now he's a regular e-government customer, and he can't sing its praises enough.

Frank says: ''Everyone I meet I tell to get themselves online and get on this government website, because it's one of the best things I ever did. It's amazing how much information is on there, and how much easier it is to find out things once you've got the hang of it.

''When I first thought about checking-up on my pension, I went into the Post Office. But I couldn't get the information I wanted from those forms, and I couldn't get any help in understanding all that jargon.

''I'd been going into Looe Enterprise UK online centre for some time to get to grips with computers, mostly so I could keep up with my grand-daughter Becky, who's nine and already a bit of a computer-whiz. They suggested one day I should try this internet site - direct.gov - and helped me find the bits and bobs I needed. It was brilliant!

''Everything I was looking for was right there - and the information I found is already making a difference. For example, I'm diabetic, and I have to make regular trips to the hospital. I was paying a lot for the petrol and the parking, and it's surprising how it all adds up. One of the things I found out was that I was entitled to tax credits to cover the cost, which has been a great relief.

''I've been really pleased with the advice I got from the pensions site, and now I'm a real convert to e-government. I'm even planning to get the internet at home so I can keep looking things up when I want to.

''I'm looking forward to finding out what else technology can do for me, and I just can't understand why other people aren't doing the same. There's so much information out there, on the things people need to know and do anyway - like getting a TV licence. Why not go into a local UK online centre and get help to do it online? If I can do it, anyone can.''

New homes: new digital opportunities

The digital inclusion agenda should assess the means to enable technology for home enterprise in new homes and particularly for upland and sparse communities.

Equipping homes now will help people to stimulate new enterprise, aid social cohesion and enable learning and training through community intranets.

The sheer scale of home-working and the political elevation of the low carbon economy means that Government must be encouraged to produce clear policies to support and facilitate home based work – *designed to promote it as a sustainable use of property that can help grow the local economy.*

[17] UK Online Casestudy www.ukonlinecentres.com/ corporate/content/view/43/110/lang,en/

Live-work[18] is beginning to gain currency and a number of leading national and regional house builders have started to invest more imaginatively in the use of space, specification and services. But given the breadth of the digital inclusion agenda and positive Government response to the Matthew taylor'a 'Living, Working Countryside' report and the Dr Stuart Burgess' report 'England's rural areas: steps to release their economic potential' – clear scope now exists to explore the live-work potential further. The role of house builders in perceiving a 'market' for live-work which helps sell properties and which in due course could be instrumental in taking the case to, for example, the Homes and Communities Agency (HCA) to deliver new affordable rural homes, designed and equipped to meet this demand. Existing housing often mitigates against 'live-work' options, holding back rural start-up enterprise and investment.

With more proactive planning a new housing programme will boost live-work in the countryside enabling more people to work from home and reducing car journeys and CO_2 emissions. The development of 'green' housing in the countryside will not only create a large number of jobs in *its* development but will also create a second wave of jobs as new homes in particular act as a host for live-work.

> CRC would like to see, where appropriate, a significant proportion of all new rural housing being designed and equipped to *enable* home working through the accommodation of broadband accessibility.

CRC would like to see the Department for Communities and Local Government (CLG) show clear leadership[19], in taking forward its positive response to Matthew Taylor's 'Living Working Countryside' report and CRC's report on building stronger rural economics – to facilitate the, as yet, untapped potential for more rural homes to offer live-working accommodation.

We are encouraged to see the new PPS4: Planning for Sustainable Economic Development (currently under consultation) recognises that new ways of working such as live-work or the use of residential properties for home working have an impact upon spatial planning which should be considered when planning for economic development.

Digital inclusion promotes local democracy
Parish and town councils lie at the heart of a vibrant rural community. There is much that is healthy and right in our local democracy in rural England, with many examples of strong local leadership, proactive town and parish councils and effective community engagement. Access to effective broadband is key to the successful operation of this local first tier of democracy.

From 27 June 2008 there have been a number of changes to the Quality Parish and Town Council Scheme[20] which now places greater emphasis on the ability of councils to communicate with their electorate electronically.

[18] Live-Work may be defined as occurring where people make a conscious decision to work from home and equip and adapt it for this purpose including installing the IT infrastructure and broadband connectivity to enable them to do so. Typically, they establish and run a business from home. Nearly a third of rural businesses operate in this way.

[19] With other key partners: namely the Treasury, Defra, BIS, DWP, HCA, LGA, RDAs, BT, Building Societies Association and Council of Mortgage Lenders, the RTPI, RIBA and Chartered Institute of Housing.

[20] National Association of Local Councils, www.nalc.gov.uk

The scheme is designed to allow councils to test themselves against good practice benchmarks, and demonstrate to the local community and partners that they are able to deliver efficient services.

4

Rural proofing the Digital Britain report

'The digital information and communications sector is one of the sectors in the economy, alongside energy and financial services, upon which the whole economy rests. The success and health of this sector is of interest and concern not just to those employed in it but also to the 22 million of us who depend upon it for our daily work, and to the employing organisations for whom effective modern communications is a critical source of efficiency and competitiveness.

'It is also a sector which touches on all aspects of our lives, at home and at leisure as well as at work. The average British adult spends almost half of all their waking hours using the services of the communications sector or browsing, watching or listening to the audio-visual content it distributes, content that at its best can engage and delight us as consumers and inform us as active citizens in a democracy'.

Lord Stephen A Carter – Digital Britain interim report, January 2009

The CRC recognises that as we move through the recession and plan for economic recovery, the choices we make about where we invest for the future will have a profound effect upon rural communities as well as urban. Therefore we see the Digital Britain report as a fundamental driver for such investment and future provision of digital infrastructure in rural areas.

CRC has reviewed the Digital Britain interim report and set out our response - in particular how the Digital Britain report can help rural communities to reach their full potential.

Action 2 – the Government will, while recognising existing investments in infrastructure, work with the main operators and others to remove barriers to the development of a wider wholesale market in access to ducts and other primary infrastructure.

CRC supports the development of a wider wholesale market to deliver new digital technology infrastructure. We also support the development of an open market so that existing infrastructure is used effectively and to a consistent standard.

CRC recommends that new developments have the ability to access NGA and communications provision is identified in any local plans.

Action 4 – consider the value for money case for whether public incentives have a part to play in enabling further next generation broadband deployment, beyond current market-led initiatives.

The Digital Britain interim report states it does not wish to ''chill'' private sector investment, but the Map 4 on page 42 shows that the investment climate in rural areas is mainly ''cold'' for access to NGA, despite increasing demand for broadband in rural areas.

CRC believes that current investment models for rural areas are misconceived because they are based purely on economic criteria. Despite the potential of rural areas, they still get overlooked by service providers, because their geography creates a perceived barrier to investment, and because existing investment models do not adequately take into account the social impacts and benefits alongside the economic ones.

CRC recommends that alternative investment models for rural areas should be explored and adopted.

CRC offers to work with stakeholders in support of this.

Action 5 – the Government will help implement the Community Broadband Network's proposals for an umbrella body to bring together all the local and community networks and provide them with technical and advisory support.

The CRC wants to see more support for communities to help themselves in delivering their own solutions to digital technology challenges. We would wish to see a comprehensive support network for community broadband networks including practical advice and guidance to help communities deliver their own local solutions by setting up community broadband networks. CRC offers to take the lead in developing this recommendation.

Action 17 – we will develop plans for a digital Universal Service Commitment to be effective by 2012, delivered by a mixture of fixed and mobile, wired and wireless means. Subject to further study of the costs and benefits, we will set out our plans for the level of service which we believe should be universal. We anticipate this consideration will include options up to 2Mbps.

The CRC fully supports the aspirations in the Digital Britain interim report to ensure universal connectivity, take-up and use.

CRC recommends that the Government regularly monitors the level at which the Universal Service Commitment is set to ensure it keeps pace with the fast pace of demand for bandwidth, and that appropriate action is taken to ensure rural areas reach this standard.

Action 19 – we will encourage the development of public service champions of universal take-up. The Digital Inclusion Action Plan recommended the appointment of a Digital Inclusion Champion and expert taskforce to drive the Government's work on digital inclusion.

CRC believes there is a role for a Digital Inclusion Champion with a clear rural remit to promote equitable service delivery at the heart of government.

CRC recommends that the Digital Champion role incorporates a clear remit to tackle the rural digital divide.

CRC fully supports the regional Digital Inclusion Advisors and recommends that these positions also have a clear remit to ensure that rural needs are addressed.

Action 21 – Public Service Delivery plan: we commit to ensure that public services online are designed to be used by the widest range of citizens, taking advantage of the widespread uptake of broadband to offer an improved customer experience and encourage the shift to online channels in delivery and service support.

CRC recommends that new public sector online services should be designed equitably, so that rural service users are not disadvantaged by the speed of their internet connection. Government should initiate a full scale review of the barriers to delivering services equitably both now and in the future as new services are designed.

5

Universal connectivity in rural areas

'But if by 2012 we have a society where 50% of the population has very high speed broadband, 40% has first generation broadband but little prospect of market-led upgrade to next generation broadband, and up to 10% of homes are in not spots, not-a-lot spots or not-at-all-good spots, then the gulf in access and connectivity will appear starker than it is today.

We believe we need to do more to drive connectivity, capacity and take up.'[21]

There is, of course, a direct correlation between the '40%' and the 'up to 10%' and rural areas. There are three main issues that we believe should be examined further:

- How can a USC of 2 Megabits per second (Mbps) be achieved for rural areas?
- Will it be of sufficient quality to deliver high quality public services?
- Will it actually satisfy existing and more importantly future demand for existing services.

On the assumption that by 2012 those areas covered by first generation broadband will eventually need to move to higher speed services (Next Generation Broadband), what is the scale of the challenge and how might it be addressed for rural areas?

Achieving the Universal Service Commitment (USC)

The Digital Britain interim report, and subsequent speeches by Lord Carter, makes clear the expected rapid transition of public services and the evolution of new services based on the use of broadband. As broadband speeds increase more and more applications and services will emerge. Lord Carter indicated[22] that the USC is about being a critical building block for the 'analogue switch off' of services other than broadcasting – especially government services'. If we are unable to achieve the USC level, however basic, we can't deliver universal digital public services.

CRC believes there are 3 generic routes to the USC deliver in rural areas:

- upgrading/extending first generation landline broadband;
- upgrading/extending mobile broadband coverage or using other wireless technology; and,
- providing satellite connections.

[21] From interim Digital Britain report

[22] Lord Carter's speech at the 'Delivering Digital Britain' event at NESTA on 24 February 2009

To understand whether these routes can be valid solutions, we need to look at some aspects of the provision of service which have a direct impact on user experience. These are:

• The 'headline' speeds of 'up to X Mbps' used by service providers principally to sell their services and compete with others. We also need to understand what can be done by the user with these theoretical maximum speeds;

• Other technical factors which have a direct impact on how customers experience the services.

Prospects for a USC based on existing landline infrastructure
Based on Ofcom's research, we know that rural users are both more likely than their urban counterparts to be dissatisfied with their overall broadband services and with the speed of their service. This is not surprising, as they typically receive slower speeds than urban users (among consumers on 8Mbps packages, the average speed for urban users is 15% higher than for rural users).

Those in rural households also express relatively high levels of dissatisfaction (14% compared to 8% of urban users). The main reasons for dissatisfaction tend to focus on speed, reliability and value. Those living in rural areas are significantly more likely to mention speed as the main reason for their dissatisfaction (42% of rural users state speed as the main reason, compared to 22% of urban users).

First generation broadband services are offered on a 'best efforts' basis by service providers (and there are no Service Level Agreements to assure quality), transitioning rural areas to digital public services on existing infrastructure looks problematic for many users.

Ofcom has recently published an interim research report on the quality of service received by broadband customers across the country[23]. In this report, Ofcom provides a summary of the important factors to consider.

[23] Ofcom. ''UK broadband speeds 2008 Consumer experience of broadband performance: initial findings''

Table 1

Problems associated with landline provision It should be noted that while the factors above all have a critical impact on the performance of broadband services; none of them have any level of service quality assurance.

Factor	Brief description	Comment
Download speed or 'headline speed'	The 'Up to X Mbps' number used to describe the theoretical maximum speed information can be received by the user from the network	Few users actually experience these headline speeds. For example on up to 8Mbps products, the average maximum speed delivered is 45% of the headline speed.
Upload speed	The speed available for the user to send information to the network	Upload speeds are important for those looking to share large files (such as photos or videos) or large databases, use real-time video communications and for some games. Note that First Generation Broadband is strongly asymmetric, e.g. a user on an 'Up to 2 Mbps' connection has about 1.6 Mbps download but only 0.25 Mbps upload. This becomes an issue as households and businesses make intensive use of their connections
Latency	Latency is the time it takes a single packet of data to travel from a user's PC to a third-party server and back again. The figure is most commonly measured in milliseconds, and a connection with low latency will feel more responsive.	Low latency is becoming more important. Many applications perform better, and for some applications such as VPNs, Web 2.0 ''software as a service'', and real-time video a low latency connection is vital. Online gamers, for example, are particularly concerned with having a low latency connection.
Packet loss	Packet loss is the term used to describe the loss of data packages during transmission over an internet connection.	Packet loss can have a big impact on real time applications such as streaming audio or video (iPlayer, for example) or voice and video communications (extended periods of loss lead to choppy and broken-up video and audio, as well as reduced access to the available bandwidth).
Jitter	A measure of the stability of a connection – essentially how much latency changes over time.	A stable connection is vital for real time applications. Jitter and packet loss are the two biggest contributors to the quality of a VoIP (Voice over IP) phone call and to real time video.
Domain Name Service (DNS)	This is a vital service which converts domain names (such as bbc.co.uk) into the information needed to locate addresses on the internet. All ISPs maintain a DNS.	When these servers fail or operate slowly, web browsing and other online activities suffer. A slow DNS time can even affect access to download speed, and will severely affect the responsiveness of browsing the internet.

First generation broadband appears unlikely to be capable of delivering the USC to a large proportion of rural areas

The true extent of broadband availability has never been made publicly available. A number of attempts to measure the size of the 'not-spot' problem have been undertaken. None of these have empirically demonstrated the full extent of the issue. Only BT is in a position to do this; they have previously said this is commercially sensitive data.

Commissioned by CRC, the Samknows[24] broadband information service researched the likely ability of existing landline broadband services to provide the speed required to achieve the USC of 2 Mbps. The research produced an estimated ADSL broadband speed using their line-checking service for the population centre for each of the 32,000+ ONS ''lower super output areas'' (LSOAs) in England. Whilst not a perfect model, the LSOA model does lead to a good understanding of the main cause of slow speeds and not-spots, namely telephone line length.

Other factors such as the existence of line sharing devices, known as Digital Access Carrier System (DACS), may further increase the numbers of those unable to get broadband services. Line sharing is something which is more likely to affect more vibrant and economically active rural communities. Communities that took steps to evolve and grow, developing a more diversified economy, typically demand more phone lines as the number of homes and businesses grow. The number of copper phone lines laid between an exchange and a rural village was calculated many years ago and in many cases hasn't increased since. Rather than build new connections, BT and its predecessor used line-sharing technology to meet the additional demand.

Ironically, line-sharing technology is therefore more likely to exist in communities with a higher than average demand for broadband services. The precise scale of this problem is unknown and while it is considered less of a problem than line-length, it is a significant problem in some rural areas.

As well as mapping ADSL services, our analysis includes access to Virgin Media cable broadband services. We have also considered the level of competition and extent of choice available to customers. The results of our research are striking.

Rural homes and businesses are under-served by the market
Rural homes and businesses have fewer choices than their urban counterparts. Cable services are almost exclusively an urban offering with almost 60% of urban areas able to receive a cable-based broadband service of up to 50Mbps (with trials for 200 Mbps just beginning), while in villages and hamlets this drops to just 1.5%.

A similar picture forms when considering competitive ADSL services from Local Loop Unbundling (LLU) operators. A business located in an urban area might typically expect to choose from five competitors to BT, many of whom will be offering the faster ADSL2+ technology. In most of England's market towns and villages BT remains the sole broadband provider.

The performance of ADSL broadband is also inferior in rural areas. Map 1 depicts the LSOAs where ADSL broadband services are likely to fall short of the proposed 2 Mbps USC, and where there is no mainstream alternative such as Virgin Media cable services.

[24] www.samknows.com

Map 1
Rural areas with DSL
downstream speed of <2Mbps

**Areas below the proposed
2 Mbps USC level**

■ Less than 2 Mbps & no
alternative services
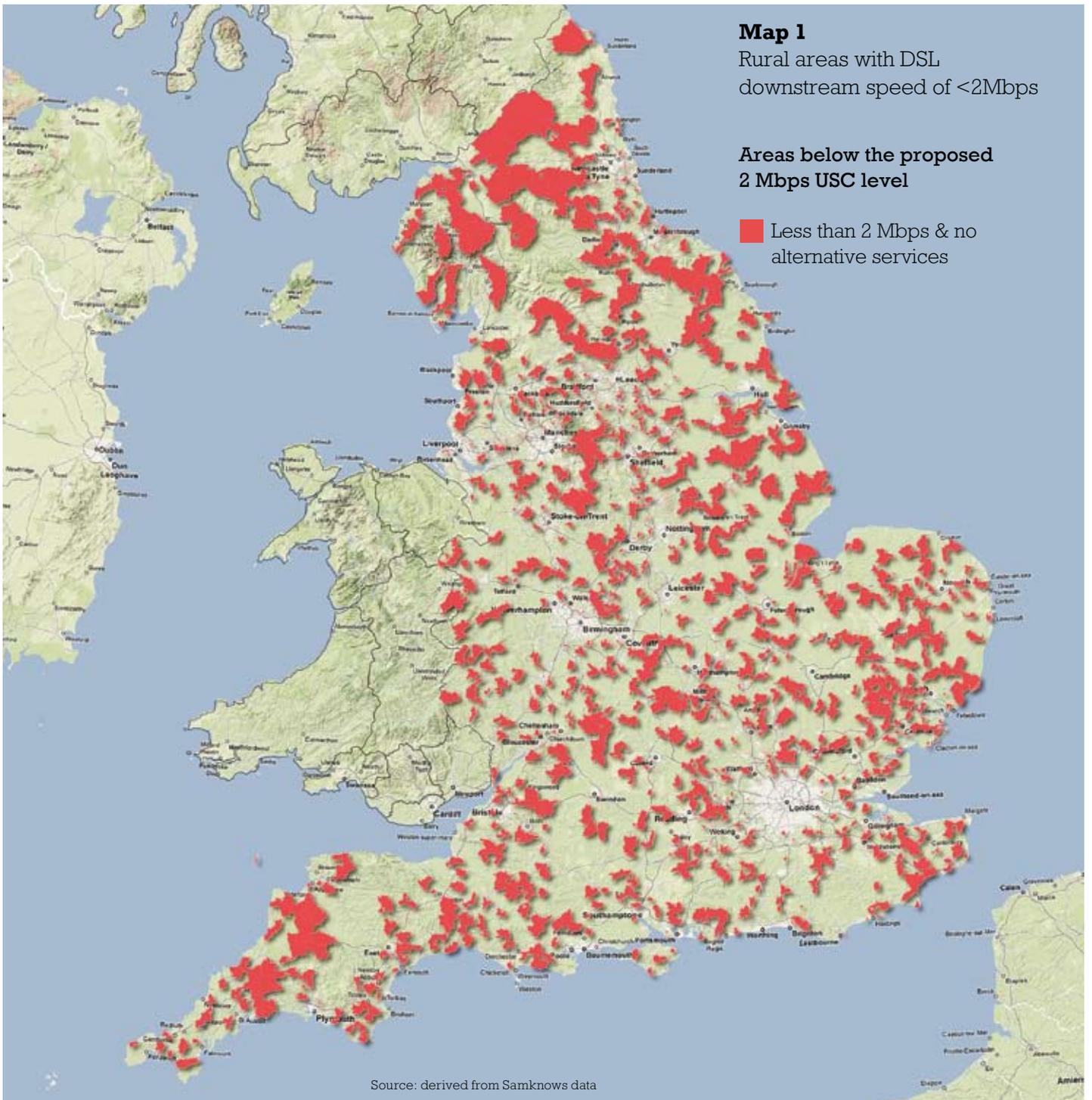
Source: derived from Samknows data

In the following table, we show the ADSL speeds available in different areas
using the Ordnance Survey definitions for 'morphologies'; the ONS definition
for 'urban' includes all communities with more than 10,000 people and 'town'
refers to smaller market towns, with 'rural' representing hamlets and more
dispersed communities.

Table 2
ADSL speeds

	Urban > 10k	Rural Town	Rural (Other)
0 kbps	2.8%	3.8%	4.1%
250 kbps	0.0%	0.6%	4.5%
500 kbps	0.8%	2.6%	8.8%
1,000 kbps	0.7%	1.5%	4.0%
1,500 kbps	0.9%	1.9%	5.0%
2,000 kbps	1.1%	1.7%	3.6%
2,500 kbps	1.2%	1.6%	3.7%
3,000 kbps	5.9%	5.9%	11.0%
3,500 kbps	5.3%	4.1%	6.9%
4,000 kbps	8.3%	4.4%	7.4%
4,500 kbps	8.4%	4.3%	6.1%
5,000 kbps	12.1%	5.2%	6.6%
5,500 kbps	14.6%	7.2%	7.0%
6,000 kbps	15.7%	11.0%	5.7%
6,500 kbps	22.3%	44.1%	15.5%

□ 21% of those in rural areas are unlikely to receive speeds to support the USC

We can see that the issue for the USC is not just in the 'not-spots' but also in areas that have existing broadband services. The following table highlights the number of households affected using ONS definitions of household types.

Table 3
Table of potential USC problems

	Urban > 10k	Rural Town	Rural (Other)
Affluent Urban Commuter	4%	6%	15%
Blue Collar Urban Families	4%	14%	25%
Countryside Communities	14%	15%	27%
Educational Centres	6%	0%	100%
Farming and Forestry	16%	19%	34%
Mature City Professionals	3%	0%	0%
Mature Urban Households	5%	9%	30%
Multicultural Inner City	3%	N/A	N/A
Multicultural Suburbia	2%	N/A	N/A
Multicultural Urban	1%	N/A	N/A
Resorts and Retirement	4%	3%	100%
Rural Economies	10%	11%	30%
Small Town Communities	3%	4%	30%
Struggling Urban Families	6%	0%	N/A
Suburbia	3%	13%	N/A
Urban Commuter	5%	13%	12%
Urban Terracing	4%	10%	25%
Well off Mature Households	4%	7%	17%
Young City Professionals	4%	N/A	N/A
Young Urban Families	6%	19%	22%

While the cohort for some of these classifications is small in rural areas, the models suggest that as many as 460,000 homes in areas classified as ''Rural Economies'' and a further 128,000 homes in ''Farming and Forestry'' areas will fall below the USC levels. In addition, as many as 133,000 rural homes outside of these groups that might otherwise be considered candidates for home working as an alternative to commuting may also not be able to receive the level of broadband necessary to consider working from home. In contrast just 4% of urban homes will suffer the same fate.

Prospects for USC based on mobile or wireless infrastructure

A USC based on mobile or wireless infrastructure offers some opportunities to extend services to rural areas and it may be less expensive to implement than using wired connections. We see two main modes of operation:

- Using mobile (or perhaps wireless) infrastructure as a replacement for landline connections. Mobile broadband services offered by all the major mobile providers using data cards or 'dongles'. Using these with a home PC or perhaps a home router could provide broadband access. Wireless connections (using what is called Fixed Wireless Access technology) are being employed in some areas – the Bristol area and rural Kent for example.

- Accessing services over mobile phones directly without using a PC. This could be attractive to some users especially as we know that some 20% of users in some areas do not have a landline and therefore cannot received fixed line broadband. These users are generally in deprived areas.

Fixed Wireless Access
In terms of Fixed Wireless Access (FWA), this has mostly (though not exclusively) been used to extend services into 'not-spots'. Large scale roll-out covering significant fractions of the rural areas which cannot receive USC quality services would entail building towers and linking these towers back to the core network (called 'backhaul'). On the face of it, this looks a difficult and complex problem given the likely distribution of potential users. Placing additional FWA antennas on existing mobile base-station towers is one possibility – this would require a degree of infrastructure sharing and cooperation between mobile operators which currently appears to be problematic. There is also the issue of the connections from mobile base station towers back to the core network to consider (see below).

Mobile infrastructure
We consider that looking to use some elements of the existing mobile phone infrastructure to offer USC level services is worthy of detailed consideration. The Digital Britain interim report mentions using wireless spectrum to help achieve the USC. For our part, the CRC highlight four areas for further consideration:

- **Spectrum**. If mobile broadband services are to become a long-term solution to the rural broadband problem then the issues surrounding so-called 4G services based on Long Term Evolution (LTE) and the associated spectrum issues need to be explored further;

- **Coverage in rural areas**. While 3G services are promoted as ''up to 7.2Mbps'' evidence shows that it is unusual to experience anything approaching this even in more urban environments. In many rural areas, especially forestry and farming areas which feature so strongly in the USC data, mobile services are patchier and data rates considerably lower, if indeed they exist.

- **Backhaul from mobile base stations**. It is our understanding that mobile base stations are typically provisioned with 2-8 Mbps backhaul, often multi-sectored (meaning that the available bandwidth is shared widely in the area of the base station). In rural areas, the connection from the base station to the network is often based on microwave links. So if the USC is to be implemented using the mobile networks it would be necessary to understand how the connection from the base station to the network can be scaled-up to deliver acceptable service quality.

- **Costs to users and download limits**. Many 3G broadband packages are based on low transfer allowances and high per-Megabit fees for excess use. If mobile broadband is to become a practical solution for rural communities then packages with similar transfer allowances to ADSL and cable broadband packages will be essential.

Prospects for USC based on satellite connections

Satellite-based broadband was the mainstay of many early community broadband services; almost any location, which can see the southern sky, is likely to be able to receive a satellite service. While satellite services were typically less expensive than alternatives such as private leased lines, cost was still a key barrier. Regional government programmes such as the Rabbit grant scheme provided some initial subsidy, which rural communities often pooled together to build local wireless networks to share the running costs. While the subscription costs have reduced significantly, albeit still at a premium over alternatives, the cost of installation is still much higher than terrestrial broadband options with costs often in excess of £600.

The broader issues with satellite services, however, are technical. Typically, satellite broadband uses geostationary satellites, which hover high above the equator. Even at the speed of light, a pulse of radio waves leaving a dish in the UK bouncing off the satellite and returning to earth where it can join the internet will take around a quarter of a second. In practice other overheads are likely to result in a minimum round-trip delay of at least half a second, possibly rising to over a second.

This delay, or latency, can create problems with internet applications. While email and downloading files are likely to perform largely as expected (once the transfer of information starts), traditional web surfing has a delay before the images appear but will then often download very quickly. This delay doesn't lend itself to Web 2.0 applications such as ''software as a service'' models which are becoming increasingly common especially among SMEs. Using centrally provided software on a 'rental' model is increasingly popular in saving cost and increasing

flexibility; common examples include Google Docs and Salesforce.com. A further issue is that applications which involve exchanging information in real-time, such as secure connections to e-commerce sites and VPN tunnels, and two-way multimedia applications like telephony, video-conferencing or online gaming are also not well supported by satellite technology. For these reasons, satellite-based broadband can at best be considered an inconsistent ''stop-gap'' solution.

The view from 2012

Let's imagine that the USC of 2 Mbps has been implemented. Will this provide sufficient bandwidth and service quality for rural users? While the USC may be sufficient to access public services individually – users and rural businesses often use the network simultaneously for multiple tasks.

New services and innovations which change the way we live and work are constantly emerging e.g. BBC iPlayer, YouTube and online banking. New services will require more capacity, and that will put greater strain on the existing broadband network in rural areas. BT and Virgin Media are aiming to deliver better broadband connections in urban areas, but these companies believe that the investment case in rural areas is not good enough. The Digital Britain interim report has called for UK wide coverage of up to 2Mbps by 2012, but by then many users in urban areas will already have very high speed services and estimates are that 70% of the country will have 50Mbps by 2015, again, predominantly in urban areas.

Public services will continue to expand – for example, Business Link aims to have:

- training and examples of 'how to' video case studies on businesslink. gov.uk;
- plans to pilot face-over-the-web services, as a potential alternative to face-to-face meetings; and
- businesslink.gov.uk becoming the online channel for government campaigns (such as Real Help for Business Now, and Tax Help from HMRC), with increasing use of video as part of these campaigns.

Offering services over mobile phones is a challenge both to industry and government. While all mobile phones operate to the same transmission standards, there are many different types of user interfaces and different ways of using the devices to access content. There will also be the need to coordinate a common set of standards for public services to be available over mobile devices.

The pressure will come when users try experiencing video consultations with medical staff from home, watching highlights of the Olympics on the BBC's iPlayer in HD and downloading videos of their children's lessons. These modernised services, while they may work (just) as single applications running on one PC connected to a USC connection, they are unlikely to provide a satisfactory user experience at all if a family tries to use their home network simultaneously or users in a rural business attempt multiple tasks such as videoconferencing while updating a large

database of customer requests. Those affected will be predominantly rural and disadvantaged neighbourhoods.

Numerous reports have been produced over the past 3 years examining the future needs of users for bandwidth. All the reports talk about the 'inexorable rise' of demand for bandwidth. In 2006, the Broadband Stakeholders Group (BSG) commissioned a report which examined 11 different scenarios based on household types and typical usage patterns[25]. Noting that the results are critically dependent on the extent of High Definition TV use, the report's conclusion was that:

'By 2012 household bandwidth demand reaches 23Mbps downstream and 14Mbps upstream, but 'time criticality' of applications means that 3Mbps upstream may be sufficient.'

Broadband Stakeholder Group

Also in 2006, researchers in Australia produced analysis ''Quantifying the Broadband Access Bandwidth Demands of Typical Home Users''[26]. They used household scenarios based on existing technologies to examine demand; considering what reductions in demand for bandwidth might be enabled by improvements in compression technology. They concluded that a household of five people requires between 58 and 113 Mbps if bandwidth is managed on a per-application basis. The chart below shows how bandwidth use varies with the number of people in the household:

Table 4
Number of users / data rate

■ Pessimistic
■ Optimistic
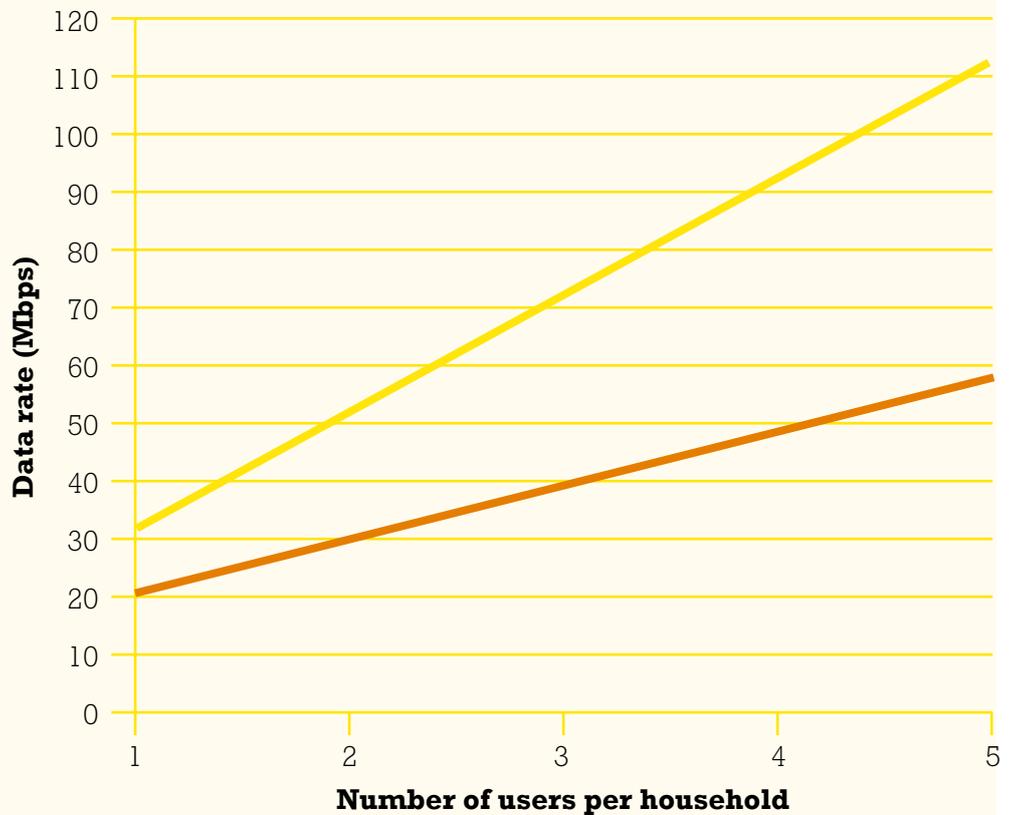
[25] ''Predicting Future UK Residential Bandwidth Requirements'', Broadband Stakeholders Group, 2006

[25] ''Quantifying the Broadband Access Bandwidth Demands of Typical Home Users'', Harrop W and Armitage G, Australian Telecommunication Networks & Applications Conference (ATNAC), Australia, December 2006, ISBN/ISSN 0977586103

We note the disparity between these expected bandwidth demand figures and the USC set at 2 Mbps. While we accept that 2 Mbps may be sufficient to access public services on a 'standalone' basis, the reality of internet use is that standalone access is not the norm and speeds in excess of the proposed USC would therefore be required.

The CRC believes that rural communities need and deserve broadband speeds which will support them now and equip them for the future. Rural communities do not deserve a stop gap solution.

6

Next Generation Access – now and in the future

Defining Next Generation Access

Before looking at where Next Generation Access services may be delivered now and in the future, it is worth considering what the term ''Next Generation Access'' (NGA) broadband might actually mean. There are three factors which are often discussed in relation to NGA:

- bandwidth;
- symmetry; and
- transformation.

There can be no doubt that for a service to be considered as NGA it must deliver higher bandwidth than today's broadband offerings, but alone it doesn't fully define NGA – few in the telecommunications industry would consider ADSL2+ as a next generation service yet it delivers higher bandwidth.

A more contentious aspect is that of symmetry, (which is the balance between upload and down load speeds). Today's broadband packages tend to offer considerably less bandwidth for up-loading to the internet than they do for downloading. We believe the advent of Web 2.0 services and interactive multimedia applications requires a closing of the gap between up- and down-loading speeds but not all industry experts would agree that total symmetry is required.

The final aspect, and one which we believe has a greater bearing on rural communities, is transformation. By this we mean that some technologies may fundamentally change relationships and the way services are delivered. Both fibre-optic broadband and the 4G mobile technology LTE have these characteristics. For example, neither fibre nor LTE inherently support voice services; instead they require a Voiceover IP (VoIP) application. This has regulatory, technical and user aspects which need to be resolved ahead of widespread deployments.

Secondly we understand that the investment in many true NGA networks, as opposed to simply ''superfast broadband'', requires fundamentally different business models from today's shorter technology investment models. When investing in a fibre-optic network it is necessary to consider a long-term business model and this is something which traditional telecommunications companies in the UK appear to find difficult to justify.

Where are the 'not spots' for Next Generation Access?

CRC has employed Community Broadband Network's modelling tools to estimate the 'mean distance between neighbours' as a proxy for the cost of deploying NGA broadband – the greater the distance between neighbours (see Map 2), the greater the cost of the civil engineering works to install fibre-optic cables, for example. We believe there is also likely to be a correlation between this 'mean distance' and the effectiveness of fibre-to-the-cabinet deployments such as BT's programme; many rural areas may not have the necessary street cabinets, and the greater distance between homes means that VDSL technology will be less effective in delivering higher speed services.
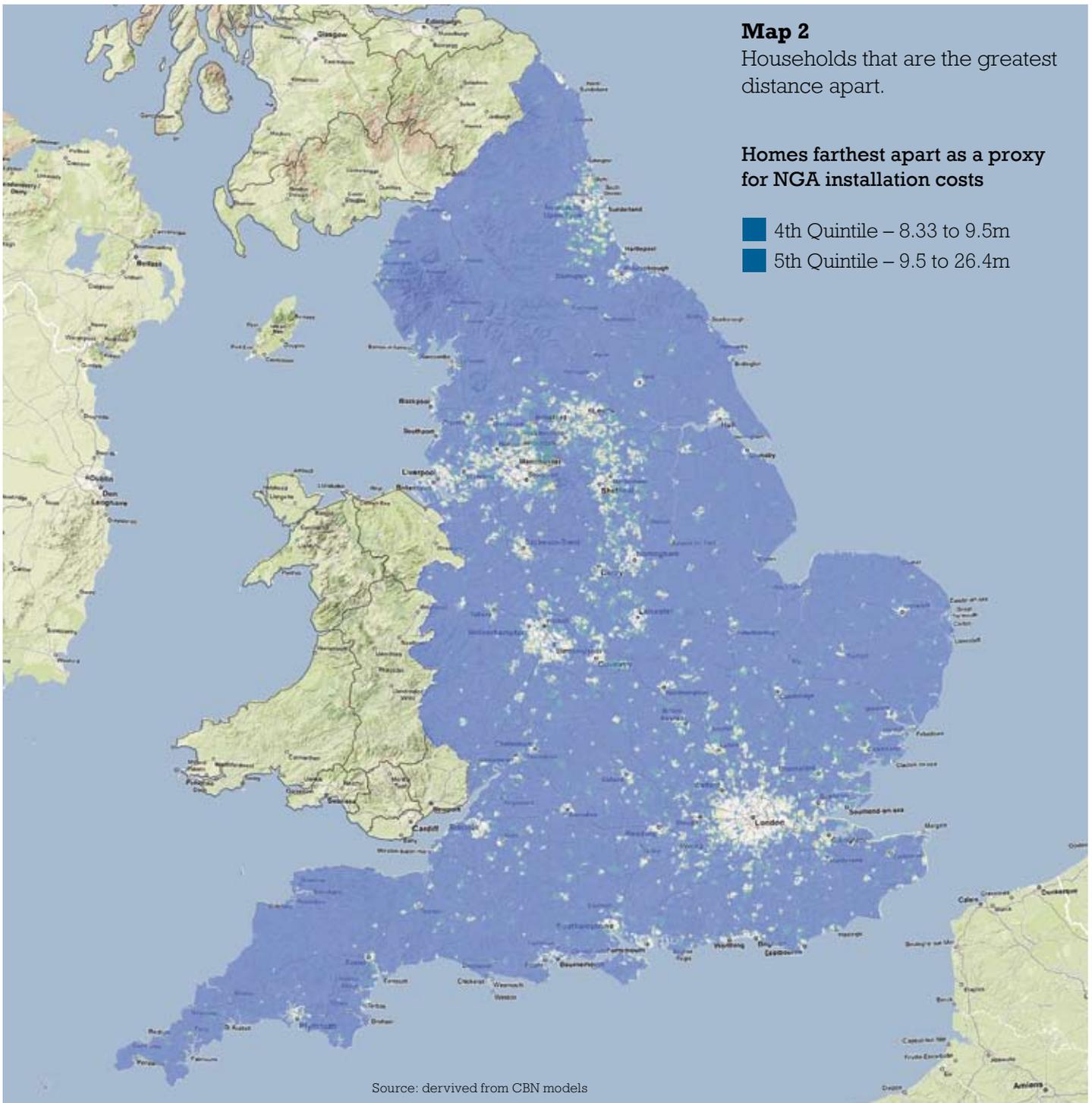
Map 2
Households that are the greatest distance apart.

Homes farthest apart as a proxy for NGA installation costs

◼ 4th Quintile – 8.33 to 9.5m
◼ 5th Quintile – 9.5 to 26.4m

Source: dervived from CBN models

Unsurprisingly, when this data is mapped it highlights that the 60% living in areas most likely to see next generation broadband investments are almost exclusively in deeply urban areas; geographically tightly focused and densely populated areas.

We estimate that on average 'rural' homes as defined by the ONS are 30% farther apart than 'urban' homes, and therefore at least 30% more expensive to reach with true NGA services.

Focusing on urban areas allows traditional operators to reach contiguous high population areas, creating large-scale ''islands of connectivity'' without considering, in the short term at least, how they join the islands together to achieve a seamless national market. This approach in more

rural areas will result in sub-scale islands of connectivity, requiring a different approach which fosters a joined up ''patchwork quilt'' from the outset; something we believe the larger urban schemes will need to address in the future if the market for services is to develop.

While it is true that urban areas are likely to see ''superfast'' broadband first, it is the rural areas which will need to solve the NGA transformational issues soonest if business and homes are to be receive services which keep pace with their urban counterparts, regardless of whether the solution is based on fibre or wireless.

Map 3
Broadband speeds across
England

Predicted ADSL Speeds

- Up to 2Mbps
- 2 to 4 Mbps
- 4 to 6 Mbps
- More than 6 Mbps
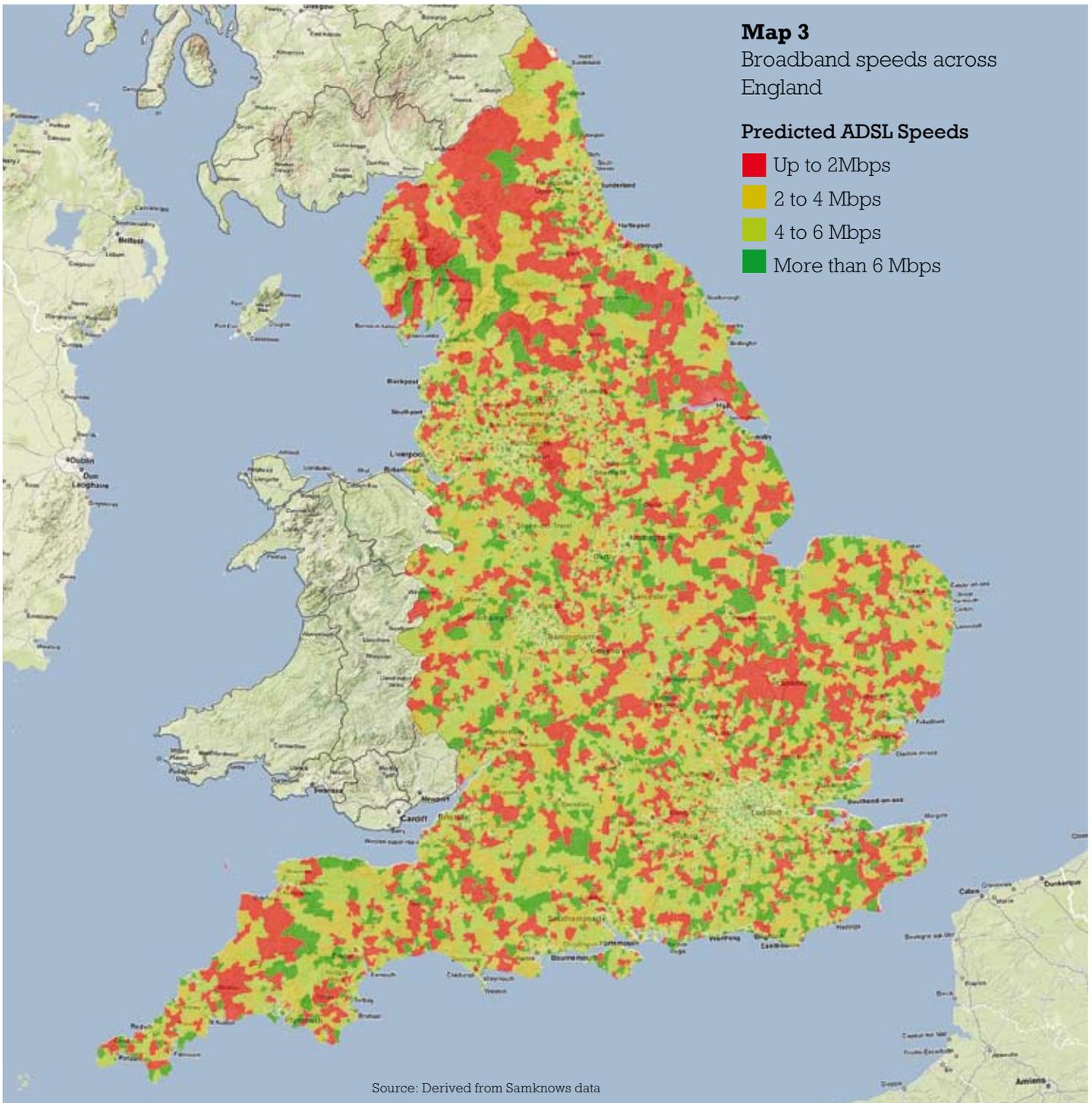
Source: Derived from Samknows data

Less haste more speed

In the next few years, residents and businesses in rural areas will rely far more on high speed internet than they do now to maintain their full potential. However, the signs are that these services will not be available in rural areas and, as a result, people will either fail to maintain that potential or move to urban areas.

This could be positive for some market towns which are big enough to attract investment in next generation broadband. A pattern will emerge as business ''follows the bandwidth''.

Map 4
Number of infrastructure
competitors by area. Local Loop
Unbundling with 4 competitors
with locations of market towns

Ofcom Market Classifications

■ Only BT ADSL services
available

■ 2 to 3 operators including BT

■ 4 or more operators

Source: Derived from Samknows data
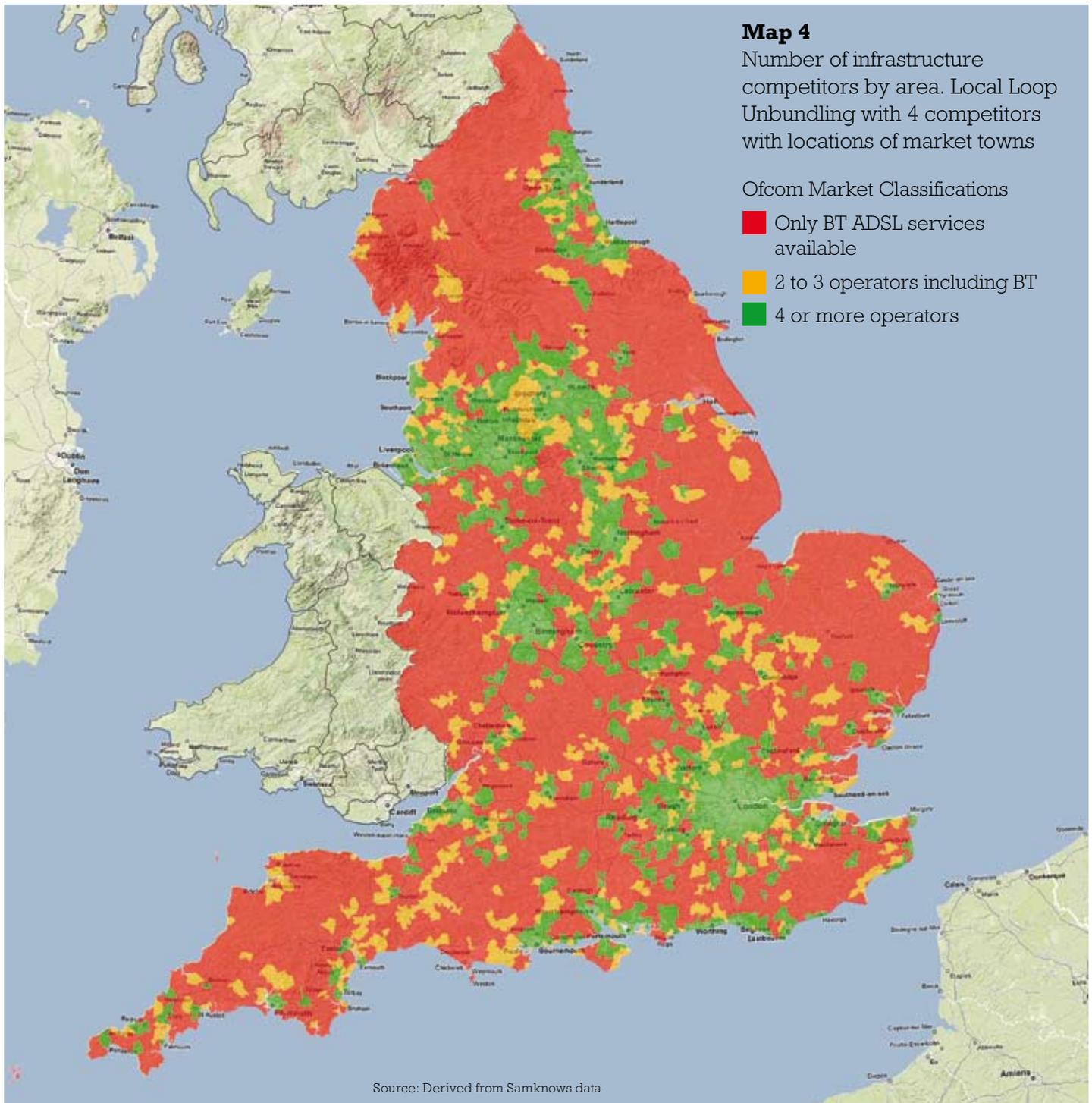
Rural communities out in the cold

When other internet service providers were allowed to use BT"s network
to increase choice for consumers, virtually all chose urban locations.
Map 4 shows how rural towns and villages were left out in the cold.

Ofcom research shows that offers of ''free broadband'' therefore failed
to reach rural residents but take up still kept pace with urban areas[27]. In
fact the take-up rate in rural areas for the first time surpassed that of the
urban areas. It can be argued that this trend is part of a wider economic
development where those living in rural areas are in need to be better
connected and stay informed.

[27] Ofcom Nations and Regions Report 2008
www.ofcom.org.uk/research/cm/cmrnr08/

Investment priorities for rural areas. The Caio review

The Caio review into the barriers to investment in NGA was commissioned in 2008 by BERR Minister Baroness Shriti Vadera on the advice of the Prime Minister. Francesco Caio was formerly CEO of Cable and Wireless and prior to that held senior positions in the Italian telecommunications industry.

The main conclusion of the Caio review is that:

''In the short term, the case for a major Government intervention is weak...but government should act now to support investment in NGA.''

These seemingly contradictory conclusions are squared if one considers the broader political context. Analysis Mason estimate the costs of NGA roll out at between £5billion (FTTC) and £29billion (FTTH). These are very large numbers, significantly in excess of any currently palatable levels of universal public subsidy.

The CRC welcomes the Caio review's recommendations, in particular, that the government sets out a framework for NGA delivery – explicitly including the adoption of open access models (particularly where public subsidy is made available), and encouraging the development of local projects 'provided they comply to access standards of interoperability and open access'. Also the recommendations that the government aims to create a stimulus for the upgrade of the access infrastructure; facilitate NGA implementation by removing uncertainties and lowering build out costs; and 'create conditions that favour the development of new investment models'. This latter recommendation is aimed specifically at local projects. It recommends 'establishing standards for local NGA developments' to create a technical and business framework for local projects.

The appetite to invest in the communications infrastructure for Next Generation Broadband access in rural areas has decreased as finance has become harder to obtain. However, demand for faster services has continued to increase – BT has committed to invest £1.5 billion in urban areas to improve connection speeds. A figure of £30 billion has been quoted by the Broadband Stakeholder Group (BSG) to connect all of the country with fibre to the premises.

Network Rail is currently building a fibre optic network around the railways of Britain. There is an opportunity to use spare capacity to deliver high bandwidth services to rural stations.

Rural dwellers can pay a premium for faster services – Sky Broadband is available in urban areas but rural residents typically pay £12 more for the service per month.[28]

The Digital Britain interim report calls for the coordination of local and regional action, further building on the recommendations in the Caio review.

[28] http://packages.sky.com/surf - Sky Broadband Connect costs £17 / month in non Sky Broadband areas but £5 / month for Sky Broadband Base in areas covered by their network.

7

NGA in rural areas – putting it into practice

The models developed for this report indicate that 813,000 rural homes may not be able to receive a 2 Mbps service. It seems unlikely that a conventional 'market' solution will deliver for these customers. We have considered, what the implications might be of enabling next generation access. In this section, we provide some thinking on the issues.

The BSG estimates that the cost of providing NGA to all of the UK's 25million buildings is £30 billion. This equates to £1,200 per building. Assuming a mean cost of £2,000 per home as a premium over the BSG number indicates a working cost of approximately £1.6 billion to provide NGA services to rural communities who cannot benefit from the USC.

Investment models

The following points are key to financing NGA in rural areas:

- The Community Broadband Network (CBN) has undertaken work for the East of England Development Agency examining new models of 'community trust' or 'community bond' investment vehicles. If, for example, 30% of a local community's households become 'founders' investing, say £2,000 per household these resources could be leveraged to enable additional investments.

- Carbon credits paid for journeys saved by residents and businesses carrying out activities on-line rather than face-to-face. e.g. having shopping delivered rather than driving to the supermarket, or online video conferences rather than travel to business meetings. Buying, selling or exchanging goods on the internet can also encourage waste prevention and re-use of products so substituting for new products and producing environmental gains and reducing waste which could also be included in the calculation. These could be measured and the carbon ''saved'' sold to businesses to offset their own carbon footprint. The revenue generated could be invested in NGA.

- The business model for the networks is developed on a long-term utility model.

- National Endowment for Science Technology and the Arts (NESTA) proposes that the government could loan the money to broadband companies. That borrowing could be repaid in later years by a universal broadband levy on the communications and media industries.

This thinking leads to the following financial structure:

Table 5

Investor	Finance (£m)
Local community founder investors: 20% of 813,000 households invest £2,000	480
Carbon Credits (say)	100
Long term loans (EIB?)	513
Government bond (repayable over 10 years)	500
Total	1,603

Obviously the business models for these locally-driven networks would need careful structuring to be viable.

Government can help to deliver Next Generation Access by finding new ways of working with communities, focusing on taking steps to reduce the cost of ''middle mile'' connections which often place punitive costs on operators keen to deliver new services in rural areas; possibly by:

- Using existing public sector investment in broadband (services into schools, hospitals and council offices) to reduce the cost of services to communities (case study 4.8).
- Self-help schemes where work can be carried out by local people ('dig where you live').
- Providing support to rural entrepreneurs to establish Next Generation Access.
- Providing a framework for local initiatives to work on common standards.
- Good practice guidance about models of delivery and steps to take, which would help other communities towards self-help.

Rural communities can help too
Third sector organisations are transforming the delivery of services in rural areas through projects to provide advice, support and services to rural residents. Broadband is the foundation for these services. By working innovatively with the public sector, third sector organisations are supporting the delivery of transformational government in rural areas, but in some areas this is not possible due to poor broadband infrastructure.

Locally managed projects can deliver services more cost effectively, building on local knowledge and skills within communities. Evidence shows that they can tap into community finance and secure higher take up of these services. Cybermoor in Cumbria has 30% of households connected to its service and is currently upgrading its network to offer fibre to the home and telehealth services to residents. South Witham Broadband provides broadband with a local support service to reach customers who would not normally get a connection through their landline. These community and locally based initiatives have shown that locally derived solutions can go a long way towards solving the problem.

Case study 12

Information Advice Support Services

Information Advice Support Services (www.ia-ss.co.uk) delivers legal advice and other services via video links to residents in rural Oxfordshire. The video link provides residents with a face-to-face consultation on services as diverse as debt counselling and job seeking. Existing broadband services allow the service to be delivered throughout the county but it could potentially increase to cover the whole country. ''The barriers exist with organisations which are providing advice, initially they are sceptical about the benefits.'' says Marlan Higgins. The project has just doubled its number of access points and expects to see a growth in numbers of residents using the service.

Healthcare services

Transforming healthcare delivery in rural areas can improve access to services for patients and reduce costs for the taxpayer. Current services allow patients to book repeat prescriptions and GP appointments online. In Scotland, video links between community hospitals, allow consultants to do their ward rounds in a hospital and then carry out video consultations with patients remotely.

Healthcare providers in rural areas will come under increasing pressure over the next 20 years as the ageing population will require more services from the NHS. At the same time, patients have increasing expectations about the services they will receive. Telehealth services, allowing home monitoring of conditions enables patients to leave hospital early. The potential exists to save journeys to hospitals and prioritise staff time so that medical staff look after those patients who really need support. The most remote, and potentially most costly patients to reach, will be unable to access these services without suitable broadband connections.

There is a movement to deliver services remotely. This clearly demonstrates the massive potential that government departments recognise in delivering services online. Rural residents and businesses also want to reap the benefits of accessing these services, and are constrained in many cases by poor bandwidth.

Case study 13

NGA in a rural market town

Alston Moor is located high in the North Pennines and has a community hospital and secondary school a few yards from one another. Both the local NHS Trust and education department are upgrading the broadband connections into their premises at a cost several thousand pounds each. They are prevented from purchasing a single link and sharing capacity by centrally adopted management and cultural restrictions rather than technical barriers. A link could also be shared with the community to provide greater bandwidth to residents and businesses. Greater trust and joined up thinking at higher levels in education and health could save the taxpayer significant amounts. While there is obviously a requirement to maintain the security of data, there is also a requirement for government departments to identify how they can make savings by sharing services.

One solution being developed is to set up a social enterprise to deliver 'dark fibre 'connections to each organisation, asking each organisation for a capital fee to cover the cost of installing the fibre and a low maintenance fee. This has a low ongoing revenue cost after a high initial capital contribution from the public sector. It will offer sufficient bandwidth for the next 20 years and reduce the cost of service delivery on Alston Moor.

Local media

Local newspapers play a vital part in the life of rural communities, providing news, information on events and comment on issues facing an area. The rapid structural changes in the news media caused by falling advertising revenues and increased competition from news websites is directly affecting rural areas.

Case study 14

CN Media Group in Cumbria

The group is establishing local websites which publish content derived from local people acting as ''citizen journalists''. They use their basic journalism training and low-cost digital cameras to post stories to the local website in exchange for a proportion of the advertising derived from the site.

When asked to place a value on 'local news' in rural Cumbria during a focus group for CN Group, most respondents said they would pay between £1 and £1.50 per week. The BBC's Laughton Report[29] ascribed an average consumer value to local TV of £5; the average citizen value was £3. The key challenges to providing local news online in rural areas are:

- low populations and subsequent low advertising revenue;

- demographic profile with older people who prefer the experience of reading a newspaper than looking at news on a screen; and

- establishing new models of revenue generation to realise the amounts that people expect to pay (as above) for their news.

A potential solution brings together key stakeholders to provide local news and information in locally managed social enterprises. These would include local authorities, media groups, the BBC and be driven by the local community.

Next Generation Access – experiences of rural areas in other countries

Rural broadband in other countries provides a useful contrasting picture to the issues we see above. In this section, we provide some case study examples of rural projects which involve very high speed broadband services based on optical fibre infrastructure:

- Nuenen in the Netherlands where a small market town implemented a fibre network covering nearly 90% of 7,500 households, making the town the 'most connected place on the planet'.

- Skellefteå in Sweden where a municipally owned network serves 80% of a population density of only 10 people per sq km.

- East Central Vermont in the USA where 22 towns are cooperating on the development of ECFiber providing services to rural communities.

NGA in Nuenen in the Netherlands

Nuenen is a small market town not far from Eindhoven in the Netherlands. Close the Gap, a social enterprise, enabled fibre to the home provision for 8,000 households in Nuenen and achieved take up rates of 90%, making it the most 'connected' town in the world. The founder of the project, Kees Rovers, a local entrepreneur discovered that the key to getting people to commit and engage is not to discuss the technology but to focus on the people.

[29] www.bbc.co.uk/bbctrust/assets/files/pdf/consult/laughton_report_2006.pdf

Here the model followed a bottom-up approach in which residents were asked what it is they find important in their lives. For this community (which has a large proportion of elderly inhabitants) it was felt that healthcare, living longer in their own homes, security and safety, staying in touch with children and grandchildren and other social issues, were the most important aspects of their lives.

By explaining to this community how high speed broadband (without discussing technology) could enable and enhance quality of life issues, the vast majority of the residents bought into a shared ownership structure of broadband access called OnsNet which means ''Our Net''.

The network has a symmetrical speed of 100Mbps and offers 'triple play' (TV, telephony and internet) for much the same cost as the incumbent and other operators. However, in addition to standard services, the community run their own TV station, have started trials with healthcare applications and other services and have regular meetings in which they develop ideas for further applications and services most appropriate to their needs. There are a number of other 'unexpected' consequences of the Nuenen case which make it interesting to consider in the context of our rural areas[30]. The use of the network has been to promote interaction and social cohesion in the town:

Fitness and activity clubs (such as the Nordic walking now popular with elderly people in the Netherlands) use the network both to promote and record their events; through 'community reporters' using video available over the network;

Grandparents report that they use the high quality video services to 'keep in touch' with their grandchildren. Their children and grandchildren use the internet and other services when they visit. Anecdotal evidence suggests that visits become more likely and the grandparents get 'kudos' from their grandchildren. In the early phases of the project, some residents supported the OnsNet to help the community (they were keen on the TV service and telephony but did not intend to use the internet); latterly, more residents – particularly the elderly, are beginning to use the Internet services, particularly real time video;

The use of the network to provide support services ranging from mainstream healthcare services (such as the monitoring of heart patients and video consultations on diets for diabetics) through to voluntary groups (such as a video calling 'ring round' first thing in the morning run by older people) are increasingly used.

It is true that no one single service requires the full capacity of the fibre network as a number of visitors from the UK (particularly Ofcom) have noted. However this misses the point. The business model for OnsNet breaks even at about 30-40% take-up and this community has close to 90%. The network therefore makes a surplus which is retained in the community. In addition, the fact that the community owns the network means that new services and ideas can be tested *without any additional running costs*. This is a particularly attractive feature of community-owned network assets.

[30] Fieldwork undertaken by Brian Condon and Marit Hendriks of the Community Broadband Network in Nuenen during 2008

Skellefteå

Sweden is a world leader in broadband – always appearing near the top of any number of OECD tables despite its sparse population. Some 85% of the broadband projects are owned by some combination of regional utility companies and the municipalities.

Against the received wisdom, Lars Hedberg, a spokesman for Swedish fibre broadband schemes, cites the low population density as one of the reasons Sweden is a pioneer in fibre deployment. The reasoning behind this is the necessity for distance learning and eHealthcare in order for the country to function well.

Skellefteå is a community of around 70,000 people in the rural north of Sweden. With just 10 people per square kilometre, the area is more sparsely populated than England's most sparsely populated areas, yet 80% of the households are connected to a fibre–based service.

The project is a partnership between the community and SkeKraft; a municipal joint stock company and one of the largest energy companies in Sweden. One of the key factors in the success of the project is a sharing of the work between SkeKraft and the community.

Such a division of the effort and skills encourages the community to become involved in those elements they feel comfortable executing, while essentially outsourcing the specialist the more esoteric functions. Because the area is so large, 7,200 km^2, SkeKraft also provides the project co-ordination function.

This structure has kept the cost of connecting a home to around £2,500 – while still more than an urban norm, it is considerably less than the anticipated costs of a traditional network build. Customers pay an initial installation fee of £450 and a monthly subscription of around £10 per month for a 10 Mbps broadband service, and £13 for telephony and internet service.

There is also a mechanism for recognising further contributions both in kind and financially. Members of the community that are in a position to, for example, dig the trenches for their neighbours, are rewarded, encouraging active community engagement in the project with a safeguard against volunteer fatigue; this is a carefully balanced sustainable project.

Fibre in rural Vermont, USA – 'ECFiber'

There are approximately 35 municipally owned fibre to the home networks in the USA, most of which are based on a single city or town. In Vermont, for example, Burlington Telecom is a municipally owned telecommunications network which began connecting customers in early 2006 and has over 4,000 customers. It is operationally cash-flow positive and expects to be profitable when it reaches 5,000 customers in 2009.

Vermont itself is a rural state, with an overall average of only 23 people per sq km. In East Central Vermont, where ECFiber began, population density is about 13 people per sq km. ECFiber is a grassroots community-based initiative, working to bring modern, affordable internet and telecommunications access to all residents, business, and institutions within the community. Over the past two years, volunteers from a growing list of towns in east-central Vermont (now twenty-two) investigated the various ways of responding to local demand for high-speed access. Having weighed all options, they concluded that a community-owned and operated fibre-optic network was the best solution, both technically and financially.

ECFiber has established a partnership with ValleyNet, a community-based non-profit organisation in White River Junction, Vermont, which has been serving local customers for years, to develop a business plan, secure financing, and build and operate the network.

The drivers for the initiative are rooted in the communities' awareness of the need to be included in the social and business advantages of very high speed broadband[31]:

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[31] Quotations from ECFiber's 'Tell Us Your Broadband-Divide Story, http://tinyurl.com/cs58yl

''We are at the point with broadband (and cell, land line, electricity, etc) where it no longer makes sense to do business in rural Vermont. Our customers are annoyed beyond the point of jokes about ''pulling tighter on the string to get a good signal''. The rural environment has lifestyle advantages, but the infrastructure handicaps are a severe impediment to doing business in Vermont.''

David in Vershire, USA

''I am a small business owner in rural Vermont. I run two web-based companies. Being a virtual company has allowed me to run my business in many ways that were not possible only a few years ago. With the current economic climate, sometimes I feel that I am one of the few businesses that are growing and hiring... or trying to.

We run our meetings with Skype and take advantage of their low cost telephone fees. We video conference and screen share with customers. We provide end user support through Gmail and training videos through Screencast.com and podcasts. By leveraging the web and the many tools now available I am able to run two world-wide businesses with employees, contractors and customers in several continents.

The web is accelerating the speed at which business is done around the world, but Vermont is getting left further and further behind. I only hope that a point won't be reached when ''catch up'' becomes impossible for our state. At that point, I might well be forced to move to a 1st world state just to grow my business.''

Barrie in Strafford, USA

''The ECFiber initiative is essential to stop the out-migration of young people from Vermont. Broadband is important to middle age people, but it is like air and water to young people. A Vermont without true high speed broadband will become a Vermont with not enough ambitious and productive young people.

Expansion of the first generation broadband (cable, DSL, satellite, cellphone-based) that is available in some parts of Vermont is a temporary stopgap measure. These approaches fall far short of what young people (and the employers of young people) want to do with the internet today and in the future. They should ask the advice of young people who grew up with DSL in their homes. These young people can see much more clearly. High speed broadband is certainly a part of their future, but just maybe, not here in Vermont. I wholeheartedly urge my representatives to fund and build the ECFiber system without delay.''

Paul in East Thetford, USA

8 Next steps

Recommendations

The CRC calls upon Government to lead the way in bridging the gap on Next Generation Access for rural areas. CRC offers support through its roles of rural watchdog, advocate and adviser.

We have set out our recommendations in the table below and indicated who we believe should lead on each.

Table 6

CRC recommendations and actions	Lead responsibility	Chapter
The CRC recommends that existing and future business incentives apply to digital technology and Infrastructure development. i.e. installing fibre optic cable should be an approved business expense and therefore tax deductable.	BIS and DCMS	3
The CRC would like to ensure that investments made through FE/ HE colleges, publicly-funded private training providers and Job Centre Plus are rural proofed to ensure that these meet the needs of rural employers, employees and would-be employees. The CRC recommends that where possible e-learning support for SMEs and vocational studies should provide support for access to digital technologies e.g. laptops on loan, broadband discount grants for infrastructure development. This will reduce the technological barriers to distance and on the job learning.	BIS, DWP and the UK Commission for Employment and Skills (UKCES)	3
CRC recommends DCSF enable the opportunity for rural primary and secondary schools to offer broadband opportunities to the wider community.	DCSF	3
CRC recommends all service funding, planning and delivery plans to be rural proofed in order to address the needs of rural communities.	All Government Departments	3
CRC would like to see where appropriate a significant proportion of all new rural housing being designed and equipped to enable home working. We are encouraged to see the new PPS4 (currently under consultation) recognises that new ways of working such as live/work or the use of residential properties for home working have an impact upon spatial planning which should be considered when planning for economic development.	CLG	3
CRC recommend that new developments have the ability to access NGA and communications provision is identified in any local plans.	BIS, DCMS and CLG	4
CRC recommend that alternative investment models for rural areas should be explored and adopted.	BIS, DCMS and the Treasury Supported by Community Broadband Network	4
The CRC wants to see more support for communities to help themselves in delivering their own solutions to digital technology challenges. We would wish to see a comprehensive support network for community broadband networks including practical advice and guidance to help communities deliver their own local solutions by setting up community broadband networks.	CRC offers to take the lead in developing this recommendation for rural areas	4
CRC recommends that the Government regularly monitors the level at which the Universal Service Commitment is set to ensure it keeps pace with the fast pace of demand for bandwidth, and that appropriate action is taken to ensure rural areas reach this standard.	BIS and DCMS	4

Table 6 (continued)

CRC recommends that the digital champion role is rural proofed to ensure a clear remit to tackle the rural digital divide. CRC fully supports the regional Digital Inclusion Advisors and recommends that these positions are also rural proofed to ensure that rural needs are addressed.	CLG and the Digital Inclusion Action Plan team Supported by CRC	4
CRC recommends that new public sector online services should be designed equitably, so that rural service users are not disadvantaged by the speed of their internet connection. CRC recommends that the Government should initiate a full scale review of the barriers to delivering services equitably both now and in the future as new services are designed.	CLG	4

Glossary and acronyms

		Table 7
VPN	Virtual Private Network	VPNs are used to securely tunnel through a public network, allowing two locations – such as home and office – to communicate securely as if they were directly connected. VPNs are key technology to allow home working.
DSL	Digital Subscriber Line	DSL is a family of technologies which deliver broadband internet connections over standard telephone lines by using a set of frequencies above human hearing. Because higher frequencies travel shorter distances than lower frequencies such as normal speech, DSL technologies have distance limitations.
ADSL	Asymmetric Digital Subscriber Line	ADSL is the most widely deployed member of the DSL family today and includes the broadband services from BT. The asymmetry stems from ADSL supporting a greater download speed than upload. Over short distances, ADSL can support up 8Mbps for downloading but is limited to no more than 1Mbps for uploading to the internet. As with all DSL technologies, ADSL has distance limitations so customers further from the exchange will experience slower speeds than those nearer. In the UK the average ADSL speed is now approximately 4Mbps.
ADSL2+	Asymmetric Digital Subscriber Line version 2+	ADSL2+ is the more recent version of ADSL broadband technology. Over short distances ADSL2+ can provide data speeds of up to 24 Mbps for downloading and 1.4 Mbps for uploading; in practice few if any customers will experience the headline speed but in many cases will provide a performance improvement. In the UK a number of network operators are deploying ADSL2+ such as O2 and Sky, and BT has begun an upgrade programme as part of their 21CN project (21st Century Network).
ONS	Office of National Statistics	The ONS is the independent body responsible for collating and publishing statistics relating to the UK economy and society.
LSOA	Lower Super Output Area	LSOAs are small geographical areas defined and used by the ONS for calculating statistics in a consistent way. Each LSOA has between 1,000 and 1,500 residents.
DACS	Digital Access Carrier System	DACS is a technology used by BT in more rural communities where there is insufficient capacity from a community to the telephone exchange. DACS is used to combine two phone services onto a single phone line. While this technology provided an economical solution for voice-grade services it does not support broadband. Although Ofcom requires BT to make reasonable steps to remove the technology when a customer requests broadband, the regulator falls short of mandating them.
LTE	Long Term Evolution	LTE is the main candidate to become the fourth generation (4G) mobile phone technology. Unlike today's 3G services, LTE is an IP-only broadband data service which can potentially deliver up to 1,000 Mbps when the technology is ready to be deployed in the coming years. To support voice communications LTE will require a ''Voice-over-IP'' (VoIP) application on the handset to provide traditional telephony services.
	Transfer allowance	The unmetered amount of data a customer is allowed to send and receive using their broadband connection. Once this initial allowance is used up, mobile operators typically enforce a high per megabyte excess charge. Typical mobile broadband allowances are lower than terrestrial broadband allowances, so it is not usually economically viable to use a mobile broadband service as a direct replacement for a traditional terrestrial broadband service.

Table 7 (continued)

Rabbit	Rabbit grant scheme	Rabbit was an approximated acronym for ''Remote Area Broadband Inclusion Trial'', and was a grant programme for small businesses of up to £700 towards the cost of a satellite broadband service in areas where ADSL broadband was unavailable. The programme was run by a number of Regional Development Agencies but in no longer in operation. Examples can be found on Worcestershire County Council's and Stafford Borough Council's websites: **www.worcestershire.gov.uk/home/wccindex/wcc-ibs/wcc-broadband/wcc-broadband-rabbit.htm** **www.staffordbc.gov.uk/static/page5723.htm**
SaaS	Software as a Service	SaaS is where software is hosted on the internet rather than on your computer. The most common examples are GoogleDocs, which provide office applications via a web browser, and Salesforce.com, which provides customer relationship and sales tools through a browser. SaaS is becoming a more common and popular way for smaller businesses and individuals to access applications which they would otherwise need to buy and install on their own computers, lowering the technical literacy requirements, reducing the costs, while holding data remotely where is can be accessed from anywhere and can be backed up on a professional data centre. It is a particularly good was for smaller companies to access software solutions that might previously have only been available to large organisations – such as customer relationship tools.

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