INCA

the independent networks cooperative association

Beyond Broadband

How our communities can get the digital networks they need

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FOREWORD

Broadband has transformed the way that many of us live, work and play. In the words of the Digital Britain report: "We are at a tipping point in relation to the online world. It is moving from conferring advantage on those who are in it to conferring active disadvantage on those who are without."

Yet many people live in parts of the UK where broadband still isn't available or cannot deliver the performance they need to become fully engaged online. And already many countries are moving on to the next level – broadband over optical fibre – to enable video-rich applications and entertainment, to facilitate small businesses and home working, and to support multiple users in each household.

The UK has been slow to deploy next-generation access and fibre-to-the-home. As a country we do not feature in the FTTH Rankings – a league table of nations where at least 1% of households subscribe to broadband over fibre connections. Indeed, analysts estimate that the UK lags the leading fibre nations like Japan and Sweden by at least five years.

The cost of delivering next-generation access is high and reaching 100% coverage is currently beyond the scope of the major private sector players. This means that without co-ordinated regional and local action, many areas will be left without high-speed broadband for many years to come.

INCA's vision is to achieve 100% coverage as quickly as possible, nobody left behind To get there, particularly in areas where commercial operators are less likely to invest, INCA advocates a partnership approach that brings together public, private and community sectors to plan next-generation access regionally and locally. It is our belief that by working together, sharing knowledge and experience, we will facilitate investment, encourage innovation and speed up deployment to deliver a truly next-generation broadband Britain.

This booklet is an important part of the process of sharing knowledge and information. It was conceived as a companion document to the FTTH Business Guide, a publication from the FTTH Council Europe that offers practical advice on the business case for fibre-to-the-home. We believe it provides a good template for next-generation broadband project development.

The FTTH Business Guide analyses many of the high-level issues in fibre deployment, such as the major influences on income and expenditure, and their effect on the business plan. This booklet homes in on UK-specific issues, including public policy, industry stances, sources of guidance and information, and different project approaches – in other words, what works where.

Malcolm Corbett, CEO of the Independent Networks Co-operative Association

TECHNOLOGY PRIMER

Know your bits from your bytes

What is broadband?

When broadband first appeared in the UK in the late 1990s, it was characterised by two things: it was always on, allowing customers to surf the internet and make phone calls at the same time, and the speed of data transfer was faster than that of dial-up modems. Today the term broadband has become synonymous with always-on access to the internet, regardless of the technology used.

One caveat: although the term broadband is becoming increasingly diluted, it usually refers to the sort of affordable internet access offered to consumers and small businesses, not to the bespoke high-capacity internet connections for the enterprise market.

What is superfast broadband?

Superfast broadband originated as a marketing term without a strict definition, but Ofcom is now using it to describe broadband speeds greater than 24 Mbps. The significance of 24 Mbps is that this is currently the maximum possible speed for broadband over existing copper telephone lines.

What is next-generation access?

The majority of homes and small businesses in the UK currently receive broadband services through the access network that connects them to their local telephone exchange via a twisted-pair copper cable. The term next-generation access (NGA) describes a significant upgrade to the access network.

In NGA networks, some or all of the copper in the network has been replaced with fibre. Since fibre is capable of sustaining much higher data transmission speeds over longer distances than copper cable, NGA is the key enabler for faster broadband.

It is generally accepted that NGA includes fibre-rich infrastructure and technologies such as fibre-to-the-cabinet (FTTC), fibre-to-the-home or premises (FTTH/FTTP) and upgraded cable TV networks.

There has been some confusion about the difference between broadband and NGA. Broadband is a service that allows a connection to the internet; NGA is the physical cables and equipment to deliver the service.

Bandwidth, bits and bytes

The performance of a broadband connection is most often described by its speed, or bandwidth. This is the amount of digital data that can be transmitted in a given time, measured in bits per second. A bit is the smallest unit of information, either 0 or 1, in the digital language of computers.

Dial-up modems connected at 56 kilobits per second (kbps). Today the average download speed of broadband connections in the UK is nearly 100 times faster at 5.2 million bits per second (megabits per second or Mbps), according to a study carried out in May 2010 by Ofcom with technical partner Samknows.

The total quantity of data, like hard disk capacity, is measured in bytes rather than bits, where a byte equals eight bits. A typical email is just a few thousand bytes (kilobytes or kB), while standard quality BBC iPlayer requires a continuous 800 kbps of throughput; so watching a 30 minute programme would consume 180 million bytes (megabytes or MB) of data.

A number of internet service providers (ISPs) in the UK have introduced bandwidth allowances, which place an upper limit on the total amount of data consumed during the month, typically 10 billion bytes (gigabytes or GB) for any entry-level broadband account. Consumers exceeding their allowance may incur penalties, such as an additional surcharge on their bill or “throttling”, where the speed of the connection is reduced for a period.

A 10 GB data allowance will allow hundreds of hours of basic web browsing, but it is not particularly generous for streaming video. Future applications are likely to make heavier use of video. For example, streaming a little over eight minutes of HD-TV at 16 Mbps would consume a massive 1 GB.

Broadband technologies

ADSL (Asymmetric Digital Subscriber Line) is the technology used to provide the first-generation of broadband connections over existing copper telephone lines, and has been deployed on a mass scale around the world. Data is transmitted over the telephone line at frequencies that are too high for the human ear to hear. A DSL filter, known as a "splitter", fitted to the telephone socket inside the house breaks out the frequencies for voice from those used for data, and sends them to the correct piece of hardware (telephone or computer). At the other end of the line in the telephone exchange, a so-called a DSL Access Multiplexer (DSLAM) separates the voice and data traffic so that it can be carried over the phone company's separate voice and data networks.

ADSL, which is available in all but a handful of UK telephone exchanges, offers headline speeds of 8 Mbps. However, the speed a user actually receives depends on a number of factors related to the characteristics of copper phone lines. ADSL works best the shorter the distance from the telephone exchange to the customer premises. Other factors like the quality of the copper and connectors, aluminium cables in the network and line-sharing devices (DACS) also affect the service. Hence it is estimated that around 10% of homes and businesses cannot get a 2 Mbps service from their connection and around 166,000 cannot get any sort of ADSL broadband.

BT is in the process of rolling out 21CN (an abbreviation for 21st Century Network), which is long-term project to upgrade the core of the network so that it can carry both voice and data – for the simple reason that it is more efficient to manage one network rather than two. Related to this programme, BT is replacing DSLAMs in the exchanges with Multi Service Access Nodes (MSANs), which support ADSL2+.

ADSL2+ has a headline speed of 24 Mbps, which can represent a significant bandwidth boost for some. But, like all copper technologies, the speed of ADSL2+ depends on line quality and distance; beyond 3 km from the exchange there is no real speed advantage over ordinary ADSL. An estimated 50% of telephone lines are capable of speeds above 8 Mbps, with the majority remaining in the 8–12 Mbps bracket.

DEFINITIONS OF SPEED

Advertised speed is the speed that ISPs use to describe the packages they offer to consumers. They are usually expressed as "up to" speeds because they are only a guide to the speed the ISP can provide. Few subscribers (if any) can get the "up to" speed of service advertised, something that is the source of consumer dissatisfaction and much debate in the industry.

Line speed is usually the maximum speed a customer's telephone line can support, which depends on factors such as distance to the telephone exchange and line quality. The line speed will always be slightly higher than the speed the customer actually experiences because 10-15% of transmitted bits are protocol overheads for managing the connection.

Throughput speed is the actual speed a consumer experiences at any particular moment when they are connected to the internet. This figure is dependent on many factors, including the ISP's traffic management policy, the number of subscribers sharing the connection (contention), congestion across the core of the internet, and the speed of the target website's connection to the internet. Poor in-home wiring and old computer equipment can also reduce the throughput speed.

Fibre-to-the-cabinet (FTTC) boosts broadband speeds by shortening the distance from the electronic equipment to the customer. This involves laying fibre-optic cables to green street cabinets or their equivalent, which are typically located within a few hundred metres of the customer premises. MSANs installed in the street cabinet provide Very high-speed Digital Subscriber Line (VDSL2) connections over the remaining few hundred meters of telephone line.

VDSL2 as deployed in Europe has a theoretical maximum speed of 52 Mbps downstream and 16 Mbps up, but in order to receive the top speed, the user would need to be located next to the cabinet. Speed decreases rapidly with distances further from the equipment and at distances beyond 1 km VDSL2 offers

PERFECT SYMMETRY?

The majority of broadband services in the UK are designed to be asymmetric, which means that the bandwidth available for downloads (from the network to the user) is greater than that available for uploads (from the user to the network). ADSL, as the name indicates, is highly asymmetric, with most users experiencing sub-1 megabit upload speeds.

Historically, internet use has been dominated by downloads, but that is changing. Upload speed is becoming increasingly important as more people become creators of content, uploading photographs and video clips to social networking sites or sending large data files back to the office. Poor upload speeds also restricts the use of interactive services based on two-way video communication and cloud-based applications such as internet back-up, photo storage and software-as-a-service.

Upload speed is the key, rather than symmetry as an ideal. By way of an example, Cisco has recently launched a home telepresence product called Umi that allows people to place video calls from their television, which are carried over the internet. Cisco has gone to great efforts to create a high-quality user experience with efficient use of bandwidth – yet the standard product configuration still requires 3.5 Mbps of throughput in both directions.

It's worth emphasizing that this is not a fanciful product concept; this is a product available on the market today in the US – but one that, when it comes to the UK, will be beyond the reach of a large number of UK internet users.

ADSL-like performance. The average distance to from the street cabinet to the customer is around 300m, so the majority of end users can expect to see broadband speeds in the region of 25 Mbps with this approach. The service provided by VDSL2 is also susceptible to interference from neighbouring copper pairs, and so speeds can fall as more subscribers sign up.

Hybrid-Fibre Coaxial (HFC) is a term that describes the architecture of modern digital cable TV networks, which are similar to FTTC in terms of the amount of fibre in the network. Cable operators have already invested significant sums of money to install fibre up to the street cabinet, leaving a much shorter length of coaxial cable from the street cabinet to end users.

Unlike telephone lines, coaxial cable was designed to transmit high-frequency electrical signals so it can carry more information. Most of that information-carrying capacity is given over to TV channels; the amount allocated to broadband depends on the cable operators' equipment. In addition, the coaxial segment of the network contains amplifiers to boost the signal strength, so that the data rate is not affected by the length of cable.

Aside from the choice of service package, the main influence on the speed a customer actually receives is the fact that customers share the broadband channel on a section of coaxial cable. In the downstream direction, data is received by all cable modems; the modem decodes only the data addressed to it. As a result, data rates can drop off noticeably at busy times when lots of customers are using the network.

Fibre-to-the-home (FTTH) or Premises (FTTP) networks use fibre all the way to the customer's property, usually terminating at a box on the wall. Fibre can support much faster broadband speeds than either telephone lines or coaxial cable; the actual speed of the connection depends on the equipment at either end of the link.

FTTH network operators around the world are providing broadband services today at 50 Mbps, 100 Mbps and even 1 Gbps.

Gigabit Passive Optical Network (GPON) is a shared fibre technology. New optical fibres are installed in a point-to-multi-point configuration, with branches at one or more points in the network. PONs are termed "passive" because, unlike FTTC, they do not contain any electronic equipment between the telephone exchange and customer premises – instead they use "passive splitters" at the branching point(s) to share light across multiple fibres.

Point-to-point (P2P) networks provide a dedicated fibre to each end-user – hence they are also known as "home run" networks. This configuration offers high capacity both upstream and down; P2P FTTH is easier to upgrade than GPON because there is no equipment in the field (no electronics or passive splitters), and there is no fibre sharing so users can be upgraded individually.

What about wireless?

Fixed wireless and mobile broadband technologies such as Wi-Fi, WiMAX and LTE can also provide internet connectivity that would meet the current definition of superfast broadband.

Wi-Fi is an important technology for wireless transmission around the home, where it is specified at 54 Mbps over up to 30m, although actual throughput is lower. Wi-Fi equipment has to trade off speed to reach longer distances; long-range Wi-Fi services today typically offer 8-12 Mbps per user. "Wireless N" is a newer version of Wi-Fi that offers roughly double the reach of its predecessor, or up to six times the speed, although not at the same time.

WiMAX (an acronym for Worldwide Interoperability for Microwave Access) provides similar broadband performance to Wi-Fi, but across a wider geographical area, typically up to 10 km. Future versions of WiMAX will provide higher data rates over longer distances, but again not both at the same time. Several WiMAX pilot projects are currently underway in the UK.

LTE (Long Term Evolution) is the emerging fourth generation of mobile broadband, which can provide peak download speeds in excess of 100 Mbps per user. LTE services are currently being tested in the UK, but full-scale deployment is unlikely to begin until wireless spectrum is allocated; spectrum auctions have been delayed but should take place in 2011—12.

The role of mobile broadband is still being debated, but for the next few years at least it is expected to provide a niche solution – access to broadband on the move – rather than a direct substitute for fixed-line broadband. One reason for this is price – mobile broadband plans tend to be more expensive and have much lower usage allowances than fixed line broadband.

The technology hierarchy

INCA promotes the idea that there is a hierarchy of technologies: they are not all equal. All possibilities to provide the network using a "better" technology should be exhausted before settling for a lesser one. The technology that is eventually chosen will depend on local conditions and funding.

Generally speaking, in descending order of desirability the technologies are:

- Fibre to the Premises – P2P
- Fibre to the Premises – GPON
- Cable networks
- Fibre to the Cabinet
- Long range wireless
- ADSL and related technologies
- Satellite

Why? Technologies at the top of the list provide the highest broadband speeds with the greatest flexibility and ease of upgrade in the future; going down the list both speed and upgrade potential become increasingly restricted.

Fibre is at the top of the list because the capacity of the fibre itself is virtually unlimited. A single optical fibre in the heart of the internet can transport millions times more data per second than an average consumer internet connection – and yet is still a long way from reaching fundamental physical limits.

In contrast, wireless networks are already operating near fundamental limits. What this means in practical terms is that the design of wireless networks is often ruled by capacity rather than reach – in other words, the only way to provide the necessary network capacity is to install more base stations or transmitters.

In addition, every wireless transmitter needs a high-capacity link to carry data back to the local aggregation node – today this is often achieved over copper telephone lines because they are cheap and readily available, but wireless systems capable of supporting superfast broadband to multiple end-users will need faster connections using point-to-point microwave or, better still, optical fibre. Ultimately, wireless and fibre will complement rather than compete with each other.

POLICY MATTERS

A summary of broadband policy in the UK

Background

Technology never stands still. Having completed a range of measures to promote the roll-out of first-generation broadband in the UK, it soon became apparent to the Government that other countries in Europe were investing in broadband infrastructure capable of delivering even higher speeds. What should the Government do? Was the economic competitiveness of the country in jeopardy?

The development of UK broadband policy can be chronicled through the publication of several key reports. The debate was opened up by the Broadband Stakeholder Group (BSG) in 2007 with *Pipedreams? Prospects for Next Generation Broadband Deployment in the UK,* which laid out the issues confronting the UK in rolling out new access network infrastructure.

BSG then commissioned Analysys Mason to study fibre costs, and calculate the investment needed to deploy NGA across the whole of the UK. (Note: An equivalent report on the technical capabilities and costs of wireless and satellite broadband was also commissioned, much later, in 2010).

The Government also asked Francesco Caio, former chief executive of Cable&Wireless, to carry out a comprehensive and independent review of the future of broadband in the UK, paying particular attention to barriers to investment, which was published in 2008.

Finally, in 2009 this was followed with a series of strategy papers under the banner "Digital Britain", which were to inform new policy in this area. The final Digital Britain report takes a wide-ranging view of communications strategy, covering topics as diverse as digital inclusion, the digital TV switchover, digital radio, public service broadcasting, the role of the BBC, online copyright, monetization of content, and addressing IT skills shortages.

From the point of view of improving broadband infrastructure, the plan had two stages:

1. A universal service commitment (USC) to provide 2 Mbps to all UK households by 2012;
2. Coverage to 90% of homes with NGA at speeds of 40 Mbps or more by 2017, which would be market-led for two-thirds of the population, with subsidies available for the remainder.

To meet the objectives outlined in Digital Britain, the Government created a delivery body, christened Broadband Delivery UK (BDUK). This body was initially to concentrate on delivering the USC, using £200 million of funding from the Digital Switchover Help Scheme under-spend (part of the BBC licence fee set aside for helping people convert to digital TV), and the Strategic Investment Fund (a new £750 million fund announced in the March 2009 Budget).

KEY PUBLICATIONS:

April 2007	Pipe Dreams? Prospects for next generation broadband deployment in the UK Report by the BSG executive.
September 2008	The costs of deploying fibre-based next-generation broadband infrastructure Final report for the BSG by Analysys Mason.
September 2008	Review of Barriers to Investment in Next Generation Access: Final Report by Francesco Caio (also called The Caio Review).
June 2009	Digital Britain: The Final Report by Department for Culture, Media and Sport.
March 2010	An assessment and practical guidance on next generation access (NGA) risk in the UK by Communities and Local Government.
October 2010	The Costs and Capabilities of Wireless and Satellite Technologies - 2016 snapshot Report for the BSG by Analysys Mason

The Final Third

Digital Britain introduced an important concept, the so-called "Final Third" – the areas left behind by the current wave of commercial NGA deployment plans. In March 2010, the Department of Communities and Local Government (DCLG) published an *Assessment and Practical Guidance on Next Generation Access Risk in the UK*, which identifies areas likely to become part of the Final Third. These are predominantly rural areas due to the higher cost of installing fibre, but some urban populations may also be at risk as a consequence of social deprivation. The Final Third occupies 85% of UK land mass.

Coalition Government Policy

Following the change in government in May 2010, new objectives were issued by Jeremy Hunt, Secretary of State for Culture, Olympics, Media and Sport, who is responsible for broadband policy under the Liberal Conservative coalition government:

1. The universal service commitment of 2 Mbps is still a target, but the timeline for achieving this was pushed back until the end of the current parliament in 2015.

2. A new undertaking to deliver NGA: "Our goal is simple: within this parliament we want Britain to have the best superfast broadband network in Europe."

The Government wants to "unlock private investment" in NGA. South Korea provides the inspiration – its broadband program was Government led, but 95% funded by the private sector. To encourage private sector investment, the Government has been examining measures that will reduce the cost of fibre deployment, such as sharing of ducts and poles and other utility infrastructure.

Targeted interventions will be made in the Final Third. The Government is advocating a national policy with a local approach – NGA projects will be led from sub-regional level (possibly local authority or lower) with BDUK acting as central bankers and advisers to these local programmes. This chimes nicely with the "Big Society" initiative, which aims to put more power in the hands of local government and communities, and encourages community enterprises and co-operatives.

Funding of £530 million has been allocated to broadband for the period to 2015, including £230 million as previously pledged, and a further £300 million from the BBC licence fee. The license fee settlement includes a contribution of £150 million per year for broadband in the four years between 2013/14 and 16/17, taking the potential funding period beyond the end of the current parliament.

Broadband Delivery UK

In essence, BDUK has now been tasked with achieving both the USC and superfast broadband in the same timeframe and so both objectives have been rolled into a single approach. The plan is to use superfast broadband to solve the USC problem wherever practical, cost effective and affordable. Where other solutions are necessary, it seeks to promote technologies with an upgrade path to superfast broadband to minimise wasted investment.

Initially, BDUK has been gathering information on technical and commercial solutions to help determine which are most likely to be successful in achieving its objectives. Some information has been sought through a technical exercise; where possible BDUK will draw on practical experience.

BDUK has identified four areas where superfast broadband market testing projects will take place: Cumbria, Hereford, North Yorkshire, and Highlands and Islands in Scotland. Each location will receive £5—10 million of public subsidy. Deployment will begin in 2011 once the projects have been defined and a procurement process has taken place.

BDUK has not said how and when it will start distributing the rest of the funds for broadband. Given the limited funds available relative to the scale of the task, BDUK is expected to provide "gap" funding that, when added to investment from other partners, will make the difference between viable or non-viable business cases.

Funding is more likely to be in the form of a public investment programme than simple grants – the Government has said it expects projects to be commercially viable.

STATE OF PLAY

Who are the main players in the UK broadband market?

This chapter describes the main players in the UK broadband market and their plans to deliver NGA. Only larger companies that operate their own telecoms equipment and infrastructure are included; numerous smaller retail ISPs sell broadband, but they do this by buying wholesale products from BT.

BT Group Plc

BT Group is the incumbent telephone operator covering all parts of the UK except Hull which, for historical reasons, is served by a different operator.

BT, at the urging of Ofcom, was the first telecoms operator in the world to implement structural separation with the creation of Openreach in early 2006. Openreach manages the "last mile" wiring from customers' homes to the local telephone exchange.

In 2008, BT announced that it would spend £1.5 billion building a NGA network to bring headline speeds of 40 Mbps to 10 million homes by 2012. Most of the planned deployment was FTTC, with FTTP only being rolled out in selected new-build locations, starting with Ebbsfleet, a new commuter town in Kent. The following year, BT pledged a further £1 billion of investment, deciding to enhance coverage from 40% to two thirds of the country, and increase the proportion of homes covered by FTTP from 10% to 25%.

Two locations were identified for trial installations of FTTP on Brownfield sites during 2010: Bradwell Abbey in Milton Keynes and Highams Park in north-east London. Two further sites have been announced for future trials of a "mixed-economy" deployment using both FTTC and FTTP in the same exchange area: Leytonstone in Greater London and York.

By June 2010, more than 100 telephone exchanges and 2700 street cabinets had been enabled for FTTC/FTTP, bringing NGA within reach of more than 1 million UK homes, according to Openreach. BT Retail launched consumer NGA products in January 2010 under the brand name "Infinity".

BT has been involved in projects to bring FTTC to areas outside its commercial deployment plans. A small project recently took place in the village of Iwade in Kent. A grant from Kent County Council of roughly £10 per premises enabled BT to connect the 1,350 homes in the village using FTTC delivered from the telephone exchange in Sittingbourne, roughly 3 km away. This involved laying new fibre from Sittingbourne to street cabinets in Iwade that had previously been served from a slightly closer but smaller exchange in Newington. Crucially, the Sittingbourne exchange had already been scheduled for upgrade to FTTC as part of BT's NGA programme.

BT has also been awarded large-scale NGA contracts in partnership with local authorities. One such contract is currently underway in Northern Ireland to upgrade 166 exchanges with FTTC to connect businesses in both urban and rural areas. The deployment is being part-funded by BT to the tune of £30 million with an additional £18 million coming from the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD) programmes.

In October 2010, BT won a contract in Cornwall to bring superfast broadband to 86% of homes and businesses in the county by 2014 with around half of properties expected to benefit from FTTP. The project will cost about £135 million; £78.5 million from BT and £53.5 million from the ERDF. Cornwall is the only county in England that qualifies for ERDF funding.

KCOM Group

KCOM Group, formerly Kingston Communications, is the UK's last remaining independent local telephone company, supplying broadband in the Hull area through its retail broadband arm Karoo. Although Kingston does offer wholesale packages to other service providers, there have been no takers, and so Karoo remains the only provider of ADSL services in the area (although some wireless broadband services are also available). The relatively small size of the Hull market – just 0.7% of UK households – is thought to represent a barrier to market entry. KCOM has not announced any NGA plans for the Hull area.

SHAKING UP THE LLU MARKET

Local loop unbundling (LLU) is the mechanism that helped to create a hugely competitive broadband market in the UK. This is the process whereby an alternative operator connects customers directly to its network by placing its own equipment in BT telephone exchanges.

BT's FTTC roll out is likely to cover the same exchanges as the LLU operator networks because these have proven to be the most commercially attractive areas. This leaves LLU operators in a tight spot: how can they compete with "up to 40 Mbps" FTTC services in terms of speed?

Unlike copper telephone lines, individual FTTC connections cannot be physically separated at the exchange, so the LLU concept cannot be extended in a straightforward fashion. LLU operators have two main options: they can invest in putting their own equipment in street cabinets up and down the country (so-called sub-loop unbundling, or SLU), or line up behind BT as a wholesale customer.

Sky undertook a small FTTC trial in 2008 (one cabinet), but concluded that it was not economically viable to deploy new cabinets en masse. To put this into perspective, there are 5,500 exchanges in the UK compared to approximately 88,000 cabinets or their equivalent. So it looks like LLU operators will pick the second option sooner or later. TalkTalk was the first major LLU operator to launch commercial services over BT's FTTC network.

The three largest LLU operators are:

- Talk Talk Telecom Group, which is now the UK's second largest ISP following the acquisitions of AOL and Tiscali. Talk Talk's network connects 1,948 exchanges, with 76% of customers unbundled.
- British Sky Broadcasting (Sky) is the UK's dominant satellite TV provider (not including Freeview), and bundles TV packages with "free" broadband inside its network footprint. Sky has unbundled 1,275 exchanges; more than 90% of its customers are on unbundled connections.
- O2/Be, which is owned by Spanish incumbent Telefonica, has unbundled 1,247 exchanges and is steadily growing its broadband market share, which now stands at 3.4%.

Note: Orange is no longer an LLU operator, having handed operation of its network over to BT.

Virgin Media

Cable television operator Virgin Media has a hybrid fibre-coaxial network that reaches around half of all homes in the UK. Outside the network footprint, the company provides ADSL broadband (reselling BT's wholesale product).

Virgin Media has completed a roll out of DOCSIS3.0 technology across its network, which allows it to offer 50 Mbps broadband to all of its customers.

The operator also announced the start of an upgrade program to provide 100 Mbps broadband across the network, and has been testing 200 Mbps services with customers in Ashford in Kent and Coventry.

Recently, Virgin Media identified around half a million homes whose proximity to its existing network makes it commercially attractive to reach them over the next few years. This programme will involve using "non traditional methods" to bring superfast broadband to communities in rural or harder to reach areas.

In April 2010 a trial began using aerial fibre-optic cable and purpose-built telegraph poles to bring broadband to the village of Woolhampton in Berkshire. In August, following an agreement with utility provider Surf Telecoms, a second trial began in the Welsh Village of Crumlin, Caerphilly, to deliver broadband and TV services over electricity poles.

How much would it cost to give the UK nation-wide NGA?

The honest answer is that we do not know precisely. It depends on so many variables – crucially whether we are talking about fibre-to-the cabinet (FTTC) or fibre-to-the-home (FTTH), whether the cost of laying the fibre can be reduced from current procedures, and whether we are thinking of roll-out only to urban conurbations, to most of the country, or to the whole country.

In September 2008, the Broadband Stakeholder Group (BSG) published a report commissioned from Analysys Mason entitled The costs of deploying fibre-based next-generation broadband infrastructure, which examines how the costs stack up as fibre is rolled out across the country. The authors explain their assumptions clearly, and are frank about what the report does not address, including the options for using wireless technologies, and the source and scale of new revenue streams.

The headline figures for the different options were:

- FTTC/VDSL – £5.1 billion
- FTTH/GPON – £24.5 billion
- FTTH/PTP – £28.8 billion

Clearly these are very substantial figures. To put this in context, the report notes that deploying FTTC/VDSL on a national basis would cost three or four times more than the telecoms sector has spent in deploying the current generation of broadband services.

The report concluded that deployment costs will be relatively constant across areas of higher population density. This implies that, if a commercial case for deployment exists, the market should be able to deliver to approximately two-thirds of the UK population – and indeed since then BT has decided to deploy FTTC/VDSL to two thirds of the UK.

A third observation was that the fixed costs of deploying new infrastructure far outweigh the variable costs. This means that the cost per premises connected is highly dependent on the level of take-up, which suggests that pre-registration schemes and other demand stimulation initiatives will play an important role.

Why does fibre deployment cost so much?

The principal cost of an optical fibre network is not the fibre itself or even the electronic equipment (the devices that convert electrical signals into optical signal and vice versa). The main cost comes from installing the actual physical infrastructure, commonly referred to as the "civils".

UK planning laws mean that the overwhelming majority of lines from the street cabinet to the exchange are provided through underground access. This means that by far the largest cost element of a fibre network is the civil engineering involved in digging holes to lay ducts or fibre and then filling them in again.

Overall these civil engineering costs might account for some 70% of the total. Obviously this would vary from location to location – for urban areas, it might be around 50% of the cost; in rural areas it could be closer to 80% of the costs.

How could deployment costs be reduced?

Sharing infrastructure, avoiding the need to dig new trenches as far as possible, offers the greatest possibility for further cost reduction. One option, which has already been used successfully in the UK, is to use the sewer network, since fibre-optic cable can coexist happily with water.

Several other options are under active consideration including sharing infrastructure owned by other utilities, such as overhead power lines.

Ofcom has already consulted on infrastructure sharing and proposed a market remedy called Physical Infrastructure Access (PIA). This requires BT to allow third-party access to its ducts, chambers and telephone poles. BT is now obliged to publish a reference offer for duct access by January 2011 and May 2011 for poles. PIA wholesale offers are due for launch in June 2011 and will be price regulated.

Mandating fibre installation in new buildings is another obvious way forward, and some countries have already legislated for this. Co-ordination of street works would also be desirable, taking advantage of any open trenches to install fibre at the same time – although in practise this has proved to be difficult to co-ordinate.

Data from FTTH installations in other countries such as the US show that the cost of fibre deployment is already falling year-on-year, thanks to new deployment methods such as micro-trenching, more efficient installation techniques that require fewer engineers, and new products such as bend-insensitive fibre and pre-connectorised cables. No doubt costs will keep falling as the fibre industry continues to innovate.

Would wireless broadband be cheaper?

This question is even tougher to answer. To help provide some kind indication of the merits of different technologies, the BSG commissioned a second Analysys Mason study to examine the technical capabilities and costs of terrestrial wireless and satellite broadband networks in detail.

Published in October 2010, the study estimates how the costs of wireless and satellite deployment vary across the UK, especially in the Final Third. Rather than totting up the costs to supply the whole of the UK with a single technology, the study compares the cost per premises for the different delivery mechanisms – including several forms of wireless, satellite and FTTC/VDSL, which was the cheapest option from the earlier study on fibre networks.

The authors report that modelling the capabilities and costs of wireless networks is far more complex than for fibre networks, and that the results are highly sensitive to a number of technical variables, giving them less confidence in the numerical value of the results than in the fibre study.

The results are also particularly sensitive to the level of traffic to be carried on the network. Analysys Mason addresses this issue by considering scenarios of low, medium and high demand for broadband.

The report's conclusion is that terrestrial wireless technology could cost-effectively deliver the medium demand scenario to the final 15% of UK homes, although this would require a large increase in the number of base stations deployed.

The study also concludes that, while satellite is more expensive to deploy than fixed wireless, it can still play an important complementary role by delivering broadband services to homes that are most difficult to reach by other means.

The report doesn't factor in the cost of radio frequency spectrum (airwaves). Existing licenses can be taken out of the equation as a sunk cost, however, acquiring licenses to new spectrum, such as that released by the switch-off of digital TV, could be expensive.

Leased fibre-optic connections are assumed to be available in the majority of locations to provide wireless backhaul (connecting base stations to the local aggregation node). Experience from community projects suggests this is not always the case, especially in the Final Third.

Other costs: backhaul

Backhaul is the connection that carries traffic from the local aggregation node (such as a telephone exchange) back to an internet gateway. This is also termed the "middle mile" as it sits between the core network and the "last mile" or local access network.

The backhaul link must have the capacity to accommodate the broadband traffic from the entire community. Not all subscribers will be using the link simultaneously, but the network should still be able to cope with peak-hour traffic.

The ratio of potential maximum demand to the actual capacity is called the contention ratio. ADSL connections were originally provisioned at 50:1 for consumers and 20:1 for business users; these days service providers can set their own contention ratio.

Backhaul is not currently available to every community, and can be costly and complicated to install as, by its nature, it involves long digs across a variety of landscapes. The fibres will also attract business rates (see below), leading to high on-going costs.

Even when available, adequate backhaul is not necessarily affordable. For example, the Connected

Communities network, which serves 10,000 customers on the Western Isles of Scotland, pays £140,000 per annum for a 34Mbps backhaul connection, according to the Digital Scotland report.

Digital Scotland is a recent report from the Royal Society of Edinburgh that looks at the issue of backhaul in some detail, and sets out a proposal to create a Digital Scotland Trust that would build a network to bring a fibre connection within reach of every community of at least 2000 people in Scotland.

A number of State-backed projects have already focused on supplying backhaul connections, including NYnet in North Yorkshire and FibreSpeed in North Wales. A secondary aim of these projects is to create a more competitive market for backhaul services, in order to drive down market prices. This was one reported effect of the FibreSpeed network.

Another possible solution to the backhaul problem would be to open up public-sector and education networks. Currently many of these networks have restrictions on private-sector use, and require users to enter into complicated framework agreements.

Other costs: business rates

Fibre-optical cables are a business asset and as such will attract non-domestic property rates. In August 2010, the Valuations Office Agency published the current list of rateable values for fibre-optic telecommunications networks. For the first time it also published guidelines for assessing NGA networks, which include FTTC and FTTP connections.

Fibre-optic cables are assessed according to values laid out in a table called the "tone of lists", which relates to the distance, amount of fibre in the scheme and the number of fibres lit. The rateable values start at £1,500 for a single lit fibre of 1 km length outside London and go up from there. The bill must be paid by the company that lights the fibre.

At the opposite end of the scale, BT's extensive fibre network is deemed too complicated to assess on this basis, so the rates liability is calculated according to the Receipts and Expenditures method. The overall assessment is adjusted by an unpublicised formula relating to BT's market share. As a result, BT's rates bill has fallen in recent years even though its fibre network has grown substantially.

Alternative operators, who do not have the scale of BT, must pay rates according to the "tone of lists" and the rates bill can quickly add up to a hefty sum, particularly in rural areas where longer runs of fibre will be needed to reach the population centres. This creates a disincentive for alternative operators to invest in fibre; the smaller the network, the larger the rates bill will be relative to the operator's budget.

For the NGA piece the VOA has two means of calculating rateable values:

- For domestic users there is flat rate of £20 per home connected.
- For businesses, the fibre is valued according to the "tone of lists".

This raises further anomalies. The decision to rate networks according to subscribers connected rather than homes passed (at a lower rate) penalizes Greenfield operators, who would expect a high take-up of services where fibre is the only infrastructure. Clarity is also needed on how to assess connections to small business customers; how are they to be rated when shared fibre is employed?

The Government understands that the business rates charged on fibre represent a disincentive for small operators to invest in fibre networks. In November 2009, a Commons Select Committee report on broadband concluded that "that the current arrangements hinder the delivery of investment in NGA, which is being championed by Government. We recommend that the Government review the application of business rates to fibre optic networks as a matter of urgency, and develop a uniform system for all providers." Nevertheless, there are no plans to change the ratings regime.

There is a glimmer of hope for communities: create social enterprises in the form of cooperatives or community interest companies to invest in local fibre projects and seek partial or full exemption from business rates. Whether local authorities have the resources to grant exemptions in the current financial climate is another matter.

A MAN, A PLAN

Plan a community broadband campaign

Perhaps the question to ask before this is "Why create a broadband project in the first place?" The answer is that the market has struggled to deliver an adequate, universally available first-generation broadband service and will struggle even more with superfast broadband. Around 10% of homes and businesses cannot get a basic 2 Mbps service and, in terms of next-generation broadband coverage, our current best estimate is that around two-thirds of the population will be covered through commercial investment. That leaves a lot of people in the broadband slow lane. Hence there is a need to take action at local level – and probably the reason you are reading this booklet.

But where to start? There are a wide variety of approaches to delivering superfast broadband, and the needs of every community or region will be different. Nevertheless, it is possible to identify key stages in the lifetime of a broadband project – from the first decision to "do something" to the ultimate reward of a sustainable business providing broadband.

STAGE ONE – FORM A GROUP

To state the obvious, this job is too big for anyone to tackle alone. You need to join forces with like-minded people, who recognise the importance of broadband and understand the potential benefits. Talk to your local contacts, to schools, local businesses (especially those in the IT industry), the parish or town council and others, to discover those like-minded people and whether any broadband projects are already underway.

It may be that all that is needed is to demonstrate demand from your community. Projects being run by local authorities and telecommunications service providers are likely to include an element of demand aggregation at community level.

BT Retail is currently running a campaign called Race to Infinity. This is being organised in the form of a competition, where individuals vote for their exchange to be upgraded to NGA. The competition closes on 31 December 2010, but BT has offered to engage with any community that shows enough interest in superfast broadband.

Stage	Requirements
One Individual	Contact local councils and RDA/LEP Form community groups
Two Group	Identify area of problem Collect evidence of demand Partnerships Technology options Legal structures
Three Company	Business plan Consult potential suppliers Service templates Funding / investment
Four Funded Project	Tender for the project build Appoint suppliers Take-up marketing

BT is not the only NGA service provider of course; other telecommunications providers and suppliers can offer different technical solutions, with different capital investment and ongoing costs. It is usually wise to consider all the options.

MOVING ON – LAUNCH A CAMPAIGN

Raising community awareness about the benefits of broadband is vital. Not only does the business case for broadband depend heavily on getting customers to sign up; landowners and local authorities need to be on-side when it comes time to dig trenches and install cables, cabinets and other equipment.

The real key to success, however, lies not in grass-roots activism, but in bringing together the right group of stakeholders at an early stage. Identify which individuals and organisations in your community might take an active role in the project. It is important that the stakeholders understand the benefits of broadband in the context of their own interests.

The opportunities created by a high-speed internet connection could be the incentive for a public body such as a school or hospital to get involved, which creates a new source of income for the network, and

a stronger social argument for obtaining funding. Local businesses, housing authorities or mobile phone networks may also be interested in becoming collaborators.

The campaigns that have the greatest chance of success are those with a champion, someone who is absolutely passionate about the project and will see it through to the end. The rest of the team will need a variety of skills: accountant, lawyer, technical, market research, communication, sales and marketing. If you don't have those skills within the team, seek outside help as and when required.

Local authorities and business development agencies often assume the project lead because they have a vested interest in the economic development of the region, and because they have the resources – both human and financial – to direct projects of this nature.

But this is not the only way forward – there are plenty of examples where community groups have taken charge. Some communities have decided to JFDI – Just Focus and Do It (polite version).

STAGE TWO - RESEARCH

Profile your community and its communications needs. How many people there are, where do they live, who they get their existing telecoms services from, and how much are they prepared to pay?

But be careful how you ask questions: if you make it too easy for people to say yes, then when it's time to part with hard cash, they're not interested and the business model falls apart.

Mapping exercises can also provide important insight into existing levels of broadband provision and the potential challenges you face in trying to improve the situation – so much so that we've devoted a whole chapter to the subject (see page 18).

Find out about and stay up to date on new technologies, applications and legislation. The team will need to develop sufficient knowledge to be able to explain their vision to others, to evaluate business proposals and negotiate effectively with solutions providers. Suppliers are usually more than happy to engage with projects to discuss technical information.

Based on this research, outline the vision and scope of the project. What are the goals in terms of the end-user experience? Identify likely synergies that will help to move the plan forward as well as possible obstacles.

MOVING ON – SET UP A COMPANY

A company will set the business plan in motion, taking responsibility for procurement of a solution. For community-led projects, the social enterprise is an attractive way to do this.

Social enterprises are "businesses with primarily social objectives whose surpluses are principally reinvested for that purpose in the business or in the community, rather than being driven by the need to maximise profit for shareholders and owners." If you go down this route, then there are two basic models:

- A **co-operative** is a democratic organisation run by its members – one member, one vote, regardless of the amount invested. Co-operatives registered under the Industrial and Provident Societies Act enjoy limited liability in the same way as companies registered under the Companies Act.

- A **community interest company** (CIC) is a newer structure for limited companies. Social enterprise status is achieved by a "community interest test" and "asset lock", which ensures that the CIC is established for community purposes, and the assets and profits are dedicated to these purposes, even if the company is wound up.

STAGE THREE – BUSINESS PLAN

A business plan is a document that contains the financial information that generally justifies a project, along with the supporting information about how you will make it happen, including market analysis, go-to-market strategies and technical information. The financial information should contain realistic revenue and cost projections that lead to sustainability – in other words the project should be able to support itself financially over the longer term.

Entire sections of a library are devoted to business finance – this is not a subject we could possibly do justice to here. If you do not feel completely confident in evaluating business plans of this type, you should consider retaining independent expert advice.

SIZE MATTERS

Work is underway to develop a common set of standards for commercial and business interfaces to make it more attractive for large service providers to connect to small networks. The aim is to ensure that customers on local access networks are not limited in their choices, but can choose from a wide range of service providers.

NICC, a technical forum for the UK communications industry, is developing interoperability standards for Active Line Access (ALA) and NGA voice. ALA could form the basis for active wholesale products in local access networks. http://www.niccstandards.org.uk/

The Joint Open Network Exchange, or JON, is a new wholesale marketplace and clearing system for next-generation broadband services, linking the patchwork of access networks with service providers across Europe. http://jon-exchange.net

The plan should consider things like geography of the network, current bandwidth needs, market projections, reliability, and future expansion and upgrades. Don't forget to include the middle mile, marketing and operating costs in the equation as well as the capital costs of digging and equipment.

The level of technical detail in the plan will depend to what degree you expect to bring in the professionals. The plan could be purely a procurement exercise, inviting suppliers to design a cost-effective technical solution to meet your requirements. The approach "community owned, professionally run" makes good sense.

At the opposite end of the scale, you might be considering building and operating your own network. This option can bring additional risk because small networks often have trouble attracting service providers, and being your own ISP creates further challenges, not least in terms of technical support.

Of course, we're not saying "don't do it yourself". Making use of local contractors and skills can lower the costs significantly, and may be the only option if telecommunications providers show no interest in your plans – although you should be asking probing questions about why this is so!

MOVING TO STAGE FOUR - FUNDING

Funding can come from a variety of sources, including the European Union, national and local government, charities and the national lottery, banks and benevolent individuals, various grant and award schemes, and of course the community itself, through a community shares program.

Innovative funding schemes, deposits, anchor tenants – all can help to ease the cash flow and help a project to get started. In-kind payments are also worth considering. Instead of paying the landowner to cross his field, offer him free installation of a high-speed internet connection.

If local government funding is involved, then issues of state aid can arise, which can delay a project (or, in the worst case scenario, require repayment of funding plus interest). In practise with the right financial structure and appropriate procurement process in place there is unlikely to be a problem, especially in an area where there is clear evidence of market failure (broadband isn't available from commercial operators, or likely to be in the near future).

There have been a number of precedents for public funding of fibre networks, including the Welsh FibreSpeed network in North Wales, and the Cornwall NGA project being carried out by BT. However, this is a complex topic and we advise that, if in any doubt, you seek advice from professionals.

STAGE FOUR - DEPLOYMENT

Approach suppliers; show them your business plan. Select suppliers and start building the network.

Keep people informed, especially your key stakeholders and collborators. Report back to the community regularly, and update your website.

Keep up the momentum! It takes time for a project to reach a successful conclusion. Prepare for setbacks and persevere. Remember: the long-term benefits will make it worthwhile.

A recent study of broadband services in a rural area of England, involving both a mapping study and a survey of businesses, threw up a fascinating insight into the problem of developing a clear understanding of demand and availability. The name of the area will remain anonymous but it could have been any one of a number of communities.

The received wisdom in this area was that a number of small towns were poorly served by broadband and the survey of local businesses largely supported this view. However it was strongly contradicted by the mapping exercise which suggested quite the opposite. In an attempt to reconcile the difference it was much easier to check the cold, hard data than to suggest to businesses that they might be mistaken.

For example, a specific town in the area that had raised the greatest concerns was a tight, nuclear market town and had its own telephone exchange located at its centre. This seemed to further support the mapping exercise over the survey results as it was reasonable to assume that the existing copper lines were generally quite short. As a further check, line tests were carried out on each of the businesses lines, which further corroborated the data. There remained little scope to support the business community's belief that they were poorly served by broadband.

So what was going on? A theory was developed along these lines. Defined market towns tend to build up their own support structures which can lead to the community becoming reliant on a narrow and possibly isolated pool of expert advice; the more esoteric and scarce the skill, the greater the scope for that advice to be of less than the highest quality. In this environment a respected opinion can become the received wisdom and a local mythology can easily develop. This mythology can then be propagated and perpetuated in a tight-knit, well-structured community.

Contrast this with more sparsely populated areas where people tend to travel further to plug into support networks and different people may seek support in different directions. This is likely to create a richer, more diverse advice network where myths are more readily challenged. More sparsely populated communities are perhaps also more accepting of poorer infrastructure, and may have less effective communication channels. As a result, sparsely populated rural areas – relative to small towns – may under report their broadband problems.

As the shape of the digital divide hardens, with the most densely populated urban areas seeing some form of NGA investment while other areas remain largely as they are, the debate is increasingly becoming emotive. And this can make it harder to understand the business case for investing in broadband.

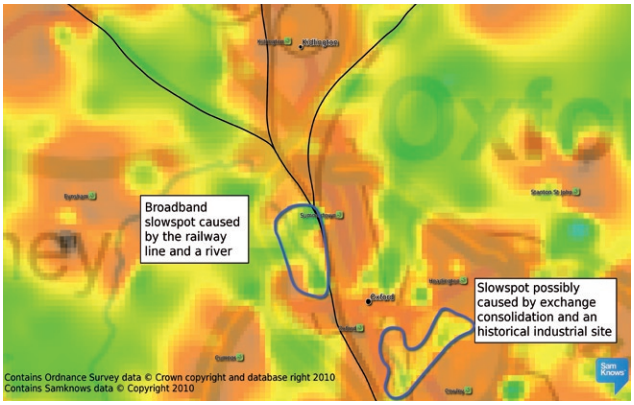
The lesson to take away from this case study is that, while the narrative of communities is important in developing a business case for broadband, it should mainly be used to add colour and to personalise cold, empirical data. The description of the problem should be based on facts, while the narrative gives voice to the kinds of services the community may demand.

The broadband landscape

The first exercise has to be to understand what the broadband landscape looks like today. It is important to base this on data from primary resources – the incumbent operator, the cable companies, and so on.

To test the level of competition for a new broadband network it is necessary to plot existing broadband services and the number and type of operators. In the UK that typically means mapping ADSL performance; the extent of Virgin Media's cable network; and the number of operators unbundling the local loop.

A variety of mapping techniques can be useful in order to gain the fullest understanding. As well as maps that blanket fill a postcode polygon with traffic light colours to represent poor, mean and good broadband speeds, it's worth considering other techniques such as contoured heat maps. While it's harder to say precisely what the speed is at a given location, it does provide a much richer picture from which the broadband landscape can be described.



The map above was generated from broadband data in Oxfordshire. There had been long-established rumours that broadband in parts of central Oxford were slow, and the reasons given seemed perfectly plausible but unproven. The story was that some phone lines had to take a long, circuitous route skirting around the old Morris car plant, which made them too long to support a good broadband service. The map clearly shows a "ghost valley" of poorer broadband to the north east of Oxford. While the now BMW car plant is much more compact, the data appears to support tales of the city's industrial past.

Supporting the business case

Technical broadband data is one aspect, but other data sets can provide important contributions to the business case. A combination of land use and population datasets from the Office of National Statistics provides a way to assess the "mean distance between neighbours" as a proxy for the cost of the civil works required for a fibre-optic network build.

Maps could also provide clues about the kinds of services that might appeal to the community, and therefore drive take-up. There are a number of possible datasets available that can provide clues, such as the ONS output area classification system and perhaps more usefully the eSociety classification system from the Centre for Spatial Literacy.

Only when combining such data with the previous technical mapping is it possible to fully understand the business case for investing in a new broadband infrastructure. It is quite possible, for example, to find a community which is under-served by first-generation broadband and which is sufficiently densely populated to suggest a lower cost of deploying fibre, but which has little interest in adopting new services.

PRIMARY DATA SOURCES

BT Openreach has now agreed to make data on street cabinets available in bulk to communications providers that may wish to unbundle sub-loops, and of course it holds the latest information on FTTC activation dates.
http://www.openreach.co.uk/orpg/networkinfo/networkinfo.do

Office of National Statistics (ONS) collects and publishes statistics relating to economy, population and society and also provides access to some of the underlying data sets.
http://www.statistics.gov.uk/
http://data.gov.uk/

Samknows provides a comprehensive database of BT telephone lines, telephone exchanges and the availability of services at each exchange. Samknows' data is sourced directly from BT and other ISPs and is backed up with its own broadband speed studies.
http://www.samknows.com/

OS OpenData was the result of a recent Government initiative "making public data public", and provides Ordnance Survey data in a variety of formats, including raster and vector data for 1:50,000 and 1:25,000 maps, as well as other location resources such as parliamentary constituency boundaries, councils, and postcode data.
http://www.ordnancesurvey.co.uk/opendata/

E-society is an academic research programme investigating the impact of digital technologies, particularly the internet, on society. They have developed a model of "eTypes" based on levels of awareness of ICT, usage patterns, and attitudes to their effects upon quality of life.
http://esociety.publicprofiler.org/

Point Topic's BroadBand Geography service is based on a database of estimates of broadband availability and take-up for every unit postcode in the UK.
http://point-topic.com/

SUCCESS STORIES

What makes a successful NGA project?

A great deal can be learned from the success – or failure – of others. Accordingly, part of the foundation stage of any next-generation broadband project should involve research to find out how other people have approached the challenge of bringing fibre networks to their communities.

In this section we offer a selection of case studies to help you get started. Each project profile includes the vital statistics of the project, including details of project partners, overall aims, investment and progress to date.

The case studies in this section do not form a comprehensive list of NGA deployments in the UK; lack of space in these pages, and the fast developing nature of the market make this impractical.

If you're looking for a more complete list of NGA projects in the UK, the Communications Consumer Panel also published a comprehensive list of UK fibre projects in 2009, which will be updated by INCA in future. Point Topic, a telecommunications analyst firm that tracks the UK broadband market, also publishes regular reports on NGA subscriber numbers, breaking out the figures by project.

The examples presented here have been chosen to illustrate the variety of commercial and business models behind NGA networks in the UK. There is no single blueprint for success but, as these examples show, there are many different options. Identify which approaches are most likely to suit your circumstances, but remember that these are not the only choices.

Information in this section comes from a variety of sources: Point Topic's Broadband User Service, the Communications Consumer Panel, INCA members, and of course the projects themselves.

PROJECT PROMOTER: FIBRECITY

Location: Bournemouth

Type of project: FTTP/GPON using low cost installation methods such as fibre in sewers and micro-trenching.

Partners: FibreCity Holdings owns the network, OpenCity Media will provide wholesale services; both companies are owned by i3 Group (formerly H2O Networks). Fibrecity had previously been contracted by Bournemouth City Council to connect public buildings; this commercial relationship was the starting point of the project. A partnership with Wessex Water to use the sewers for laying fibre was withdrawn in August 2010; reasons were not given.

Planned coverage: 88,000 homes by end 2012

Stage: 350 live connections (June 2010, Point Topic estimate)

Service providers: Fibreband, Velocity1

Finance: Private investment of about £30m

See also: http://fibrecity.eu

PROJECT PROMOTER: MANCHESTER

Location: Manchester Oxford Road

Type of project: experimental deployment of FTTP

Partners: Corridor Manchester and Manchester Digital Development Agency have appointed Geo to install the fibre.

Planned coverage: 1,000 homes and 500 businesses will be connected by March 2011.

Stage: construction started in spring 2010

Service providers: open to any service provider; no sign-ups yet

Finance: £500,000 funding from North West RDA. As a pilot project, the Oxford Road installation does not need to meet state aid rules. Public funding for a city-wide network is not likely not gain state aid approval, however, so MDDA is exploring alternative ideas and commercial models for expanding the roll-out, such as installing fibre alongside tram tracks during refurbishment.

See also: http://www.manchesterdda.com/tag/fttp

PROJECT PROMOTER: CYBERMOOR

Location: Alston, Cumbria

Type of project: Community-owned Wi-Fi network with planned upgrade to FTTP.

Partners: include Northumberland County Council, local contractors and suppliers.

Planned coverage: 350 subscribers on wireless; aims to connect 300 to fibre by end-2011.

Stage: New fibre connecting Alston to Nenthead was live in September 2010

Service providers: Cybermoor Ltd.

Finance: Cybermoor is a co-operative founded in 2002 as part of the "Wired up Community" initiative to bring computers and broadband to disadvantaged communities – Alston is the most sparsely populated parish in England. Other funding comes from the Rural Development Programme for England and the NHS Social Enterprise Pathfinder Fund for e-health services.

See also: http://fibremoor.org

PROJECT PROMOTER: DIGITAL REGION

Location: South Yorkshire

Type of project: FTTC/VDSL development.

Partners: Yorkshire Forward, South Yorkshire's local authorities (Barnsley, Doncaster, Rotherham and Sheffield) and systems provider Thales UK. Thales UK is the lead contractor for design, build and operation, and will provide wholesale access.

Planned coverage: 1.3m people (546,000 homes and 40,000 businesses) by mid 2012

Stage: more than 25% of network built, 14 exchanges completed and 341 street cabinets commissioned, representing over 16,000 potential subscribers (Aug 2010).

Service providers: RiPWIRE, DRBSY (Digital Region Broadband South Yorkshire), ask4 and Lyndos were the first four providers to sign up.

Finance: Yorkshire Forward is the largest investor, contributing £44m out of the total £93.8m, and state aid was approved by the EU in 2006. The project is forecast to have a return in value of £208m over a 20 year period.

See also: http://www.digitalregion.co.uk/

PROJECT PROMOTER: RUTLAND TELECOM

Location: Lyddington

Type of project: FTTC/VSDL via sub-loop unbundling.

Partners: engineering services firm Babcock Int.

Coverage: Network complete with 50 live customers.

Stage: Similar projects planned; next on the list is Erbistock, near Wrexham in North Wales.

Service providers: Rutland Telecom

Finance: Villagers raised £37,000 to pay for installation; a pre-registration scheme was used to make sure the network was commercially viable before the project got the green light.

See also: http://rutlandtelecom.co.uk

PROJECT PROMOTER: NEXTGENUS UK CIC

Location: Ashby de la Launde, Lincolnshire

Type of project: "dig where you live" FTTH + wireless to surrounding villages

Partners: Nextgenus works with AFL Telecommunications and CTTS

Coverage: approx 60 houses on fibre in Ashby and 400 Wi-Fi customers

Stage: Planned go-live date in November 2010

Service provider: Nextgenus UK CIC

Finance: private investment

See also: http://www.nextgenus.net

PROJECT PROMOTER: VTESSE BROADBAND

Locations: the Cornish villages of Hatt and Higher Pill, near Saltash

Type of project: FTTC/VDSL

Partners: Virgin Media was involved in the trial.

Coverage: Available to 574 homes in Higher Pill and 262 in Hatt following a trial with 15 customers. Vtesse is also connecting other villages.

Stage: commercial services on the network were launched in August 2010

Service Providers: Vtesse Broadband

Finance: private investment

See also: http://vtessebroadband.co.uk/

Regional support

Over the past 10 years Regional Development Agencies (RDAs) have actively supported the development and delivery of broadband across the UK. Good communications infrastructure is an important for economic competitiveness, which dovetails nicely with the RDAs' raison d'être – to boost the regions through economic partnerships and regeneration projects.

Historically, RDAs have supported broadband development in a number of ways:

- Identifying issues and opportunities
- Co-ordinating projects, e.g. Next Generation Broadband Cornwall
- Encouraging collaboration, e.g. Connecting SouthWest
- Demand registration and take-up activity, e.g. EREBUS in the East of England
- Procurement projects, e.g. FibreSpeed in North Wales, NYnet in North Yorkshire
- Investing in projects e.g. Manchester Oxford Road, Digital Region

The Government has confirmed its intention to abolish RDAs in England (with the exception of London) and replace them with Local Enterprise Partnerships, which are expected to be in place by March 2012. The RDAs in the devolved nations are unaffected.

Although England's RDAs are on notice, it will take time to wind up their activities. In the meantime, they still represent a useful resource for business support and for their knowledge of previous and ongoing broadband projects. The RDAs have been working closely with BDUK to share information about existing projects, to identify suitable areas for assistance, and propose new projects.

England's RDAs http://www.englandsrdas.com
Invest Northern Ireland http://www.investni.com
Scottish Enterprise http://www.scottish-enterprise.com
Highlands and Islands Enterprise http://www.hie.co.uk
Welsh Assembly: http://wales.gov.uk/broadband/

Social enterprise

ACRE (Action with Communities in Rural England) is the national umbrella body of the 38 Rural Community Action Networks (RCANs), which are charitable organisations that support rural communities across the country. Typically operating at county level, the RCANs advise and consult with people who live and work in rural areas to identify their needs and to develop local projects.
http://www.acre.org.uk/

The **CIC Regulator** provides guidance and can answer general questions on creating or converting to a community interest company (CIC). Its primary role is to consider applications to form a CIC, and ensure that CICs comply with regulations.
http://www.cicregulator.gov.uk/

Foundation for Social Entrepreneurs (UnLtd) is a charitable organisation that supports and develops the role of social entrepreneurs in the UK. The resources include business consultancy, funding information and an awards scheme.
http://www.unltd.org.uk/

The **National Association of Local Councils** (NALC) provides resources and guidance to town and parish councils in England. It operates through County level associations that provide the first point of contact for member local councils in need of free advice on a range of topics, ranging from legal and financial to technical.
http://www.nalc.gov.uk/

The Plunkett Foundation works with a range of organisations to develop and support rural co-operative and social enterprises. The support function includes advisory services and funding. It is perhaps better known for its activities with rural community shops and Post Offices, but has also supported broadband projects.
http://www.plunkett.co.uk/

Policy and regulation

Broadband Delivery UK (BDUK) has been created within the department of Business, Innovation and Skills to implement the Government's broadband policies. As well as deciding how and where to distribute central Government funding, BDUK will be developing tools and guidance documents for solving broadband issues.
http://www.bis.gov.uk/bduk/

The **Broadband Stakeholder Group** (BSG) is an industry-government forum that helps to shape government policy on broadband issues and NGA.
http://www.broadbanduk.org/

Ofcom is the independent regulator and competition authority for the UK communications industries (telecoms, TV, radio and spectrum).
http://www.ofcom.org.uk/

Ofcom's consultations and discussion papers on NGA can be viewed here:
http://stakeholders.ofcom.org.uk/telecoms/policy/next-generation-access/

Business Link is a Government-backed organisation providing access to information and support for business. Topics covered include starting up a business, finance and insurance, tax, health and safety, employment and pay, and other UK regulations that affect business. The Government is currently reviewing how it provides business support, but in the meantime it's "business as usual".
http://www.businesslink.gov.uk/

Trade associations

The **Independent Networks Co-operative Association** (INCA) was set up in 2010 to create an umbrella for the wide range of private, public and community organisations developing or promoting next-generation broadband networks.
http://www.inca.coop/

The **Internet Services Providers' Association** (ISPA UK) is the UK's trade association for providers of Internet services.
http://www.ispa.org.uk/

The International perspective

The **FTTH Council Europe** is an industry organisation that aims to accelerate the adoption of FTTH in Europe. The Council has activities around business case development, market intelligence, deployment and operations, and policy and regulation.
http://ftthcouncil.eu/

Useful publications include the FTTH Handbook, the FTTH Business Guide, and a collection of case studies called FTTH Success Stories which can be viewed through the FTTH Wiki.
http://wiki.ftthcouncil.eu/

The **European Broadband Portal** is a Web portal and online community where stakeholders can exchange information, ideas and best practise for broadband deployment. The portal provides searchable databases of broadband projects, strategies and action plans, calls for tender, industry suppliers, and European policy and regulation documents.
http://www.broadband-europe.eu/

The **UN Broadband Commission** was launched in July 2010 by the International Telecommunications Union (ITU) and United Nations Educational, Scientific and Cultural Organization (UNESCO) to define international strategies for accelerating broadband roll out worldwide.
http://www.broadbandcommission.org/

About INCA

The Independent Networks Co-operative Association was set up in 2010 to create an umbrella for the wide range of private, public and community organisations developing or promoting next-generation broadband networks.

INCA's vision is to achieve 100% coverage of next generation broadband as quickly as possible, nobody left behind. To get there, particularly in harder to reach areas, INCA advocates a partnership approach bringing together public, private and community sectors to plan next generation network coverage regionally and locally. It is our belief that by working together, sharing knowledge and experience, we will facilitate investment, encourage innovation and speed up deployment for a truly next generation broadband Britain.

INCA promotes common technical and operational standards amongst local broadband projects, runs the successful NextGen events programme and lobbies on behalf of its members. As a co-operative organisation INCA aims to help members share knowledge, aggregate their purchasing power and develop other activities of mutual benefit.



Who should read this guide?

- regional and local authorities, including county, district and parish councils
- community groups and individuals wishing to start a community project
- private network operators planning next-generation networks and services
- policy makers looking for ways to enhance broadband provision and uptake
- anyone interested in the future of next-generation access in the UK

INCA
the independent networks cooperative association