BROADBAND

UK National Broadband Strategy 2004

Preface

1. This paper provides a brief overview of the position of and prospects for broadband in the UK.

2. The UK made a late start with broadband, but has been catching up very fast. In a worldwide league table compiled by the OECD, at the end of 2000 the UK was ranked 21st out of 30 countries. In recognition of this and of the importance of broadband for the economy, in 2001 the Government adopted an ambitious target to have the most competitive and extensive broadband market in the G7 by 2005 and published its first national strategy for broadband. In the past two years, the rate of growth of broadband has been one of highest in the G7, with 40 – 50,000 additional connections per week in recent months.

3. To advise the Government on how to further develop its strategy to reach this target, the Government brought together industry representatives and encouraged the formation of the Broadband Stakeholders Group (the BSG). The Broadband Stakeholder Group represents all levels of the broadband value chain[1]. It has produced two major reports since its creation and each one has lead to a further development of the UK national broadband strategy and action plan.

4. This approach to our national target has galvanised all of the key players, including Government and has led to a transformation of the scene in only 2½ years. For example:

- The proportion of UK households that now has access to affordable broadband service is now 80%, up from 67% a year ago and 60% in 2001. The Government is confident that this number will increase to 90% or more during 2004. BT have announced that they are aiming for 100% broadband coverage of the UK by 2005 and that they have expanded their demand registration scheme to a further 2,300 exchanges.
- There are now in excess of 3 million broadband connections in the UK – over one in ten households. This is up from 1 million in September 2002. Business broadband use has also risen with the number of connections roughly doubling over the last year.
- BT's pre-registration scheme for broadband roll out has given rise to in excess of 800 local campaigns to stimulate demand. This amounts to community-based social activism on a scale the UK has not seen before.

[1] See www.broadbanduk.org

- There is increasing evidence that broadband makes a genuine and substantial impact on business productivity and competitiveness, most notably in the SME sector, but also by enabling teleworking approaches by larger organisations

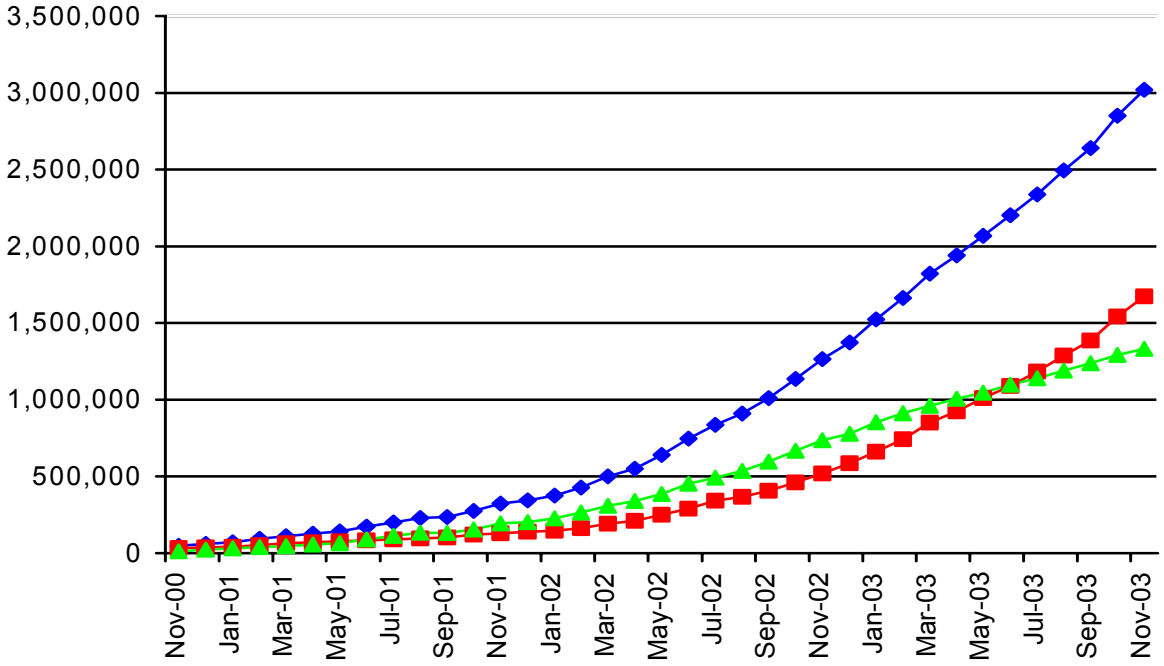


Figure 1. The growth in the number of broadband customers in the UK
Total Broadband (Blue), Cable Modems (Green), DSL (Red)

5. Despite these very considerable successes, there remains work to be done. The Government is now setting its sights on the longer term and the need to complete the rollout of broadband access and to deepen and strengthen the role of broadband in social and economic domains. Areas for future focus include:

- managing the programme of broadband procurement for public services - £1.6 billion over the next three years – to maxmise its contribution to achieving the Government target for broadband;
- overcoming the remaining obstacles that lie in the way of providing access to rural and remote communities and businesses;
- working with the digital content, applications and devices providers to ensure that take up and use of broadband continues to drive new and innovative products and services – including in the e-Government domain;
- working with businesses to ensure they use broadband proactively and intelligently to increase innovation and productivity;
- reaching out to those who have so far not taken advantage of online Government services, the internet and digital television;

- ensuring the market framework in the UK facilities the provision of higher speed services.

Introduction

6. Broadband is the term used to describe a wide range of technologies that allow high bandwidth data transmission (high-speed) and always-on access to the internet and other electronic services.

7. The Broadband Stakeholder Group defines broadband as:

"*Always on access, at work, at home or on the move provided by a range of fixed line, wireless and satellite technologies to progressively higher bandwidths capable of supporting genuinely new and innovative interactive content, applications and services and the delivery of enhanced public services*."

The British Government's Broadband Target

8. The UK Government target for broadband is for the UK to have the most extensive and competitive broadband market in the G7 by 2005. This contributes to the DTI's Public Service Agreement (PSA) target, "*To make the UK the best place in the world for e-business, with an extensive and competitive broadband market, judged using international comparative measures of business uptake and use of information and communication techniques"*.

9. The UK Government sees broadband as a key enabling technology in support of policy objectives other than e-business. In recognition of key role that broadband will play in delivering an enhanced educational experience the Department for Education and Skills (DfES) has a target to have broadband installed in all schools by 2006. The Government also sees broadband as having an important contribution to make to its targets "To make sustainable improvements in the economic performance of all English regions and over the long term reduce the persistent gap in growth rates between the regions, defining measures to improve performance and reporting progress against these measures by 2006" (DTI's PSA target 7) and Department for the Environment Farms and Rural Affairs' (DEFRA) target "to reduce the gap in productivity between the least well performing quartile of rural areas and the English median by 2006, and improve the accessibility of services for rural people."

10. Progress towards the broadband target is measured bi-annually through five indicators - price, choice, regulatory regime, availability and market context[2]. These are combined to give overall rankings for competitiveness and extensiveness (see Appendix 2).

[2] "Market context" refers to the potential for the broadband market to grow quickly, taking into account, for example, the penetration of existing flat-rate narrowband internet access.

11. In September 2001 the UK was 5th in the G7 for extensiveness and 4th for competitiveness. By March 2003 the UK had moved to 3rd place for competitiveness, behind Japan and Canada, but having overtaken the US – a position the UK retains. By September 2003 the UK had moved to 3rd equal for extensiveness, level with the US and ahead of Germany.

Why Broadband is important

12. Until recently, broadband was too new to permit much meaningful assessment of its impact. However, hard evidence for its economic impact is starting to emerge. For example, in 2001 a survey of small businesses estimated that, 'by 2005, broadband will be making £3.5 billion productivity savings and £1.2 billion cost savings a year for the UK Small and Medium Sized Enterprise (SME) sector[3].' It also predicted that about 40% of all SMEs in Britain (some 1.4 million businesses) will be connected to broadband by this time. This year, other surveys have shown that SMEs who have adopted broadband believe that their business have benefited. A recent survey for British Chambers of Commerce showed that only 16% of SMEs could not identify any benefits from broadband adoption whereas 46.4 % thought that they had benefited from improved productivity, 45.3% from reduced costs and 13.4% from increased sales[4]. At a local level, broadband can bring significant benefit to communities, as demonstrated by the case of South Dundas (pop 10,000) in Ontario, Canada, which has reversed a decade of declining employment[5]. Macroeconomic predictions for the UK economy have suggested that there may be a £22 billion increase in GDP from mass adoption of broadband[6], an impact on the economy comparable to the introduction of mains electricity in the early 20th century.

13. Beyond these general economic impacts, broadband promises to deliver a bundle of other benefits, including:

- greater lifestyle choices for people as, for example, home-working possibilities increase;
- improved public service delivery through transformation of the public sector and increased access for citizens to on-line education and health services;
- substantial new opportunities for digital content providers to commercialise new products in the ever-expanding digital space. With its strong media and computer games industries, this is an area where the UK has the potential to benefit.

[3] SME broadband user research (May 2001) Fletcher Advisory for BTopenworld www.btinterface.co.uk/reports/sme_broadband.html

[4] Business Broadband: a BCC Survey. BCC in association with Cisco Systems and Oracle.

[5] Economic Impact study of the South Dundas Fibre Network. Strategic Networks Group for DTI. www.dti.gov.uk/industries/telecoms/sdcsfi270603.pdf

[6] The Economic Impact of a Competitive Market for Broadband – A cebr report for the Broadband Industry Group November 2003.

Transition to the new regulatory regime – Office of Communications (Ofcom)

14. Ofcom will assume its full regulatory functions by the end of 2003 taking over the regulation of the electronic communications markets from Oftel. Among its new obligations under the Communications Act, Ofcom will be required, when carrying out its functions, to 'have regard', among other things, to the 'desirability of encouraging the availability and use of high-speed data transfer services throughout the UK[7]. This is a new duty introduced by the Communications Act 2003 that does not apply to the current regulators.

15. Ofcom has recently published a document[8] setting out its immediate operational priorities and the process it will follow in taking decisions and in developing its business plan for 2004-05, to be published next April. The latter includes a commitment to engage closely with all stakeholders in industry and elsewhere on all major decisions. Ofcom has identified broadband as one of three 'big-ticket items' for 2004, and indicated that it would stand behind Oftel's conclusions on the various market reviews throughout 2004. Ofcom and Oftel published their draft regulation of the wholesale broadband market on the 16th December 2003 with final representations due on the 6th February 2004.

Encouraging business to make the most of broadband - UK Online for Business

16. UK online for business is a DTI led partnership between industry and government that helps all businesses make the most of their investment in information and communication technologies. It operates a series of information programmes and regional advisors to help small businesses make the most of ICT in transforming their businesses.

17. A key point to note is the importance of business *adaptation* as a result of the changes Broadband can offer over and above the mere *adoption* of the technology. This is true of both the private as well as public sector. As Broadband becomes the catalyst for a potentially radical change management programme, those organisations that fail to recognise this will not leverage the full benefits that the technology offers.

Reaching out to non-Internet users

18. The expectation is that most people will migrate from narrowband Internet access to broadband. In order to maximise the contribution that broadband can make to the economy and to the delivery of public sector or e-government services it will be necessary to encourage people who have so far not taken

[7] s3(4)(e), Communications Act 2003 (Chap 21). This provision is due to be brought into effect by 28 December 2003.

[8] 'Ofcom – From Commencement to 1st Quarter 2004' : Ofcom, September 2003

advantage of online Government services, the internet and digital television to do so.

19. Over the last four years there has been a five fold increase in home internet access in the UK and a four fold increase in DTV penetration. But there is more to do to create a digitally inclusive UK. That is why the UK Government has announced that it will establish a Digital Inclusion Panel lead by a high-level industry figure.

20. The Digital Inclusion Panel will play a key role in helping us ensure that every home in the UK should have a connection to online services through a digital network by 2008 – whether through a personal computer, DTV, mobile phone or other device." The panel will specifically aim to:

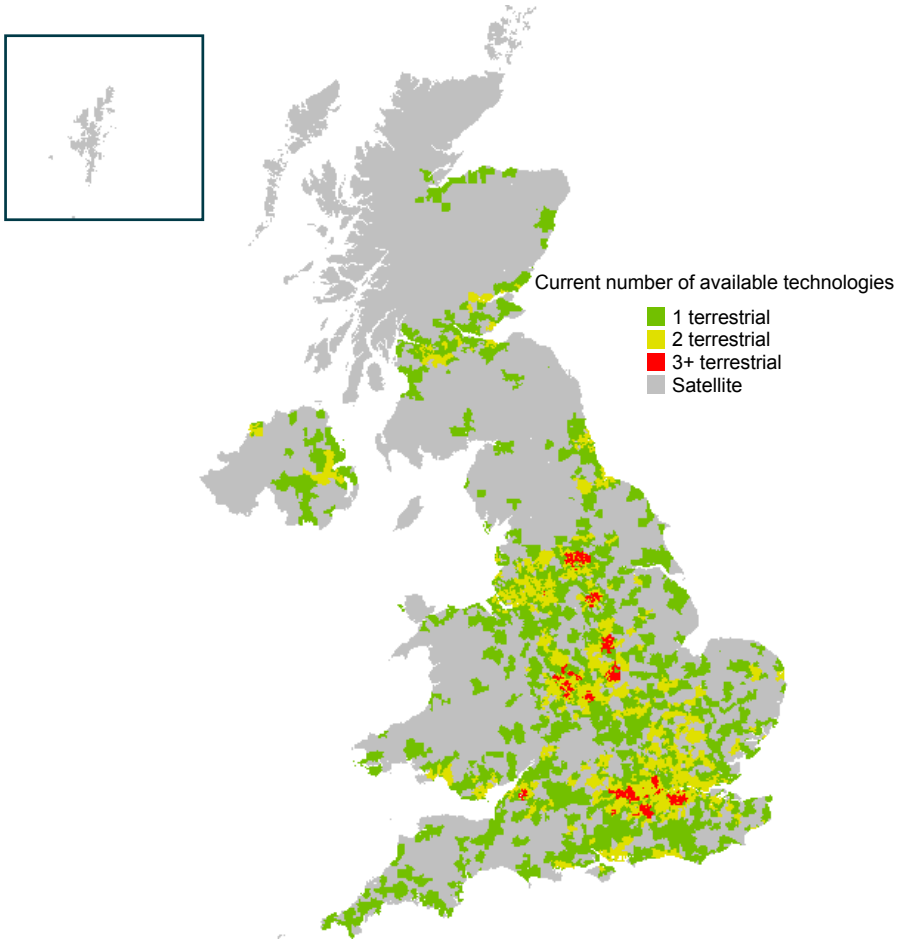
- identify those groups most at risk of digital exclusion;
- identify future actions that might encourage those homes to take advantage of online services and get digitally connected; and
- make recommendations about how industry and government can work together to drive a digitally United Kingdom.

Opportunities for digital content providers

21. Content will be one of the key drivers of the future uptake of broadband, and is for many the whole point of the technology. One issue which many reports have identified is the lack of willingness of big rights holders (particularly in the music and film industries) to engage with making their content available online. This is particularly so given the much reported problems with digital piracy and peer-to-peer file sharing.

22. This is primarily a matter for the industry to address. The DTI funded an in-depth study by the BSG into digital rights management and micro-payment systems. This serves as a useful basis for future policy and has been identified by the World Economic Forum as one of the best available analyses of the subject. Following two major studies on broadband content and prospective business models, well received by industry, DTI is also working with RDAs and Devolved Administrations to implement a number of pilots to stimulate broadband content.

The roll-out of broadband



Broadband coverage in the UK, Q3 2003 (Source: Analysys)

23. Currently 80% of the UK population is covered by a mass-market, terrestrial broadband solution, a figure which is expected to rise significantly by 2005. Cable modem services are available to 45% of households, fixed wireless services to 13% and ADSL to 78%. However, most of this provision is concentrated in urban and suburban areas.

24. At the moment 80% of households can access an affordable broadband service, a higher proportion than in for example the USA, France and Italy. However, the UK Government recognises that more needs to be done if broadband is to be made available in all parts of the country. The UK Government believes that better partnerships between the broadband industry, Government, the regions, local government and local communities should allow broadband to be made available to every community in the UK by the end of 2005.

25. The Government does not believe that there is a case for a general subsidy for broadband roll-out. In the main part the UK believes that the competitive market which has brought about the current level of availability should continue to roll out services where this is economically viable and to develop innovative approaches to doing so. This evidence that the market still has significant contributions to make to extending broadband availability beyond the levels currently forecast.

26. But Government has levers at its disposal to bring to bear in areas where a fully commercial solution may be difficult to find. These include:

- public sector expenditure on broadband. The Government will be spending over £1 billion on public sector connectivity in the three years to

2006. Aggregation of this demand can have a significant positive impact on industry investment and availability of broadband;

- regional economic development. The Government has already given the RDAs and devolved administrations £30 million for pilot projects to help them learn what will work in extending availability and take-up (the UK Broadband Fund). This has stimulated many of them to use their own funds for regional economic development where lack of broadband availability or adoption is a significant barrier to economic development;

- the use of the existing European structural funds. Structural funds are another source of funding where applicable;

- European Investment Bank funds made available through the Quick-start programme of the European Initiative for Growth;

- the Rural Broadband Unit which has been set up in DTI in partnership with DEFRA to identify and disseminate innovation and best practice about broadband roll-out and demand stimulation in rural areas;

Role of Industry

27. The Government believes that industry has the predominant role in determining how broadband should be made available within the UK. It is not for Government to choose the technologies to be deployed or the business models behind those choices. This section sets out the contributions that the different technologies currently make to the UK market.

ADSL

28. ADSL enables broadband capability over normal telephone subscriber lines. ADSL is predominantly supplied by BT (and Kingston Communications in Hull) and now accounts for 52.5% of the broadband market. Because BT has significant market power it has to offer products at fair and equitable terms to other operators. OFCOM/OFTEL have proposed further regulations (see above) that subject to consultation, are intended to fortify competition.[9] There are some 180 resellers of BT's wholesale ADSL product who share about half of the ADSL retail market making the UK ISP market one of the most competitive in the world.

29. ADSL services are available to some 78% of household in the UK. Almost every household is connected to an exchange that could be enabled for ADSL. But in practice the business case for smaller exchanges is not seen as

[9] s. 16 and s. 17 OFTEL's Wholesale Broadband Access Market review: www.ofcom.org.uk/consultations/current/wabmr/wbamr.pdf

sustainable and there is a range limitation of 6 km. BT has enabled 1708 exchanges out of the approximately 5,600 it operates.

30. ADSL products in the UK are mostly offered at 512 kbps, but BT offers 1 Mbps and 2 Mbps services aimed at small businesses and a residential 1 Mbps service. Higher speeds are possible but only over shorter distances. BT offers the 512 kbps at £30/month while most major resellers offer it at a discount, £25-£27 a month being typical.

31. It is important to bear in mind that ADSL is not the only way of getting broadband.

Cable

32. The cable TV companies – NTL and Telewest Broadband - offer similar broadband packages, which compare well with the ADSL offerings of BT and the retail ISPs in terms of price and service. Cable has about 47% market share at present, of which NTL has about two thirds and Telewest the rest. Cable TV networks pass some 50% of UK households and most of these have been upgraded to deliver broadband. 45% of UK households are passed by a cable network which can support broadband.

Mobile, fixed wireless and satellite

33. 3G mobile phones offer, in addition to existing voice and text telephony services, video calls and access to downloads at up to 384 kbps. "3" is the only UK operator providing a 3G service at present they had reached 210,000 subscribers by December 2003.

34. Fixed wireless has not yet made a major impact on the broadband market. But the Government hopes that this will change because of the entry by PCCW, which has 14 of the 15 UK regional 3.4 GHz licences auctioned by RA in the summer. GX Networks has an existing broadband wireless service that is available to some 13% of UK households.

35. Satellite services are available across the UK and could address the last 10% problem. But owing to the comparatively high cost of satellite services, take-up is currently very low. The delay inherent in satellite signals in any case means that this technology will not suffice for some interactive applications. Two-way satellite services have 0.15%, of the broadband market

Roll-out of Broadband in Rural areas

36. The main obstacle to the provision of more affordable broadband in rural areas is the lack of a clear commercial model for the provision of services to low population density areas, often over long distances. For instance, BT has approximately 5,600 exchanges of which it has ADSL-enabled over 1,700 which cover some 80% of the population. This means that BT would have to enable

more than twice as many exchanges as it has so far to reach the last 20% of the population (and not all of them would be able to receive service as there are distance limitations on ADSL).

37. Wireless and satellite technologies have specific potential to reach more rural areas as their geographical constraints are different and often not as severe as the fixed-line technologies.

38. Satellite broadband is available across the UK and could address the last 10% problem. BNSC and industry are working to reduce the cost of satellite broadband services to bridge the digital divide worldwide. There are a number of broadband satellite suppliers including BT, Avanti, and Hughes.

Role of Government

39. It is in rural areas where the market is least likely to deliver and Government action is most likely to be justified.

Public procurement and the Broadband Aggregation Project (BAP)

40. The government is committed to investing over £1 billion towards providing key public services with broadband connectivity over the next three years, including:

- DfES plans to provide all primary and secondary schools with a minimum 2Mbps and 8Mbps broadband connections respectively by 2006
- The National Health Service will provide all GP practices with 256kbps connectivity, and all hospitals, Primary Care Trusts and other Health Authorities with a minimum of 2Mbps;
- The Criminal Justice System will provide ICT infrastructure across the six major criminal justice organisations - police, crown prosecution service, magistrates' courts, crown court, probation and prisons.

41. This level of investment creates an exciting potential for using public sector procurement to extend the reach of broadband into rural areas in a way which could make a real difference to access for rural businesses and communities. Nine out of ten rural households are within 2km of a primary school and six out of ten within the same distance of a secondary school (source: *The State of the Countryside 2002*, Countryside Agency).

42. The Broadband Aggregation Project, is on track to deliver 9 Regional Aggregation Bodies (RABs) and a National Aggregation Body (NAB) whose job will be to aggregate this public sector broadband connectivity demand and take it to market. To begin with this demand will come from broadband provision to schools and connectivity to all 16,000 NHS sites. The Government expects other public sector customers to use the RABs for their needs. The RABs and NAB themselves will be given legal effect in November and the DTI has already

recruited eight of ten CEOs. The RDAs are key partners in this enterprise having agreed to provide a repayable grant of £13 million to cover the set up costs of the RABs and the NAB.

The Regional Devolved Administrations (RDAs) and devolved administrations

43. The RDAs are expected to focus on economic development as a means of promoting regional growth and addressing regeneration. They will receive £1.8 billon in 2003-04. Broadband can contribute to economic development and so is a legitimate use of these funds where schemes meet the other general criteria applied to economic development and comply with the EU State Aids rules.

44. In order to stimulate regional activity DTI launched in 2002 a £30 million fund through the RDAs and devolved administrations. This has been used to develop many local and regional pilot projects designed to extend the availability and use of broadband in areas where it would not usually have been available on commercial terms. Stimulated by this fund, several RDAs have also employed their own resources to fund Broadband initiatives. The projects vary from technology pilots testing wireless systems in small remote rural communities, through subsidies for rural businesses to try satellite broadband to larger schemes designed to bring broadband to whole regions.

45. Some regions have taken a more ambitious approach to ensuring that broadband is more widely available than commercial terms would currently allow.

- The £12.5m **Cornwall** ActNow project was launched in April 2002 with the help of £5.25m Objective One funding. Under this scheme, 19 BT exchanges in Cornwall were upgraded to deliver ADSL with another 7 to be enabled before the end of the year[10]. The total number of broadband connections within the Objective One area of Cornwall, has risen to 5,000 under this scheme. Of this total 1,800 are SMEs. Also 126 new jobs have arisen since broadband enablement – research continues into the improvement in economic activity.

- In **Cumbria**, Project Access, seeks to address the lack of affordable access to, broadband. A contract for the provision of broadband services will be let by the NWDA, which will facilitate the delivery of broadband access to over 90% of the resident citizen and business communities throughout Cumbria. Responses to the Invitation to Tender are currently being evaluated and work is expected to begin early in 2004.

46. All three devolved administrations have developed strategies for extending availability and take-up of broadband. For example, the Department of Enterprise Trade and Industry (DETI) in Northern Ireland is running a project to promote equitable and comprehensive access to broadband services across Northern Ireland. DETI will require that the winner of a tender process makes

[10] www.actnowcornwall.co.uk

broadband available to at least 95% of the populated area of Northern Ireland by 31 December 2005, but aspires to 100% coverage.

The Rural Broadband Unit

47. The Rural Broadband Unit was set up by Stephen Timms and Alun Michael in May 2003 to join up DTI, Defra and RDA thinking to address the emerging gap between broadband provision to urban and rural communities.

48. Rural Broadband Unit exists to help:

- ACCESS: support local community action to secure affordable access to broadband
- TAKE UP: ensure rural communities derive the maximum benefit from the deployment of broadband
- PROFILE: promote rural access and take up to those in a position to effect positive change

49. The Unit will do this by stimulating coherent community action that encompasses business, residential and civic demand through best practice found at local, regional and international levels.

50. The Unit works in support of both the DTI broadband and business competitiveness objectives and DEFRA's target to reduce 'the gap in productivity between the least well performing quartile of rural areas and the English median by 2006, and improve the accessibility of services for rural people.' In the House of Commons debate on Rural Broadband (1st May 2003), Stephen Timms emphasised that he wanted to see every rural community having access to an affordable broadband service from a competitive market, irrespective of location.

The European Initiative for Growth

51. The UK Government welcomes the recent proposal for an Initiative for Growth and the inclusion of broadband projects in the Quick-start Programme. The Digital Divide Project is the most relevant to the roll-out of broadband. As has been discussed above the UK Government has already announced our ambition to make broadband available to every community in the UK by 2005. The cost of providing a terrestrial broadband solution rises dramatically with distance from population centres, and there is a danger that large numbers of people in rural communities may be denied access because the investment remains uneconomic. This would hinder the full development of the European economy. we need to ensure that we adopt an approach which promotes competition and innovation, but is, at the same time, technology neutral; - the choice of delivery platform, whether it be ASDL, cable, fibre, wireless or satellite should be based on market conditions and customer demand.

52. The impact on growth will be particularly felt if businesses, particularly SMEs, have affordable access to the services they require. Businesses often require a higher specification service than the usual consumer service, with faster speeds symmetrical services, lower contention ratios and better quality of service. As a consequence we see enabling the provision of these services as one of the key uses that the UK might make of the European Investment Bank funds under this Initiative.

53. In many more rural and remoter parts of the UK the issue for these services is not just providing a local access system but one of bringing access to the core network (via a “backhaul” to a “point of presence”) sufficiently close to the customer that these higher specification services can be provided. In some cases this would require significant investment in new infrastructure which, we believe, might be a suitable use of EIB funds.

Competition in the UK Broadband Market

54. BT owns the great majority of all UK fixed wire telecommunications networks. Its ownership of the last mile between the exchange and the home or office gives BT significant market power in fixed telecoms services. There are exceptions to this, for example in the City, where BT has just 20% market share of business telecoms services.

55. BT uses its local telephone network to roll out the leading broadband technology – ADSL[11]. ADSL overtook cable modem as the most popular form of broadband only in July this year, but given BT's nationwide footprint has potential to become the market leader by a significant margin. Because BT is required to provide access to its systems to ISPs (Internet Service Providers), its own share of the retail ADSL market is only about 50%. Some 180 ISPs compete for the remaining business – notably Freeserve and AOL – meaning that the UK has just about the most competitive retail broadband market in the world.

56. A key issue is the way that BT is rolling out ADSL. It has adopted an approach which depends on there being a business case at each local exchange. It sets trigger levels for exchanges and then seeks pre-registrations to match those triggers before upgrading an exchange. BT has made cost savings throughout this year which has allowed the company to accelerate roll out. Nevertheless, BT calculate that there are a set of exchanges in rural and remote locations where, on present assumptions, there is never likely to be a case for roll-out. However, they either do not know or are reluctant to say which these are. It is this fact which has largely given rise to the whole rural broadband agenda and the search for alternative models of provision. For this reason, Stephen Timms and Alun Michael recently wrote to Ben Verwaayen to suggest that greater transparency in trigger setting would benefit everyone.

57. Oftel has told BT that it regards broadband as a national product and therefore that it could accept a model in which the costs of roll out were smoothed across exchanges. But BT has, for now, chosen to continue to select, on individual economic grounds, which exchanges to enable.

[11] Asymmetric Digital Subscriber Line – an always-on service, which provides fast downloading and standard speed uploading. Many currently popular applications do not require high bandwidth for uploading.

Access to the market for retail broadband providers

58. Retail broadband subscribers can enter the market over BT's network via a number of intermediate products that BT offers. The existence of these products has in some cases been facilitated by regulatory decisions taken by OFTEL in the interests of enhancing competition in broadband services.

Local Loop Unbundling (LLU)

The original Direction forcing BT to offer LLU in 2000 has been followed by several other decisions in which Oftel has had to make increasingly detailed Directions on such issues as the various ways by which LLU operators can organise their equipment within BT's exchanges to the last on the cost of supplying power to LLU operators (Feb 2003). Investigation into the pricing mechanisms for some LLU products is still under way.

After a slow start, LLU is now starting to take off with the number of unbundled local loops rising from 2300 in January 2003 to 7200 in September. Easynet is the largest LLUO in the county selling SDSL services to businesses.

BT's IPStream wholesale product

BT has offered a wholesale end-to-end ADSL product since it launched ADSL services in June 2000. It is intended that it should be offered on non-discriminatory terms to all customers including internal customers with BT (BT Retail and BTopenworld -now a part of BT Retail). The current offering is priced at £13.00/month. The product accounts for the majority of broadband connections within the UK.

BT's Bitstream Product (Datastream)

This product allows other operators to interconnect with BT's network at intermediate levels. Use of this product is starting to grow allowing some competition for end-to-end products at a wholesale level.

59. Retail competition, is predominantly available from the resale of BT's wholesale ADSL product and this compares favourably with many European markets, where retail competition is more limited. In particular, there is cross-ownership of cable and DSL networks in France, no wholesale DSL in Germany and limited infrastructure competition in Italy. In the UK BT Retail competes with some 180 resellers of BT Wholesale's ADSL product and BT Retail has about half of that market. This compares favourably with other markets such as Germany and France where the incumbents have some 90% of the retail ADSL market.

60. AOL UK has negotiated a deal with NTL that allows them to retail their services over the NTL cable network.

The impact of competition on the consumers

61. Consumers benefit from choice and low prices. The previous section on retail competition shows how the consumer benefits from a wide choice of retail offers in the UK. To this should be added the choice of infrastructure provision in some areas of the country provided by the cable and fixed wireless operators and across the UK by the satellite operators.

62. The UK remains third (behind only Canada and Japan) in the G7 for retail price. The price war in Japan has continued, consolidating the country's lead. However it remains to be seen whether their current pricing (as low as £18.50 per month) is sustainable in the long term. Prices in the UK have remained broadly stable since spring 2002, when BT implemented significant reductions in wholesale DSL prices. Typical prices for consumer 500-600 kbps products are £25 for cable modem products and £25-£30 for ADSL products.

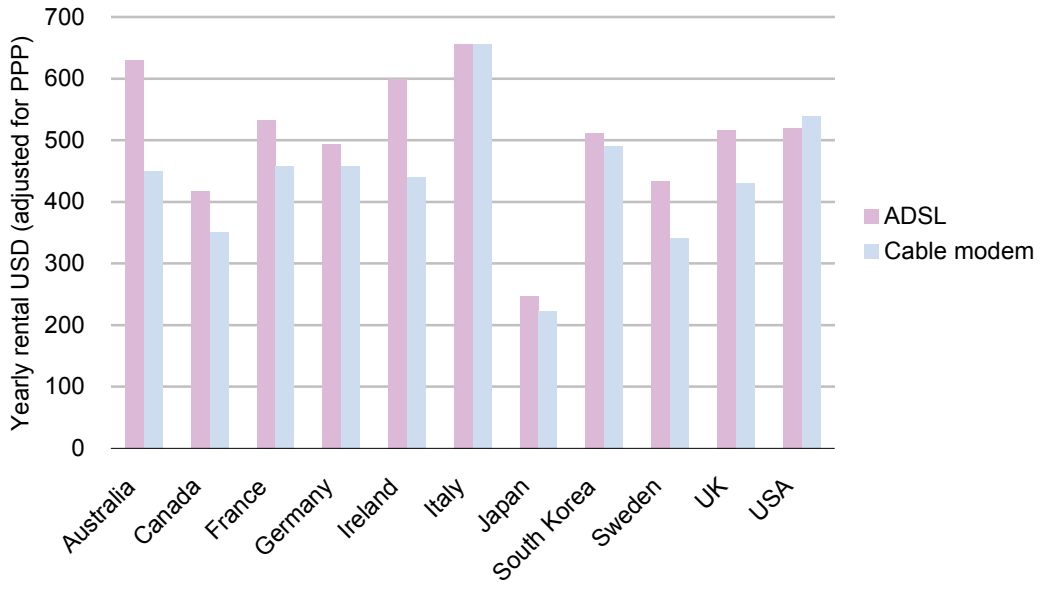


Figure 2: *Yearly rental for a residential broadband connection, excluding connection charges adjusted for PPP – Q3 2003 [Source: Analysys]*

63. In terms of take-up, the UK has strong underlying subscriber growth – some 170 000 per month. At the end of November 2003, the number of broadband subscribers in the UK had risen to over 3 million[12] This increased demand stems from the continuing effects of the significant price cuts at the start of April 2002 combined with aggressive marketing campaigns and increasing availability.

[12] November 2003, OFTEL market review

Beyond 2005

64. As customer sophistication grows in the UK, we expect an increasing demand for higher-speed services. Probably above the higher speed broadband that NTL, Telewest and BT already offer (1-2 Mbps). This increasing bandwidth will accommodate an ever widening range of high value added applications and content delivered through an increasing array of broadband-enabled devices, not just PCs.

65. A critical success factor is whether the UK is able to develop the next generation networks needed to carry this volume of data fast enough to keep up with demand. The present focus on the roll out of entry-level broadband based on existing networks and mature technologies - while understandable - will not be allowed to prevent us from seeing where the next big step forward will come from. The next step almost certainly has to include a deployment of fibre closer to the home. BT - which is already developing a 21st Century Networks Programme - has a key role to play in this as, clearly, does OFCOM, who will need to act in a way which encourages the right sort of investment while maintaining sufficient competitive pressure on BT. The future almost certainly will provide further opportunities for wireless, satellite and mobile broadband and may even see them emerge as mainstream competitors to fixed-wire providers rather than just fillers in areas not served by wire.

Appendix 1

Radio spectrum available for broadband

The Radiocommunications Agency is currently responsible for management of most civil radio spectrum in the UK and provides the lead in international negotiations regarding spectrum use. These functions will transfer to the independent regulator Ofcom in December. The Communications Act however provides powers for the Secretary of State to give general or specific directions to Ofcom in respect of spectrum, but these are limited to national security; the interests of international relations; compliance with international obligations, and in the interests of public safety or public health. A small joint DTI and DCMS Radio Spectrum Unit has been established to provide advice as necessary to Ministers in regard to exercising powers of direction, and more generally to manage the official interface with Ofcom on radio spectrum issues, including availability for broadband services. The Agency is shortly to commission an independent research study that will assess the likely future demand for spectrum to support wireless broadband in the UK. The study is expected to be complete during the first quarter of 2004 with a final report delivered to Ofcom.

3.4 and 3.6 GHz

Broadband wireless technology at 3.4 and 3.6 GHz provides always on, fast internet access at similar data rates to ADSL services. It is most suitable for small and medium sized businesses, and the top end of the domestic market.

Licences for 3.4 GHz have been awarded, with Pacific Century Cyberworks (PCCW) having won 13 of the 15 regional fixed wireless licences across the UK with one licence per region for a total of £6.3m. PCCW have also bought out Red Spectrum the company which had won the licence for the North of England (metropolitan), leaving only one other licence holder: Public Hub (Southern England; provincial). The licences include neither roll out obligations, nor service restrictions on licensees.

Firstnet acquired the wireless service formerly operated by Tele2 / Liberty Broadband in September 2002 together with its operating capability, and its wireless infrastructure national spectrum at 3.6-4.2GHz. In August 2003, Firstnet was then acquired by GX Networks plc. GX Networks now has a significant market presence in fixed, wireless, voice, data and Internet services and intends to be a leading provider of SME based communications solutions in the UK.

GX Networks' wireless deployment is based on 'point to multi-point' technology with a variety of base station capacities and costs. They are licensed to deliver service to a 10km radius from its transmission points.

The Government is also looking to make additional spectrum available for broadband in the 3.6 GHz waveband. The proposals for the use of spectrum at the 3.6GHz waveband for broadband services will consider how much spectrum to use and how the licences will be made available, including a proposal for a single national licence.

28GHz

RA carried out an auction for 28GHz broadband wireless local loop licences in November 2000. The Radiocommunications Agency offered 42 licences (three in each of 14 regions). Fifteen licences were sold as follows:

- three in Greater London;
- three in Greater Manchester;
- three in West Midlands;
- two in Northern Ireland; and
- four in northern England and Scotland.

The licensees are at various stages in deploying their networks: in particular, Your Communications is offering broadband to corporate organisations in the West Midlands, Greater Manchester, Yorkshire and the North of England, including Cumbria. A second award process closed on 14 October 2002 without any more licences having been awarded.

RA published a consultation document on 15 October 2002, proposing a new award process for unsold licences. After considering the responses, the Government has concluded that the Agency should:

- modify the "purpose of use" condition within new and existing licences, to allow the deployment of any fixed service;
- remove the "use it or lose it" condition within new and existing licences; and
- consider offering licences in Licence Area 3 on the basis of pre-determined areas (e.g. county licences), or by operators nominating the areas they want, or by licensing individual base stations.

Smaller licence regions was discussed at the recent BFWA Consultation Group meeting, held at the Agency's HQ on 4 March 2003. . The Agency is currently considering responses received on papers at the meeting and has appointed Mason Communications as market and financial consultants to advise on current market conditions and the scope for re-designing licence regions, including the valuation of licences. This work will be presented at the next BFWA Consultative Group which is due to be held in July. The Government plans to announce details of an award process by this summer.

The Agency will not, however, apply the minimum path length policy to 28 GHz licences.

2.4GHz

The provision of commercial telecommunication services is now permissible in this licence-exempt band and several existing operators are providing Internet access “hotspots” in public places.

5GHz

Licence-exempt applications such as radio local area networks (RLANs) are intended to operate in a number of frequency ranges between 5150 MHz and 5875 MHz. These ranges are also under consideration for the provision of FWA services using RLANs.

In September 2002, RA published a consultative document on the proposed Consolidated Wireless Telegraphy Licence-Exemption Regulations; the consultation closed in October. The Regulations, came into force on 12 February 2003, exempt low-power RLANs for both public and private use in the 5 GHz band A (5150 to 5350 MHz) and band B (5470 to 5725 MHz). The new changes to regulations mean that telecoms operators can offer commercial broadband services through public networks without the need for a Wireless Telegraphy Act licence. The deregulation will allow commercial network operators and other public and private users, from schools to hotels, to set up Radio Local Area Networks (RLANs) to operate in parts of the 5 GHz radio spectrum

As there are already users in band C (5725 to 5875 MHz), sharing studies must be completed before this band can be released.

Appendix 2

Broadband market indices

Broadband market indices have been developed to measure and compare the attractiveness and performance of the broadband market across a range of countries. The underlying principles used to develop the indices that comprise the broadband market index are:

- simplicity – the index must be transparent and easy to explain and understand;
- quantifiable – the data to be used in the index must exist in a consistent manner across all the countries studied;
- realistic – it should give as realistic an impression as possible as to the status of broadband in a given country.

In these situations it is sensible to start from an end goal and work backwards. In the UK's case, the goal is to have the most extensive and competitive broadband market in the G7[13] by 2005. Therefore, extensiveness and competitiveness are clearly the two criteria that will need to be measured.

The DTI has worked closely with the Broadband Stakeholders Group (BSG) and Analysys Consulting to develop suitable metrics. Consensus has emerged around a dashboard of indicators. A range of indices enables a deeper understanding of the relative strengths and weaknesses of each international market that cannot be attained from a single aggregated measure.

Definition of indices

Six key measures of success have been identified: price, choice, regulation, availability, addressable market and take-up. These are calculated as indices between 0 and 1 for each country, where a high score represents a good performance.
Weightings are attached to these different indices to produce extensiveness and competitiveness indices, against which countries can be ranked.
All indices are calculated based on the situation at the end of September 2003.

Choice index

The choice index is comprised of three parameters:

- infrastructure competition – sum of the squares of the top three infrastructure player markets shares[14]
- infrastructure choice – proportion of households with a choice of terrestrial infrastructure operator

[13] G7 countries are: Canada, France, Germany, Italy, Japan, the UK and the USA

[14] Sum of the squares of market share is a standard measure of market concentration. The score for a pure monopoly is 1 and as a market becomes more competitive so the score tends towards 0.

- retail competition – sum of the squares of the top five retail ISPs market shares.

Equal weighting is given to infrastructure and retail by weighting both infrastructure competition and infrastructure choice as "1" and retail competition as "2". The UK is ranked fourth in the G7.

Price index

The price index is calculated as the price of the top 5 retail ISPs, weighted by market share. Prices used are for mainstream residential products and include connection fees amortised over a three-year period and are adjusted for purchasing power parity (PPP)[15]. In order to give a value between 0 and 1 for this index a PPP price of USD200 or less (per year) is allocated a score of 1, with a PPP price of USD800 or more allocated 0. A linear scale is used between these points. The UK is ranked third in the G7.

Regulation index

The regulation index compares and contrasts the broadband market actions taken by regulators in each country. The regulation index is based on simple, binary scores for the presence (or absence) of regulatory provision for:

- wholesale DSL
- wholesale cable
- local loop unbundling (LLUB) – mandated
- access upstream of MDF
- line sharing
- separation of network ownership.

The index does not provide a measure of the success of policy implementation. On this simple index, the UK is joint first with the USA in the G7.

Availability index

Availability index is a measure of the proportion of the population with access to a terrestrial broadband solution (naturally a value between 0 and 1). The UK is ranked 4th in the G7.

[15] Prices are converted from local currency to USD using the exchange rate from the same time as the PPP factors to ensure consistency.

Market context (potential) index

Countries with a high penetration of services that are 'part way' towards broadband (i.e. flat rate narrowband, ISDN, digital TV, 3G) have a large pool of subscribers, who may quickly switch over to broadband given certain circumstances. Hence countries with high flat rate, ISDN, or DTV penetration could expect an accelerated growth in broadband penetration, once broadband prices are close to flat rate prices, the applications for which broadband is essential increase in attractiveness and (or) digital TV becomes a competitive platform for broadband delivery. 3G provides an additional way of providing broadband access, albeit at lower data rates / higher cost per Mbyte transferred.

Flat rate Internet access is available in a number of countries (e.g. the USA, Canada, Australia), due to local calls being either untimed, or bundled with line rental. For example in the USA local calls are 'free' (effectively bundled with line rental)[16] and in Australia local calls are a set cost, regardless of duration. Hence if the call to the ISP can be made via a local number (most cases) then the telephony element is flat rate. Payment to the ISP occurs on top of this charge and can either be a flat fee per month, or based on some sort of usage measurement (volume, time). Data on the breakdown of which price plans subscribers have adopted is scarce, however, the trend is towards flat rate prices except for low users.[17]

The UK is unusual in that flat rate services are available (via FRIACO or cable operators), even though local calls are metered. In other countries where local calls are metered e.g. Germany the availability of flat rate services is very limited. The high levels of take-up of flat rate services in the UK (over 50% of Internet subscribers) indicate that if the gap between broadband and flat rate prices is reduced, or compelling applications emerge then the UK could see a fast migration of flat rate users (who are familiar with paying monthly fees) over to broadband.

This potential market is captured in the market context index as a measure of potential acceleration of broadband, where equal weighting is given to ISDN, flat rate, digital TV and 3G subscribers. In order not to penalise countries where transition from these services to broadband has already occurred, broadband penetration is also included in this index. The penetration of these services is then summed and divided by 200% to give a value between 0 and 1. The UK is ranked third in the G7.

[16] There are a small number of exceptions where local calls are not 'free' e.g. NYC

[17] Assumption is that 75% of users are on a flat rate package from their ISP, if untimed local calls are available

2005 government target

The government target is to have the most competitive and extensive broadband network in the G7 by 2005. The target may therefore be broken down into the two factors – competitiveness and extensiveness – which combine to provide the overall market environment for Broadband. One can define these two factors in terms of the relevant dashboard indicators as follows:

competitiveness is defined as a composite measure of the market regulation index (a leading indicator), market choice, and price (a lagging indicator) – these are weighted: regulation (1), choice (3) and price (3)

extensiveness is defined as a composite measure of market context and Broadband availability – these are weighted market context (1) and availability (2).