postnote

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BROADBAND INTERNET ACCESS

There are now over 700,000 subscribers to high speed 'broadband' internet access in the UK. With 100,000 new customers being connected each month, progress is being made towards the Government's target "*for the UK to have the most extensive and competitive broadband market in the G7 by 2005*". However, the UK still has one of the lowest numbers of broadband subscribers in the G7 and a third of UK households are not covered by the main broadband providers. This briefing outlines how broadband internet access can be received, examines international comparisons and considers options to encourage take-up and coverage.[1]

What is broadband?

Broadband internet connections allow users to download web pages and data many times faster than conventional 'narrowband' internet access. There is little agreement on the definition of broadband - the Government's UK Broadband Stakeholder Group has accepted that it is constantly evolving and uses a definition based on services to the end user rather than data rates. Most current UK mass-market broadband consumer packages offer speeds of 512kbps (512,000 bits of information per second), compared with 56kbps for narrowband.

Broadband services are 'always-on' - the computer is connected to the internet continuously. Users pay a flat rate independent of how long they spend on the internet or the amount of data downloaded. Broadband users typically spend four times as long online as narrowband customers[2] and broadband take-up has been faster than many comparable technologies, such as mobile phones.

Some of the ways to receive broadband are shown in the box on page 2. The vast majority of UK broadband customers use the cable network or standard telephone lines (ADSL - see box). Cable broadband is supplied by NTL and Telewest. BT sells wholesale ADSL packages to around 200 operators, so customers can buy ADSL directly from BT (who have around 60% of the market) or from another operator. See table below.

Broadband subscribers, cost and coverage

Broadband technology	Number of subscribers (June 2002)	Cost per month (512kbps)	Coverage (% of all households)
Cable modem	419,000[1]	£25-35[2]	45%
Telephone line (ADSL)	290,000	£22-30	60%

[1] *Includes customers on NTL's 128kbps package, at £15/month*

[2] *Includes telephone line rental*

Sources: Oftel, Broadband Stakeholder Group, NTL

Government policy

The Government published its broadband policy *UK online: the broadband future*, in February 2001. This set out two main reasons why the Government believes broadband is important: to encourage users to connect to the internet more often and for longer; and to enable new consumer and business services. It suggests that these changes will play an important role in national competitiveness. In the autumn, the Prime Minister's Strategy Unit is expected to report on the development of electronic networks over the next decade[3].

The UK Broadband Stakeholder Group

The Government's Broadband Stakeholder Group was established in April 2001 and reports to the DTI.[4] It includes representatives of policy makers, content providers, communications companies and consumers. Its latest report was published in June 2002, focusing on two main areas: accelerating take-up and extending coverage. These issues are considered on page 3.

Technologies for broadband in the UK

Cable
Cable networks in the UK cover around half of all households, providing television, telephone and internet access. Around 85% of these networks currently can supply broadband internet services using cable modems. NTL and Telewest both offer services at 512kbps and 1,000kbps. In 2001, NTL launched a combined cable modem and digital TV set-top box offering broadband internet access.

Standard telephone lines - ADSL
ADSL (Asymmetric Digital Subscriber Line) technology uses special equipment at each end of copper telephone lines so that they can send and receive data more quickly. Like many broadband technologies, ADSL provides faster downstream rates (to the user) than upstream (from the user to the internet). Many users receive more data from the internet (web pages, audio files etc.) than they send. BT launched ADSL services in summer 2000 and aims for more than 1 million ADSL connections by summer 2003. ADSL is also provided by Kingston Communications in Hull, who have 10,000 subscribers.

ADSL can only be used within ~5.5km of a suitably equipped telephone exchange - in a typical exchange area, this includes 90% of premises, although it will be less in rural areas. 1115 exchanges, serving two thirds of households, have been converted to offer ADSL.

Satellite internet
Satellite services can provide broadband internet access to areas which other technologies do not cover. Information sent to each user is broadcast by the satellite, but encoded so that only the intended recipient can read it. The return path can be via a landline phone or direct to the satellite. A number of service providers now offer satellite broadband services, mainly aimed at small and medium-sized businesses. It is generally more expensive than cable or ADSL with particularly high installation costs. However, rural businesses may be able to receive support - for example, Highlands and Islands Enterprise in Scotland have allocated £250,000 to help with installation costs.

Optical fibre
Optical fibre can provide very high data rates. It is used for the backbone of the communications network and by many existing businesses, but costs have been too high to allow fibre to the home. However, costs are falling and becoming comparable to ADSL for new housing estates.

Wireless
'Broadband fixed wireless access' allows high speed internet access via an antenna which users attach to the outside of their building. It is offered in the UK for around £50 per month but coverage is currently limited to 13% of households (although it is planned to extend this to 65% by 2003). Regional licences for spectrum were auctioned by the Government in November 2000 but of the 42 available licences, only 16 were sold. The Government is running a rolling auction for the unsold licences until October 2002.

The next generation of mobile phones (known as 'third generation' or 3G) is due to be launched in the UK in 2002/3. This will allow faster internet access than current mobile phones (although rates of 512kbps are unlikely).

New fixed and portable wireless technologies are also being tested and may offer the chance to extend broadband coverage. In particular, the 'WiFi' technology developed for in-building wireless networks may prove useful for local rural community schemes and for broadband 'hotspots' in public areas such as train stations and cafes.

International comparisons
Take-up
Broadband take-up in five countries is shown in the figure below. Although UK take-up is increasing, it remains the lowest of the countries considered. South Korea has the world's highest take-up of broadband, with 64% of households subscribing (July 2002) – although because much of the population lives in apartment blocks, direct comparisons with the UK are difficult. The box below considers the policy approaches taken by some of the leading broadband nations.

International broadband take-up (% of population)
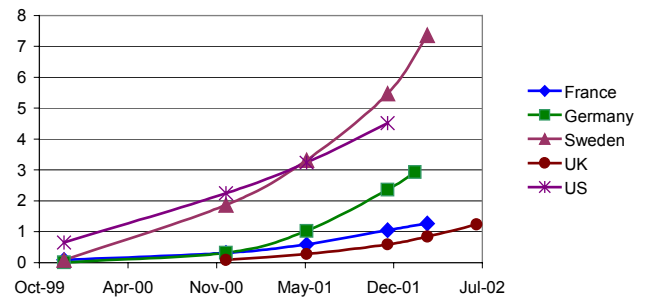
Source: Oftel

International broadband policy

South Korea
'Cyber Korea 21' aims to provide universal access to broadband by 2002. In a new initiative, 85% of homes should have 20,000kbps connections by 2005. The government has offered low interest loans to network providers in rural areas and mandated broadband installation in new apartment buildings.

Canada
$4bn Canadian dollars (£1.75bn) is being spent by the government to implement the National Broadband Task Force action plan, which includes connecting all communities to national broadband networks. The government is funding network builders and co-ordinating demand to stimulate infrastructure investment.

Sweden
In Stockholm, a publicly owned company is installing a network of 'dark fibre' (with no communications equipment at either end). This can then be leased by operators to provide communications services. The Swedish government is also investing £680m with the aim of ensuring that broadband access reaches 98% of towns and villages. This is expected to be matched by equal private investment. In addition, there are tax subsidies for broadband subscribers.

Source: Broadband Stakeholder Group, OECD

Price
Oftel conducted a study comparing the April 2002 price of ADSL and cable modems in the UK with those in France, Germany, Sweden and the US. It considered the two cheapest packages in each country, examining residential and business deals. Key points were:
- residential broadband prices in the UK were similar to or lower than in all countries except Sweden.
- for basic business services, the UK was cheaper than the other countries studied.

Further, Oftel has concluded that the UK has one of the most competitive broadband marketplaces in Europe. It argues that there is competition between cable and ADSL and that ADSL service providers can choose between local loop unbundling (see box below) and wholesale services, unlike in many other European countries.

Unbundling the local loop

BT, as the former state telecommunications network, operates an extensive 'local loop' - the copper wires that run from telephone exchanges to customer premises. Through 'local loop unbundling', BT makes its local loop available to other operators who can then upgrade individual loops using ADSL technology to offer high speed internet access. An EC Regulation requiring incumbent operators to unbundle their local loops came into force in January 2001.

When unbundling commenced, there was great demand from operators - so much so that BT believed that it would be unable to offer space in exchanges to all those who requested it. However, by February 2001 requests from operators had fallen to such a low level that BT could now meet all demand. By July 2002, ~600 local loops had been unbundled out of a possible 28 million. There have been similar problems in other European countries, with the Competition Commissioner concluding in July 2002 that "*in many countries unbundling has not gone beyond a merely experimental stage*". Some telecommunications operators have suggested that BT's local loop network should be run as a stand alone business, separate from its retail services.

Encouraging take-up

In their June 2002 interim report, the Broadband Stakeholder Group argued that increasing take-up in areas where broadband is already available was key to further development. Price is clearly an important factor. Cable modems have gained nearly 60% of UK broadband subscribers, in part due to 2001 price reductions. April 2002 reductions in BT's wholesale prices (by 40% for its main residential product) have similarly encouraged the ADSL market.

Thus far, the UK broadband market has been driven by narrowband internet customers who wish to access the same content more quickly. In business, case studies suggest that broadband can cut transaction costs and increase efficiency and innovation. However, for significant growth in residential take-up it seems likely that new (as yet unidentified) types of content and services will be needed.

The ability to view full motion video is seen by many as an important future application for broadband, with the BBC and Kingston Communications in Hull running a trial of broadband interactive local TV. Public sector content may also drive take-up, for example in education and health services. The Stakeholder Group suggested that new content will require two key developments:
- a standard 'micro-payment' system, so customers can buy small value items, such as the right to watch an online video, without needing to use their credit card
- a 'digital rights management' system, which would encourage providers to deliver their content via broadband without concerns over piracy[5]. 'Peer-to-

peer' file sharing, where users swap audio and other files over the internet, is one of the primary applications for current broadband users.

The Group also proposed work on a number of further areas to encourage take-up, including: security guidelines (to inform customers about how to protect themselves against viruses, hacking etc.); and the development of a competitive broadband market - particularly through the proposed new communications regulator, OFCOM.

Broadband coverage

Around two-thirds of UK households are currently covered by cable or ADSL broadband services (~40% of households have a choice between the two). However, in rural areas less than 5% of households are covered. In the longer term, satellite and other wireless solutions may offer greater availability in rural areas, but at present these are not mass-market products.

The Broadband Stakeholder Group is working on a detailed map of UK broadband availability and has suggested that areas fall into four broad categories:
- a competitive market for affordable mass-market broadband services (duopoly)
- at least one provider offers affordable mass-market services (monopoly)
- no services currently available, but potential for commercially sustainable broadband services. Market incentives required
- little expectation that the market will provide affordable services. Political solutions required.

UK regional development

The Government has announced the establishment of a network of dedicated regional broadband advisors, to be co-ordinated by the DTI. It is also providing £30m funding for projects to encourage broadband roll-out in regions across the UK. Managed by Regional Development Agencies, the projects include:
- 'Broadband Buckfastleigh' – connecting public services in this small Devon town to broadband
- trials of new technologies such as wireless access and satellite in rural areas of the East Midlands.

Other regional initiatives are also developing. For example, in Cornwall the £12.5m ACT NOW partnership aims to ADSL-enable 12 exchanges and provide broadband equipment and support for over 3,000 businesses. It is part-financed by EU Objective One funding. In addition, the devolved administrations have established broadband strategies (see box on page 4).

Aggregating demand

Under this model, potential broadband customers in a local area come together to express their interest in broadband, and thus aim to persuade suppliers to extend coverage to their area. The Government's broadband strategy includes a pilot Broadband Brokerage service in the East of England, to allow companies, public sector organisations, communities and individuals to register their interest and then procure services together.

Broadband in the devolved nations

Scotland
The Scottish Executive's August 2001 paper *Connecting Scotland: our broadband future* set out three strands:
- liaison at UK level on regulation and policy
- plans for 'zonal' procurement - where public sector demand would be aggregated in local zones, which providers would then bid to serve. Two areas have been nominated as 'pathfinder' areas: the Highlands and Islands, and South of Scotland.
- identifying areas where direct support is needed - including work under the £4.4m allocated to Scotland from the UK broadband fund.

Wales
Cymru Arlein Online for a Better Wales set out the Welsh Assembly's IT strategy. £100m of public money is being invested in a five year programme to bring broadband to 310,000 extra homes and 67,000 extra businesses. The programme includes:
- promotion and advertising of broadband
- investigating the economic case for subsidising terrestrial broadband
- a satellite subsidy scheme for businesses who cannot access affordable broadband by other means
- aggregation of public sector demand, including the establishment of a 'lifelong learning network' for Wales.

Northern Ireland
The Executive's broadband programme includes:
- support for businesses to connect to satellite broadband
- schemes funded through Northern Ireland's £1.5m share of the UK broadband fund
- 'Broadband for Business' campaign to stimulate demand
- a feasibility study into public sector aggregation
- providing broadband in classrooms and libraries.

BT has set up a registration scheme for over 300 exchanges (with another 500 due to be added by September) where, if demand is sufficiently high and it is technically feasible, it will convert the exchange to ADSL. In these areas, 200-500 advance orders would trigger ADSL provision. However, the pressure group Broadband4Britain is running its own campaign to aggregate local demand and has suggested that 50 orders should be enough to convert a typical exchange. In reply, BT argue that all exchanges are available for local loop unbundling, so other broadband suppliers could meet this demand if it is commercially feasible.

Public sector demand
The public sector will be one of the key drivers of broadband demand. Pooling requirements from hospitals, schools etc. could permit more cost effective procurement and stimulate broadband roll-out. A team in the Treasury's Office of Government Commerce will advise public sector purchasers on broadband and negotiate 'framework contracts' with suppliers. The team will work with the DTI network of regional advisers.

However, concerns have been expressed about aggregation of public sector demand as a means of encouraging infrastructure investment. Communications providers have little capital available and any proposal will need the prospect of significant returns. Even with aggregation, it is not clear whether demand in remote areas will be enough to justify infrastructure investment. In addition, anticipated public sector demand is uncertain, so some providers have called for the Government to guarantee a level of future demand.

Fiscal incentives
In its December 2001 report, the Stakeholder Group noted that the stock market slump had decreased the capital available for telecommunications companies to invest in broadband infrastructure. The Group proposed that the Government explore fiscal methods to reduce the cost of this capital, an approach used by some of the leading broadband nations. However, the Government rejected such incentives, arguing that there was not "*clear evidence of market failure, sufficient to justify the costs of intervention*". Such direct Government help may also be considered illegal state aid by the EU.

Universal service obligation
Despite the market incentives proposed above, there will remain areas where it is uneconomic for communications providers to offer mass-market broadband using current technology. The Broadband Stakeholder Group suggests that ensuring access in these regions is a matter of public policy rather than an industry issue.

Access to standard fixed line telephone services for all areas of the UK is ensured through the Universal Service Obligation (USO). This requires BT (and Kingston Communications in Hull) to provide access to fixed line telephone services at an affordable, geographically averaged price. Oftel reviewed the USO in August 2001 and concluded that an extension to broadband would be premature. EU law rules out extending the USO to broadband, but requires the EC to review this by 2005.

Overview
The number of broadband subscribers in the UK is growing substantially, and should reach 1 million before the end of the year. Oftel has concluded that the UK broadband market is competitive, but issues remain to be addressed in two areas before the Government's target for the most *extensive* market in the G7 is likely to be met:
- increasing take-up where broadband is available
- extending coverage to the third of households which do not have access to affordable broadband services.

Endnotes
1 For a more detailed study of broadband, see POST's longer report *e is for everything?*, December 2001
2 *UK online: the broadband future*, Office of the e-Envoy, 2001
3 See www.strategy-unit.gov.uk
4 The Group submitted a full report and strategic recommendations to Government in November 2001. See www.broadbanduk.org
5 See forthcoming POSTnote about copyright and the internet