



Cynulliad National
Cenedlaethol Assembly for
Cymru Wales

Economic Development Committee
Broadband Policy in Wales

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ECONOMIC DEVELOPMENT COMMITTEE BROADBAND POLICY IN WALES

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1. Introduction

1.1 The Economic Development Committee has for some time been concerned about the availability of affordable broadband ICT in Wales. It has considered various papers at different times from a member of the Committee, the Economic Development Minister, from external organisations and companies involved in the development of broadband, and the subject figured in the programmes for the Committee's visits to the United States and Sweden. Although the Committee has not formally launched a review into broadband ICT, it considered it appropriate to prepare a report summarising its conclusions.

2. Background

Broadband

2.1 There are countless papers on just what broadband is and there is little need to repeat much of the technical description here. Information is carried electronically along wires and fibre optic cables, or broadcast from land-based transmitters and satellites, using a 'band' of frequencies. The rate at which information can be carried is proportional to the *bandwidth* – the range of frequencies covered in the band. The capacity of a band can be used in 2 ways: either to allow many users to transmit a small amount of information each, or to allow a small number of users to transmit a lot. There is a wide range of other technical factors that come into play but much of these are of interest only in relation to specific aspects of the debate.

2.2 The key issue to a user is the volume/speed of data that can be transmitted and this is measured in terms of the number of bytes per second. In scientific terms (e.g. ITU-T Recommendation I.113) 'broadband' is often considered to be the ability to transmit data at greater than 1,500 kilobytes per second (kbps) – this can otherwise be expressed as 1.5 megabytes per second (Mbps). However, practical and market considerations mean that the term is now used to describe a range of 'products' which offer customers faster transmission rates than could previously be obtained via dial-up and ISDN lines. This is an evolving marketplace but most UK Broadband consumer packages currently offer speeds of 512 kbps or more for downloading information and up to 256 kbps for transmission. One package with these specifications, including the differential transmission rate, is known as ADSL (Asymmetric Digital Subscriber Line) and has developed because it allows broadband to be provided using standard telephone lines up to 5.5 kilometres from the exchange. It is also argued that most users spend more time downloading information than transmitting it and therefore the speed of the former is more

important than that for the latter. Nonetheless, this approach is clearly a compromise between a range of factors and work is continuing to develop the availability of symmetric transmission and faster data transfer rates.

Domestic use of Broadband

2.3 The significance of a transmission speed depends on the purpose for which the line is used. Browsing the internet at a transfer rate of 28 kbps or 56 kbps can be adequate for many purposes – but becomes increasingly unsatisfactory to customers as the desire to download music and other material, use Internet banking, book holidays increases. Waiting for pages to download is also frustrating. But there is a much greater significance to offering fast Internet access at home. It brings a wide range of information, entertainment and products directly to people. And, along with these there are economic benefits from the many and substantial market opportunities that flow from this and from which Wales could benefit. But also, home use of ICT is a valuable way of increasing awareness of how it can be used commercially - and of developing people's skills in using it.

Commercial and Industrial use of Broadband

2.4 Ways of doing business have changed rapidly in the last few years. At the lowest end, e-mail is a standard form of communication for many and one which allows companies, suppliers and customers rapid access to each other. Alongside this, information which might previously have been provided in 'brochures' is now made available via the Internet. This can reduce the cost of publication and distribution of information – and allows it to be updated continuously. It enables business to operate more efficiently and quickly and to serve customers in a much wider area. A small company can potentially sell to a global market. It is a corollary to this that a company that does not adopt the new technology may lose its existing markets.

2.5 As this kind of application has developed, the amount of information available, and the scope of transactions possible, has increased. This has resulted in a need for higher capacity and faster transmission of data. Dial up telephone lines are now inadequate for many purposes and higher capacity connections are needed.

2.6 Especially important will be the ability to receive and send high-quality video information, which will be a pre-requisite for the development of many productive and creative industries based in locations remote from their customers. These already exist and provide opportunities for jobs to be created in rural areas such as Wales and to serve markets both in the remainder of the UK and around the world. The opportunities for this

kind of technology are only just being exploited and can clearly be expected to continue to grow rapidly.

2.7 It is likely that the bandwidth necessary for symmetric transmission of high-quality video data – at least 2 Mbps but preferably 10 Mbps – will set the long-term standard for broadband connectivity (just as the ability to transmit a recognisable voice set the long-term standard for telephone communication).

2.8 The Economic Development Committee therefore considers that the widespread availability of broadband is essential to Wales' economic development. It will provide opportunities for job creation in many areas of Wales and in sectors where there are strengths. Conversely, the availability of broadband elsewhere in the UK and Europe means that competitors are exploiting the benefits that this technology has to offer and Wales is falling behind.

3. **Broadband in Wales**

3.1 There is widespread evidence that the availability of broadband in Wales is not as great as in the rest of the UK (e.g. UK On-line: the Broadband Future, 2001). In part this can be attributed to geography – it is technically and commercially easier to provide all forms of telecommunication links in urban areas because of the availability of a large number of customers in a dense area. Wales' remote and rural populations mean that both the technical and commercial challenges are much greater. Nonetheless, if these are not addressed then Wales will fall behind not just in terms of broadband availability but also in respect of the economic opportunities available to it and the ways in which it can exploit them. In the same way that the railways opened up massive economic opportunities in the 19th century, and dual-carriageways in the 20th, broadband can do the same in the 21st.

4. **Welsh Assembly Government policies: Cymru Ar-lein – On Line for a Better Wales**

4.1 The Welsh Assembly Government has adopted policies in order to promote and develop the use of ICT in Wales. This policy is entitled **Cymru Ar-lein** and is aimed at creating a Wales which is:

- ***United*** through its use of ICT, ***confident*** in promoting our achievements on the world stage and ***creative*** in exploiting ICT for the benefits of individuals, communities and businesses;

- **Committed** to fostering, through the effective use of ICT, its unique and diverse identity, and the benefits of bilingualism;
- Using ICT to become more prosperous, well-educated, skilled, healthy, **environmentally and culturally rich**;
- **Served** by modern, effective, efficient and accessible public services that use ICT to enhance their services;
- **Active** in its use of ICT in local communities, where the voice of local people is heard;
- **Fairer** – a place where everyone is valued and ICT is used to give everyone an opportunity to play a full part.

4.2 These are worthy aims – and amount principally to making ICT an integral element of meeting the full range of the Government's objectives. Cymru Ar-lein has 5 strands:

- *Enhancing our communities – E communities;*
- *Building successful businesses – E Business;*
- *Improving public services – E Government;*
- *Developing ICT skills – E Education and training;*
- *Ensuring first class infrastructure – Broadband Wales Action Plan.*

4.3 Cymru Ar-lein details a large number of specific actions being taken in order to deliver the Broadband Wales Programme. A major part of the programme is based on stimulating demand and involves a number of activities:

- promoting and encouraging the use of broadband through advertising, increasing awareness, offering impartial information and advice to potential users, bringing users together to share experiences;
- increasing the opportunities to use the internet by developing resources such as extranets serving communities of interest, developing learning and curriculum material, providing support for teachers, and increasing awareness of the resources already available.

4.4 All strands are important but the success of the whole package depends entirely on the fifth strand – the existence and effective use of a comprehensive and future-proof infrastructure.

4.5 The **Broadband Wales Action Plan** has 5 key action areas focused on developing the availability and use of broadband:

- **Demand stimulation** - actions to raise awareness of broadband and to support those who wish to exploit the new technologies;
- **Supply stimulation** - actions to overcome obstacles to the availability of affordable broadband;
- **Encouragement of local initiatives** – actions to facilitate initiatives to develop local broadband solutions and content;
- **Specific procurements** – interventions to increase the availability of broadband in specific circumstances, addressing identified gaps in provision;
- **Aggregation of public sector demand** - actions to rationalise public sector broadband procurement in Wales that can also positively influence the economics of broadband deployment.

4.6 **The Broadband Wales Programme** was launched by the Economic Development Minister in July 2002 as the Assembly Government's programme for facilitating broadband in Wales. In his paper to the Committee, the Minister said:

In the five years July 2002 to July 2007 the Plan has the following targets:

- *An increase in the availability of affordable terrestrial broadband services in Wales by approximately 30%, with 310,000 extra homes and 67,000 extra business lines potentially being able to access broadband. [This is in addition to the normal, commercial increase in the availability of broadband];*
- *50-100 local or regional initiatives to be developed to deliver broadband solutions;*
- *Broadband connectivity to be available in most business parks in Wales;*
- *Approximately 1200 additional public sector sites to be broadband-enabled;*
- *Broadband services to be made widely available throughout Wales at near-DSL prices;*
- *Increased awareness of broadband communications and its benefits.*

4.7 The policy recognises the chicken and egg situation. Affordable access to broadband would be possible if the infrastructure and services were available to deliver it. But in many areas – including the most economically-deprived - demand is currently insufficient to justify the commercial investment necessary to provide these. It is debatable whether this is strictly 'market failure' but if one accepts the basic premise of the need for a major

expansion of broadband availability, there is a clear case for Government intervening to overcome the market hurdles.

4.8 Because telecommunication services are primarily delivered by the commercial sector the Government cannot easily influence supply directly – not least because it has to have regard to European state aid issues. Initiatives to increase supply are therefore based largely on developing and co-ordinating the use made of broadband by, and in, the public sector, consciously and directly increasing demand where this falls within Government's power, and encouraging pilot initiatives. These include:

- support to the WDA, and involving local authorities, to provide high speed connectivity at key business parks and business locations;
- the development of services utilising broadband within public sector bodies such as Assembly Sponsored Public Bodies, the criminal justice system, Government Departments in Wales, the Health Service, Local Education Authorities and local authorities. The aim is to form a Wales Broadband Public Sector Network which will provide a substantial infrastructure. The key point is that the infrastructure will be provided by the private sector stimulated by the increased and co-ordinated demand from the public sector;
- the Government is also pursuing a number of projects in connection with Objective 1 funding to promote the use of broadband ICT amongst local communities and groups and help deliver infrastructure upgrades in areas where market forces will not deliver a solution in 5 years.
- providing subsidies for small businesses who cannot get terrestrial broadband to obtain it via satellite.

Funding

4.9. The Government has allocated total funding of £135M to support the programme, £50 M from the Objective One programme, £20 M from the WDA, £45 M from the Assembly budget and £20m from the NHS DAWN2 budget. Roughly one third of this is to go into developing broadband connectivity in the health and education sectors; one third to developing local community-based projects, with the remainder spread between the other activities.

5. Principles for the development of broadband

- 5.1 In its various discussions the Committee has identified a number of principles which it considers should underpin the development of broadband ICT in Wales:
- 5.2 Development should be based on market principles utilising the private sector wherever possible. The role of Government should be to ensure that appropriate infrastructure is available and do what is necessary to facilitate this.
- 5.3 Options need to be kept open. Care should be taken about policies which involve a commitment to a single technological route as technologies can and do change. Any 'solution' must be 'future proofed' incorporating flexibility to protect against investing too heavily in technologies that might rapidly prove obsolete.
- 5.4 At the same time, and not contradicting the previous point, Government should be looking to solutions for the long term. While there is a clear need to examine all expenditure and investment in terms of value for money, it is important to have a clear long term view of the kind of infrastructure that one is looking to achieve and to ensure that any cost-benefit analysis takes account of this.
- 5.5 It is important to recognise that the market for broadband does not contain a single product. At the domestic end, the most obvious demand is for e-mail and Internet browsing services and it is at these that dial up and current ADSL technologies have been aimed. However, consumers have a clear demand for music and videos to be transmitted to their homes and it seems inevitable that there will be a deeper integration between broadband, telephone, cable television and other services. There appears to be evidence, particularly in the US, that appropriate bundling of these services can result in consumers being prepared to pay the higher cost that high specification connections require.
- 5.6 While it is important to recognise geographical constraints and the challenges facing small populations, the current level of ADSL transmission is not adequate as a long-term objective. Needs and demand can change very rapidly in this sector and faster transmission rates might very soon be required if Wales is to keep up with the rest of the world.

5.7 ADSL provides the very minimum bandwidth that can be described as broadband and recent developments are pointing to an international standard using a wider bandwidth, such as SDSL or VDSL. In the medium term a realistic aspiration should be the provision of at least 2 Mbps symmetric transmission.

6. Conclusions

6.1 The Economic Development Committee welcomes the initiative taken by the Welsh Assembly Government to promote and expand the availability of broadband in Wales. This is an important and much needed development which can, and will, bring significant economic benefits. In a world where technology and communications are changing rapidly, this must be a priority if Wales is to keep up with economic development elsewhere - let alone close the GDP gap with the UK. The Committee shares in particular the concern expressed about the needs of Rural Wales and endorses the priority placed on this by the recent report 'ICT in Rural Wales' from the Agriculture and Rural Development Committee.

6.2 The Committee therefore welcomes the **Cymru Ar-lein** programme and the initiatives it encompasses. However while there can be no doubt that all of these are pointing in the right direction, the Committee considers that the programme would be improved if aspects of it were set out in more detail. This would provide greater clarity as to its direction and would assist the private sector partners on whom it depends.

Targets

6.3 The Minister's paper to the Committee identified 6 main targets to be achieved between July 2002 and July 2007. These are shown above in para 4.6.

6.4 The first of these is for an increase in the availability of affordable terrestrial broadband services of 310,000 extra homes and 67,000 extra business lines - over and above the levels which would be achieved by normal market forces. These seem worthwhile and challenging targets and ones which would deliver a significant increase in provision. However, Cymru Ar-lein does not give the baseline figures against which these should be measured and so it is not possible to say what needs to be done to achieve them - or the amount of investment that meeting them would entail. Moreover, they relate to only **terrestrial** broadband services - and exclude satellite broadband despite the introduction of the Satellite Broadband Subsidy Scheme forming an important element of the plan.

6.5 Similarly, the targets for broadband connectivity to be available in 'most' business parks in Wales, and for 1200 additional public sector sites to be broadband-enabled, give no indication of what these mean numerically or in relation to current provision. What constitutes an increased awareness of broadband communications and its benefits? While the Committee considers the development of broadband too important to turn into a number-chasing exercise, it considers this information is essential to judging what needs to be done, to determining the resources necessary and appropriate, and to monitoring progress.

Supply and demand stimulation

6.6 The first 2 of the 5 key action areas are 'demand stimulation' and 'supply stimulation' and on the face of it, for a market delivered service, these should cover everything. But, the 3 further areas (encouragement of local initiatives, specific procurements, aggregation of public sector demand) are also about stimulating demand and supply, albeit specific aspects of these. This separation seems to indicate some uncertainty, or lack of clarity, in the thrust of the initiative. In fact, the initiative is virtually all about demand stimulation. The 'supply' is to be delivered by the private sector through a range of public sector procurements such as that undertaken for the delivery of the Lifelong Learning Network. In the Committee's opinion the only direct influence that Cymru Ar-lein has exerted is, arguably, through the E-fro Broadband Wireless Project. This illustrates the problem of relying too heavily on 'demand stimulation': the cost to the Government of supporting the E-fro project, a project operating on unlicensed frequencies, would have covered the cost of equipping the exchanges in the project area with DSL equipment. The Committee is aware of the BT trials which have been undertaken in North Wales involving the upgrading of exchanges with mini DSLAM equipment. It notes that mini DSLAMs could be really important for broadband roll out in non-urban areas but acknowledges that BT have yet to bring this product to market.

6.7 Cymru Ar-lein will have a relatively direct impact on supply through the establishment of the Wales Broadband Public Sector Network which will build on the DAWN2 project and the Lifelong Learning Network. The demand created by the development of these should provide a very significant effect on the provision of infrastructure. It is important to recognise the role that Local Authorities, educational institutions, the health service and other public bodies and organisations have in taking this initiative forward. The £53m Objective 1 bid is also almost wholly focussed on supply as the available money is eligible to support infrastructure projects. This bid, which is currently going through the Objective 1

comment and approval process involves a reverse subsidy auction, extension of the Lifelong Learning Network and a Local Projects pot.

Technological needs of different areas

6.8 The Committee's greatest concern though is the lack of a clear lead in recommending the appropriate technology to be pursued in different areas and circumstances. The Committee fully recognises that ultimately this must be a matter for determination by market forces, and local initiative should be encouraged. Therefore the Committee welcomes the Government aim of stimulating the market. However, an overall vision should be in place to guide the whole process.

6.9 There is general widespread acceptance that in most areas of Wales, as in many areas of the world, the best way to provide broadband services in the long-term are through fibre optic connections. All exchanges are already linked by a backbone of fibre connections and, if the appropriate equipment is installed, subscribers within about a 5.5-km line-length will in the immediate future be able to receive ADSL via existing copper lines. In some areas, especially those economically deprived, a degree of support might be needed: the use of Corus-regeneration funds to provide ADSL in five exchanges in Caerphilly is an excellent example. Extrapolating from this example, £40m would appear ample resource to provide access to ADSL for 80% of the population of Wales. However, in the rural areas of Wales, remote from an exchange, it is likely to be a long time before broadband via landline can realistically be achieved, if at all. In such areas there is a clear alternative based on wireless technology and in others satellite might be a suitable option.

6.10 In encouraging the use of wireless and satellite two factors must be considered:

- All broadcast signals are limited by frequency contention; i.e. the risk that two independent signals transmitted at the same frequency will interfere with each other. Such technologies can seem very successful when first introduced and when there are only a few users of the frequencies, but problems can arise when the number of subscribers increases. This is especially the case if the frequencies are unlicensed. While the Committee recognizes that the Government is acting as a facilitator rather than a provider, the use of unlicensed frequency bands, as in the E-Fro Project, does not seem appropriate for a long-term strategy. The problems of contention will increase if the standard bandwidth for broadband communication increases. For example, SDSL will require four times the bandwidth and VDSL twenty times the bandwidth.

- In using the licensed frequencies, the problem of contention is less at the highest frequencies, such as 28 or 40 GHz, but here there is a problem of range, especially in the presence of rain. The Committee was informed that this problem could be resolved with a substantial increase in transmitted power, but this may introduce problems with public acceptability.

6.11 A full analysis of the population in Wales that is remote from an exchange but lie within good line-of-sight of existing transmitting antennas would allow an estimate to be made of the potential number of subscribers at different ranges from each transmitter - and hence the total bandwidth required. This would allow the optimum frequency band to be determined in each case. This could, indeed, form part of the Spatial Plan.

6.12 The Committee has already expressed concerns about the auction for the 3.4 GHz wireless broadband technology licences by the Radio Communications Agency. This is a specific issue and they note the Government's response that this particular frequency band is only one of a number available - and that the specific issues relating to this auction do not impact significantly on the overall broadband Wales strategy. However, if the strategy for the use of Wireless were set out in more detail it would be easier to confirm this, and to ensure that other frequency bands were not lost to Wales.

6.13 The Committee recognises the risks of being too prescriptive in a rapidly changing technological and commercial market. On the other hand it is wrong to imagine it equally likely that the market could deliver any of the technologies in all areas. The Committee considers that the Government would most efficiently incentivise the marketplace if it gave a much clearer steer as to the type of operator, or the type of technology, it is seeking to incentivise in different parts of Wales. It should also indicate where it seems a need for particular technology in an area is a long-term solution - and where it considers it more a shorter-term expedient while longer-term solutions are developed.

6.14 The Committee appreciated the presentation by BT, which provided a careful analysis of the potential connectivity of different parts of Wales. While the Committee has expressed concerns about aspects of BT's development of broadband in Wales, and does not feel it appropriate to endorse the analysis of a particular company, they nonetheless welcomed the company's views on the areas where the market would deliver broadband in the short term and those where different levels of subsidy were required. The Committee understands that a similar analysis was commissioned by the Minister prior to the launch

of Cymru Ar-Lein and considers that, possibly after updating, such an analysis should figure in the Cymru Ar-lein Strategic Framework.

Target transmission standard

6.15 Much of the discussion in Cymru Ar-lein talks about the benefits that can come from the greater availability of broadband but the Committee considers that this tells only part of the story if it does not address the link between these and the method and rate of data transmission. There is little discussion in the plan of the different rates of data transmission and the potential that each has to offer. Similarly, there is a vast difference between the potential offered by symmetric or asymmetric systems. broadband is not a single product. These considerations are critical both to the supply and demand for it in an area - and to the range of applications and wider economic benefit that can be achieved. This is as fundamental an issue as, and goes alongside, the type of technology in a specific area.

6.16 From its various discussions, the Committee considers that in the medium term Wales' objective should be a 2 Mbps symmetric broadband service in as many areas of Wales as possible. It also recognises that what is an appropriate standard today might not be one in the near future. Nonetheless, it considers that this issue should be more explicitly addressed in any strategic framework.

Funding

6.17 The Committee notes the allocation of £135m to support the programme and agrees that this is a considerable sum of money. It agrees this should be adequate to provide the kind of system that Wales needs although it feels that it will be easier to judge whether this is sufficient and whether it is being applied in the most effective way when the strategy is set out in more detail.

7. Summary/recommendations

7.1 The Economic Development Committee welcomes the Economic Development Minister's strategy to develop the availability of broadband ICT in Wales and acknowledges the significant amount of funding that has been put into this initiative. It shares the concerns already expressed about the particular needs of rural areas and urges the Welsh Assembly Government to continue to place a high priority on expanding the availability of broadband in Wales. The Committee therefore welcomes the Cymru Ar-lein programme and the initiatives it encompasses.

7.2 Nonetheless, the Committee considers that the programme would be improved if aspects of it were set out in more detail. This would provide greater clarity as to its direction and would assist the private sector partners on whom it depends. The Committee recommends that the programme should include:

- A clear statement of the overall vision behind the whole process giving an indication of the type of technology, or the type of operator, the Government is seeking to encourage in different parts of Wales – and the work necessary to achieve this. The Committee understands that such an analysis was commissioned by the Minister prior to the launch of Cymru Ar-Lein. It should also indicate where the role of a particular technology in an area is a long-term solution - and where it is more a shorter-term expedient while longer-term solutions are developed.
- A full analysis of the population in Wales that is remote from an exchange but lying within good line-of-sight of existing transmitting antennas so that an estimate to be made of the potential number of subscribers at different ranges from each transmitter - and hence the total bandwidth required.
- A clear statement of the technological objectives of the programme, which the Committee considers should, in the medium term, be for a 2 Megabyte per second symmetric broadband service in as many areas of Wales as possible.
- A more explicit statement of the targets for the programme with the current position clearly identified. These should identify separately non-terrestrial supply – both satellite and wireless. In addition, where these relate specifically to access levels, for example for businesses and business parks, it should make the targets explicit by setting out the current level as a baseline.

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