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LOCAL AND REGIONAL AUTHORITIES SUPPORT INITIATIVE

WORKSHOP REPORT

Scoping Exercise Workshop: Satellite Broadband for Hampshire

In partnership with Hampshire County Council

With the support of

esa

ESOA
European Satellite Operators Association

I. Introduction

The following recommendations on the value of satellite broadband to cover blank areas are based on an analysis of the existing local challenges and objectives related to broadband access in Hampshire, as well the "good practice" example of the Scottish Government.

The report is the outcome of a Eurisy workshop hosted by the Hampshire County Council in Winchester on 17 February 2011. The workshop brought together stakeholders from Hampshire and satellite broadband experts from the European Satellite Operators Association (ESOA[i]). It aimed to evaluate the added value of satellite broadband in achieving 100% broadband coverage of the Hampshire territory.

II. Broadband in Hampshire: current situation and needs

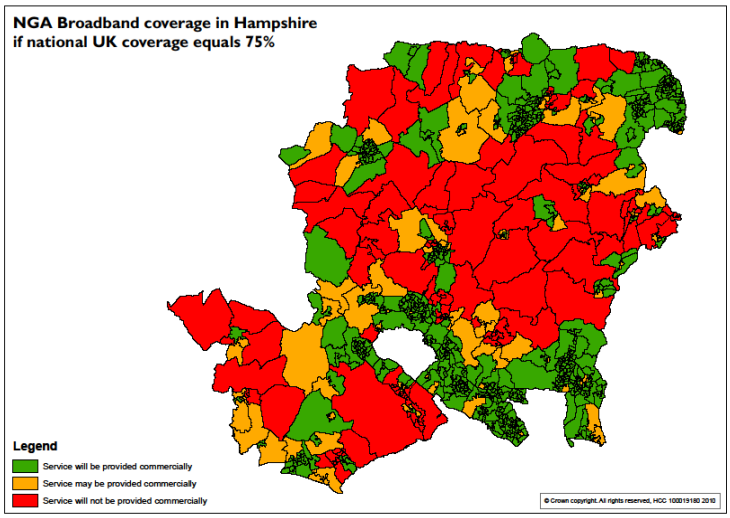
Hampshire County Council is responsible for strategic planning and public service provision in the Hampshire Economic Area, an economically vibrant region accounting for 20% of the economy of the South East.

Broadband provision is a key objective in the Regional Economic Strategy Development, following conclusions that poor broadband access hampers economic growth and affects property values negatively.

eHampshire is a programme initiated by the County Council, aiming to:

- improve broadband networks and cover blank areas
- facilitate the provision of and access to SuperFast Broadband, through the use of emerging technologies (WiMax, ADSL2, BT21CN etc)
- stimulate demand for fast broadband and support users, especially businesses, make the most of it.

Hampshire already has excellent broadband access, covering 1 million people and around 50,000 businesses across the region. However, while the Council is looking at introducing fibre optic cables to provide download speeds of up to 40Mb/s (with a 15Mb/s min. guaranteed), and upload speeds of 5 Mb/s, there remains the challenge of rural, sparsely populated areas: 25,000 businesses and 119,000 people are currently located in areas with less than 2Mb/s speeds (see below).



The high investments necessary to install fibre optic cables, in relation to the size of the demand in these areas means that there is little commercial drive to make these investments. While 80% of landlines in Hampshire are likely to receive enhanced broadband by 2015, sparsely populated areas with under 2Mb/s access are the least likely to benefit from this. Market failure in this case calls for public intervention from the County Council.

A survey of households' willingness to pay concluded that:

- 90% have broadband now
- 52% interested in superfast broadband
- 53% would take it at £20/month
- 43% at £25/ month
- 63% willing to pay a £50 connection fee
- Much smaller numbers above these figures

This shows that, for the moment at least, domestic consumers' appetite to pay a premium is quite limited.

The County Council will consider satellite broadband as a solution to closing the digital gap in areas where population density and clusters do not support non-satellite solutions. The following criteria will be taken into account:
- price (connection and subscription fee) in relation to the users' willingness to pay for the service
- speed and responsiveness (ability of users to download music, game online, video-conference, watch videos online).
The impact of the land infrastructure on the landscape will also be assessed.
Finally, Hampshire County Council noted a strong correlation between poor broadband and poor mobile coverage and would be interested in solutions addressing that.

III. Broadband via satellite: how it works

Satellite broadband operators have made significant investments in both their space and terrestrial networks. The overall network architecture is very simple; a home or business uses a bi-directional satellite installation on its premises to connect to a geostationary satellite. The

satellite directs the IP data to a ground station (or hub), which has a high bandwidth fibre connection to the Internet.

Terminal equipment consists of a satellite antenna (approximately 80cm in diameter) and a modem, which is broadly of similar size to a standard ADSL modem. The presentation to the end-user's computer is by a standard RJ45 Ethernet cable.

Typical download speeds offered commercially today are in the range of 512kbps to 10Mbps, and upload speeds in the range of 128kbps to 4Mbps.

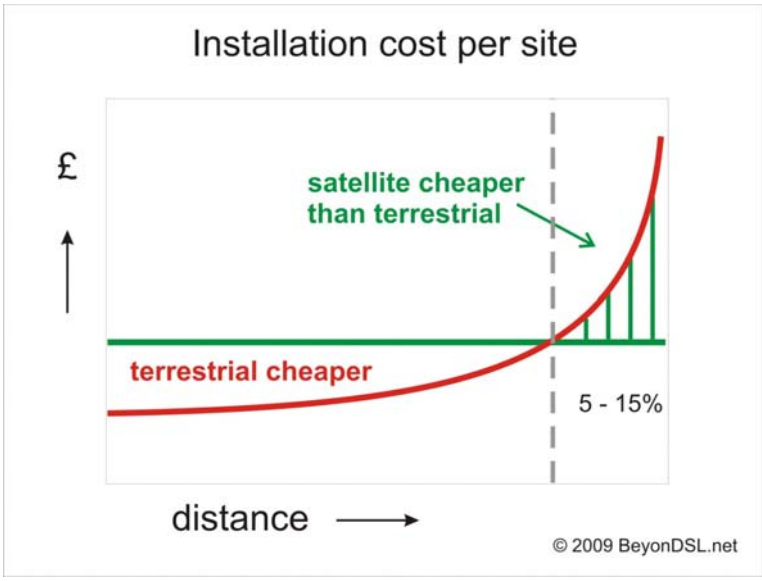
In the UK, a satellite broadband antenna with a diameter under 1 metre is generally exempt from planning permission. Antennae may also be painted to enable them to blend in more with natural surroundings. Special consideration may be required for listed buildings or within areas of outstanding natural beauty; however, an antenna can be pole mounted up to 100 metres from the premises, which may be more acceptable. The key consideration is achieving line-of-sight with the satellite, which is a pre-requisite for service to be delivered. Pole mounted solutions can also be useful for those locations where a view of the correct sky quadrant can be difficult to achieve (e.g. locations with thick tree cover).

An alternative network solution is sub-distribution. This utilises existing last mile copper to a street cabinet fitted with a DSL DSLAM, and uses satellite broadband from the cabinet to access the internet. Where the local topography and end-user density is appropriate, the technology can provide a low-cost and relatively immediate solution to address blank areas.

IV. The case for satellite broadband for areas under 2Mb/s

Based on experience, an estimated 3-5% of homes and businesses, which are currently below the 2Mbps target, would require a satellite solution to achieve 100% broadband penetration.

The dilemma facing terrestrial services is that the cost of reaching beyond the limits of DSL/copper technology is very significant. This is not the case for satellite. The figure below demonstrates the "break-even" point for satellite broadband. Whilst increased distance from an exchange increases the cost of provision to a premises by terrestrial services, the cost is constant for a satellite broadband connection.



The significant commercial advantage satellite broadband offers any public sector procurement is a fixed price for each home or business connected. Unlike fixed-line and traditional wireless broadband technologies, cost is only incurred when an end-user takes up the service.

From a technical perspective, xDSL services are also subject to line attenuation (reduced download and upload speeds) the further a customer is from their local exchange. Satellite broadband is unaffected by line distance and hence every end-user will also be able to receive the same range of download and upload speeds .

With regard to the benchmark applications for Hampshire County Council, satellite broadband performances are as follows:

- BBC iPlayer

iPlayer has proved to be one of the UK's most popular internet applications, providing catch-up TV and radio for BBC content. However, the size of the video files can consume significant amounts of monthly GB data allowances. Hampshire County Council should make a "reasonable estimation" of the required download limit when procuring satellite broadband if iPlayer is deemed to be an essential service for end-users. As a guideline, 78% of the Scottish Government's Broadband Reach project customers consume less than 3GB of data per month. A UK IP address is also a prerequisite for the service to be legally supported,

A new European Space Agency development project (Project NXY), which includes the BBC, is investigating a technical approach to alleviate network congestion using satellite and terrestrial technologies.

Satellite technology has the potential to provide TV capability alongside broadband Internet. By adding a dual feed on the same dish, customers can have satellite broadband Internet access and TV / radio reception at the same time. A separate TV services subscription would be paid to the appropriate service provider.

- Other internet applications

Satellite broadband has proved an effective solution for the delivery of other standard internet applications; indeed it is currently used by over 1 million customers in the USA. The technical characteristics of satellite delivery of web based content are slightly different to landline connections, but the effect is generally not noticeable to the consumer. The effects of additional latency do have to be considered in a very small number of applications, which includes real time gaming (first person shooters), although usability tests of the genre indicate that the overall experience of the game is not diminished. VoIP is supported using both commercially available products (e.g. Skype), and enterprise (network based) VoIP solutions.

- Using satellite backhaul to extend mobile coverage

Hampshire County Council has noted the strong correlation between poor broadband availability and poor mobile coverage. Satellite broadband can be used to extend mobile network coverage (voice and data) as either backhaul between mobile network base stations, using femto cells in a customer's premises, or pico cells in villages or hamlets.

V. Organisational considerations

a. Good practice and lessons learnt: Broadband for Scotland

In August 2004 the broadband coverage in Scotland was 43%, compared with 63% across the UK. The digital gap affected mostly its sparsely distributed rural population, with many out of reach for both conventional broadband and mobile data services. In 2004, the Scottish Executive set a target of affordable broadband to every community by the end of 2005. By the end of 2005, 99% of the population, as well as businesses, had access to basic, conventional broadband (ADSL).

The remaining 1% of blank areas still left many remote households and business without any access to a broadband connection. In 2006, the Scottish Government commissioned a report to examine the scale of the broadband reach problem on its territory and study possible solutions. It concluded that conventional broadband would not be able to bridge the remaining gap in coverage, and considered alternative technical solutions. Public debate on the issue resulted in the launch of the **Broadband Reach Project** in 2007.

The project was organised as follows:

- **financing**: a £3.5M grant was provided by the Scottish Government. No European funding was sought. The EC was notified of the State Aid

  Lesson learnt: the Scottish Government had to decide whether to provide the funds to the local communities for them to handle the project directly, or else to manage the project centrally. Both local communities' and the service providers' preferred option was for the Scottish Government to manage the project centrally

- **aggregating demand**: the Scottish government launched an awareness raising and marketing campaign to identify demand through local radio and press campaigns. Potential users were asked to express interest in benefitting from broadband. As a result, the likely demand density was mapped, taking into account:
  - clusters > 10
  - clusters with 5-9
  - less than 5

  Lesson learnt: of the 4000 expressions of interest, some were made lightly, for instance by being prompted by a vocal supporter of broadband access within a certain cluster. Some did not take up the service because the offer was deemed to expensive or because the problem had been resolved by another technology (e.g. 3G+)in the meantime. When the broadband actually became available, the number of take-ups did not always reflect the expressions of interest.

- **the bidding process**: a technology- and supplier-neutral bid was launched. The bidders were required to provide a full service, i.e.:
  - the network (512k download/256k upload speeds)
  - Internet Service Provision
  - Customer support (incl. telephone support) and billing
  - Value-added services: higher speeds, email, web hosting etc.

The Scottish government grant funded the initial investment in infrastructure when a customer signed up to be connected. The service was then contracted by the customer

directly from the service provider, without subsidies. This was to ensure that citizens would be offered an affordable and sustainable broadband provision.

Lessons learnt:

- *bidder companies were not always willing/able to provide the full service. In the end, the number of bidders was widely reduced from 40 to 3.*
- *no one solution-fits-all. According to population density, the following solutions were selected:*
  - *radio wireless for groups of > 30*
  - *Wi-Fi networks for groups of 4-29*
  - *standalone satellite dishes for isolated places*

- **roll-out and take-up**
  Approximately 2100 connections were set up by the end of the project in May 2009, with another 300 late registrations and connections by the end of April 2010, out of 4000 initial expressions of interest.
  85% of the demand was covered used standalone satellite dishes, 10% using wi-fi for small groups and 5% radio wireless.
  Lessons learnt: an appropriate awareness raising and information campaign is crucial not only in preparing the project, but also during the roll out

Broadband for Scotland bridged the digital gap successfully. It supports businesses and young families to stay local, as well as the delivery of public services.

b. Further issues for consideration by Hampshire County Council

- **aggregating demand**: as in the case of the Scottish experience, the County Council should have a significant role in generating end-user awareness and demand. It should be recognised that satellite broadband can support a single end-user as effectively as it can a cluster.
- **the bidding process:**
  - to ensure best value from any procurement, Hampshire County Council should split its lots into "within expected DSL reach" and "beyond expected DSL reach" (there will of course be grey areas).
  - the Council (or purchasing body) should insist on a costing from bidders for each site to be served. This would enable Hampshire County Council to identify any sites that could be most economically addressed using non fixed-line technologies, thereby lowering the overall cost of the procurement
- **roll-out and take-up**
  - Supporting the broadband roll-out process with locally targeted PR is a highly effective method of increasing awareness and desire for the digitally unaware to be included in a programme. Hampshire County Council should include a workstream in its programme to maximise this opportunity

VI. Conclusions

Satellite broadband provides the missing link for Hampshire County Council's broadband strategy, connecting those homes and businesses, which cannot be economically reached by extending the terrestrial network. The technology is well proven, with over 1 million users in the United States alone.

Broadband is an enabling technology offering a wealth of social and economic benefits. It provides users with fast, constant access to content, services and applications. Through the applications it supports it improves access to healthcare, education and commerce. The economic impact of telecommunications infrastructure on economic growth is enormous. Studies on the impact of ICT have indicated approximately a third of economic growth can be attributed to telecommunications. Other studies specifically related to broadband show that regions enabled with broadband benefit from increases to employment by up to 1.4%, growth in the number of companies by 1.2%, and increased property values / rents by 6%.

Most significantly, a 10% increase in penetration can boost economic growth by between 1.21% and 1.38%. The economic impact can be much higher in rural areas where the alternative means of communication are more limited.

The goal to provide universal broadband coverage in Hampshire is realistic, affordable and achievable using a mix of technologies that are both proven and commercially available today. Satellite broadband will play a critical role in reaching the homes and businesses that cannot be addressed economically by any other technology.

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[i] ESOA is the association of all European Satellite Operators who provide inter alia broadband services throughout the European Union. They can be contacted by emailing sg@esoa.net or via the url www.esoa.net