Response to BIS discussion paper

Broadband deployment and sharing other utilities' infrastructure

September 2010

BSG welcomes the government's discussion paper on infrastructure sharing. BSG has always supported the development of passive access as a competition remedy, and following its cost model work has highlighted the impact that being able to utilise existing duct has on the costs of deploying next generation broadband, and consequently what the benefits could be if access to existing infrastructure was available.

For the last year, the BSG has run a Passive Infrastructure Sharing Working Group. The work of the group identified the barriers to infrastructure sharing, how these could be resolved, and concluded with a top-level description of the elements of a passive infrastructure sharing product-set. This output was used by Openreach as the basis for their discussions with industry for their Passive Infrastructure Access reference offer.

The work of the group highlighted three things. First, that there is considerable interest from industry in passive infrastructure sharing. Over thirty organisations from across the value chain were engaged in the work, including from the largest infrastructure operators and ISPs such as Openreach, C&W, Virgin Media and Sky. The work was conducted in a relatively short space of time, with considerable engagement and commitment of resource to develop the work of the group.

Second, that infrastructure sharing on telecoms assets is possible, despite the barriers that exist; however, it will not be a panacea for rural next generation broadband deployment. Rural assets are no more or less likely to have spare capacity than urban assets, as they were usually designed to meet the needs of the area – which require considerably less capacity than urban areas with higher population densities.

Third, and most importantly for this consultation, an infrastructure sharing regime will not be designed quickly, and will take time to establish itself. In other markets, reference offers are still being refined some years after the initial obligation to develop them was brought in. The reality is that there are complex issues that need to be resolved and overcome. For a comparative example in the UK, LLU took several years to finally see scale adoption after it was introduced.

This is important for this consultation as it is likely that infrastructure sharing with other utility companies will need to follow existing industry activity on infrastructure sharing, such as Openreach's development of its passive infrastructure sharing reference offer or Virgin Media's proposed pole sharing for overhead deployment. Through these processes, the industry will define what it wants to buy, how it wants to buy, at what price, and the conditions around its use. The success or otherwise of these processes will identify the opportunity for other infrastructure owners, along with the products they would need to offer and the price points they should be offered

at. It is unlikely that market developments would be as quick as political timescales would like them to be.

The government is right to address this issue; results in other markets such as France have been widely covered, and it is right that government explores all opportunities to support and extend the market-led deployment of next generation broadband, particularly in to areas that are likely to be un-served.

As the central objective for government here is to promote next generation broadband investment in the final third, the infrastructure sharing focus should be on overhead infrastructure. This is the one infrastructure that is likely to reach many of these areas; underground infrastructure, such as sewers, will often be unsuitable in these locations and suffer from similar limitations as telecoms infrastructure.

Our work has identified areas for government activity, particularly for ensuring that the incentive for utilities to share infrastructure is not removed by sector regulation. However, we believe the most appropriate approach to infrastructure sharing would be to support the development of a functioning market, rather than to legislate to force access to be offered. Legislating to open access to utility infrastructure is unlikely to resolve the challenges involved in infrastructure sharing as these will require operators and utility companies to work together cooperatively; it would be relatively simple for utility companies to obstruct usage to the point where there was no value for operators in seeking access.

BSG response to consultation questions

1. Do you agree that the ability to share other utilities' infrastructure would reduce the costs of rolling out superfast broadband and facilitate investment?

The BSG's fibre cost model, developed in 2008 with Analysys Mason, identified the cost of civil works as being the major cost centre for the deployment of NGA, whether FTTC or FTTH. For a national deployment of FTTH, re-using BT's network, civil works account for 75% of the £24.4bn cost. In the final third, the civil works proportion of the total cost reaches 79%, versus 69% in the first two-thirds of the country; this is due to lower duct re-use in these areas, which means more expensive new duct must be built (although new duct construction costs are cheaper in final third areas).

Within the report, BSG modelled the impact of utilising both Virgin Media's infrastructure, and utility infrastructure. For Virgin Media's infrastructure, the cost of a national FTTC deployment is reduced from £5.1bn to £4.6bn, while a national FTTH-GPON deployment comes down from £24.4bn to £23bn. When using utility infrastructure the impact is more pronounced: down to £4.3bn for FTTC, and to £18.7bn for an FTTH-GPON deployment.

This would clearly suggest that utilising utility infrastructure could offer a route to reducing the cost of NGA deployment. However, this should be considered as indicative only as to what the impact could be, as there are a number of unknowns that would impact on whether this infrastructure could useful.

For example, the modelling did not factor in a price for renting space in this infrastructure, a key consideration for the business case. Nor did it have an accurate view of the location and available space of utility infrastructure, instead using assumptions for each geotype as to the likely impact on the requirement for new

duct. Further study to identify assets in particular areas would provide an indication of the accuracy of these assumptions.

BSG considers that it is likely that access to utility infrastructure will reduce the cost of deploying NGA infrastructure in some areas. However, there are many unknowns and uncertainties at this time that make it impossible to say for certain the impact it would have: the price of access; operational arrangements; location and condition of assets; and operators' appetite for investing in NGA.

2. We think that encouraging infrastructure sharing might help companies extend the reach of their networks further into harder to reach rural and remote areas. What infrastructures would be most useful in achieving this objective? How much difference do you think that more infrastructure sharing would make to the ability to reach these areas?

Not all utility infrastructures are capable of having telecoms infrastructure installed in them. The most useful are likely to be sewer networks and overhead electricity networks, as these assets are most likely to have capacity, viable routes and operational requirements that could be accommodated in any passive infrastructure sharing arrangement. Gas and water networks, however, are not capable of providing contiguous routes due to the use of valves within the ducts, and have related operational obstacles, such as health and safety requirements, that are unlikely to be overcome.

However, as the focus here is on the final third, it is important to note the limitations of utility infrastructure in these areas, particularly underground infrastructure. In much the same way that telecoms duct sizes diminish or are replaced with direct buried cable in rural areas, so utility infrastructure was designed to meet the needs of a rural area that requires less capacity than an urban area. In many rural locations, therefore, underground utility assets are less likely to be able to support passive infrastructure sharing than those assets in urban areas.

A further issue is the localised nature of many utility networks, particularly the sewer networks. These are unlikely to connect to a more urban location by way of a 'trunk sewer', as with telecoms. As a significant portion of the cost of rural networks is in providing backhaul to rural and remote locations, there is likely to be only a limited opportunity to address this through underground assets.

This would suggest that the most useful assets for rural deployment are likely to be those that permit overhead deployment. BSG modelled the impact of an increase of overhead deployment on the costs of NGA deployment as part of its fibre cost modelling work, and considered this in its response to the previous government's consultation on overhead deployment. This response highlighted the impact that increased overhead deployment could have in rural areas, although it did not model the cost of access to assets supporting overhead deployment. This would also be reliant on revisions to the regulations concerning overhead deployment of telecoms cables.

3. What do you see as the main barrier to infrastructure sharing?

There are a range of barriers to infrastructure sharing: commercial, technical, operational and regulatory. In some cases, such as those described above in relation to water and gas networks, it is unlikely that the operational barriers could be overcome.

For those assets where these barriers are most likely to be overcome, the biggest challenge is the lack of a marketplace, brought about by commercial and regulatory barriers. Currently, those with assets that could be shared have no price signals from the market for what this access could be valued at, and have little visibility of the likely demand. Meanwhile, those operators for whom access would be valuable have little knowledge of what assets could be available, where they are, and who owns them. The development of a marketplace, where this information could be available to both asset owners and access seekers, could resolve this.

A further barrier, however, is the regulatory environment facing utilities. Currently, any additional revenue and profit these companies generate is clawed back for the consumers of the utility services through pricing reviews by the regulator. Depending on the length of the access arrangement, it will be necessary to enable utility companies to continue to make profit on the access-sharing agreement across pricing review periods, in order to ensure they are incentivised to enter into such agreements, and that the risk and reward involved are commensurate.

Technical and operational barriers are substantial, and in some cases prohibitive (as discussed above). However, for sewer and overhead assets it is likely that these could be worked through: BSG discussions with utility companies, as part of the work through its passive infrastructure sharing working group, have not identified many issues that are different from those that face the sharing of telecoms infrastructure. Therefore, it is likely that existing industry activity, such as that previously discussed, will provide solutions to many of these challenges. These will provide a useful starting point for further discussions with utility companies.

4. What benefits are there for utility infrastructure owners in making their infrastructure available for sharing?

Currently, the benefits are uncertain; there are few examples of infrastructure sharing in the market, and so few price signals for them to be able to understand what any revenue benefits could be. Furthermore, there is significant risk involved in sharing infrastructure; how this would compare to the revenue uplift is at this time unknown. Furthermore, there remains the barrier posed by the existing regulatory environment to utility companies benefitting from infrastructure sharing in the long term, which is discussed in response to question three.

Existing industry activities examining infrastructure sharing should provide initial indicators to infrastructure owners of what access operators would wish to acquire, at what price and over what periods. For other infrastructure owners, seeing how infrastructure sharing develops on the telecoms network and on the infrastructures of utilities that reach bilateral agreements with operators will provide some of the clarity the likely market players currently lack.

5. What additional incentives would infrastructure owners like to see in place to encourage more sharing?

BSG's discussions with utility infrastructure owners suggests that the main disincentive is the regulatory barrier that prevents the additional revenue stream from continuing across price review periods, as discussed above.

6. What government action would be most likely to ensure that quickest and most effective deployment of broadband through infrastructure sharing? Is

legislation likely to be required or would industry cooperation be quicker and more effective?

It is unlikely that any government activity will bring about a quick development of infrastructure sharing arrangements. Unfortunately, developing a marketplace, with products and prices, takes time, and this instance will need to follow existing industry activity around passive infrastructure sharing agreements, as the operators define what it is they would like to buy and how they want to buy it.

Government legislation, to force open infrastructure, is almost certainly not the answer: the realities of infrastructure sharing are such that if an infrastructure owner did not want to share assets, it could create numerous obstacles to the use of their asset that would prevent sharing from becoming a reality.

The best outcome would be for a market to develop that aligns the commercial needs of those operators seeking access, and those infrastructure owners with access to offer. Resolving the issue of the regulatory disincentive for utility companies would be a useful area for government activity; it should then support industry in trying to develop a functioning market for infrastructure access.

About the Broadband Stakeholder Group (BSG)
The BSG is the UK government's advisory group on broadband. It provides a neutral forum for organisations across the converging broadband value-chain to discuss and resolve key policy, regulatory and commercial issues, with the ultimate aim of helping to create a strong and competitive UK knowledge economy. Further information about the BSG can be found at: http://www.broadbanduk.org/

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Annex A

Response to BIS consultation

Overhead of deployment of telecommunications cables

A consultation examining whether it is appropriate to amend the Electronics Communications Code

November 2009

Summary

Allowing deployment of new overhead distribution would make a significant difference to the business case for deployment of fibre in some areas. It is unlikely to prove a panacea for enabling rural deployment; nevertheless, it could make a significant difference to some locations, and for new entrants seeking to invest in fibre. We therefore believe the government should proceed with further work to amend the terms of the Communications Code to permit the deployment of new overhead telecommunications cables.

In coming to this view, BSG has considered the views of a range of stakeholders, and has drawn upon the detailed cost modelling contained in its 2008 report on the costs of deploying fibre based next generation broadband in the UK.

Introduction

The BSG welcomes the opportunity to respond to this consultation. Given the high costs involved in deploying fibre based next generation broadband, the BSG believes it is essential that all potential avenues for reducing those costs are fully explored.

In 2008 the BSG commissioned Analysys Mason to produce a cost model for the deployment of fibre-based next generation access networks in the UK (herein referred to as the 'fibre costs report').[1] This study, undertaken by Analysys Mason, concluded that the costs of deploying FTTC across the UK was £5.1 billion, and that the cost of deploying FTTH across the UK was between £24.4 and £28.8 billion, depending on the choice of technology.

In both cases it is the high costs of undertaking civil works to deploy fibre to the cabinet or directly to the home that drives these costs. The remainder of this response looks at what impact a relaxation of the restrictions on new overhead distribution could have on these costs. It then goes in to discuss the usefulness of new overhead distribution, from the perspective of both incumbent network operators and new entrants. Finally, it then raises a number of issues that government should consider in order to optimise the opportunity to amend the regulations regarding overhead distribution.

Our discussions with a range of commercial stakeholders engaged in deploying new access networks, suggests that there is significant interest in having the option to use

[1] 'The costs of deploying fibre-based next-generation broadband infrastructure', Analysys Mason for BSG, September 2008

aerial deployment. However, few of these stakeholders have so far undertaken significant work to understand how they would in fact utilise aerial deployment as the option to do so has not previously been available to them.

The analysis presented here is based largely on the fibre costs report. It should be noted that the modelling undertaken for that report was based on a set of specific assumptions that are key to understanding the potential impact of aerial deployment, including:

- the costs of particular types of civil works
- the levels of take-up
- equipment costs
- the level of duct reuse

Each of these assumptions was set out in detail in the original report. Changes to any one of these variables would alter the costs in the report. We therefore suggest that this response should be read in conjunction with the original report and that the analysis presented here should be considered as indicative of a likely impact (based on a set of working assumptions), rather than representing a detailed view of what would actually happen.

The impact of increased aerial distribution on the costs of next generation broadband deployment

Overhead distribution on new poles is likely to be a cheaper method of deploying telecommunications cables than installing new duct. The fibre costs report assumed that the cost of deploying fibre aerially, including the construction of new poles, was £25 per metre. For building new duct, the report assumed that it cost £40 per metre to deploy in a grass verge; £60 per metre in a footpath; and £100 per metre in a road. These costs were verified by industry as the report was produced.

The extent to which overhead distribution would be utilised by operators, however, will vary depending on the local conditions and the technology being deployed. For example, in a situation where a lot of new ducting would be required, the ability to substitute this new ducting with overhead distribution would provide significant cost benefits. Conversely, in a situation where a significant amount of existing duct is available for re-use, the benefits of being able to use overhead distribution would be smaller. Similarly, the benefit of being able to utilise overhead distribution will be higher in areas where the alternative would be to deploy new ducting in a road or a footpath compared to a location where a new duct could be deployed in a grass verge.

Other factors will also affect the practicality of utilising overhead distribution, such as the availability of space and viable routes for new poles, local planning restrictions, and the costs involved in obtaining permission from property owners to utilise the outside of buildings, where this would be required. Other operational issues, such as health and safety requirements, will also have cost implications that are difficult to predict.

The cost benefit of overhead deployment will also vary depending upon the type of technology being deployed. FTTC requires the deployment of fibre up to the cabinet only. The assumptions made in the fibre costs report suggest that there is likely to be more ducts that could be reused in this section of the network.

For either of the FTTH technologies (GPON or P2P), however, more new duct is required to deliver the fibre from the cabinet to the home. In this last mile of the network there is likely to be less duct available for re-use, and so more new duct would be required. Consequently, increased overhead distribution is likely to have more of an impact on the costs of deployment in this scenario.

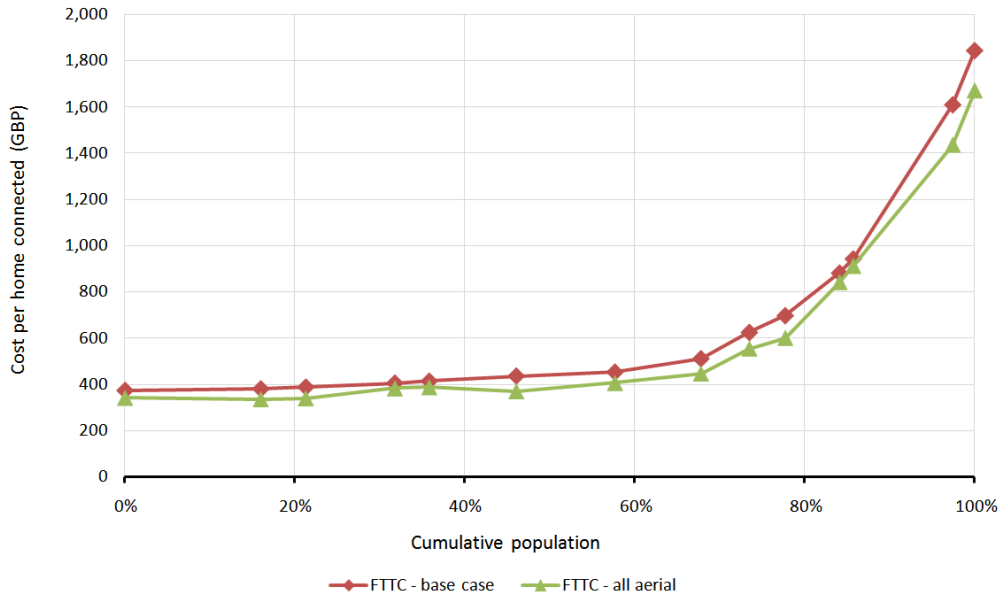
1. Impact of aerial deployment on costs per home connected

The fibre costs report analysed the impact that an increased level of overhead deployment would have on the costs of deploying both FTTC and FTTH in the rural geotypes. To assess this, the report considered what would happen if aerial deployment was used as a substitute in all instances where new duct was required (ie, where existing duct was unavailable for re-use).

In this instance, the total cost (of national deployment) of FTTC would be reduced from £5.1 billion to £4.7 billion. Similarly, the cost of FTTH/GPON would fall from £24.4 billion to £20.0 billion, while FTTH-P2P would come down from £28.8 billion to £23.3 billion.

However, this by itself does not suggest that increased overhead distribution would affect the investment case significantly in any particular location. In order to understand whether it would be likely to have a practical impact on the costs of deployment in rural areas, we need to examine the cost to connect each home. **Figure 1** below compares the fibre cost model base case for FTTC with a scenario where aerial deployment is used in place of any new duct.[2]

Figure 1: FTTC – Cost per home connected, national aerial

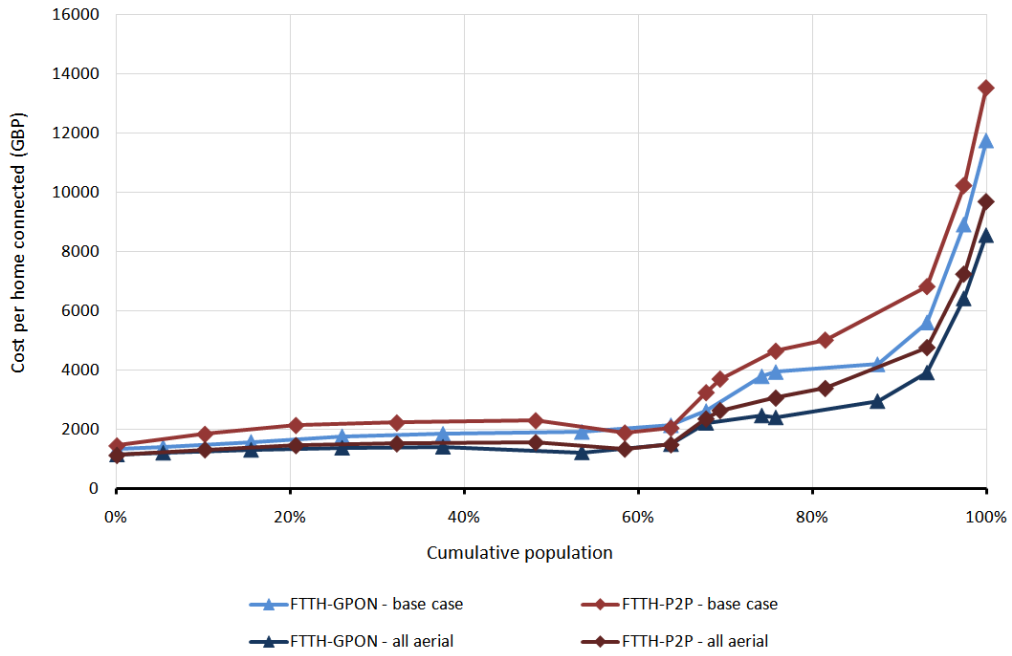


Source: BSG from Analysys Mason data

[2] The all aerial case for FTTC assumes 80% duct re-use and 20% new overhead deployment

Figure 2 below compares the fibre cost model base case for FTTH GPON and FTTH P2P with a scenario where aerial deployment is used in place of any new duct.[3]

Figure 2: FTTH – Cost per home connected, national aerial



Source: BSG from Analysys Mason data

While this analysis suggests that there would be cost savings from using overhead distribution in all areas, in practice, there are likely to be significant constraints in realising these benefits in more urban areas. Stakeholders currently engaged in deploying fibre networks in urban areas have suggested that in practice it may be difficult to realise the full cost benefits of aerial deployment in built up areas.

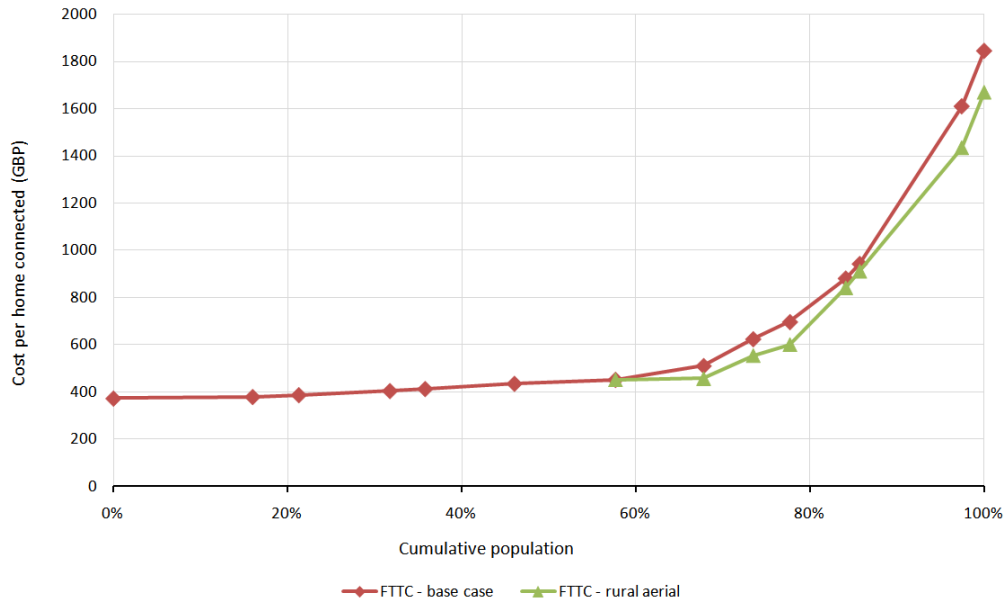
Constraints on the availability of suitable locations for poles and therefore available routes for new aerial deployments, and the costs involved in, for example, obtaining permission from owners to utilise the outside of buildings are likely to reduce some of the potential cost advantages of aerial deployment over duct use in urban areas. We therefore believe that the majority of practical benefit to be gained from increased overhead distribution would be derived from deployments in rural areas.

2. Impact of aerial deployment on costs per home connected in rural areas

Figure 3 and **Figure 4** set out the cost per home connected where aerial deployment is used in place of any new duct in rural areas only.

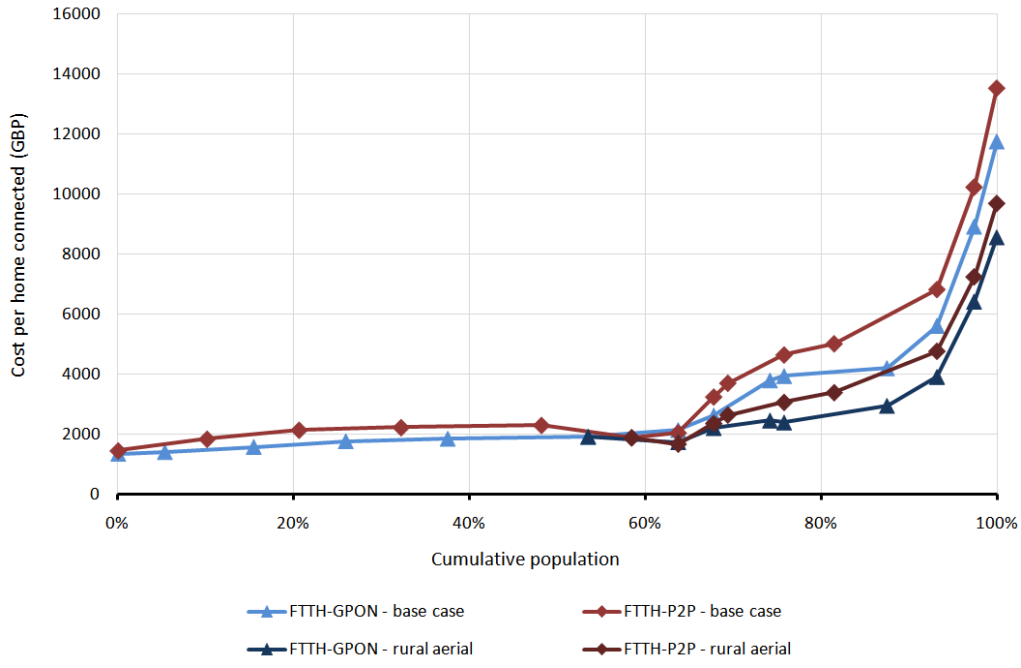
[3] The all aerial case for GPON assumes 58% duct re-use and 42% new overhead deployment and for P2P assumes 45% duct re-use and 55% new overhead deployment

Figure 3: FTTC – Cost per home connected, rural aerial only[4]



Source: BSG from Analysys Mason data

Figure 4: FTTH – Cost per home connected, rural aerial only[5]



Source: BSG from Analysys Mason data

[4] The rural aerial case for FTTC assumes 80% duct reuse and 20% new aerial deployment in rural areas.

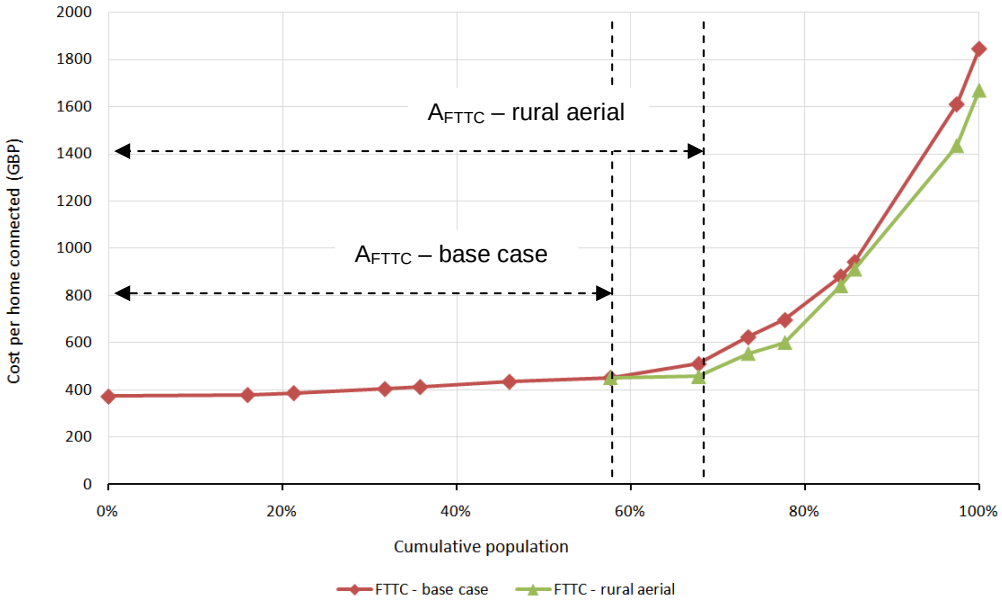
[5] The rural aerial case for FTTH-GPON assumes 61% duct reuse and 39% new aerial deployment in rural locations, while the rural case for FTTH-P2P assumes 45% duct reuse and 55% new aerial deployment in rural locations.

As stated above, we consider that overhead deployment would more likely be of practical benefit in rural areas. The above graphs reflect the cost per home connected of the aerial scenarios that featured in the fibre costs report.

3. Impact on the final third question

The use of aerial deployment could have a material impact on the so-called 'final third' problem. From **Figure 5** below, in the case of FTTC it can be seen that increased overhead distribution could bring around 1m homes within the market-led A_{FTTC} section.

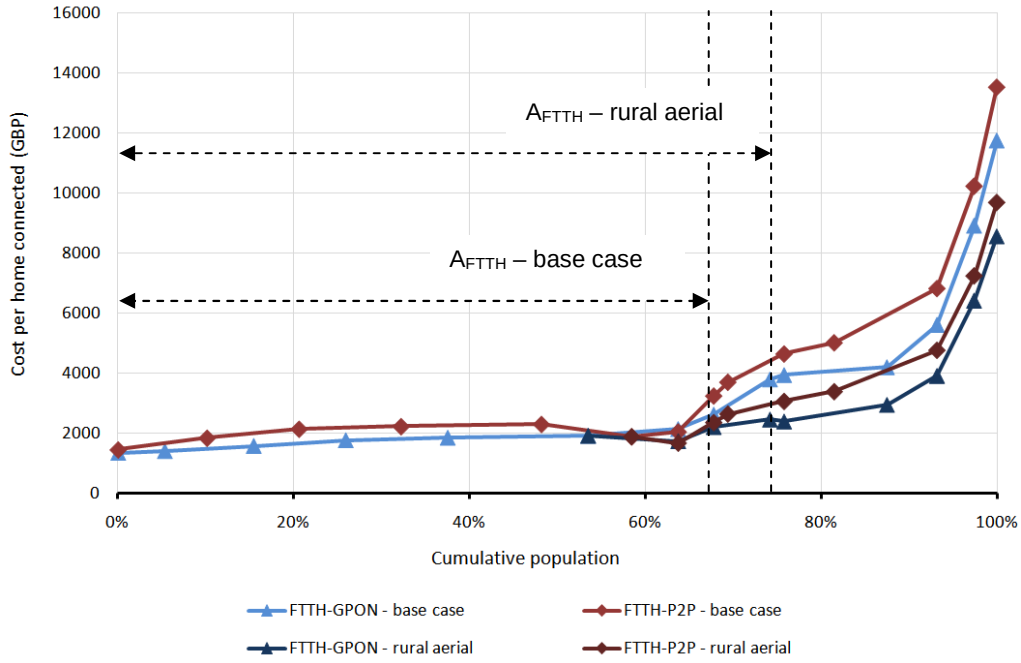
Figure 5: Cost per home connected for FTTC/VDSL



Source: BSG from Analysys Mason data

As shown in below, the impact on FTTH costs is more significant. However, the graph suggests that approximately the same number of homes would be impacted as in the FTTC scenario in **Figure 6** (ie, would be brought into the market led segment).

Figure 6: Cost per home connected for FTTH/GPON and FTTH/P2P



Source: BSG from Analysys Mason data

As discussed above, the base cases assume access to a certain amount of passive infrastructure in each part of the network. In a scenario where no access to passive infrastructure was available, however, the costs to build out entirely new duct would make investment prohibitively costly – a rough estimate based on the fibre costs report suggests that in such a scenario the cost for a national FTTH deployment would be more than £40 billion, while FTTC deployment costs would increase to around £10 billion. Therefore, where operators do not have access to existing infrastructure the opportunity to use overhead distribution could significantly reduce the costs of deployment.

If all fibre were to be deployed aerially, rather than in newly constructed duct, deployment costs would fall significantly – perhaps down to as low as those for the base cases in the fibre costs report. Although this may not significantly increase the coverage of fibre in rural areas, as the costs would remain at similar levels to those currently estimated, the option of utilising the overhead distribution of fibre provides greater flexibility for those considering how to bring fibre to rural communities, and may in some instances make localised deployments commercially viable.

As discussed earlier, this analysis should be viewed as indicative, rather than as an accurate estimate of the impact of increased overhead distribution. The actual practical use of aerial distribution in any location will be dependent on a range of factors, and would be unlikely to have a uniform impact across rural areas and is not a panacea for solving the final third problem. Nevertheless, this analysis certainly suggests that it is worth government exploring the terms under which the Communications Code should be amended to permit new deployment of overhead telecommunications cables, as it could make a significant difference in some locations. For a more detailed view of applicability more extensive research would need to be undertaken.

Why our findings are at variance with the Cisco analysis

The consultation document draws upon work undertaken by Cisco for the Caio Review and the BSG cost modelling report. The Cisco work suggested that savings of 50-60% could be achieved if overhead cabling was used instead of the construction of new ducts. This is at considerable variance with our findings.

The reason for this difference is due to the assumptions made about duct re-use. Reusing existing duct is cheaper than deploying both new duct and new overhead distribution. The BSG fibre cost report assumed that a certain amount of duct would be available for re-use in any fibre deployment. The Cisco model assumes that no duct would be available for re-use and therefore the potential savings associated with overhead deployment would be greater.

The impact of increased aerial distribution on the local environment

The consultation document recognises that there would be a concern amongst citizens regarding the visual impact of new overhead distribution. In reality a significant amount of the copper estate is already delivered overhead in rural areas however, if overhead deployment was used to deliver fibre on a universal basis this would lead to a significant increase in the total number of overhead lines. A trade off would therefore need to be made between extending next generation broadband availability and a potential loss of visual amenity that may result in some locations.

Additional issues to consider

Re-use of existing aerial infrastructure

A further corollary to this issue is the role of access to existing aerial infrastructure. Discussions with stakeholders have suggested that access to existing infrastructure, whether telegraph poles or other infrastructure suitable for overhead distribution, such as electricity pylons, could potentially be as beneficial as a change in the Code to permit new deployment of aerial cables. Access to this infrastructure would further reduce the costs for investors, as it removes the cost of installing new poles. However, a number of issues would need to be examined and addressed to enable use of this infrastructure, which would need to be explored further with industry.

While this is an extension of the issue this consultation is addressing, BSG considers that government should also include access to existing aerial infrastructure as part of its review. Government should also be aware that BSG is running a passive infrastructure standards working group, which will be examining all forms of passive infrastructure, including aerial infrastructure. This group is currently undertaking work on this issue, and its output should be considered as part of government's deliberations on this issue.

Restrictions and community control

Government, in the consultation, set out their interest in understanding what restrictions should be imposed on the deployment of new overhead distribution, should it be permitted, and is particularly interested in what conditions would alter whether an investor would find new overhead distribution beneficial to its rollout of next generation broadband. The consultation then went on to suggest that the ultimate decision may lie in the hands of individual communities as to whether they permit the deployment of new overhead distribution.

Clearly it will be important to ensure that local residents are informed and consulted about plans to deploy new physical infrastructure. However, if the processes and procedures for doing so are too cumbersome, the costs for operators in terms of uncertainty and delay could be such that they negate the benefit of permitting overhead distribution in the first place. It may be more appropriate to establish a set of pre-conditions that, if satisfied by the operator, would permit the operator to deploy new overhead distribution. Alternative approaches could include justifying the deployment through a cost-benefit analysis of the impact in the local area.

Conclusion

Government is right to consider any steps it could take that would enable the deployment of next generation broadband in an efficient and effective way. Our analysis suggests that the ability to deploy new overhead cabling could make a significant difference to the business case for investment in some areas. Although it is unlikely to be a panacea for enabling ubiquitous deployment of next generation broadband, it would be beneficial in some locations.

The ability for investors to realise these benefits will depend upon local conditions. There will be constraints on the use of overhead deployment, particularly in urban areas due to practical challenges such as a lack of available space for new pole sites. BSG considers that the majority of benefit would be in rural areas.

Achieving local consent will be important. However, it is also important that any processes developed to address this are efficient and streamlined, as delay could increase costs for operators and negate the benefits of enabling increased overhead deployment in the first place. This may involve government taking some challenging decisions about its priorities and its level of support for the development of next generation broadband in the UK when considering the trade-offs between investment in next generation communications infrastructure and local and environmental concerns.

BSG considers that government should proceed with further work to amend the terms of the Communications Code to permit the deployment of new overhead telecommunications cables. During the course of our work on this issue, it has been suggested to us that there may be a need to review the terms of the Communications Code to ensure it is fit for purpose given recent and likely future technology and market developments. We could welcome further discussions with BIS on this issue.