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BRIEFING NOTE

QUANTIFYING THE IMPACT OF REDUCING BARRIERS TO FIBRE BROADBAND

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Contents

The briefing note was commissioned by BT. The Analysys Mason team produced this note independently.

Analysys Mason Limited
North West Wing, Bush House
Aldwych
London WC2B 4PJ
UK

Tel: +44 (0)20 7395 9000
london@analysysmason.com
www.analysysmason.com
Registered in England and Wales No. 5177472

1 Executive summary

This briefing note summarises the context, approach and results of a study, commissioned by BT, to quantify the time and cost impact of reducing a range of barriers to the deployment of 'full fibre' networks in the UK (which we refer to as fibre to the premises, FTTP). There has been much discussion across the telecoms industry about the importance of reducing these barriers, but until now there has been no clear quantification of the value created by removing those barriers. This study is the first to quantify the impacts of reducing barriers on the cost and timescales of FTTP roll-out. The study is relevant to all fibre builders in the UK, not just BT. That is because the deployment barriers that exist today affect all such companies. The reduction or removal of such barriers will therefore be positive for 'UK plc'.

The deployment of FTTP networks is a hot topic for many governments around the world. In the UK, the policy position has moved from a target of 100% coverage of FTTP by 2033, which was originally set in 2018, to 100% coverage of gigabit-capable networks by 2025. FTTP is expected to comprise a large proportion of the UK's gigabit-capable infrastructure, yet the timescale of 2025 is widely considered to be challenging, unless a range of deployment barriers can be reduced or removed. This study has therefore considered: when would it be possible to achieve 100% coverage of FTTP, and what would the likely coverage be by 2025.

UK government broadband policy assumes that the majority of the network coverage should be delivered by commercial fibre builders (rather than needing government subsidy). Commercial fibre builders will only extend network coverage as far as it is commercially viable to do so. The study therefore considers how the reduction in barriers can increase the proportion of premises that can be covered on a commercially viable basis, thus reducing the need for government funding.

The study considers a range of barriers across three main themes (deployment, planning and other). For each barrier there are specific policy actions that the government could undertake to reduce barriers and promote FTTP deployment, as summarised in Figure 1.1.

Figure 1.1: FTTP deployment barriers and potential policy actions [Source: Analysys Mason, 2020]

Barrier	Potential policy actions by government
Deployment	
Availability of deployment personnel	Develop new education, training and immigration policies to support recruitment of deployment personnel, to ensure the UK has enough deployment capacity
Access to shared infrastructure	Review the Access to Infrastructure (ATI) regulations to improve infrastructure re-use, and so reduce the time and cost involved in deploying FTTP

Barrier	Potential policy actions by government
Effectiveness of deployment personnel	Actively monitor the effectiveness of the updated Department for Transport (DfT) specification on the use of innovative deployment techniques,[1] and take further action if expected changes are not materialising. This action will ensure that new/innovative deployment techniques can be deployed rapidly across the UK, with the support of local authorities
Planning	
Delays to deployment	Develop a streamlined wayleave regime to minimise delays in obtaining wayleave permissions Develop schemes to give timely permissions to undertake street works to minimise delays due to waiting for permissions to be issued Develop new education, training and immigration policies to support recruitment of planning personnel, to minimise delays caused by planning capacity constraints
Other	
Multi-dwelling unit (MDU) access	Actively monitor the effectiveness of the new MDU access bill (Telecommunications Infrastructure (Leasehold Property) Bill 2019-21) to ensure that it solves the issues associated with obtaining landlord permissions, and take further action if expected changes are not materialising
New build	Actively monitor the effectiveness of the new legislation for new-build homes to ensure that it is successfully reducing time and cost to connect new builds, and take further action if expected changes are not materialising
Business rates	Encourage fibre investment by exempting new fibre build from business rates, or extend the current exemption period to align better with the typical FTTP investment case timeframe (e.g. 15 to 20 years)

To quantify the time and cost impact of each of these barriers, we built a detailed deployment model of the costs and revenues associated with FTTP deployment. As a simplifying assumption, the model used a **generic FTTP fibre builder** covering all areas of the UK, rather than attempting to capture the various strategies of different fibre builders in the market today. This further reinforces the fact that the benefits arising from a reduction of the barriers considered in this study would be industry-wide, rather than being specific to any single company.

The impact of reducing all barriers on the roll-out time for FTTP, and on the commercially viable coverage of FTTP, are shown in Figure 1.2 and Figure 1.3 respectively.

1 See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/883986/specification-for-the-reinstatement-of-openings-in-highways-fourth-edition.pdf

Figure 1.2: FTTP coverage over time [Source: Analysys Mason, 2020]

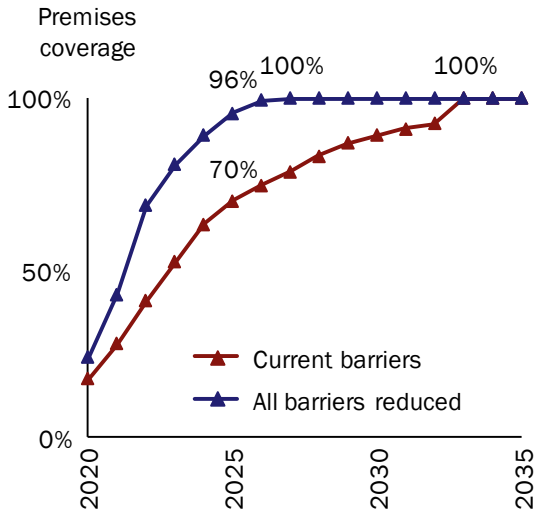
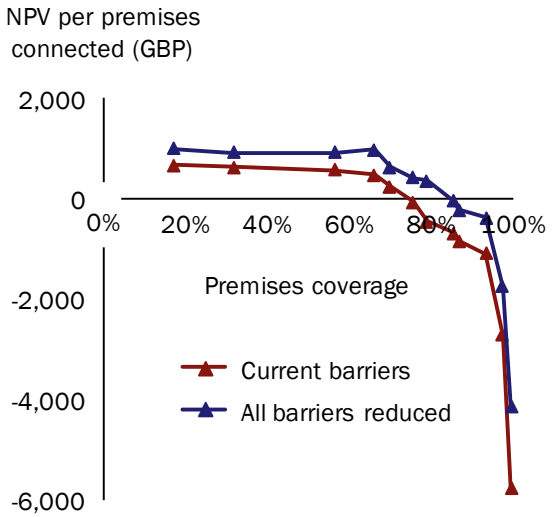


Figure 1.3: FTTP viability by premises coverage [Source: Analysys Mason, 2020]



At a national level, we estimate that the reduction of all barriers would have a significant impact on the time to deploy FTTP to 100% of premises. A reduction of all barriers would lead to 100% coverage in 2027 (vs. 2033 in the *do nothing* scenario with the current set of barriers). By 2025, FTTP coverage would be 96% with all barriers reduced (rather than 70% in the *do nothing* scenario with the current set of barriers). However, the study also reflects the fact that it is difficult to make a dramatic change to the economics of FTTP deployment. Reducing all barriers creates an increase of 10% in commercially viable premises coverage. While more modest than the impact on time, it is still material, representing c.3 million homes.

Finally, the impact on the total deployment cost is material, with 100% FTTP coverage capex at GBP31 billion in the *do nothing* scenario, and GBP21.5 billion with the reduction of all barriers. It is interesting to note that this significant reduction in costs does not translate into a similar, proportionate increase in viability; this is because the economics of rural areas remain challenging, and will require some form of government support to deliver nationwide coverage of FTTP.

The impact of each of individual barrier is shown in Figure 1.4 and Figure 1.5.

Figure 1.4: Impact on 100% FTTP coverage date [Source: Analysys Mason, 2020]

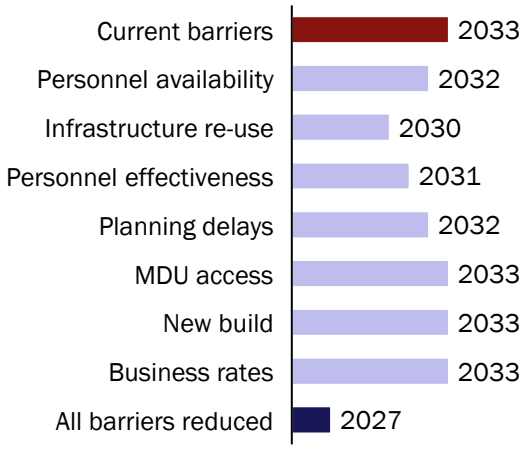
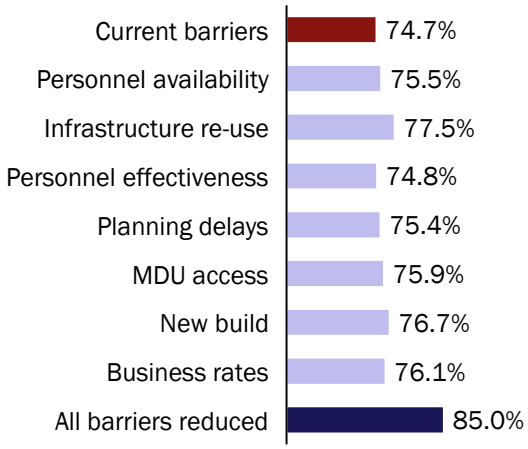


Figure 1.5: Impact on proportion of FTTP-viable premises [Source: Analysys Mason, 2020]



The improvement in FTTP 100% coverage date is delivered mainly from three of the barriers, i.e. the availability and effectiveness of the UK's deployment workforce, and the level of re-use of existing infrastructure. In contrast, the improvement in FTTP commercial viability is delivered from small improvements in viability for each of the barriers. One of the more important factors that has an impact on viability is business rates, a topic which the industry has been lobbying on for several years. If business rates were to be re-introduced (or worse, increased), this would have a negative impact on the FTTP business case for all fibre builders, and could adversely affect the appetite of investors to support such deployments.

Overall, this study highlights that there are a range of barriers that must be reduced or removed if nationwide and rapid coverage of FTTP is to be delivered, in support of the government's ambitions. Reducing the barriers will require immediate and comprehensive coordination between national, devolved and local government and industry.

2 Introduction

Analysys Mason was commissioned by BT to conduct a study to quantify the time and cost impact of reducing barriers to the deployment of 'full fibre' (which we refer to as fibre to the premises, FTTP). The purpose of the work is to show how the reduction of barriers can increase the rate at which FTTP can be rolled out in the UK, and also to show how more premises can be deployed on a commercially viable basis (i.e. without the need for government subsidy).

This briefing note summarises the context, approach and results of the work. All of the time and cost benefits are calculated for a generic FTTP fibre builder, since fibre deployments by all fibre builders in the market will benefit from a reduction in the barriers considered in this study.

The remainder of this note is laid out as follows:

- Section 3 summarises the policy context for the study
- Section 4 explains what the market can deliver
- Section 5 details the barriers to FTTP deployment, including how government can help to solve those barriers
- Section 6 gives an overview of the methodology of the study
- Section 7 sets out the time and cost impact results of reducing FTTP deployment barriers
- Section 8 presents the conclusions.

3 Policy context

The roll-out of FTTP has been a feature of government policy for some time. A government target for FTTP in all areas of the UK was first announced in May 2018.[2] This target was to reach:

- 15 million premises by 2025, and
- nationwide coverage by 2033.

The strategy for delivering these targets was set out in the Future Telecoms Infrastructure Review (FTIR). The FTIR cited the economic growth benefits of next-generation infrastructure as the main driver behind the need to deploy FTTP infrastructure.[3]

Following the election of Boris Johnson as Conservative Party leader, the subsequent Conservative Party general election manifesto include a revised, more-ambitious target,[4] "*to bring full fibre and gigabit capable broadband to every home and business across the UK by 2025*". The revised target included two significant changes:

- The timescale is far shorter, with nationwide coverage of next-generation infrastructure by 2025 instead of 2033, and
- The scope of the network to be deployed has been softened: gigabit-capable broadband could be delivered by other technologies alongside FTTP (such as cable and fixed-wireless networks).

Following the announcement of the new targets, a range of industry stakeholders highlighted the challenges involved in meeting the new timescales.[5] The stakeholders argued that the targets could not be delivered without policy reform to address major barriers to FTTP deployment.

The above events set the policy context for this study. While other technologies could meet the government's infrastructure coverage targets, FTTP is well suited to providing the required speed, resilience and reliability. This study therefore considers how barriers to FTTP can be reduced, and for the first time seeks to quantify those effects, in order to:

- maximise the level of coverage by 2025
- reduce the total time to achieve 100% coverage, and
- increase the proportion of premises that can receive FTTP from commercial fibre builders in the market, without the need for government subsidy.

2 See https://researchbriefings.files.parliament.uk/documents/CBP-8392/CBP-8392.pdf

3 See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/732496/Future_Telecoms_Infrastructure_Review.pdf

4 See https://assets-global.website-files.com/5da42e2cae7ebd3f8bde353c/5dda924905da587992a064ba_Conservative%202019%20Manifesto.pdf

5 See https://www.ispa.org.uk/wp-content/uploads/Cross-Industry-Letter-to-PM.pdf

4 What the market can deliver

Commercial fibre builders in the market will roll out FTTP where it is commercially viable to do so. The commercial viability can be considered by comparing the revenue from, and costs for, connecting each premises. While the revenue per premises is typically the same in all areas (i.e. users in rural areas do not pay more for a given speed of broadband than in urban areas), the costs do vary, with rural areas generally being much more costly than urban areas.

The cost of deploying FTTP broadband is broadly proportional to the line length, i.e. the distance between the local telephone exchange and the end-user premises.[6] Line lengths in high-density (urban) areas are much shorter than line lengths in low-density (rural) areas. Fibre builders will typically start their deployment in the lower-cost urban areas, before pushing out towards higher-cost rural areas. This behaviour, coupled with the distribution of premises in the UK, creates the relationship shown in Figure 4.1.

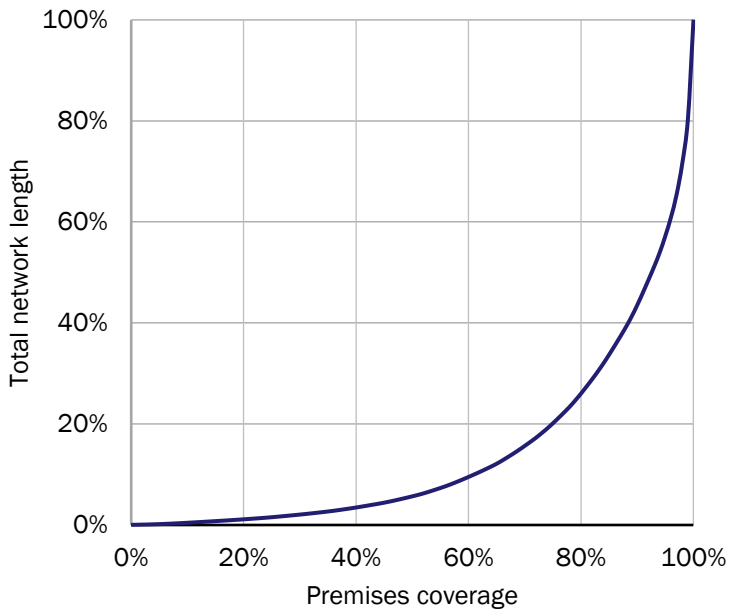


Figure 4.1: Relationship between premises coverage and network length[7] [Source: Analysys Mason, 2020]

Initial deployments to the first few percent of premises incur a relatively small proportion of the total required national network distance (and therefore cost). However, as the deployment pushes on towards rural areas and the steeper part of the curve, the increase in network length per premises has two effects: deployments take longer to complete, and more costs are incurred in doing so.

When compared against a fixed revenue, the increasing cost per premises in rural areas means that, at some point, it becomes commercially unviable to deploy any further. This trade-off can be

6 Line length is the primary driver of FTTP costs. Various other factors can affect the cost of deployment, including the availability of existing ducts and poles to be re-used, and the type of surface in which any new ducts must be deployed (road, footpath, verge, field, etc.).

7 In the analysis, cumulative total area is used as a proxy for cumulative total network length, and therefore cost.

considered by calculating a net present value (NPV) of the investment on a per-premises basis, and the resulting relationship is shown in Figure 4.2.

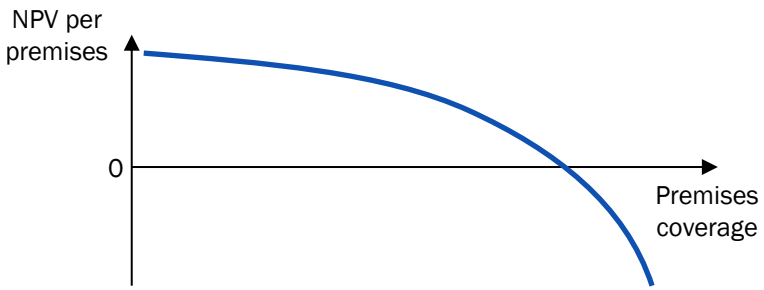


Figure 4.2: Illustration of NPV per line vs. premises coverage [Source: Analysys Mason, 2020]

The point at which the curve crosses the x-axis (where NPV per premises equals zero) represents the coverage limit of commercial viability. The commercial fibre builders in the market will not deliver beyond this point, unless they receive subsidies from government to raise the NPV of deploying to those premises above zero.

5 Barriers to FTTP and the role of government

5.1 Introduction

The study considers a range of barriers to FTTP deployment, grouped under three themes. These are summarised in Figure 5.1.

Theme	Barriers
Deployment barriers	• Availability of deployment personnel • Access to shared infrastructure • Effectiveness of deployment personnel
Planning barriers	• Permissions to access private land (obtaining wayleaves) • Permissions to undertake street works • Availability of network design personnel
Other barriers	• Access to multi-dwelling units (MDUs) • New-build premises • Business rates relief

Figure 5.1: Summary of barriers considered in the study [Source: Analysys Mason, 2020]

In the following subsections we discuss each of the barriers in turn, along with the potential role of government in reducing that barrier.

5.2 Deployment barriers

5.2.1 Availability of deployment personnel

Most of the time and cost associated with deploying FTTP networks is created by the need to install new fibre between a local aggregation point[8] and the premises. This installation is carried out along roads, footpaths, verges and fields, and is undertaken by deployment personnel, covering two main activities:

- installation of the fibre in existing underground ducts and on overhead poles, and
- where existing infrastructure cannot be re-used, building of new ducts and poles.

The speed at which the UK can deploy its FTTP infrastructure is directly constrained by the total number of available deployment personnel. Each deployment team can deploy fibre at a certain rate per day. The more teams that are available, the faster the UK can achieve FTTP coverage.

The role of government in reducing FTTP deployment time and cost

The government should consider how its education, training and immigration policies can support the recruitment of sufficient deployment personnel with the right skills.

8 A local aggregation point could be at the local telephone exchange, or another point of presence.

5.2.2 Access to shared infrastructure

A significant factor in the time and cost taken to deploy FTTP infrastructure is the need to deploy new ducts and poles where existing infrastructure cannot be re-used. Indeed, on a per-metre basis, it is 5–15× more expensive and time consuming to dig trenches and lay new duct than it is to install fibre in existing duct.

In response to Ofcom's regulations, Openreach already makes its existing ducts and poles available for re-use by fibre builders (where those ducts and poles have sufficient space). However, if infrastructure re-use could be improved further (through the re-use of utilities' infrastructure, for example), this would have a significant impact on the UK's deployment of FTTP. Some fibre builders have already used electricity and sewers infrastructure, although these deployments are quite limited at this stage.

The role of government in reducing FTTP deployment time and cost

Ofcom and Openreach have already made significant improvements in the regulated access to Openreach's ducts and poles. Further increases in infrastructure re-use could come from access to non-telecoms infrastructure (e.g. utilities such as electricity and water).

Government should review how the existing regulations (Access to Infrastructure (ATI), introduced in 2016) are supporting FTTP deployment, and whether any improvements can be made.

5.2.3 Effectiveness of deployment personnel

In combination with the availability of deployment personnel, the effectiveness of each member of the UK's deployment workforce has a significant impact on FTTP roll-out. The effectiveness of deployment personnel is constrained by their ability to practise innovative deployment techniques, such as:

- micro trenching (e.g. diamond cutters) on roadways and pavements
- other rapid trenching techniques (e.g. Ditch Witch, GeoRipper) on fields and verges
- mobile planning applications, and
- ground-penetrating radar.

The ability of deployment personnel to use these techniques is constrained by the availability of training and equipment, and critically, by permission schemes from local authorities which may not currently allow these techniques to be used.

The role of government in reducing FTTP deployment time and cost

While there is an important role for commercial fibre builders to invest in innovative deployment techniques, government should ensure that these techniques are not unduly restricted by local permission schemes. The Department for Transport's (DfT) recent update to its "Specification for the Reinstatement of Openings in Highways" supports the use of slot trenching and other innovative techniques and should support this improvement.[9] Government should actively monitor the implementation of these guidelines by local authorities.

5.3 Planning barriers

Planning barriers include those barriers which prevent deployment from starting. Three types of planning barrier are considered in this study:

- obtaining permission to deploy on private land (known as obtaining a "wayleave")
- obtaining permission from local authorities to undertake street works
- awaiting detailed network designs/plan from network planning personnel.

Collectively, these barriers have the potential to block deployments from starting, which reduces the utilisation of each deployment personnel, and increases the overall time taken to roll out the network. Planning delays are likely to have more of an impact in rural areas and/or on smaller contractors (due to difficulties in redeploying to other areas).

The role of government in reducing FTTP deployment time and cost

There are several avenues which could be explored by government to reduce planning barriers for FTTP deployment, including:

- streamlining of the UK's wayleave regime
- ensuring that local authorities issue permits in a timely fashion
- including network planning resource in any training/education/immigration policy to support the recruitment of personnel with the correct skills.

5.4 Other barriers

5.4.1 Access to MDUs

Around 16% of UK premises are in MDUs (i.e. blocks of apartments and flats). Similar to the requirement to obtain permission to deploy on private land, the permission of landlords must be

9 See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/883986/specification-for-the-reinstatement-of-openings-in-highways-fourth-edition.pdf

sought before fibre can be deployed in an MDU. This permission is required even if the tenants have requested the installation of FTTP broadband.

Currently, obtaining access to MDUs is a major issue, with around 40% of premises in these buildings being missed during FTTP deployment.[10] The process for obtaining the permission from landlords is lengthy and many fibre builders will simply leave these missed MDUs and move onto other areas. This practice means that an area with MDUs will likely have to wait until all other areas have been covered before fibre builders will return to cover the MDUs.

The role of government in reducing FTTP deployment time and cost

There is currently a bill before parliament to address the issue of access to MDUs (Telecommunications Infrastructure (Leasehold Property) Bill 2019-21). This bill will create a new process for fibre builders to deploy fibre in MDUs, even if landlords do not respond. To achieve the benefits modelled in this report the bill would need to deliver a solution to the issue of obtaining permission to deploy to MDUs. If the bill does not do that, further changes would likely be required which could add delay to the overall FTTP deployment process.

5.4.2 New-build premises

As new premises continue to be built in the UK, it will be important to ensure that these are also covered with FTTP.

Ideally, developers of new premises will liaise early in the process with fibre builders so that they can exploit the low build costs at the greenfield stage. Early coordination would also help to ensure that fibre connections are installed throughout each development. If fibre builders have to deploy their networks after the premises have been built, this would be more costly/time consuming than if they are installed by the developer during the build phase.

The role of government in reducing FTTP deployment time and cost

The government has already recently announced plans to legislate to ensure that new-build homes have gigabit-capable infrastructure installed during the build phase. The proposed legislation includes a requirement for the housing developer to install the fibre connection, up the value of GBP2000 per premises.

10 See https://www.ispreview.co.uk/index.php/2020/01/bill-to-spread-gigabit-broadband-into-big-buildings-gets-support.html

5.4.3 Business rates relief

Currently there is a regime of relief from the business rates that fibre builders must pay on each FTTP broadband connection. The reliefs are time limited:

- until 2022 in England and Wales
- until 2029 in Scotland.

The need to pay business rates has a material impact on the per-premises business case for FTTP. It is an additional cost that must be recovered by the revenue. Once the relief period expires, the re-imposition of business rates will reduce the number of premises that can be covered on a commercial basis. Any prospect of business rates being re-introduced will affect the investment case, and is therefore a source of risk/uncertainty to potential investors who support fibre builders.

The role of government in reducing FTTP deployment time and cost

Government should encourage fibre investment by exempting new fibre build from business rates, or extend the current exemption period to align better with the typical FTTP investment case timeframe (e.g. 15 to 20 years). Such an action will support the FTTP deployment business case, and increase the number of premises that can be covered on a commercially viable basis.

6 Methodology of the study

To calculate the cost and time impact of reducing barriers to FTTP deployment, we built a detailed deployment model which produces cost and time curves for deploying FTTP to the whole of the UK.

The cost base used in the model assumes a generic fibre builder, starting to deploy fibre in the densest urban areas and moving out to less dense rural areas. We do not include the re-use of the existing fibre laid by Openreach between the local exchange and the cabinet. On the revenue side, we assume that the generic fibre builder will face competition from one other network (which may be a cable network, another FTTP network, or a 5G-based fixed-wireless network) which has the effect of moderating market share.

While we have calibrated the model to consider the existing FTTP coverage at a national level (as at the end of 2019), we do not explicitly include the specific locations of existing FTTP deployments.

The model is structured around 12 geotypes[11] and includes a forecast period from 2019 through to 2040. The main function of the model is to perform a parameterised calculation of the speed and cost of the UK's fibre deployment workforce, i.e.:

- the metres of network that can be deployed per day by a team (which is affected by the proportion of simple fibre install vs. deploying new ducts in different types of ground)
- the number of days per year that a deployment team can be utilised
- the total number of deployment personnel in the UK (which is forecast to increase from today's levels), and
- the day rate (cost) of a deployment team.

A range of other assumptions are included to complete the fibre deployment business case, to calculate total costs and commercial viability:

- other non-fibre and civils capex costs, such as electronic equipment
- other non-capex costs, such as power and maintenance opex, and duct and pole rental costs
- revenue, which is driven by an assumed wholesale revenue per premises and an assumed take-up rate.

The assumptions used to test the time and cost impact of reducing barriers are shown in Figure 6.1. For each barrier, two cases were tested:

- a base case with the current status of the barrier
- a high case with the barrier reduced.

11 Geotyping is an approach whereby a country is broken down into a small number of areas with similar geo-demographic characteristics. This approach maintains population distribution characteristics while avoiding significant model complexity.

Figure 6.1: Summary of assumption ranges to test the impact of reducing barriers [Source: Analysys Mason, 2020]

Barrier	Base case (current situation in the market)	High case (with barrier reduced)
Deployment		
Availability of deployment personnel	The number of FTTP deployment personnel increases from 8 500 in 2020 to 19 300 in 2022[12] (an increase of 10 800)	We include a further 20% uplift in the workforce per year compared to the base case
Access to shared infrastructure	Average c.75% re-use of existing ducts and poles (higher in urban areas, lower in rural areas)	Average c.85% re-use of existing ducts and poles, to represent improved re-use techniques and use of alternative infrastructure
Effectiveness of deployment personnel	We assume there is some use of innovative techniques, e.g. micro trenching, GeoRipper	We assume a 20% uplift in workforce effectiveness, to represent increased use of innovative techniques (we do not model an increase in day rate)
Planning		
Delays to deployment	We assume 216 useful deployment days per person per annum (out of max. 260), with downtime due to planning delays. This gives a utilisation of 83%. We model only fully utilised days	We assume the utilisation rate increases to 92% (238 useful deployment days per person per annum)
Other		
MDU access	40% of MDUs are missed on the first pass and must be covered after all other premises are covered. We also assume GBP5000 cost per missed MDU block to cover legal and administrative fees	100% of MDUs are covered simultaneously with single dwelling units (SDUs) in that area. We also assume the legal and administrative fees for accessing MDUs are no longer incurred.
New build	In the base case, total capex includes the cost of covering new-build premises. In the high case, coverage capex for new builds is set to zero (to model the case where developers install fibre in new housing estates). Final-drop capex is still incurred by the generic fibre builder. We note that new legislation caps the contribution that a developer would have to make at GBP2000 per premises. We also note that Openreach (as one example) offers a sliding-scale tariff where it would incur anywhere between the full cost (for developments with 20+ homes) and just the remaining cost beyond GBP2000. Given this variability, and the fact that homes in the viable coverage areas will likely be below the GBP2000 threshold, we have modelled a simple all cost/no cost scenario to test the effect	
Business rates	We have modelled business rates as per the current regime	Business rate relief on fibre broadband connections continues indefinitely

12 This is slightly smaller than the total fibre deployment workforce in the UK, as the numbers do not include personnel who work for fibre builders which compete with the assumed generic fibre builder, nor do they include the personnel undertaking final-drop connections.

7 Results: time and cost impact of reducing FTTP barriers

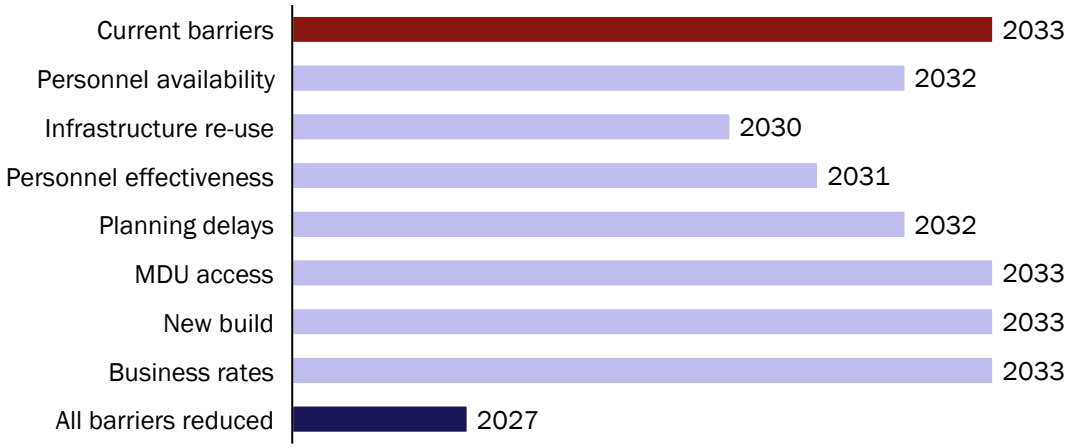
In this section we present the results of the study, showing the time and cost impact of reducing the barriers to FTTP.

7.1 The UK-wide impact of each barrier

7.1.1 Timing of achievement of 100% FTTP coverage

The year in which 100% FTTP coverage is achieved across the whole of the UK, following the reduction of each of the barriers, is shown in Figure 7.1.

Figure 7.1: Year in which 100% FTTP coverage is reached following reduction of barriers [Source: Analysys Mason, 2020]



Without any action to reduce the current barriers, it will take until 2033 to provide 100% coverage of FTTP to all of the UK. This result is dependent on our assumptions regarding the availability and effectiveness of the UK deployment personnel workforce, but we consider that this is a reasonable base case: it is commensurate with the date suggested by the FTIR, and the view from industry that it will not be possible to deliver the coverage materially sooner without a reduction of the barriers.

The barrier which has the greatest impact on the timing for FTTP coverage is infrastructure re-use. Building new duct takes significantly longer than installing fibre in existing duct. The modelled generic fibre builder is assumed to re-use duct wherever possible. While the primary source of re-useable duct will be from Openreach, duct from other sources (e.g. utilities) has the potential to further reduce the barrier. Furthermore, techniques to improve the re-use rate for all types of duct (not just Openreach duct) will be very important to FTTP deployment.

Other barriers which have a material impact on time are the effectiveness of deployment personnel and planning delays. Both barriers can be affected by the regime at local authorities (which may not

allow innovative deployment techniques, and create delays with street works permissions). The total size (availability) of the deployment personnel workforce also has a material effect.

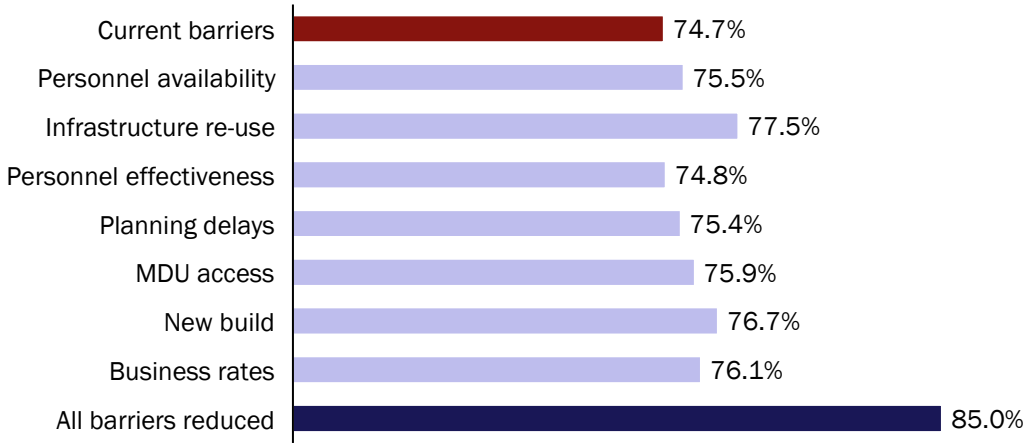
There are some barriers whose reduction does not affect the 100% completion date at a national level. Delays to MDU access do not show up in terms of the 100% national completion date, because it is assumed that any missed MDUs will be covered after other deployments are completed.[13] However, in areas with a large number of MDUs, the local completion date is likely to be much later than if the MDUs can be covered on the first pass. Neither the new-build nor the business rates barriers have any impact on timing, but they do materially affect the proportion that can be covered on a commercially viable basis (see Figure 7.2 below).

The total effect of reducing all barriers is that 100% coverage could be achieved by 2027, a reduction of 6 years from the expected date if no action is taken.[14]

7.1.2 Commercially viable FTTP coverage of premises

The number of premises that can be covered commercially by commercial fibre builders (without any government subsidy) following the reduction of each of the barriers is shown in Figure 7.2, as a proportion of all UK premises.

Figure 7.2: Viable premises coverage of FTTP following reduction of barriers [Source: Analysys Mason, 2020]



The results for viable premises coverage show similar impacts from all barriers, though again infrastructure re-use has a strong effect. Overall, the total impact of reducing all barriers is that the

13 We note that the deployment dynamics for MDUs and SDUs are quite different, and that fibre builders which focus on MDUs have already covered many premises. Our model does include coverage of MDUs in the existing coverage assumptions, though it does not consider explicitly which specific MDUs have been covered. Under the current set of barriers, our assumption that MDUs are covered after all other premises is made in order to calculate a 100% coverage result. However, if those MDUs are still not accessible (either due to high costs or lack of permission from landlords) then it may still not be possible to provide coverage.

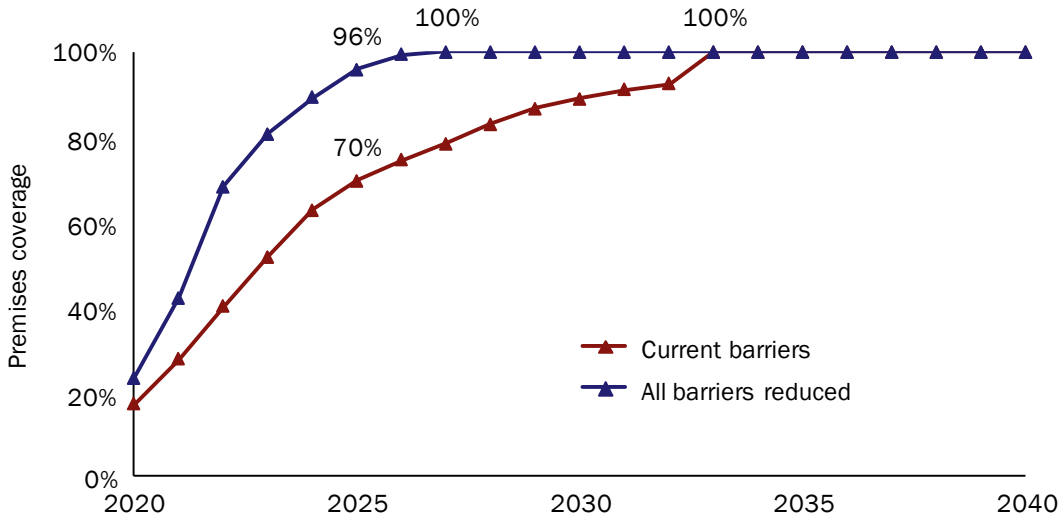
14 The combined time impacts of the separate barriers do not add up to exactly the same as the impact of reducing all barriers, due to the non-linear way that the barrier reduction measures combine.

proportion of the UK that could be covered on a commercial basis would be increased by 10 percentage points, from around 75% to 85%.[15]

7.2 The total impact of reducing all barriers at UK level

When combined together, a reduction in all barriers to FTTP deployment has a significant impact on the profile for coverage over time, as shown in Figure 7.3.

Figure 7.3: FTTP coverage over time [Source: Analysys Mason, 2020]

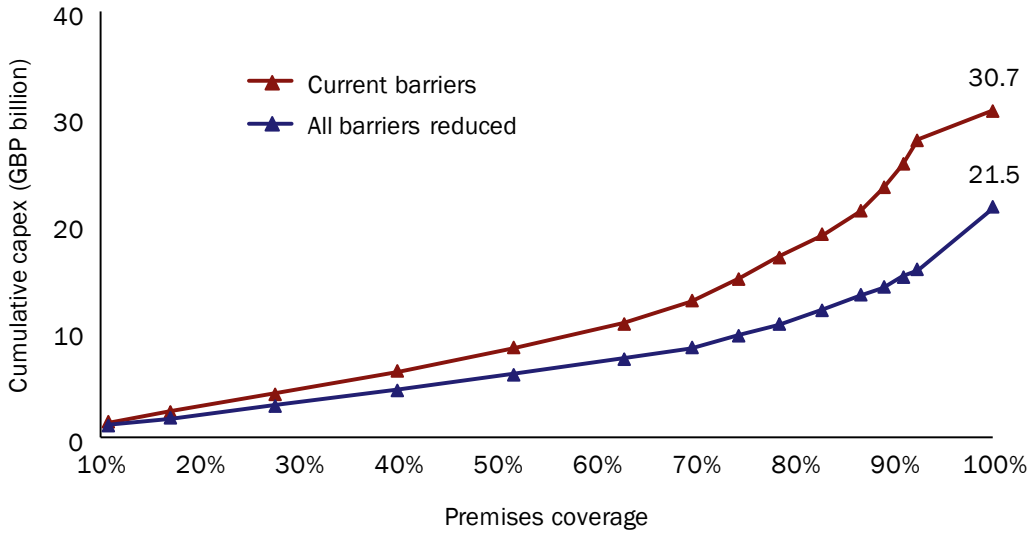


This analysis shows that by reducing all barriers the time to complete 100% coverage could be brought forward by six years, from 2033 to 2027. Also of note is the impact on the coverage achieved by 2025: with barriers reduced, coverage increases from 70% to 96%. Finally, the impact of delaying access to some MDUs is shown in the current barriers line: in the final year of deployment, coverage increases rapidly as these dense groups of premises are finally covered.

The cumulative deployment capex for deploying FTTP is shown in Figure 7.4.

15 Again, the sum of the component parts is not exactly equal to the total effect of reducing all barriers. This is an artefact of our geotyping approach.

Figure 7.4: Cumulative capex for FTTP deployment [Source: Analysys Mason, 2020]

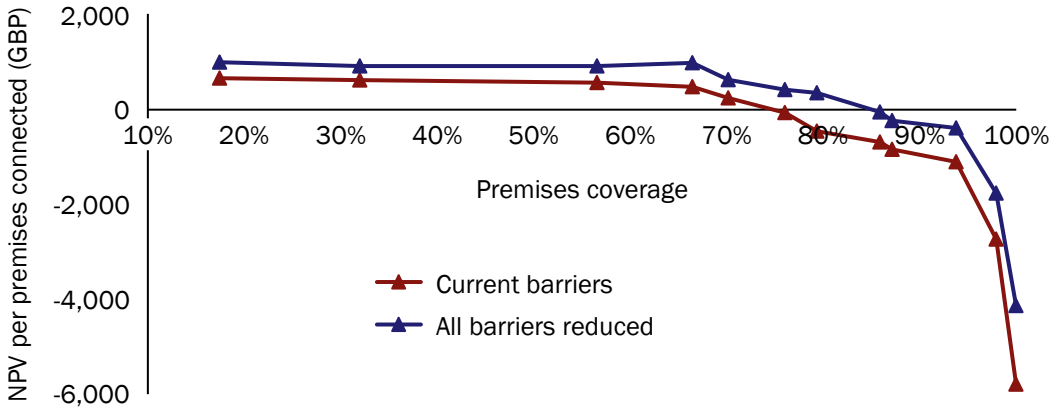


The analysis shows that with the current barriers in place, a total cost of around GBP31 billion would be required to provide FTTP to 100% of the UK. This cost includes capex for the final-drop connection for those taking service. Under the scenario where all barriers are reduced, the total cost would be reduced to around GBP22 billion.

It should be noted the total number of premises in the UK is forecast to be higher in 2033 than in 2027, though this is a secondary effect on the total capex cost. Nevertheless, the impact of deploying more efficiently has a large impact on the total cost. This is due to most of the cost being associated with the time of deployment personnel.

The impact on the viability of FTTP deployment is shown in Figure 7.5.

Figure 7.5: NPV per premises connected [Source: Analysys Mason, 2020]



The analysis shows the NPV per premises of the FTTP deployment at different levels of premises coverage. The point at which the lines cross the x-axis (where NPV=0) shows the limit of commercially viable deployment.

The analysis shows that the commercial viability of FTTP deployment in the UK is relatively constant up to around 2/3 of premises, after which the increasing line lengths in rural areas push the viability down below zero (beyond around 75% coverage). If all barriers can be reduced, this viability can be extended to around 85%.

7.3 The impact of reducing barriers on England, Scotland, Wales and Northern Ireland

7.3.1 Impact on FTTP coverage over time

In Figure 7.6 to Figure 7.9 below we show the impact of reducing all barriers on FTTP coverage over time in each of England, Wales, Scotland and Northern Ireland. In each case the coverage value at 2025 and 2033 is shown explicitly on the chart.

Figure 7.6: FTTP coverage over time in England [Source: Analysys Mason, 2020]

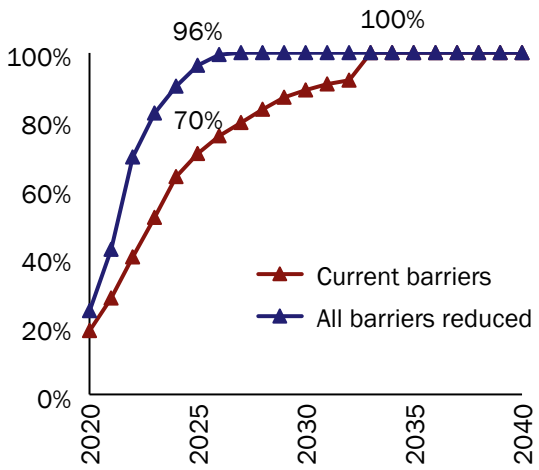


Figure 7.7: FTTP coverage over time in Wales [Source: Analysys Mason, 2020]

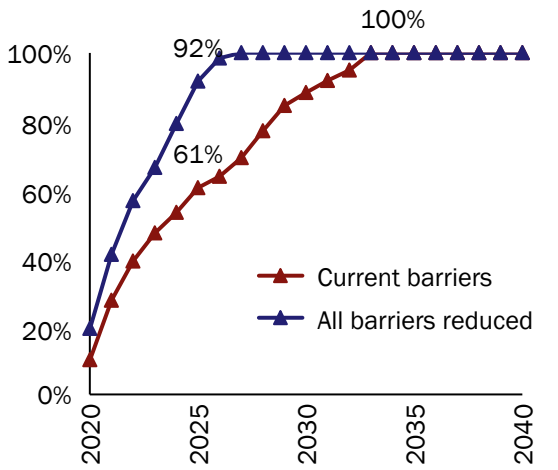


Figure 7.8: FTTP coverage over time in Scotland [Source: Analysys Mason, 2020]

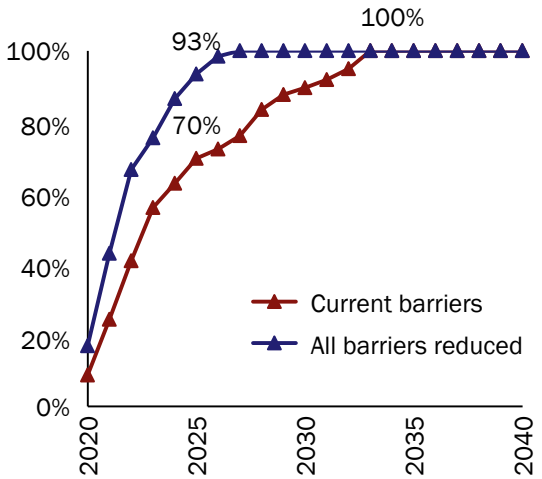
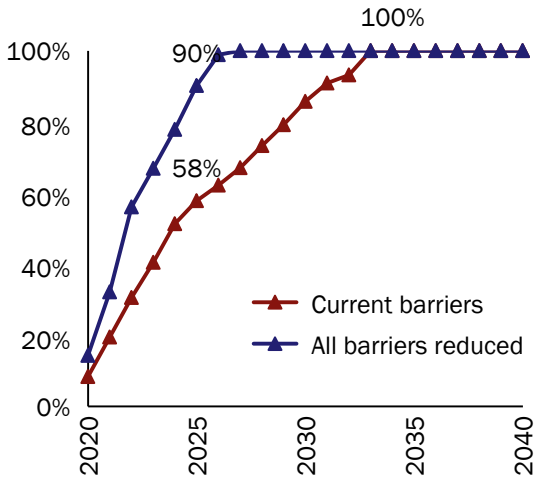


Figure 7.9: FTTP coverage over time in Northern Ireland [Source: Analysys Mason, 2020]



The model assumes there are multiple deployment teams working through the geotypes which are distributed across all four nations. As such, each nation reaches 100% coverage at the same time (2033 with current barriers; 2027 with all barriers reduced). However, the different composition of geotypes in each nation creates more difference in the intermediate coverage results, with Wales and Northern Ireland showing a much greater benefit at 2025 from reduced barriers than England and Scotland.

In Figure 7.10 to Figure 7.17 below we show in map form the difference in FTTP coverage as of 2025 between the case with current barriers and the case with all barriers reduced, in each of England, Wales, Scotland and Northern Ireland. The maps show the coverage results in terms of postcodes, where green indicates that all premises in a postcode are covered and red indicates that no premises in the postcode are covered. These results are based on allocating all the premises in a postcode to one of the 12 geotypes.

Figure 7.10: FTTP coverage of England by postcode in 2025, current barriers [Source: Analysys Mason, 2020]

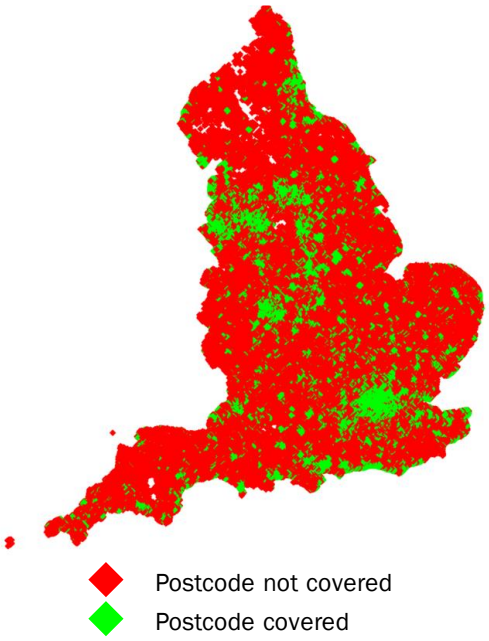


Figure 7.11: FTTP coverage of England by postcode in 2025, all barriers reduced [Source: Analysys Mason, 2020]

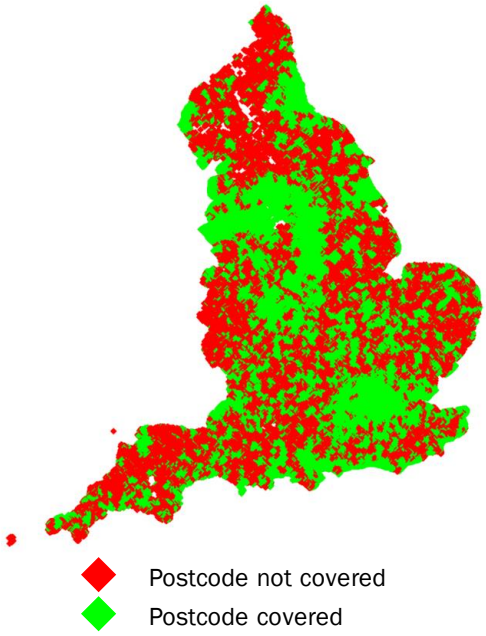


Figure 7.12: FTTP coverage of Wales by postcode in 2025, current barriers [Source: Analysys Mason, 2020]

Figure 7.13: FTTP coverage of Wales by postcode in 2025, all barriers reduced [Source: Analysys Mason, 2020]

Figure 7.14: FTTP coverage of Scotland by postcode in 2025, current barriers
[Source: Analysys Mason, 2020]

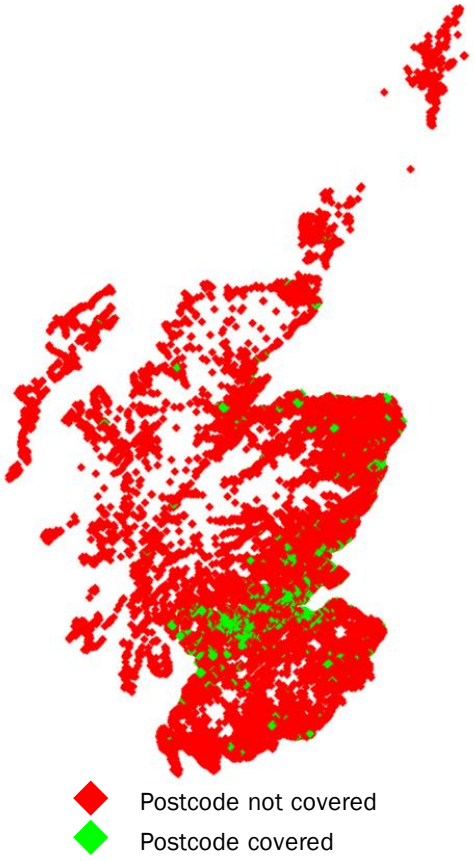


Figure 7.15: FTTP coverage of Scotland by postcode in 2025, all barriers reduced
[Source: Analysys Mason, 2020]

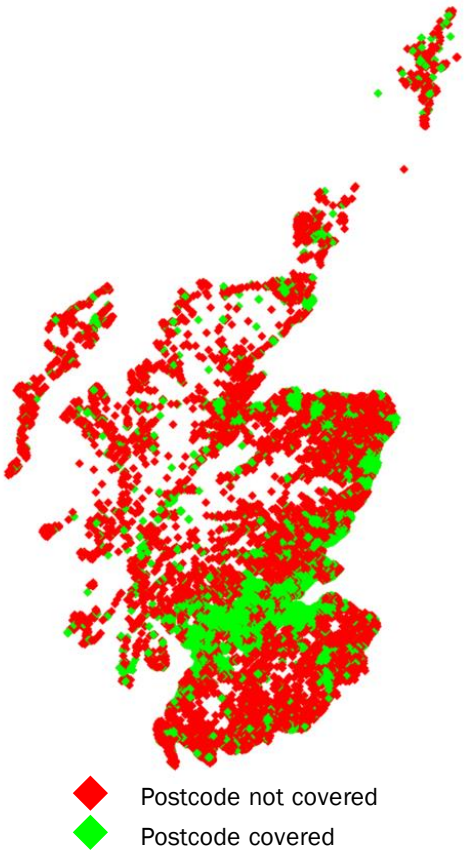


Figure 7.16: FTTP coverage of Northern Ireland by postcode in 2025, current barriers
[Source: Analysys Mason, 2020]

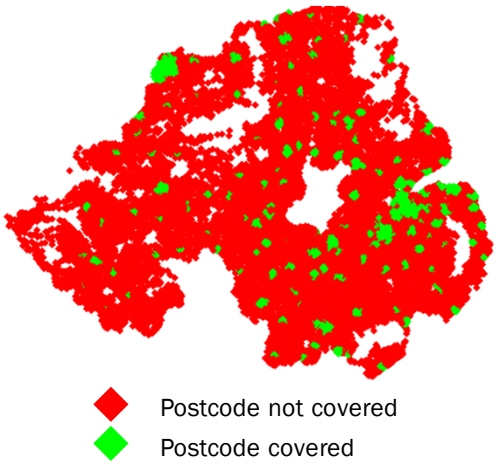
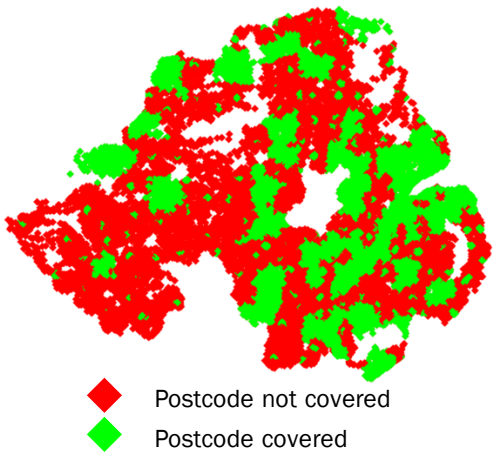


Figure 7.17: FTTP coverage of Northern Ireland by postcode in 2025, all barriers reduced
[Source: Analysys Mason, 2020]



7.3.2 Impact on total FTTP deployment capex

In Figure 7.18 to Figure 7.21 below we show the impact of reducing all barriers on total FTTP deployment capex in each of England, Wales, Scotland and Northern Ireland.

Figure 7.18: Total FTTP deployment capex in England, GBP million
[Source: Analysys Mason, 2020]

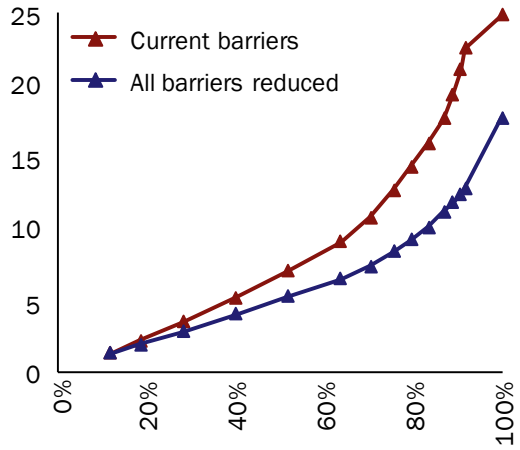


Figure 7.19: Total FTTP deployment capex in Wales, GBP million
[Source: Analysys Mason, 2020]

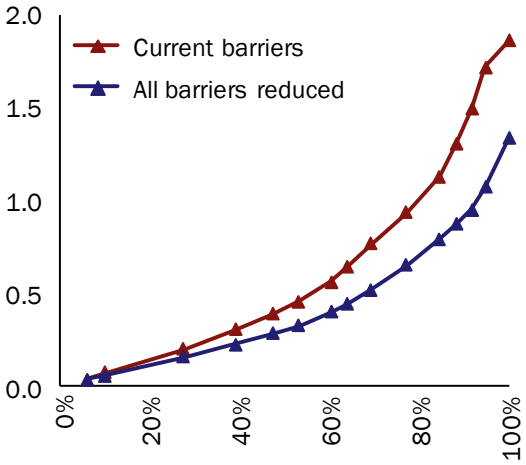


Figure 7.20: Total FTTP deployment capex in Scotland, GBP million
[Source: Analysys Mason, 2020]

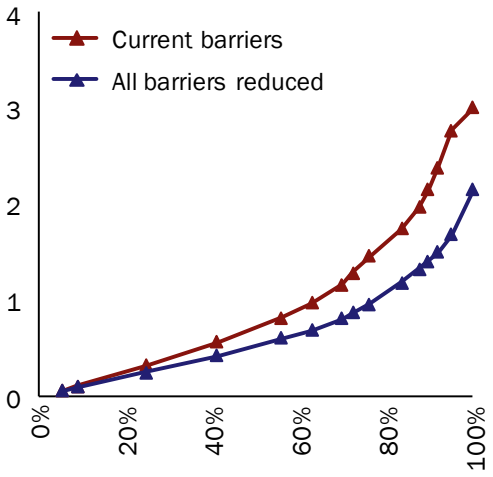
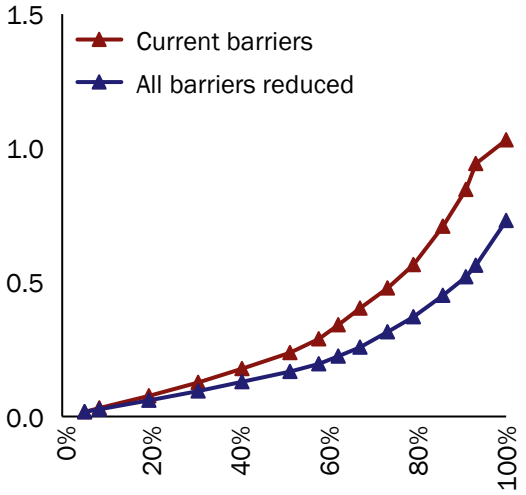


Figure 7.21: Total FTTP deployment capex in Northern Ireland, GBP million
[Source: Analysys Mason, 2020]



All four nations exhibit a similar profile of total capex as deployment is pushed out from urban to rural areas, though it is notable that the absolute totals are quite different.

7.3.3 Impact on commercial viability of FTTP deployment

In Figure 7.22 to Figure 7.25 below we show the impact of reducing all barriers on the commercial viability of FTTP deployment in each of England, Wales, Scotland and Northern Ireland. In the charts, the commercially viable coverage is highlighted in the coloured boxes.

Figure 7.22: NPV per premises connected in England, GBP [Source: Analysys Mason, 2020]

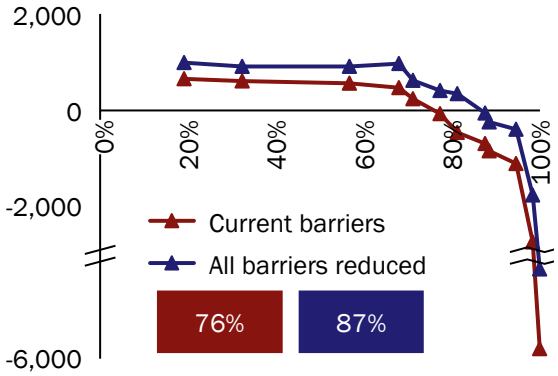


Figure 7.23: NPV per premises connected in Wales, GBP [Source: Analysys Mason, 2020]

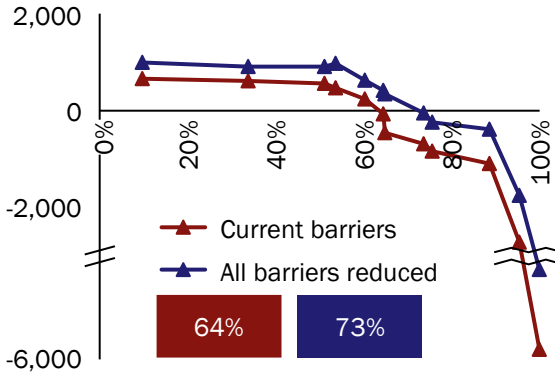


Figure 7.24: NPV per premises connected in Scotland, GBP [Source: Analysys Mason, 2020]

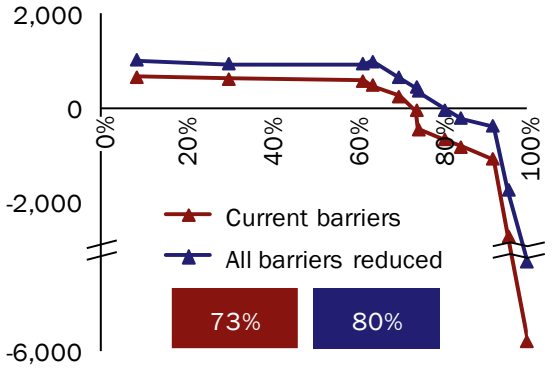
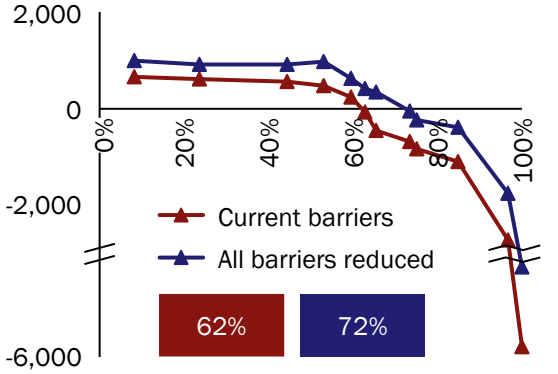


Figure 7.25: NPV per premises connected in Northern Ireland, GBP [Source: Analysys Mason, 2020]



The analysis of commercial viability across the four nations exhibits a similar profile in terms of how the NPV falls below zero in rural areas. The impact of reducing barriers on commercial viability shows some variation across the four nations, though all are in the range 7–11%.

7.4 The impact of reducing barriers on local authorities

We have also considered the impact at the local level, as the local distribution of premises across different geotypes means that solving barriers to FTTP deployment has different effects. The model developed for this study produces results for all 382 local authorities in the UK. However, below we show mapping results for a selection of three local authorities distributed across the UK. The local authorities were chosen for purely illustrative purposes (to provide a spread from across the UK, and to choose some local authorities where the effects of reducing barriers are very apparent):

- Hartlepool in the North East of England
- Cardiff in South Wales
- Renfrewshire in the West of Scotland.

Figure 7.26 to Figure 7.31 below show the FTTP coverage in 2025, for both the current barriers scenario and the scenario with barriers reduced, for the three selected local authorities. In the figures below, post point locations are used as a proxy for premises locations. Areas of the maps with few post points are equivalent to areas with few premises.

Figure 7.26: FTTP coverage by postcode in 2025, current barriers, Hartlepool [Source: Analysys Mason, 2020]

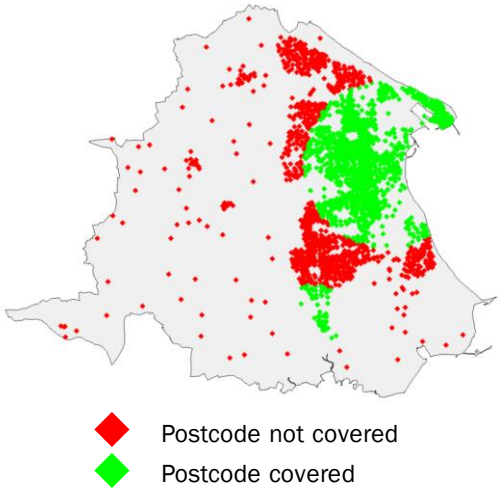


Figure 7.27: FTTP coverage by postcode in 2025, all barriers reduced, Hartlepool [Source: Analysys Mason, 2020]

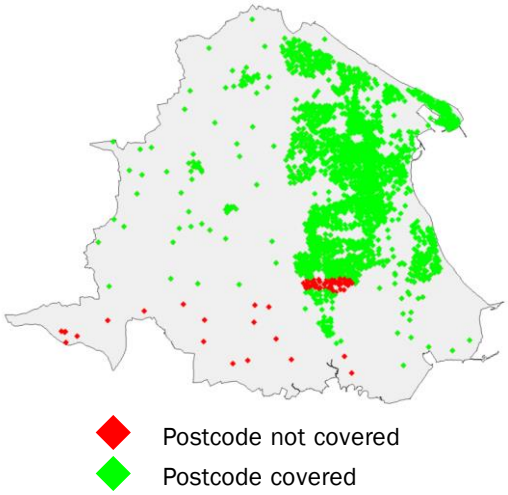


Figure 7.28: FTTP coverage by postcode in 2025, current barriers, Cardiff
[Source: Analysys Mason, 2020]

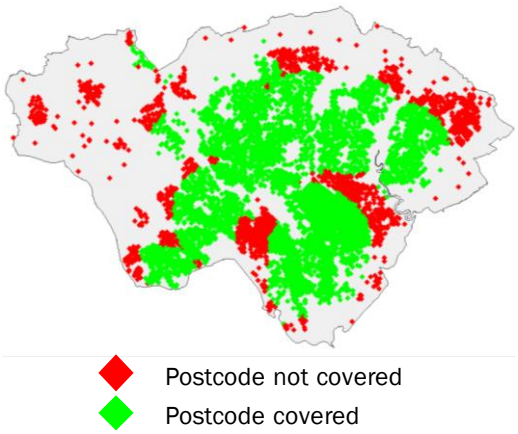


Figure 7.29: FTTP coverage by postcode in 2025, all barriers reduced, Cardiff
[Source: Analysys Mason, 2020]

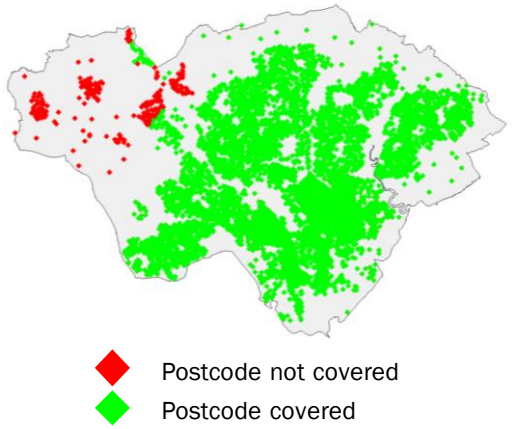


Figure 7.30: FTTP coverage by postcode in 2025, current barriers, Renfrewshire
[Source: Analysys Mason, 2020]

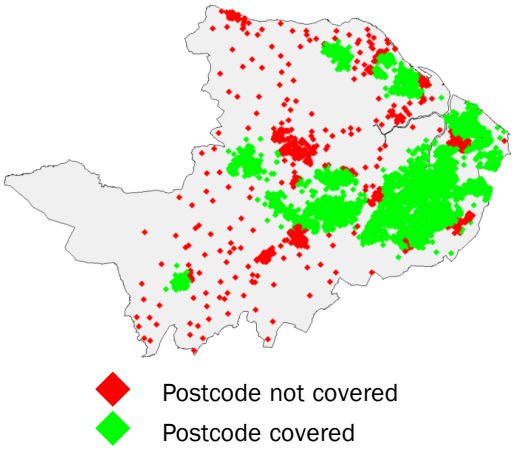
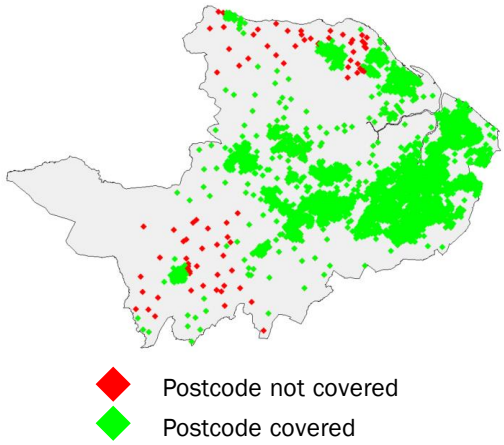


Figure 7.31: FTTP coverage by postcode in 2025, all barriers reduced, Renfrewshire
[Source: Analysys Mason, 2020]



8 Conclusions

At a national level, reducing all major deployment barriers would have a significant impact on FTTP deployment time, and a modest but material impact on commercial viability.

By reducing all the barriers to roll-out, 100% FTTP could be brought forward by six years, to 2027 (from 2033 under the current regime of barriers). There is an equivalent large impact on coverage by 2025 (the date of the government's aim for 100% coverage of gigabit-capable broadband). Under the current regime, 70% of the UK would be expected to have FTTP coverage by 2025, while following the reduction of all barriers 2025 coverage would be as high as 96%. This timing improvement is delivered mainly from three of the barriers, i.e. the size and effectiveness of the UK's deployment workforce, and the level of re-use of existing infrastructure.

Regarding the increase in commercial viability, the results of the study reflect the difficulty of making a dramatic change to the economics of FTTP deployment. Reducing all barriers to deployment creates a modest but material increase in the proportion of the UK that could be covered on a commercial basis, from 75% to 85% of premises. This increase is delivered from small improvements in viability from each of the barriers.

Government policy can be used to make a significant change to the UK's FTTP roll-out, and realise the benefits quantified in the study: that is, a six-year reduction in the timescale for 100% FTTP and a material increase in the proportion of premises covered by commercial operators. The study highlights a range of government policy actions, which fall into three themes:

- Recently introduced policy that will support FTTP deployment, which the government should actively monitor to ensure its effectiveness (e.g. updated DfT specification on the use of innovative deployment techniques, new MDU access bill, new legislation for new-build homes)
- Existing policy that could benefit from review to improve the way it supports FTTP deployment (e.g. reviewing the ATI regulations to improve infrastructure re-use), and
- New policy that should be created to support FTTP deployment (e.g. education, training and immigration policies to support recruitment of deployment and planning personnel, streamlining of the wayleave regime, development of schemes to give timely permissions to undertake street works, extending the business rates relief regime for fibre connections).

Overall, this study highlights that there are a range of barriers that must be reduced or removed if nationwide and rapid coverage of FTTP is to be delivered, in support of the government's ambitions. Reducing the barriers will require immediate and comprehensive coordination between national, devolved and local government and industry.