

Department for Digital, Culture, Media & Sport

Executive Summary: Future Telecoms Infrastructure Review (23 July 2018)

(www.gov.uk/government/news/forging-a-full-fibre-broadband-and-5g-future-for-all)

(NB: Key points highlighted by Chris Stanton, Rural Economy Officer):

In the coming decades, fixed and mobile networks will be the enabling infrastructure that drives economic growth. The UK is a world leader in superfast connectivity with more than 95% of premises covered. However, next generation Fibre to the Premises (FTTP) – or ‘full fibre’ – coverage is only 4%, where we lag behind current world leaders like South Korea (c.99%), and Japan (c.97%). Mobile coverage is also improving – 87% of UK landmass has a 4G signal from at least one operator (compared to 78% in 2017).

For the UK to be the best place to start and grow digital businesses, we need greater investment to build fixed and wireless networks that are fit for the future, and take advantage of the benefits of fixed and mobile convergence. The wide-scale deployment of these next generation technologies will underpin the UK’s modern Industrial Strategy and the Grand Challenges in areas where the UK can lead the global technological revolution. We want every part of the UK to be able to benefit from the significant economic developments that digital connectivity brings.

When looking at the speed, resilience and reliability that consumers want and businesses need in order to grow, it is clear that full fibre and 5G are the long-term answer. These technologies have the potential to transform productivity, and to open up new business models. Full fibre networks are faster, more reliable, and more affordable to operate than their copper predecessors. 5G will deliver faster and better mobile broadband, and enable revolutionary uses in industry sectors like manufacturing, health and transport.

The Government has set clear, ambitious targets for the availability of full fibre and 5G networks. We want to see 15 million premises connected to full fibre by 2025, with coverage across all parts of the country by 2033. We want the majority of the population to have 5G coverage by 2027. The security and resilience of the UK’s telecoms networks is also of paramount importance.

The Future Telecoms Infrastructure Review (FTIR), announced in the Government’s Industrial Strategy, has considered the changes that need to be made to the UK telecoms market and policy framework to give us the best chance of meeting these goals.

The Government and Parliament are responsible for setting the overall policy and regulatory framework for telecoms, consistent with relevant EU law. Ofcom, as the UK’s independent regulatory authority, is responsible for implementing the framework, and for making regulatory decisions under its statutory duties.

The Digital Economy Act 2017 sets out the Government’s role in defining the strategic priorities and outcomes in relation to telecoms through a Statement of Strategic Priorities (SSP), which Ofcom must have regard to when carrying out its regulatory functions. It is our intention to follow this Review with the Statement, based on the conclusions of the Review.

Nationwide Full Fibre Connectivity

The total level of investment required for the national roll out of full fibre is estimated to be in the region of £30 billion. We would expect to see incremental revenue from the delivery of more valuable services to help pay for this investment. At the same time, earning a return on this large-scale investment will require the mass take-up of full fibre services. A range of fibre products and pricing will be important to encourage the migration of the existing customer base from copper networks and recover the costs of the new networks.

Commercial investment in full fibre networks is gaining momentum with major investments by established and alternative network operators. Over a million premises now have a fibre connection – more than 450,000 of those within the last year alone; and not just in towns and cities, but also in rural areas as well.

To meet our ambitions, there must be a sharp increase in the pace of full fibre roll out. The availability of capital is not the key constraint – but we do need the right conditions to attract investment. The current regulatory and policy environment has worked well to date in stimulating retail competition based on existing networks. However, changes will be necessary in the regulatory and policy environment, to incentivise the large-scale deployment of new networks in rural and urban areas across the UK.

The National Infrastructure Commission (NIC) published its National Infrastructure Assessment on 10 July. We welcome their assessment which includes a strong focus on digital connectivity and recommends that a national full fibre rollout programme should be put in place to achieve nationwide coverage.

The analysis we have commissioned in support of this Review indicates that, absent change, full fibre networks will at best only ever reach three quarters of the country, and take more than 20 years to do so. This is not good enough to meet our ambition of world class digital connectivity for the UK, with no part of the country being left behind.

The most effective way to deliver nationwide full fibre connectivity at pace is to promote competition and commercial investment where possible, and to intervene where necessary. We estimate that:

- At least a third (with the potential to be substantially higher) of UK premises are likely to be able to support three or more competing gigabit-capable networks;
- Up to half (or lower if there are more than three network areas) of premises are likely to be in areas that can support competition between two gigabit-capable networks;
- There are likely to be parts of the country (c.10% of premises) that, while commercially viable for at least one operator, may not benefit from investment. The Government will use 'competition for the market' mechanisms to secure investment in areas. The proposed new Electronic Communications Code (EECC), for example, provides powers to designate areas where no operator has indicated plans to deploy; and

- In the final c.10% of premises, the market alone is unlikely to support network deployment and additional funding of some description will be required to ensure national coverage.

This strategy relies on getting five things right:

1. Making the cost of deploying fibre networks as low as possible by addressing barriers to deployment, which both increase costs and cause delays;
2. Supporting market entry and expansion by alternative network operators through easy access to Openreach's ducts and poles, complemented by access to other utilities' infrastructure (for example, sewers);
3. Stable and long-term regulation that incentivises competitive network investment;
4. An 'outside in' approach to deployment that means gigabit-capable connectivity across all areas of the UK is achieved at the same time, and no areas are systematically left behind; and
5. A switchover process to increase demand for full fibre services.

Addressing deployment barriers and reducing costs

Reducing the cost and making it quicker and easier to roll out new telecoms infrastructure is essential. There are currently too many barriers which make building networks expensive and too slow. The Government has already launched a Barrier Busting Task Force, with the single objective of reducing the cost of building fibre networks by identifying and removing barriers to their deployment. The Task Force has worked closely with industry to identify the biggest barriers that exist, and we are proposing new legislation and non-legislative approaches, to tackle them in the following areas:

- Simplifying wayleave agreements to facilitate easier access to multi-dwelling units. Operators face particular difficulties in identifying owners of multi-dwelling buildings and business parks, meaning tenants are often left without their choice of service. Enabling easier access will mean more full fibre can be deployed, faster;
- Reducing the costs and time caused by street works by standardising the approach across the country. We plan to work with operators and local authorities to establish a set of common operational standards and best practice which work within the current legislative and regulatory framework. Different interpretations of street works rules by local authorities mean that operators face differing costs and procedures across the country, hampering investment and creating uncertainty; and
- Ensuring fibre connectivity in new builds, so residents of new homes have full fibre technology. We welcome the efforts by operators and house builders to extend full fibre but further action is required as too many homes are still being built without fibre connections.

In addition, the Government has already supported fibre investment by introducing a five year relief from non-domestic rates (otherwise known as business rates) in April 2017.

Building infrastructure that will support world-class connectivity across the country is a significant project. The pace of roll out will depend on various factors, including availability of labour, sensible management of road closures and supply chain factors. The publication of a long-term strategy for infrastructure roll out will galvanise the sector behind a national plan and give the supply chain time to adjust. The Government will work with industry to identify and mitigate the practical challenges.

Easy access to passive infrastructure in telecoms and other utilities, to support market entry

The largest expense incurred when deploying a network is typically the costs of civil works in laying passive infrastructure like ducts and poles. There are limited benefits from the duplication of passive infrastructure and sharing such assets will reduce both costs and disruption, while preserving the ability of networks to compete. **Ofcom's enhanced access regulations requiring Openreach to share its vast network of ducts and poles with rival operators has the potential to significantly reduce deployment costs.**

Duct and Pole Access (DPA) could transform the business case for investing in competing full fibre networks. If the evidence shows that this remedy is not being implemented properly by Openreach, all options should be considered to ensure compliance.

Where ducts and poles are not available or effective, **there should be other options to enable market entry by alternative networks, for example, access to dark fibre.** We encourage Ofcom to consider the regulatory options, in ways that do not undermine the case for operators to invest in their own networks using duct and pole access.

DPA can also be complemented by access to passive infrastructure owned by other utilities, where appropriate. Assets from utilities such as power, gas, water, and local authorities should be easier to access, and available for both fixed and mobile use. This not only includes multi-utility ducts and poles, but also potentially pipes in the case of water, sewers and gas. There are existing provisions for this, such as the Communications (Access to Infrastructure) Regulations 2016, but they have had limited success in the UK to date. The Government will carry out a review of these Regulations in 2019 to assess if there are improvements that could be made to further boost investment in infrastructure. Ofcom should also work collaboratively with other regulators to ensure that these opportunities are explored, and barriers addressed.

Stable and long-term regulation that encourages competitive network investment

A telecoms market that promotes competition between rival networks where possible is best placed to deliver the Government's objectives of extending full fibre coverage across the country as rapidly as possible.

Countries that have relied on infrastructure competition have generally seen higher levels of fibre coverage, particularly in Spain (c.71%), Portugal (c.89%), and France (c.28% and increasing quickly). This has been supported by access to passive infrastructure, deregulation of wholesale access and pricing flexibility, co-investment and risk-sharing, as well as convergence of fixed and mobile markets.

The Government's overarching strategic priority is to promote efficient competition and investment in world-class digital networks. **Investment is key to improving consumer outcomes, in terms of**

choice, service quality, innovation and price over the longer-term. It is the Government's view that promoting investment should be prioritised over interventions to further reduce retail prices in the near term, recognising these longer-term benefits.

The Government has identified a set of outcomes with a view to achieving this strategic priority:

- **Greater regulatory stability and clarity**, through the availability of longer five year market review periods and a framework whereby firms making large, risky investments can have confidence that any regulation reflects a fair return on investment commensurate to the level of risk.
- **Recognising the convergence of business and consumer uses of networks**, through unified access market reviews, where appropriate. See section 4.
- **Regulation only where and to the extent necessary** to address competition concerns and ensure the interests of consumers are safeguarded as fibre markets become more competitive.
- **Recognition of the differences in local market conditions across the UK**, through, where appropriate, a geographically differentiated approach to wholesale regulation. For areas where there is actual or prospective competition between networks, we would expect there to be less need for regulation.
- **Flexibility for firms to develop new approaches** to reduce deployment costs and manage risks through commercial arrangements.

Ofcom must have regard to the Government's strategic priorities and outcomes in the exercise of its regulatory functions. Putting these into practice will require a large number of decisions which will be a matter of regulatory judgement for Ofcom.

This approach, alongside the Review's other proposals, should incentivise established players to invest more in fibre networks and also make it more attractive for competing providers to build their own networks rather than buying wholesale services from the incumbent.

Full fibre connectivity for all through an 'outside in' approach to deployment

Those areas that are likely to be unviable commercially for full fibre deployment will require additional funding of some kind. We estimate this will include around 10% of premises across the UK. These, often rural, areas must not be forced to wait until the rest of the country has connectivity before they can access full fibre networks. Widespread connectivity creates opportunities for small businesses to tap into a global customer base and for people to work more efficiently. We will pursue an 'outside in' strategy, meaning that while network competition serves the commercially feasible areas, the Government will support investment in the most difficult to reach areas at the same time. The additional funding from whatever source is likely to be region of c.£3 billion to c.£5 billion.

To make sure that fibre delivery in these areas starts early, we will prioritise delivery of full fibre networks through the existing BDUK Superfast Programme, which has already made FTTP available to over 200,000 premises in predominantly rural areas by March 2018. Phase 3 of the Superfast

Programme is seeking to address superfast coverage in as much of the remaining 5% of the country as possible, and Government will now maximise the number of premises to be covered with full fibre. We have already identified around £200 million within the existing Superfast Programme that can be used for this purpose.

We will use competitive tenders to award contracts for these areas to commercial operators, in order to minimise any public subsidy requirements and ensure fairly priced services. Whilst full fibre is the long-term ambition, we recognise that there are alternative solutions that may also deliver ultrafast connectivity in harder to reach areas. In areas where it may not be cost effective to get fibre all the way to the home, even with additional funding, other technologies like hybrid fibre-wireless solutions can also deliver gigabit connectivity. Bidders will be encouraged to explore innovative solutions, including using a mix of mobile and fixed technologies where appropriate.

Switching to a full fibre future

As full fibre networks are rolled out, maximising the number of people using them will secure the full benefits of the technology. This will involve customers moving onto new fibre networks and retiring the legacy copper networks. Running copper and fibre networks in parallel is both costly and inefficient. A fibre switchover strategy is necessary to stimulate demand for fibre, to enable new networks to achieve scale quicker, and to ensure a smooth transition process for customers. This should be led by industry, working closely with Ofcom and Government.

The Government will set up a mechanism with Ofcom and industry for planning the switchover process. Switchover should meet a number of policy conditions:

- Plans support a **timely switchover**;
- **Efficient**, so that switchover is smooth with minimal consumer disruption;
- **Transparent**, so that customers have the information they need to make informed choices and clearly signalled via notice periods so operators have certainty;
- **Consistent**, with existing regulatory and consumer obligations;
- **Pro-competitive**, so processes are in place to support easy **switching between networks**; and
- A **fair deal** for consumers, including **adequate safeguards** for vulnerable customers.

It is realistic to assume that switchover could be underway in the majority of the country by 2030, but the timing will ultimately be dependent on the pace of fibre roll out and on the subsequent take-up of fibre products. We would only expect switchover to start when a significant proportion of the population has taken-up new fibre services. To aid mass migration from copper-based networks, we would expect fibre networks to have suitable 'entry level' products at prices similar to those provided on copper networks, including voice only services for those who want them. We also expect the Internet Service Providers (ISPs) to market and promote newly available fibre products to drive take-up.

Ofcom will have an important oversight role in ensuring industry readiness for switchover. It will need to protect the interests of consumers and guard against any anti-competitive behaviour.

Legal separation of BT and Openreach

The legal separation of Openreach from BT Group has the Government's backing, and is critical to deliver better connectivity for consumers throughout the UK. We recognise the important steps that have been taken by BT Group and Openreach to implement legal separation, including: setting up the Openreach Board, responsible for setting Openreach's strategy and overseeing its performance; and proper industry engagement on technology investment choices. The Government wants legal separation to be completed as soon as possible and for Openreach to address all the outstanding actions identified in Ofcom's first progress report, particularly the transfer of staff from BT to Openreach.

It is too early to determine whether legal separation will be sufficient to deliver positive changes on investment in full fibre infrastructure. The Government will closely monitor legal separation, including Ofcom's reports on the effectiveness of the new arrangements. The Government will consider all additional measures if BT Group fails to deliver its commitments and regulatory obligations, and if Openreach does not deliver on its purpose of investing in ways that respond to the needs of its downstream customers.

A World Leader in 5G

We want the UK to have high quality mobile connectivity where people live, work and travel. Mobile coverage has significantly improved over recent years, with 87% of UK landmass having 4G coverage by at least one operator, up from 78% in 2017.

Despite this progress, **there remain areas where mobile connectivity must be improved**. The Government has committed to extend geographic coverage to 95% of the UK by 2022 and so address these 'not spots'. We have introduced changes to the Electronic Communications Code and to planning laws, to make it easier and cheaper to deploy mobile infrastructure. We are working with Ofcom on options to extend coverage.

Alongside finishing the roll out of 4G networks to meet existing mobile demand, we want the UK to be a world leader in 5G to take early advantage of this new technology. **We have set a target that the majority of the population will have 5G coverage by 2027.**

5G is expected to enable both an evolution of existing mobile services and potentially revolutionary new services

5G is the next generation of mobile technology. It is likely to be deployed as an intricate patchwork of technologies, including advanced LTE, Wi-fi and New Radio, and will utilise a range of spectrum frequencies including re-farmed existing bands, new bands (below 6 GHz) and mmWave spectrum.

The technical capabilities and performance characteristics of 5G are clear. **5G is expected to deliver faster and better mobile broadband services to consumers and businesses, and to enable innovative new services for industry sectors, including manufacturing, transport, immersive technologies and healthcare.**

Unlike previous mobile generations, 5G networks will not be homogenous. Deployment will be in phases rather than a 'big bang', and will likely vary by geography. The Review assesses that a realistic scenario is for a low capacity layer providing wide-area 5G coverage (using 700 MHz band), with high capacity in areas of high demand such as towns and cities (using 3.4 – 3.6 GHz band) and, over the longer-term, smaller hotspots of very high capacity (using mmWave bands).

5G deployment will be driven by competition and efficiency benefits

The roll out of 5G will require significant investment by mobile network operators and other players in all network domains, including spectrum, radio access network infrastructure, fibre backhaul and core networks. The wireless sector will need to develop strategies to cope with this expected growth in network costs to meet future demand, including infrastructure sharing and new infrastructure models.

The competitive dynamics in the mobile market, alongside the efficiency and capacity benefits of 5G, are likely to underpin the early business case for 5G investment. Mobile operators may seek to gain a competitive advantage by marketing 5G to existing and potential customers, and thereby spur a response from other operators to protect market shares.

Mobile Network Operators (MNOs) are likely to deploy 5G first on existing sites to alleviate network congestion and efficiently meet the growing demand for data. Over time, MNOs are likely to use 5G-enabled innovations such as 'network slicing' to offer new services to industry sectors. 5G is likely to see a greater deployment of small cells to provide extra capacity in specific locations such as city centres, local high streets, factories, and sports and entertainment venues.

While there is some uncertainty over the business models for 5G, we expect it to create new revenue opportunities for existing operators and also open up opportunities for new players to enter the UK market.

Market expansion – 5G will create opportunities for existing and new wireless players

The Government's strategic priority is to promote investment and innovation in 5G to ensure services and applications are widely available to the benefit of consumers and the UK economy. The Review concludes that there would be strategic advantages in a model that maintains the benefits of competition between multiple mobile network operators, while encouraging new solutions to connectivity challenges, such as small cell networks, indoor and rural coverage.

The mobile network operators will be central to 5G's successful delivery. 5G also creates the potential for market expansion with new infrastructure and service players. National mobile networks could be supplemented by 'neutral host' infrastructure to address the cost and practical challenges of, for example, small cell deployment in high demand areas, or to expand rural coverage. New private wireless networks could also serve new use cases, in particular locations such as factories, business parks, or rural communities. Enhanced mobile broadband services could be provided by existing mobile operators, alongside new 5G services for industry 'verticals' enabled by existing and new players.

There is a clear role for policy and spectrum management in creating conditions that grow a competitive mobile market and support investment and innovation in 5G. The Review has identified four priority areas:

- Make it easier and cheaper to deploy mobile infrastructure and support market expansion, including the implementation of the wide-ranging Electronic Communications Code (ECC) on site access and consideration of further planning reforms;
- Support the growth of infrastructure models that promote competition and investment in network densification and extension;
- Fund beneficial use cases through the Government's £200 million 5G Testbeds and Trials Programme that helps de-risk business models for 5G; and
- Promote new, innovative 5G services from existing and new players, through the release of additional spectrum. We should consider whether more flexible, shared spectrum models can maintain network competition between MNOs while also increasing access to spectrum to support new investment models, spurring innovation in industrial internet of things, wireless automation and robotics, and improving rural coverage.

5G is at an earlier stage of development than full fibre fixed services and so we will keep this strategy under review and return to areas as and when necessary.

Convergence between Full Fibre and 5G

In the longer-term, the Government expects to see a more converged telecoms sector.

Fixed fibre networks and 5G are complementary technologies, and 5G will require dense fibre networks. In some places, 5G may provide a more cost-effective way of providing ultra-fast connectivity to homes and businesses.

The technology synergies between 5G and fixed networks are likely to create strategic advantages for those operators that have interests in both. Those international markets with the best fibre infrastructure tend to be characterised by significant convergence and operators that have leveraged their assets for fixed and mobile services. Consumers will also benefit from an expansion of converged offers, allowing more seamless delivery of content and services across networks and enabling simpler billing and more flexible tariffs.

The policy and regulatory framework should be sufficiently flexible and forward-looking to reflect the growing convergence between fixed and mobile networks and services. This could be achieved through:

- Removing practical obstacles or barriers to converged networks given the benefits;
- Considering access network requirements holistically, where appropriate, through unified market reviews; and
- Allowing operators to benefit from unrestricted usage of Openreach's passive infrastructure for the provision of mobile backhaul services.

Next Steps

This document sets out a national, long-term strategy for digital connectivity. Building infrastructure across the country to support world-class connectivity is a significant undertaking. The Government, Ofcom and industry must work together to make it happen. We will create the supportive policy conditions and will look to industry to attract the necessary capital, roll out the infrastructure and promote take-up.

The strategy sets out a package of policy measures that the Government will take forward in the short-term. These are summarised in Section 5. **We will shortly publish consultations on legislative changes to streamline wayleaves and mandate fibre in new builds.** The EU's new directive for electronic communications – the EECC – is currently under negotiation. It is likely to be adopted by the EU shortly. If adopted, we are minded to implement, where appropriate, the substantive provisions in UK law, on the basis that it would support the UK's domestic policy objectives. This will enable the extension of market review periods to five years and provide mechanisms to aid fibre network roll out in certain areas.

The conclusions of the Review will also form the basis of the Government's Statement of Strategic Priorities to Ofcom, setting out the strategic objectives and outcomes that the regulator should have regard to in the exercise of its regulatory functions. In particular, the Statement will emphasise the importance of promoting investment as the key to achieving the UK's connectivity ambitions.

The delivery of this national strategy is a core part of the UK's Industrial Strategy and is of fundamental importance to the country's future global competitiveness. We will, therefore, monitor progress on an annual basis and undertake a full review of the strategy's impact after three years. At this point, we will consider all additional measures if not satisfied that the strategy is on track, including actions, if necessary, in those parts of the country that have not benefited from competitive deployment, but where operators could reasonably have been expected to have deployed fibre networks over this period. The Government will consider the more widespread use of 'competition for the market' mechanisms to ensure the roll out of fibre networks in those parts of the country.