



National Audit Office

Report

by the Comptroller
and Auditor General

Department for Digital, Culture, Media & Sport

Improving broadband

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Department for Digital, Culture, Media & Sport

Improving broadband

Report by the Comptroller and Auditor General

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Gareth Davies
Comptroller and Auditor General
National Audit Office

9 October 2020

This report considers what the Superfast Broadband Programme has delivered and how the UK's broadband infrastructure has held up during the COVID-19 pandemic. We examine lessons from the Superfast Broadband Programme and other comparative projects and how these could apply as government supports roll-out of nationwide gigabit broadband.

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Key facts

£1.9bn

Public funding committed to subsidising the roll-out of broadband infrastructure in harder-to-reach areas through government's Superfast Broadband Programme

5.3m

Number of UK premises whose broadband infrastructure was upgraded through government's Superfast Broadband Programme

1.6m

Number of UK premises currently unable to access broadband speeds of at least 30 megabits per second (Mbps)

29.5 million number of UK premises out of a total of 31 million that can sign up to internet packages offering download speeds of at least 30 Mbps, of which 17% (5.1 million) was reached through government's Superfast Broadband Programme

95% proportion of UK premises able to access superfast broadband speeds of at least 30 Mbps

80% proportion of premises in rural areas able to access superfast broadband speeds of at least 30 Mbps compared with 97% in urban areas

2025 government's target date for all UK premises to have access to gigabit-capable broadband (speeds of at least 1,000 Mbps)

£5 billion total government funding committed to its future programme for subsidising roll out of gigabit-capable broadband infrastructure to the hardest to reach 20% of UK premises

27% proportion of UK premises currently covered by broadband infrastructure that provides speeds of 1,000 Mbps. 14% is covered through fibre-optic cable

Summary

Context

1 Government views digital infrastructure as central to the future of the economy and wants every part of the UK to benefit. It considers fast and reliable broadband as key to improving productivity and to delivering economic, social and well-being benefits. Commercial operators supply broadband infrastructure where profitable, but the cost of infrastructure and lower population density make some areas, typically rural, less attractive commercially. Government policy is to subsidise commercial operators to provide broadband infrastructure in these areas.

2 The Department for Digital, Culture, Media & Sport (the Department) manages government's broadband policies and Building Digital UK (BDUK), a unit within the Department, implements these policies. Ofcom is the regulator and competition authority for the UK's communications industries, including telecoms.

3 In 2010, government announced its aim for the UK to have the best superfast broadband network in Europe. It established the Superfast Broadband Programme (the Superfast Programme) to support broadband roll-out to areas which were not commercially viable. The Department allocated grant funding to local bodies (a local authority or group of local authorities, devolved governments or local economic partnerships). Local bodies would then provide additional funding and procure superfast broadband services for their areas. The Superfast Programme's original target was for 90% of premises to have access to download speeds of at least 24 megabits per second (Mbps) by 2015. In June 2013, the Department revised its target to achieving 95% by 2017. These targets could only be met in conjunction with industry-funded roll-out. Industry stakeholders and Ofcom now consider superfast to mean download speeds of at least 30 Mbps, a definition since adopted by the Department.

4 Superfast broadband is fast enough for most household use today, but internet traffic is growing at around 40% each year driven largely by video streaming. The *National Infrastructure Assessment*¹ anticipated that demand could outstrip current part-copper, part-fibre capacity between 2030 and 2040 and recommended full-fibre, which is more reliable and can provide 'gigabit' speeds (1,000 Mbps), as the next step for the UK's digital connectivity.

¹ National Infrastructure Commission, *National Infrastructure Assessment*, July 2018.

5 In 2018, to meet future demands of consumers and businesses, government announced a new policy for the UK's telecoms industry to provide gigabit-capable infrastructure to 50% of premises by 2025 and nationwide coverage by 2033. It has since committed to 2025 for nationwide coverage and has allocated £5 billion for its UK gigabit programme (the Future Programme), to subsidise roll-out to the most difficult to reach 20% of premises. It intended to take an "outside-in" approach by starting with the most difficult to reach premises first. The Department estimates that accelerating nationwide gigabit capability to 2025 will need government to subsidise roll-out of 20% of premises compared with only 10% for a 2033 timeline.

6 In 2013 and 2015 we published reports on the progress of the Superfast (Rural) Broadband Programme.² Since we last reported, the Superfast Programme has moved increasingly to gigabit-capable full-fibre solutions in place of copper telephone wires from premises to a local cabinet. Local bodies used contractors to deliver the programme, the largest of which was Openreach, a subsidiary of BT that runs the UK's largest broadband network. Openreach remains the dominant provider under the Superfast Programme, responsible for 125 of the 147 contracts and for delivery to around 97% of premises overall.

Scope of this report

7 This report considers what the Superfast Programme has delivered and how the UK's broadband infrastructure has held up during the COVID-19 pandemic. We examine the lessons from the Superfast Programme and other comparative projects, and how the Department could apply these as it establishes its Future Programme. The report focuses on the role of the Department and considers:

- progress with superfast broadband (Part One);
- managing current and future broadband provision (Part Two); and
- learning lessons (Part Three).

Our audit approach is summarised at Appendix One and our evidence base in Appendix Two.

8 The Department is still developing its plans for the Future Programme. It expects to let its first contracts in autumn 2021 and is currently awaiting approval of its outline business case. This report therefore does not examine the Department's progress on the Future Programme in detail. Those that are digitally excluded out of choice or for financial or other reasons are also out of scope.

² Comptroller and Auditor General, *The rural broadband programme*, Session 2013-14, HC 535, National Audit Office, July 2013 and Comptroller and Auditor General, *The Superfast (Rural) Broadband Programme: update*, National Audit Office, January 2015.

Key findings

Progress with superfast broadband

9 Along with the commercial roll-out, government's Superfast Programme has helped to extend the UK's superfast broadband coverage. In combination with industry-funded roll-out to profitable areas, which delivered to the majority of UK premises, the Superfast Programme helped the Department to achieve its roll-out target of 95% coverage of 24 Mbps by 2017 broadly on time. Broadband download speeds of at least 30 Mbps are now available to around 95% (29.5 million) of UK properties, approximately 17% (5.1 million) of which were reached through the Superfast Programme. By mid-2019, the European Commission's Digital Economy and Society Index ranked the UK eighth out of the 28 EU countries on overall superfast broadband coverage, ahead of Germany and France, and fifth out of 28 on rural coverage. Since 2011-12, the Superfast Programme has provided £1.9 billion of public subsidy to commercial suppliers, which has supported delivery of faster broadband (24 Mbps) to 5.3 million properties in harder-to-reach areas. Some local bodies are seeking to further extend coverage in their areas by reinvesting money returned to them through clawback mechanisms designed to safeguard value for money. The Department estimates that £0.9 billion will be returned to local bodies in this way (paragraphs 1.11 to 1.14, 1.16, 1.20 and Figures 2 and 4).

10 Government's programme is delayed, meaning that those without superfast broadband speeds in hard-to-reach areas will have to wait longer to benefit. More than half of the Superfast Programme's current contracts are reporting delays due to suppliers underestimating build times, insufficient supply chain capacity and local bodies having to rescope contracts because of supplier data errors. This means that some people in harder-to-reach areas are waiting longer to get superfast speeds. The Department now expects its contracts to run until 2024, four years longer than originally planned. This is partly due to delays to existing contracts but also because the programme has been extended, with local bodies awarding new contracts to increase coverage. Ofcom estimates that nearly 1.6 million premises cannot yet access speeds of 30 Mbps and nearly 600,000 cannot access 10 Mbps (paragraphs 1.14 and 1.20).

11 Despite wide coverage, many people in the UK still experience poor broadband, including those who should have access to higher speeds.

Although coverage is at 95%, it is not consistent across areas or types of premises and MPs still receive complaints from constituents about their broadband. Achieving maximum benefits, as set out in the business case, requires the remaining problems to be addressed:

- Rural coverage in the UK is now 80%, compared with 97% in urban areas. Overall, England has higher coverage than the devolved administrations. While urban coverage is broadly the same across the four nations, rural coverage varies and, at 66%, is lowest in Northern Ireland. These data, from Ofcom, are based on actual and predicted data from network operators. The speeds achieved in practice may be higher or lower than those predicted.
- Only 57% of covered properties have signed up to superfast broadband packages. Consumers can be unaware that faster services are available, may find their existing service sufficient or consider faster services too expensive.
- Premises do not necessarily experience their advertised speeds, either because of poor-quality copper lines, distance from the cabinet or factors in the home affecting performance (paragraphs 1.19 to 1.22, 3.3 and Figures 5 and 7).

12 Prioritising coverage over broadband speeds has left the UK with infrastructure that will not meet future demand.

The UK's existing infrastructure allowed it to follow a fibre to the cabinet (FTTC) approach. This is where fibre-optic cables run to a street cabinet, then existing copper telephone wires connect the cabinet to individual premises. It is cheaper and faster to deploy than running fibre to the premises (FTTP) – also called 'full-fibre' – and allowed most people to access speeds over 30 Mbps. However, the Department expects future demand to require faster broadband. Other countries, often those without existing reliable telecoms infrastructure, such as the Baltic States, went straight to full-fibre. Full-fibre can achieve gigabit download speeds and is more reliable and cheaper for operators to maintain, but more expensive and time-consuming to deploy. At around 14%, the UK now has one of the lowest full-fibre coverage rates in Europe. Including other technologies, gigabit-capable coverage rises to 27% (paragraphs 1.2, 1.15, 1.16 and 2.2).

13 The way in which the Department set up the Superfast Programme makes it difficult to assess performance. It is difficult to assess programme performance as the business case lacked programme-specific measures against which to judge success. For example, the Superfast Programme's primary objective of 95% UK coverage was achievable only in conjunction with industry roll-out. A 2013 research paper commissioned by the Department projected a return of £20 for every £1 of public investment across all of government's broadband interventions – which included the Superfast Programme. To date there has been no collective evaluation of what these interventions have achieved. The Department has conducted a formal evaluation of the Superfast Programme and concluded that, over the seven years to 2019, it had delivered £2.70 to £3.70 for every £1 of public investment. It has also conducted a separate cost-benefit analysis of its voucher scheme but differing evaluation periods make it difficult to say whether the Department will achieve its projected returns. The Department expects the Superfast Programme's impact to increase over time (paragraphs 1.12, 1.17 and 1.18).

Managing current and future broadband provision

14 The existing infrastructure has coped well with increased demand for the internet during the COVID-19 pandemic. The UK's broadband infrastructure has been tested rigorously in recent months. There has been an unprecedented increase in daytime demand for internet services as more people work and study from home and keep in touch with friends and family using video conferencing tools. BT reported a weekday daytime increase in demand of 35% to 60% as people started to work from home extensively in March but overall demand has remained below the usual evening peak when many users are online simultaneously. Ofcom considers the existing infrastructure to have held up well although there has been some congestion at local levels. In general, local stakeholders support Ofcom's assessment but some representing areas with large rural populations told us that those with poor broadband have felt the impact more sharply during the pandemic (paragraphs 2.3 and 2.4).

15 Government has set a challenging 2025 timeline for nationwide gigabit coverage and the Department is currently considering how to deliver this to the hardest to reach premises. Roll-out of gigabit-capable broadband across the UK is a complex challenge requiring the telecoms industry to deliver connectivity to approximately 31 million premises and lay around 500,000 kilometres of cable. The Department estimates that this would require a four-fold increase in build rates and accepts it will be challenging to achieve the 2025 target, particularly for the hardest to reach 20%. In an open letter to the Prime Minister in 2019, industry experts said they stood ready to meet the challenge but called on government to deliver a fully coordinated cross-government strategy to remove significant regulatory barriers. The Department is developing its detailed plans and has much work to do. It needs to deliver a substantial change project to increase its capacity and capability; secure State Aid approval, which can take 18–24 months from start to finish; and design and deliver a complex procurement in time for industry to deliver to the final 20%. The Department has told us that it considers the final 1% could be prohibitively expensive and for these premises is exploring alternative solutions to gigabit broadband. Government’s July 2020 decision to reduce its dependency on technology originating from certain high-risk vendors could introduce delays and additional expense to nationwide roll-out. Ahead of the programme starting in 2021 the Department has told us it is finalising its plans and will keep these under regular review (paragraphs 2.8 to 2.11 and 3.13).

Learning lessons

16 The Superfast Programme has shown that future success will depend on good data and local knowledge. To maximise value for money, the Future Programme should avoid funding premises that are already covered, or which suppliers plan to cover without subsidy. These are becoming more difficult to identify as the number of suppliers increases and because there is no single map or database of current and planned broadband installations. There are now more than 20 suppliers building new infrastructure, many of whom are not required to submit coverage data to government. Identifying premises for intervention therefore needs comprehensive local knowledge. With the Superfast Programme, local experts and contacts were also critical, for example, in organising street works and engaging with local communities. The Department told us that it recognises data as a potential risk but is still planning how to address it. There is a further risk that pressures on local government finances may lead to existing teams in local bodies being disbanded, with a consequent loss of local knowledge (paragraphs 3.2 to 3.6 and 3.12).

17 The Department concluded that aspects of its contractual approach had contributed to delays and discouraged competition. The Department believes that lengthy contracts covering too many premises under the Superfast Programme discouraged smaller suppliers and contributed to high numbers of change requests, which subsequently caused delays. For its Future Programme, the Department is introducing more contracts with shorter duration and involving fewer premises. Greater competition should encourage innovation and competitive pricing, as it did for the later phases of the Superfast Programme. However, a market with more suppliers offering competing infrastructure also risks creating the types of integration issues that we have seen on other projects. Elsewhere, we have seen some suppliers face issues when integrating their systems with a central infrastructure. The Department also has some concerns about the long-term financial stability of some smaller suppliers (paragraphs 3.7 to 3.9).

18 The Department considered its local partnership approach to have worked well despite contributing to delays. The Department concluded that the locally procured, locally managed approach for its Superfast Programme worked well and that it was difficult to see how an alternative approach would have delivered a better result. However, it identified that having multiple bodies undertaking procurements and allowing them to vary the standard contract templates had been causes of delay, and therefore will fund, let and manage all contracts for its Future Programme. Some local bodies welcome this, citing difficult relationships with suppliers and limited capacity, but a new approach introduces new risk. Some local bodies fear that without direct accountability for managing local performance, they may be less engaged. Our previous work on major government projects has highlighted some of the risks with a more centralised procurement approach (paragraphs 3.10 to 3.12).

19 Prioritising speed of programme delivery over other objectives poses a risk to value for money. Many government programmes, including the Superfast Programme, have taken longer to deliver than originally planned. Our work on other projects shows that publishing a fixed deadline and not continuing to test whether it remains achievable can negatively influence decision-making and lead to delays and cost overruns. Maximising gigabit-capable build by 2025 means that the Department is likely to try to deliver to as many premises as possible in the timeframe, rather than starting with those in greatest need. The timeline has been a key driver both in determining the procurement approach, which the Department views as critical to meeting the challenging timeline, and in its decision to broaden the range of technologies used in the Future Programme. This shift away from full-fibre helps make government's 2025 gigabit ambition more realistic but some stakeholders, who view fibre as a superior technology, consider this a watering down of the target (paragraphs 3.15 and 3.16).

20 Encouraging suppliers to prioritise easier-to-reach premises has left the rural divide in place. Under the Superfast Programme, suppliers were able to prioritise roll-out to easier-to-reach premises. The properties left behind were largely the hardest and most expensive to reach and, mostly, in rural and remote areas. In 2018, government committed to an “outside-in” approach to supporting full-fibre deployment by starting with the most difficult to reach premises. This approach is strongly supported by rural stakeholders but the Department has not yet confirmed how closely it intends to keep to it and does not yet have the right data to support it. If it prioritises the timeline, there is a risk that the same properties are left behind (paragraph 3.17).

21 Increased infrastructure competition did not translate into more competition for internet services or better outcomes for consumers. Government wants to encourage competition in broadband infrastructure but it is not clear that this approach increased consumer choice during the later phases of the Superfast Programme. Under the Superfast Programme, suppliers receiving government subsidy had to allow other service providers to offer products to customers over the subsidised parts of their networks. Average take-up of services over Openreach’s infrastructure is 60% compared with less than 20% over smaller networks. This is partly explained by Openreach’s infrastructure having been available in the market for longer, but the cost and effort to internet service providers of integrating their networks to work with those of smaller suppliers may have made it unprofitable for them to offer their products over smaller networks. Looking forward, smaller infrastructure suppliers may gain dominant positions in areas which cannot support competition. Superfast Programme contracts include obligations on infrastructure providers to offer access to other suppliers on a wholesale basis, but, for technical and commercial reasons, other suppliers may choose not to take up this access. Without support to make these networks more attractive, consumers in these areas may find themselves with a very limited choice of service providers, making switching difficult. Parliament has also expressed concern that in the event of a single infrastructure provider, consumers in rural areas may get locked into higher prices (paragraphs 3.18 to 3.20).

Conclusion

22 The Superfast Programme has extended the nation’s broadband connectivity and has delivered benefits, which the Department expects will continue to increase with time. Better broadband has helped communities across the nation to work and study from home and stay connected during the COVID-19 pandemic in ways that would not have been possible five years ago. However, in managing the trade-off between coverage and speed, the UK has a broadband network that is not fully future-proof and, less than a decade after launching its Superfast Programme, government has identified the need to upgrade it again.

23 Government has set a very challenging timeline in promising nationwide connectivity by 2025 and the experience from the Superfast Programme, as well as our previous work on major programmes demonstrates the importance of setting and publishing a realistic timetable and continuing to test whether this is achievable. The Department is working towards finalising its plans for its Future Programme to support nationwide gigabit coverage. In doing so, it must manage the tension between meeting a timeline and serving those in greatest need. Failure to do so risks leaving those left behind by the Superfast Programme even further behind and widening the rural divide. The Department still has much to do to mobilise and deliver a substantial programme. It has applied some learning from the Superfast Programme but it has moved away from some of its more successful aspects in a bid to meet its challenging timeline. As the Department develops its approach for the Future Programme it will need to show that it has considered how best to mitigate any new risks arising.

Recommendations

24 The Department should, in respect of both the Superfast and Future Programmes:

- a** **work with suppliers and Ofcom to address customer issues with broadband and encourage take-up**, to help realise the benefits from widespread broadband envisaged in its Superfast Programme's business case and to ensure the Future Programme also achieves the benefits of gigabit-capable technology;
- b** **set out how it will ensure better outcomes for consumers**, including any relevant learning from similar programmes, so that they have both choice and the ability to switch providers; and
- c** **set out how it intends to measure the benefits of its investment**, including setting programme-specific objectives as clear measures of success for its Future Programme.

In respect of the Future Programme, it should:

- d** **set out how it intends to improve its data**, including how it will:
 - secure the required quality of data for identifying which areas and premises it intends to subsidise;
 - replicate local body knowledge and systems; and
 - encourage suppliers to set out their plans;
- e** **set out how it will retain local body expertise in a centralised procurement model**, including how it will mitigate the risk of financial pressures on local government leading to broadband teams being disbanded;

- f present a detailed plan and schedule**, reflecting on learning from the recent pandemic to pinpoint gaps in current broadband provision, identifying:
- how it will meet the proposed timeline together with additional costs and benefits of accelerating the programme;
 - the key risks to delivery, costs and outcomes and its proposed mitigation approaches;
 - the extent to which it intends to follow an “outside-in” approach;
 - those local areas which will still not be covered by the final 20% of the Future Programme and any mitigations to ensure that these areas are not left behind; and
 - how and when it intends to review and update these plans to ensure transparency about what it considers to be deliverable and by when.

Part One

Progress with superfast broadband

What is broadband?

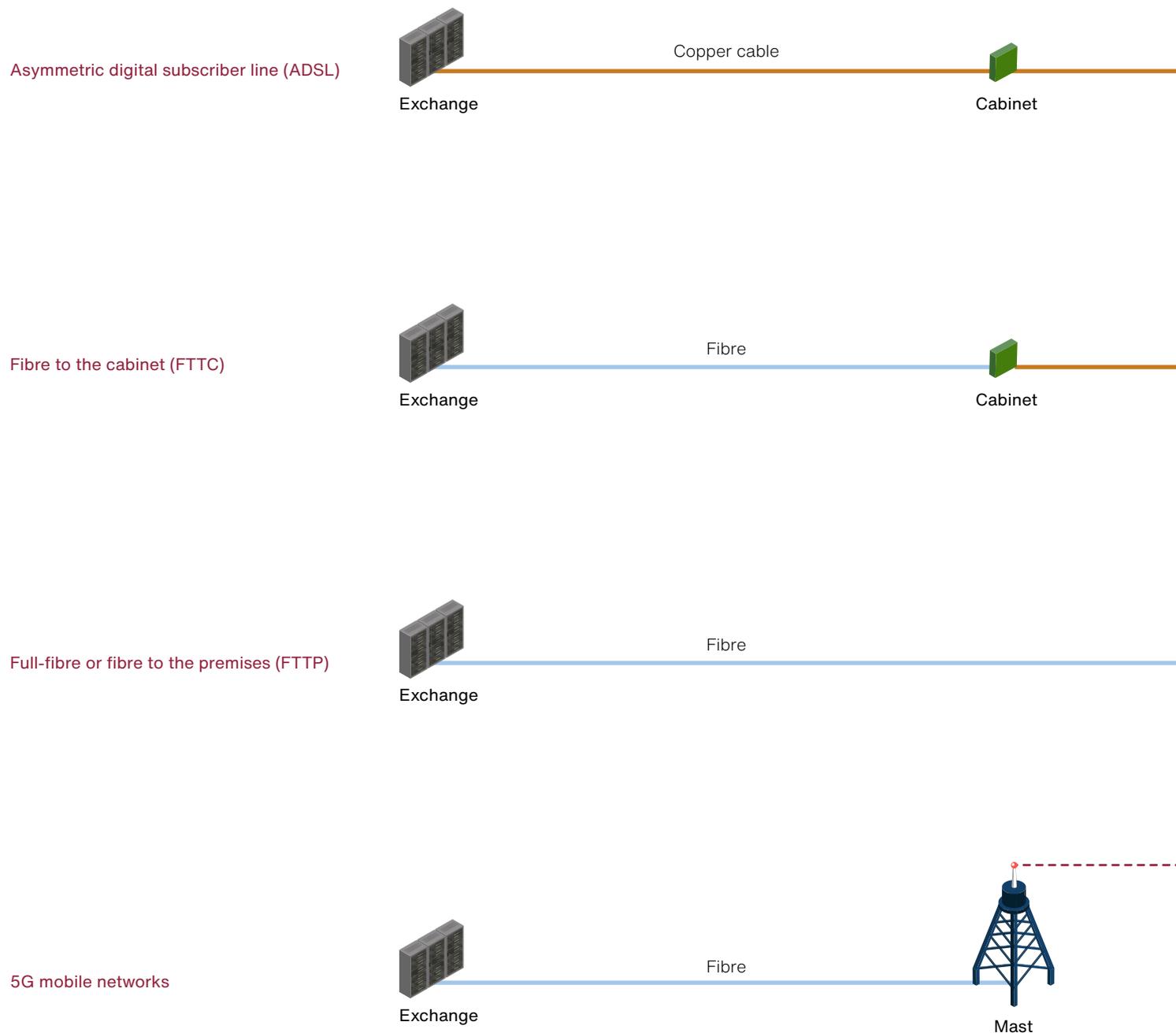
1.1 Broadband is internet access that is 'always-on' and measured by bandwidth. Bandwidth is the amount of data that can be uploaded or downloaded per second, usually measured in millions of bits (or megabits) per second (Mbps). Download speeds are important for activities such as browsing websites and streaming videos; upload speeds are important for video calls and gaming. Ofcom, the regulator and competition authority for the UK's communications industries, including telecoms, defines download speeds of at least 30 Mbps as 'superfast'.

1.2 The speeds available to premises depend on the type of technology used to deliver the broadband connection (**Figure 1** on pages 16 and 17). Most broadband connections in the UK are provided through copper telephone wires or fibre-optic cables but others use cable or wireless technologies. Superfast broadband in the UK is mainly delivered through 'fibre to the cabinet' (FTTC) technology where fibre-optic cables run to a street cabinet and existing copper wires connect the cabinet to individual premises. FTTC provides download speeds of up to 80 Mbps but the speed decreases with distance from the cabinet. Full-fibre – also called 'fibre to the premises' (FTTP) – technology runs entirely over fibre-optic cables all the way to the premises. It can deliver download speeds of one gigabit per second (or 1,000 Mbps).

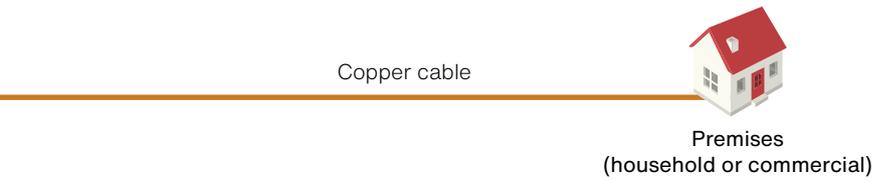
Figure 1

Broadband connection types

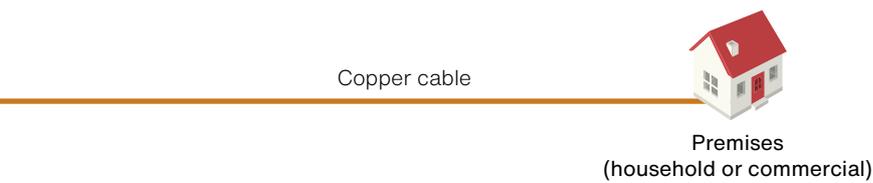
Fibre-optic cables deliver data at rates thousands of times faster than copper cables by transmitting information using light rather than electrical signals



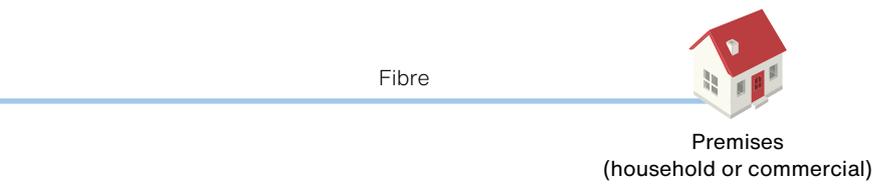
Source: National Audit Office analysis of information from telecoms industry and Ofcom



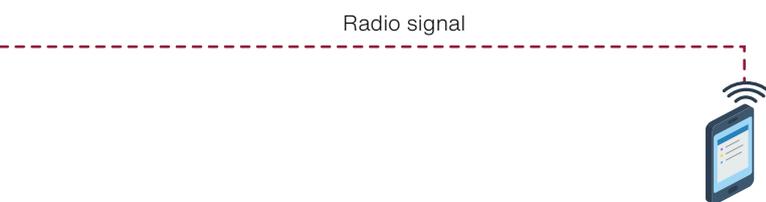
Speeds diminish the further the cabinet and premises are situated from the exchange.



Properties located over 1km from the cabinet will not be able to get fast speeds.



Capable of providing gigabit speeds (1,000 Mbps equals 1 Gbps) with no need for a cabinet.



5G mobile networks also rely on a fast broadband network for their 'backhaul', which is the connection between a mobile network and the core network.

1.3 In the UK, broadband provision is through:

- FTTC: Openreach, a subsidiary of BT, operates BT Group's fibre and copper infrastructure. Given Openreach's dominant market position, Ofcom requires it to open its network to internet service providers selling broadband packages;
- cable: Virgin Media owns and operates the largest cable broadband network in the UK and also owns and operates an FTTP network. It provides broadband along with TV and telephone services. This network is separate from the UK's fibre and copper infrastructures;
- full-fibre: provided by a mix of those who sell services from their own infrastructure, for example Hyperoptic; wholesale providers who build infrastructure for others to sell their services, such as Openreach and CityFibre; and those that offer both, for example Gigaclear; and
- retailers: internet service providers, including large telecommunications companies such as BT, Sky and TalkTalk, who provide internet services using wholesale broadband infrastructure. As well as Openreach, several small operators are building alternative full-fibre networks.

1.4 Government views digital infrastructure as central to the future of the UK economy. It considers fast and reliable broadband as key to transforming productivity and to delivering economic, social and well-being benefits. While commercial operators supply broadband infrastructure where profitable, higher costs and lower population density make some areas, typically rural or remote, commercially unattractive. Government policy over the past decade has been to subsidise commercial operators to provide broadband infrastructure in unprofitable areas to reduce digital exclusion.

The Superfast Broadband Programme

Background and objectives

1.5 The Department for Digital, Culture, Media & Sport (the Department) manages government's broadband policies. Building Digital UK (BDUK), formerly known as Broadband Delivery UK, a unit within the Department, delivers its broadband programmes.

1.6 In December 2010, government published its superfast broadband strategy,³ which set an ambition for the UK to have the best superfast broadband network in Europe by May 2015. It announced an initial £530 million investment in the UK's rural broadband network over the 2011-12 to 2014-15 spending review period and established the Superfast Broadband Programme (the Superfast Programme) to improve broadband in rural areas.⁴ With additional contributions from local bodies, government anticipated total public funding of £1.2 billion for the programme.

1.7 In developing its broadband ambition, the Department settled on a target that 90% of premises in each local authority would have access to superfast broadband by May 2015. While the Superfast Programme focused on harder-to-reach areas, the programme's target was wider and included premises delivered through commercial roll-out to profitable areas. The Department originally defined superfast as broadband speeds of at least 24 Mbps but contracts let under the programme since 2016 have used Ofcom's definition of 30 Mbps. When measuring progress against coverage targets, the Department continues to use its initial definition.

1.8 The Superfast Programme has developed iteratively, and the Department has introduced additional phases, increased funding and revised timescales and targets:

- Phase 1: The Department changed its target from achieving 90% superfast coverage in each local authority to 90% in all UK premises, and extended the timeframe from May 2015 to early 2016. Procurement of contracts was between 2012 and 2015.
- Phase 2: In June 2013, the Department allocated a further £250 million funding to the programme and reset the target to extend superfast coverage to 95% by 2017 through additional procurements between 2016 and 2017.
- Phase 3: This tackled post-95% coverage, with procurements from 2017. The Department continued the Superfast Programme to push towards 97% to 98% coverage by March 2020. There was no formal target or additional budget. Instead, local bodies have used remaining budgets or have re-invested funds. Almost all infrastructure under this phase is FTTP.

³ Department for Business, Innovation & Skills and Department for Culture, Media & Sport, *Britain's Superfast Broadband Future*, December 2010.

⁴ The Department has intervened primarily in rural areas but has also assisted urban premises that have missed out on commercial roll-out.

Funding the Superfast Programme

1.9 The Superfast Programme uses a gap funding model, where public funding tops up private investment in broadband infrastructure projects to make them commercially viable. Once built, suppliers own and maintain the network. Under State Aid obligations, owners must offer wholesale access to that part of the network built using public funds for at least seven years.

1.10 The Department has allocated grant funding to 54 local bodies (a local authority or group of local authorities, devolved government or local economic partnership) who then procured a private sector supplier to build and operate a superfast broadband network in their areas. The Department required local bodies to match its grant funding by raising funds through EU grants, loans or from their internal budgets.

Programme costs

1.11 As at August 2020, total public funding for the Superfast Programme across 147 contracts is £1.9 billion (**Figure 2**), 63% of which has come from local bodies. The Department has provided £719 million of the funding and local bodies have provided a further £1.2 billion. The Department forecasts its total funding to the end of the Superfast Programme will be around £750 million.

1.12 To maximise value for money, the contracts contained two 'clawback' mechanisms that require suppliers to return funding to local bodies where capital expenditure is lower than expected or consumer take-up of superfast packages exceeds a certain percentage. Local bodies have used funds from clawback to reinvest in their local projects and reach more premises. The Department estimates total clawback of £0.9 billion, all of which is from its Openreach contracts.

Figure 2

Capital funding and delivery of Superfast Programme contracts, August 2020

Public funding of £1.9 billion has supported roll out to 5.3 million premises to date

	Phase 1	Phase 2	Phase 3	Total
Funding (£m)				
Department for Digital, Culture, Media & Sport (the Department)	469	173	78	719
Local bodies	697	160	377	1,233
Total public funding	1,166	333	454	1,952
Suppliers	399	203	204	806
Early take-up clawback	44	67	0	111
Total contract value	1,608	603	659	2,870
Contract data				
Number of contracts	46	50	51	147
Number of suppliers	1	5	3	5
Premises delivered to date (000s)	4,380	790	94	5,264
Number of contracts still in delivery	5	23	51	79

Notes

- 1 The Department for Digital, Culture, Media & Sport had no budget for Phase 3 and used underspend from earlier phases. It records separately on early take-up clawback – initial reinvestment from Phase 1 contracts from higher take-up than forecast.
- 2 Figures may not sum due to rounding.

Source: National Audit Office analysis of the Department for Digital, Culture, Media & Sport's contracts' data

Progress with superfast coverage

1.13 Superfast coverage of at least 30 Mbps is now available to around 95% of UK premises; approximately 29.5 million homes and businesses. As at August 2020, the Superfast Programme had helped 5.3 million premises, mainly in rural areas, to access speeds of at least 24 Mbps. Of these, more than 5.1 million have at least 30 Mbps. The Superfast Programme accounts for approximately 17% of the country's total superfast coverage. The Department's 2020 evaluation of the Superfast Programme estimated that by 2019 38% of the premises would not have been reached without government subsidy and a further 23% were reached up to four years earlier than they would have been under commercial roll-out. The Superfast Programme's Phase 1 contracts delivered superfast broadband to 4.4 million premises, with phases 2 and 3 delivering around 790,000 and 94,000 respectively. The connection rate slowed in phases 2 and 3 as the Superfast Programme moved into more challenging locations. During phase 3 it increasingly deployed more costly and time-consuming FTTP solutions.

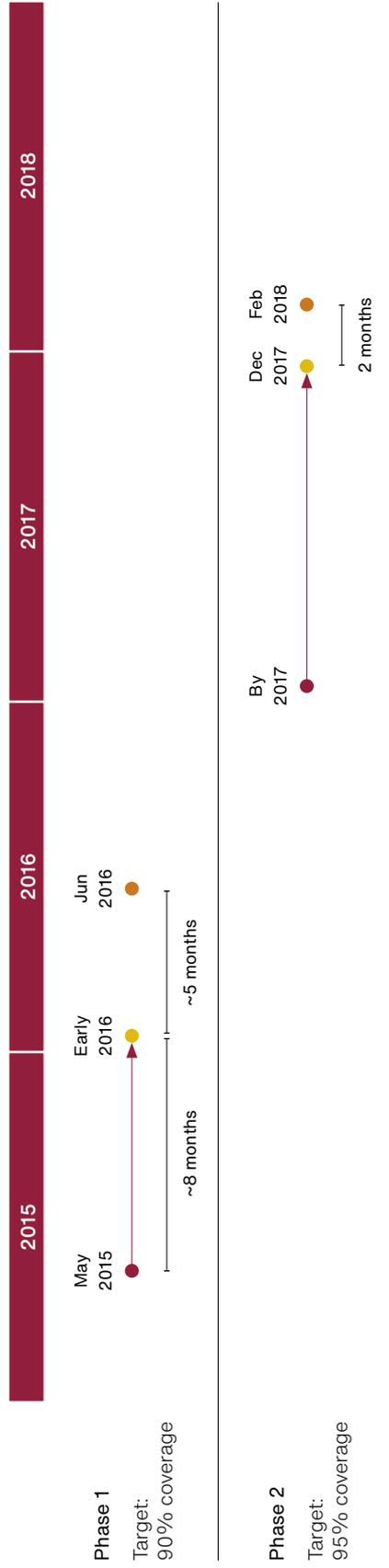
1.14 Using the Department's original definition of 24 Mbps, Ofcom reported that the UK telecoms industry achieved government's original target of 90% superfast coverage in June 2016, 13 months later than planned. It did this through a combination of commercial roll-out and the Superfast Programme. It achieved 95% coverage in February 2018, broadly on time (**Figure 3**). To help achieve its target of 95% on time, the Department agreed that Openreach should prioritise its commercial delivery, which contributed to delays in the Superfast Programme. The Superfast Programme is behind schedule and more than half of its live contracts are reporting delays of between three and 51 months. The Department attributes delays to suppliers underestimating how long it would take to build the infrastructure, insufficient supply chain capacity and local bodies having to rescope eligible premises because of errors or out-of-date information from suppliers. Including new procurements from Phase 3 contracting, the Department now expects superfast contracts to run to 2024, four years longer than originally planned.

1.15 The UK's focus on FTTC superfast broadband roll-out means it has quickly attained high levels of coverage, but figures from May 2020 show that, at around 14%, the UK has one of the lowest full-fibre coverage rates in Europe. This increases to 27% if including other gigabit technologies,⁵ but it remains one of the lowest in Europe. The UK's extensive and reliable copper telephone infrastructure meant that it could deliver superfast broadband to most UK premises by connecting them to nearby cabinets. It was cheaper and faster to roll out fibre to street cabinets than to every household and allowed most people to access speeds of 30 Mbps.

1.16 Other countries, often those without existing reliable infrastructure such as the Baltic States, went straight to full-fibre. While full-fibre is more expensive and time-consuming for operators to deploy, it is much cheaper for them to maintain because it experiences fewer faults and is more reliable. The European Commission's Digital Economy and Society Index (DESI) from mid-2019 ranked the UK eighth out of the 28 EU countries on overall superfast coverage, ahead of Germany and France, but 27th out of the 28 on gigabit coverage (**Figure 4** on pages 24 and 25). Country comparisons do not reflect that it is much cheaper and easier to deliver full-fibre at pace in countries with high population densities and a high prevalence of multi-household buildings than it is in more geographically dispersed countries.

5 Thinkbroadband's estimate of UK's gigabit coverage as at 2 October 2020

Figure 3
 Superfast broadband coverage (24 Mbps) against the objective
 The Department for Digital, Culture, Media & Sport's (the Department's) coverage targets were achieved later than originally planned



- Original target date
- Revised target date
- Target achieved

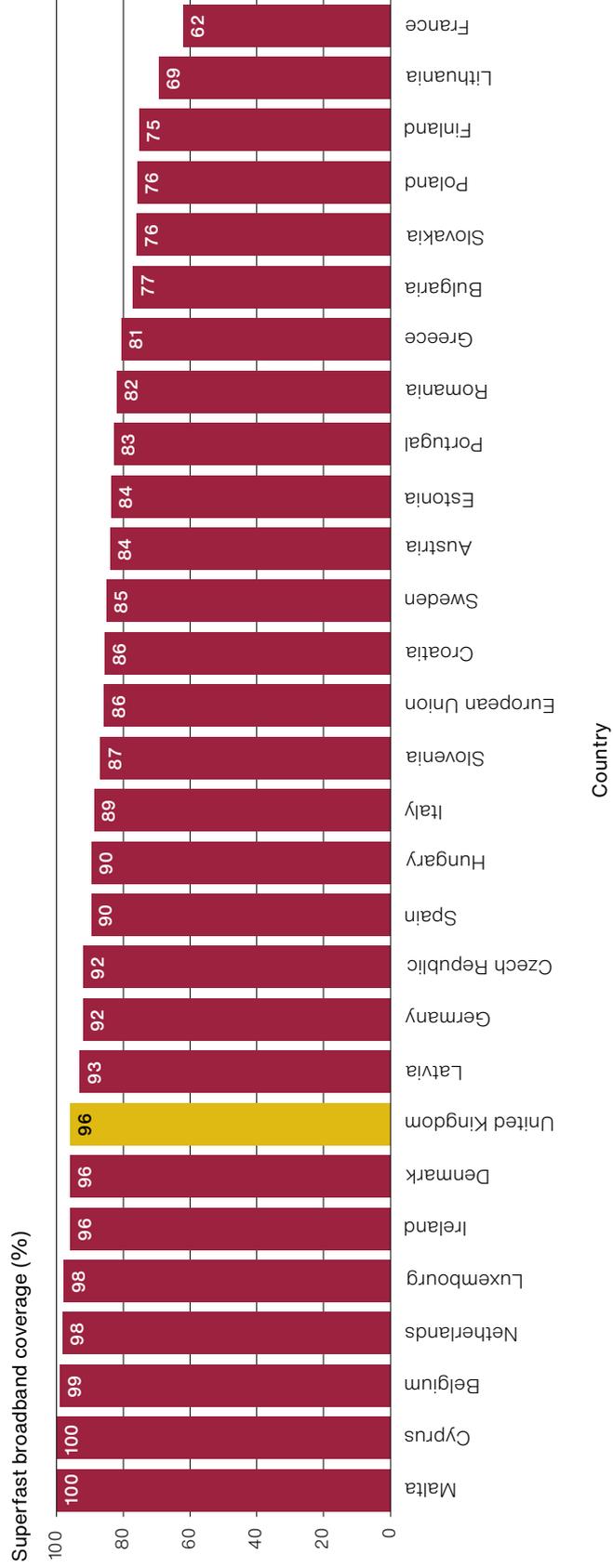
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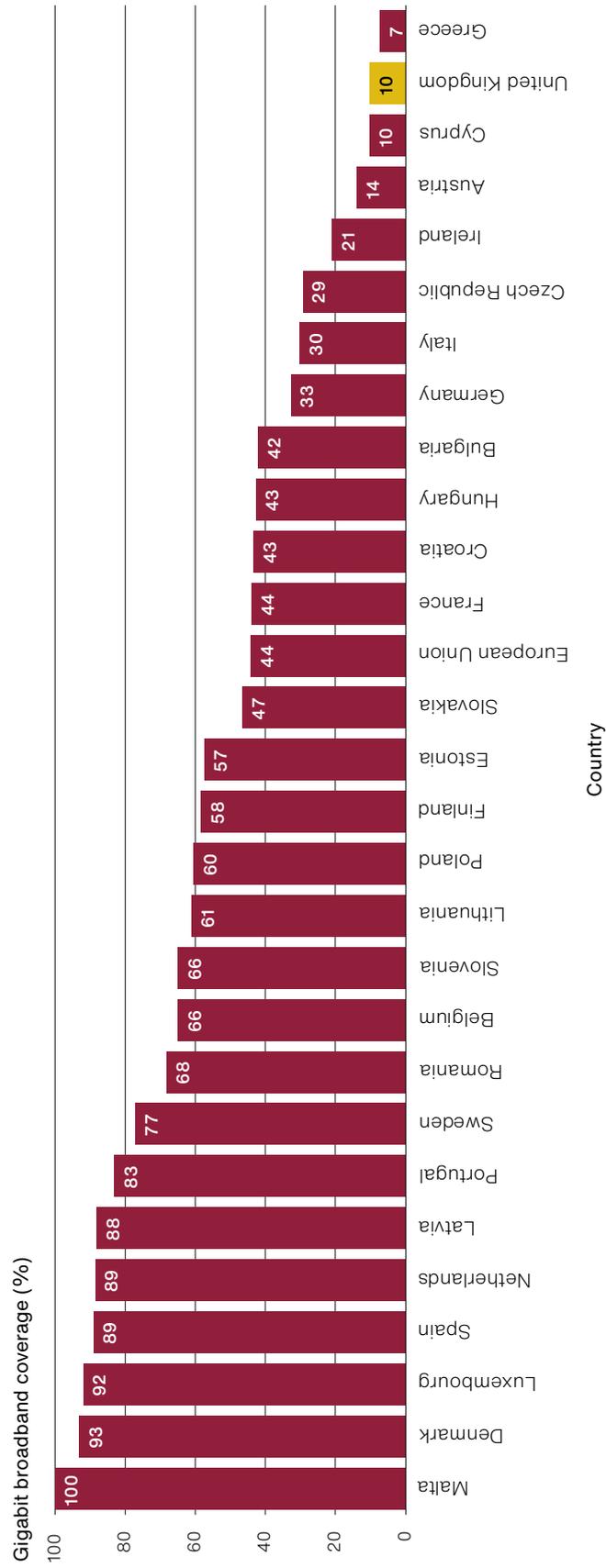
- 1 In 2013, the Department reset the Superfast Programme's objective from 90% to 95% coverage, which it initially announced to be achieved 'by 2017' that was later clarified as December 2017.
- 2 We have interpreted 'early 2016' as January 2016.

Source: National Audit Office analysis of information from Ofcom and the Department for Digital, Culture, Media & Sport

Figure 4 Superfast and gigabit broadband coverage of households in EU member states at mid-2019

The UK ranks highly for superfast broadband but less so on gigabit broadband coverage





Note

1 European Commission's definition of superfast is of speeds of at least 30 Mbps. Gigabit includes full-fibre and cable, which can provide speeds of 1,000 Mbps.

Source: National Audit Office analysis of the European Commission's Digital Economy and Society Index 2020

Delivering and managing benefits

1.17 The Superfast Programme business case identified a range of potential benefits arising from widespread superfast usage including increased productivity, improved educational attainment, public sector cost savings and a reduction in carbon emissions. These benefits are not programme-specific but come also from privately funded infrastructure and will not be formally evaluated. Moreover, they are realised only when users subscribe to superfast packages. The Department's business case defined no programme-level benefits against which to measure progress, making it difficult to assess programme performance. In its subsequent evaluations of the Superfast Programme, the Department used established methods to estimate programme-specific impacts arising only from public investment, and not from commercial roll-out. Local bodies have reported substantial returns on their superfast investment and benefits including job creation, productivity improvements and new start-ups.

1.18 A 2013 research paper commissioned by the Department⁶ estimated a return of £20 for £1 of public investment across government's broadband interventions.⁷ These interventions included the Superfast Programme and a voucher scheme where businesses used grants to purchase broadband infrastructure directly. We have not seen a collective evaluation of these broadband interventions, but a 2020 evaluation of the Superfast Programme estimated that, between 2012 and 2019, it had delivered impacts of between £2.70 and £3.70 for every £1 of public investment. A separate cost-benefit analysis of the Super Connected Cities Programme estimated that its £81 million broadband voucher scheme had returned £8 for every £1 between 2013 and 2015. Differing evaluation periods and the scope of what is included make it difficult to say whether the Department will achieve its projected returns. It expects the Superfast Programme's impact to increase over time and its Superfast Programme's 2020 evaluation estimates a return of between £3.50 and £5 for every £1 invested between 2012 and 2030.

UK broadband performance

1.19 Despite the widespread availability of superfast broadband, many people have complained to their MPs about their broadband and Ofcom research shows broadband satisfaction levels of 85%, which is below other utilities. The primary reasons for consumer dissatisfaction were unreliable connectivity and slow speeds. Issues with broadband stem from premises not yet covered by superfast broadband, those that are covered but have not signed up to superfast internet packages, and those that do not get speeds they were promised.

⁶ Department for Digital, Culture, Media & Sport, *UK Broadband Impact Study*, November 2013.

⁷ Estimated return calculated over a 15-year period between 2009 and 2024, which falls to £6:1 if a 10-year period is applied.

Inconsistent coverage across the UK

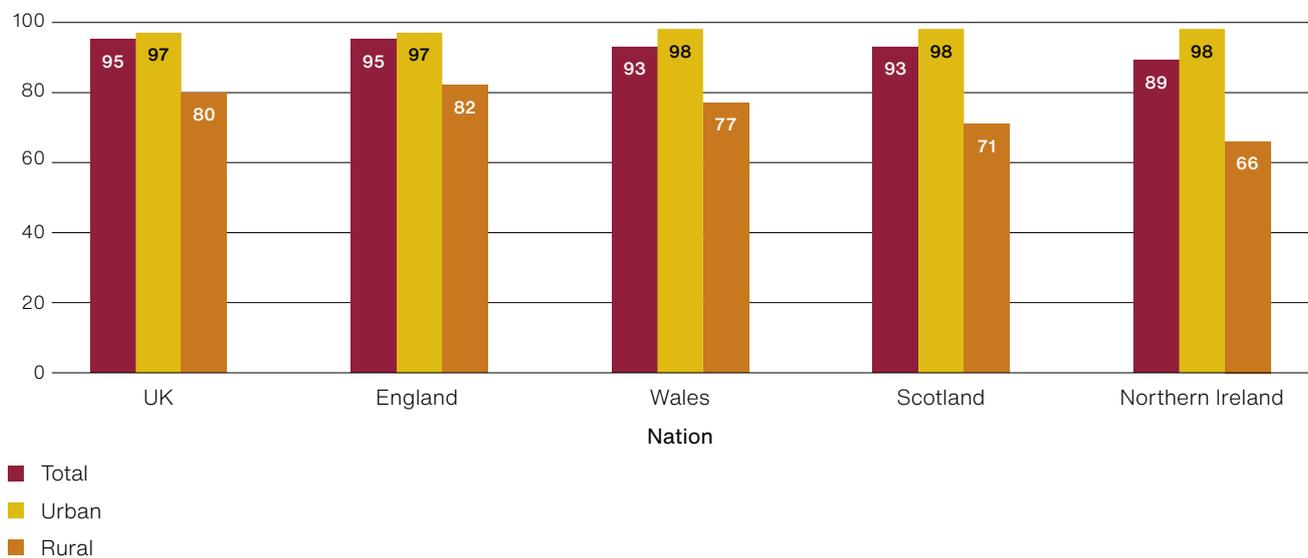
1.20 While UK superfast broadband coverage is 95%, it is variable by area and type of premises. Ofcom estimates that nearly 1.6 million premises do not have superfast broadband access. Of these, nearly 600,000 receive download speeds of less than 10 Mbps; the minimum required to meet government's Universal Service Obligation.⁸ Superfast coverage for UK businesses is only 86%, compared with 95% for households. The European Commission ranks the UK fifth out of the 28 countries on rural superfast coverage, but at 80% it falls well behind the 97% coverage in urban areas. Overall, England has higher coverage than the devolved administrations but while urban coverage is broadly the same across the four nations, rural coverage varies and, at 66%, is lowest in Northern Ireland. The devolved administrations have a higher proportion of harder-to-reach premises than England (**Figure 5**). **Figure 6** overleaf shows that 31 local authorities out of 216 fall below the original 90% coverage target for each local authority and 75 fall below 95%.

Figure 5

Superfast broadband coverage across UK nations, May 2020

Coverage in rural areas is considerably lower than in urban areas

Superfast coverage (%)



Note

1 Ofcom defines superfast broadband as speeds of at least 30 Mbps.

Source: National Audit Office analysis of Ofcom's Connected Nations data

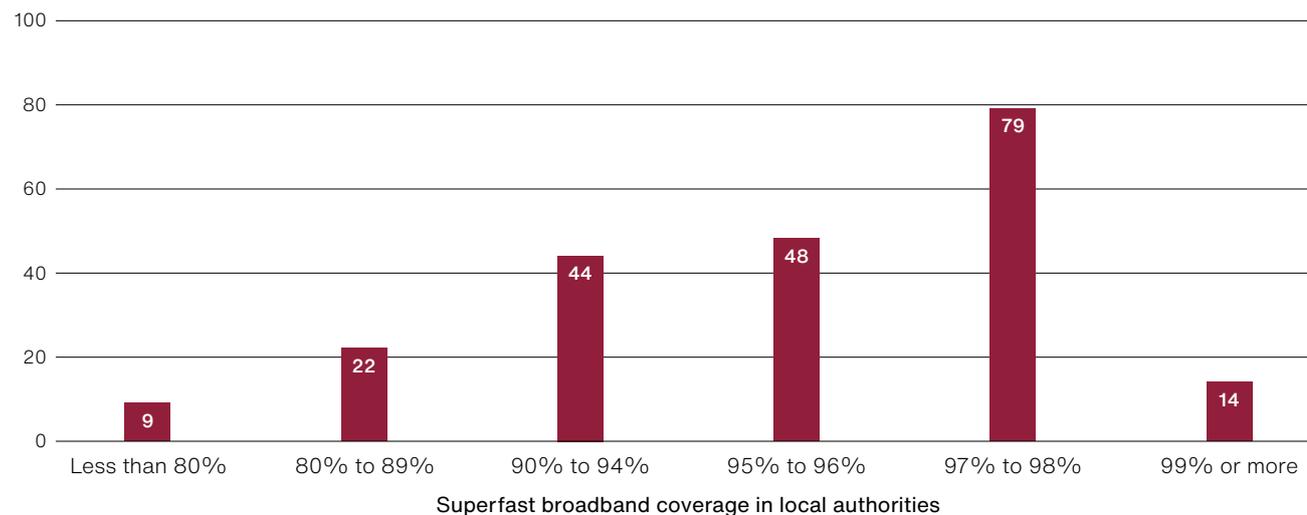
⁸ From March 2020, broadband users can request an upgraded connection if they cannot get download speeds of 10 Mbps.

Figure 6

Superfast broadband coverage of local authorities, as at May 2020

Widespread variation – more than a third of local authorities have less than 95% superfast broadband coverage

Number of unitary or county councils

**Notes**

- 1 Nationally there is 95% coverage of superfast broadband, which Ofcom defines as speeds of at least 30 Mbps.
- 2 An original ministerial ambition of the Superfast Programme was for 90% coverage in each local authority by 2015. As of 2020, 31 out of 216 councils (14%) in the UK have less than 90% coverage.

Source: National Audit Office analysis of Ofcom's Connected Nations data

Low take-up rates of superfast services

1.21 As at September 2019, only 57% of covered properties had signed up to superfast broadband packages. This may be because consumers are not aware that faster services are available, may find their existing service sufficient or consider superfast packages too expensive.

Infrastructure and factors in the home

1.22 Where broadband is available, it can be slower for reasons that are not well understood by customers and for which suppliers are sometimes unfairly blamed. Poor broadband performance in the home can be caused by a building's distance from the cabinet, number of premises sharing a physical cable, the condition of the copper wiring or factors in the home. These include the quality and positioning of equipment such as routers or extension cables, the number of devices or applications running concurrently and the age of devices (**Figure 7**).

Figure 7

Factors affecting broadband speed within the control of customers

Broadband infrastructure itself may not be the sole cause of poor broadband experience

Factor	Explanation
Use of telephone extension cables	This increases the amount of copper in the circuit. The signal loses strength as it travels along copper wires.
Age and quality of the router	Devices in the home connect to the internet via a router. Performance can vary, for example, newer routers usually outperform older ones so customers may be able to upgrade.
Router not optimally configured	Optimising settings such as WiFi channel selection to minimise interference from nearby routers and using the 5GHz band rather than 2.4GHz can help.
Position of the router's antennae	Some models have "null spots" at specific angles and small changes to orientation can improve signal strength and coverage.
Objects which interfere with or block the WiFi signal	Physical features such as thick interior walls or beams are known to block WiFi signals. Metal and water also reduce signals so coverage can be affected by the positioning of, for example, radiators. Other home equipment such as microwave ovens and cordless telephones emit signals which interfere with WiFi.
The number of devices or applications running at the same time	The more devices or the more applications that are open, the slower the speed for each one as a fixed level of capacity is being spread more thinly.
Use of a virtual private network (VPN)	A VPN is a secure 'tunnel' across the internet and is widely used by organisations to protect data in transit where employees access corporate applications remotely. Use of a VPN can slow down speeds, sometimes significantly.

Source: National Audit Office summarisation of Ofcom technical guidance and other resources

Part Two

Managing current and future broadband provision

2.1 In this part of the report, we look at how the UK's broadband infrastructure has held up under increased demand during the COVID-19 pandemic and at how the Department for Digital, Culture, Media & Sport (the Department) intends to support future broadband provision.

Growing demand

2.2 Superfast broadband is fast enough for most household use today, but internet traffic is growing at around 40% each year. Much of this growth comes from increased demand from existing technology in public services, social media, gaming and online media streaming. The Department anticipates exponential increases in new technology – such as 4K and 8K high-resolution devices (televisions) for streaming video – which require four and 16 times the bandwidth required for existing high-definition video content. Increasing use of cloud services by businesses and consumers and the growing number of devices connecting to the internet may also increase demand. The *National Infrastructure Assessment*⁹ anticipated that demand could outstrip current (copper) capacity between 2030 and 2040. The Department wants to upgrade the UK's broadband infrastructure ahead of future increases in demand.

The UK's broadband infrastructure during the COVID-19 pandemic

2.3 The COVID-19 pandemic has highlighted the strategic importance of digital infrastructure to the economy and wider society. The 2020 nationwide lockdown created an unprecedented increase in daytime demand for internet services as people shifted to working and studying from home and kept in touch with friends and family using video conferencing tools. The increase in data traffic tested the resilience of the UK's broadband infrastructure, most of which had been upgraded over the past decade to support superfast speeds.

9 National Infrastructure Commission, *National Infrastructure Assessment*, July 2018.

2.4 Ofcom considers the UK's broadband infrastructure held up well to increased demand during the pandemic.¹⁰ While there have been reports of local outages and Ofcom observed some congestion at local levels, the average download and upload speeds fell by only 2% and 1% respectively. BT, the UK's largest broadband retailer, reported an increase of 35% to 60% in weekday daytime traffic immediately following the Prime Minister's call on 16 March 2020 for UK residents to work at home where possible. However, overall demand has remained below the normal evening peak. Operators design broadband networks to withstand demand during their busiest periods, which normally occur in the evening when most people are online simultaneously. BT reported that daytime demand during the lockdown peaked at 7.5 terabits per second, less than half its pre-lockdown record evening peak of 17.5 terabits per second. Local body representatives told us that recent broadband infrastructure improvements, delivered partly through the Superfast Broadband Programme (the Superfast Programme), had served their communities well. They reported that local residents and businesses were able to continue to function by using the internet in a way that they would not have been able to do five years ago. However, we also heard from stakeholders representing areas with large rural populations that those with poor broadband have felt the impact more sharply during the pandemic.

Future broadband provision

2.5 In its *Future Telecoms Infrastructure Review*,¹¹ government set out its ambition for all UK premises to have full-fibre broadband by 2033, with 50% coverage by 2025. This was a 15-year timescale agreed with industry, consumer groups and investors. Government proposed an "outside-in" approach, with public funding for the most difficult to reach areas to be connected at a similar pace as commercial roll-out. In 2019, the Prime Minister pledged to accelerate delivery of nationwide gigabit-capable broadband to 2025.

2.6 Gigabit-capable technologies have the potential to deliver speeds of 1,000 megabits per second (Mbps) and include cable broadband and future 5G networks as well as full-fibre – also called 'fibre to the premises' (FTTP). Numerous stakeholders told us that while 5G would be of use in urban areas, its viability as an alternative to full-fibre in rural areas was open to question because fibre would still be needed to connect the transmitter masts to the core telecommunications network. There are currently no commercial satellite providers who offer gigabit-capable speeds and some existing services do not offer superfast speeds.

¹⁰ Ofcom, *UK Home Broadband Performance*, May 2020.

¹¹ Department for Digital, Culture, Media & Sport, *Future Telecoms Infrastructure Review*, 2018.

Government's Future Programme

2.7 In the March 2020 budget, government allocated £5 billion to supporting the roll-out of nationwide gigabit-capable infrastructure. In its *Future Telecoms Infrastructure Review*, the Department anticipated that commercial suppliers would reach 90% of premises by 2033. It estimated that government would need to subsidise roll-out to the final 10% at a cost of £3 billion to £5 billion. The Department estimates that accelerating nationwide gigabit roll-out to 2025 will need government to subsidise roll-out to 20% and that it will require an additional £2 billion funding, totalling £5 billion. This estimate excludes the cost for reaching the final 1%.

2.8 The Department is still in the early stages of establishing its programme to support the final 20% of premises (the Future Programme) although it has already made some key decisions about the delivery model. While some funding will support a voucher scheme,¹² approximately £4.5 billion will be gap funding to subsidise infrastructure roll-out. In England, the Department plans a more centralised procurement approach than it did under the Superfast Programme; it is still developing its plans for devolved administrations (see paragraphs 3.10 to 3.12). The Department is developing its detailed plans and has much work to do. It needs to deliver a substantial change project to increase its capacity and capability, to secure State Aid approval, which can take 18-24 months from start to finish, and design and deliver a complex procurement in time for industry to deliver to the final 20%.

2.9 The Department has told us that it considers the final 1% of premises could be prohibitively expensive to reach. It is still exploring options for improving broadband in the most rural and remote areas. In July 2020, the Department submitted an outline business case for its Future Programme to HM Treasury for approval, and as at September was still awaiting approval.

¹² Unlike the gap funding approach, where public bodies contract with suppliers by topping up commercial investment with public subsidy, a voucher scheme allows consumers to contract directly with suppliers using a grant towards the cost of building broadband infrastructure.

Gigabit infrastructure delivery challenges

2.10 The scale of the challenge to deliver nationwide gigabit infrastructure is significantly greater than superfast broadband. Delivering UK-wide connectivity would require the telecoms industry to lay around 500,000 kilometres of new cable to around 31 million premises, compared with around 100,000 street cabinets for fibre to the cabinet (FTTC). It would need to undertake roadworks on most UK roads. To achieve the 2025 timeline, it would need to increase build rates immediately from 1.5 million premises per year currently, to around six million. In an open letter to the Prime Minister in 2019, industry experts said they stood ready to meet the challenge but called on government to deliver a fully coordinated cross-government strategy to remove significant regulatory barriers to delivering at pace. These include areas such as planning, road closures, street works and immigration (to secure access to semi-skilled labour). The Department is working with other government departments to make changes to the policy and regulatory framework to support rapid commercial roll-out. To meet the 2025 timeline, the Future Programme would need to roll out to the hardest to reach areas at the same rate that industry is achieving in urban areas with less challenging terrain.

2.11 The uncertainty surrounding the UK's approach to high-risk vendors puts the gigabit schedule at risk. Equipment from vendors now formally designated high-risk by government has been installed in UK fixed and mobile telecoms network infrastructure from 2004 onwards. Government's *Telecoms Supply Chain Review* which concluded in January 2020 recommended that high-risk vendors be excluded from sensitive core parts of the networks and limited to a minority presence of 35% in the periphery. In July, government made the decision to further reduce or eliminate entirely its dependency on technology originating from certain high-risk vendors for 5G networks and future infrastructure.¹³ This has the potential to introduce considerable expense and delay to the roll-out of gigabit-capable networks. BT said that it will remove high-risk equipment mostly on a replacement basis. This will introduce an extra step for suppliers' roll-out activities and add complexity to the planning and contract arrangements.

¹³ 5G networks rely on fibre to connect the transmitter masts back to the core network.

Part Three

Learning lessons

3.1 In this part of the report, we look at lessons from the Superfast Broadband Programme (the Superfast Programme) and other comparative programmes. We consider how the Department for Digital, Culture, Media & Sport (the Department) could apply these as it develops its plans for managing its future gigabit programme (the Future Programme).

Lessons on the importance of data and local knowledge

3.2 To maximise value for money, the Department must avoid giving money to suppliers to build broadband infrastructure where it already exists, or where they are planning to build anyway.¹⁴ This would also be a breach of State Aid rules.¹⁵ Identifying premises for intervention is difficult because there is no single definitive map or database of current and planned broadband infrastructure. Tracking commercial roll-out during the early phases of the Superfast Programme was simpler because there was a single main supplier. There are now more than 20 independent companies, known as alternative networks ('alt-nets'), who are deploying new full-fibre – also called 'fibre to the premises' (FTTP) – infrastructure, only four of which are participating in the Superfast Programme. Other suppliers are under no legal or regulatory obligation to provide detailed information on their plans and can be reluctant to do so if they have concerns that this information might become known to their competitors.

¹⁴ The technical term for this is 'deadweight'.

¹⁵ EU rules apply to the UK until the end of the withdrawal period on 31 December 2020. The position after then is the subject of ongoing negotiations.

3.3 In the absence of a single map or database of broadband infrastructure and speeds, public bodies identifying premises for subsidy must piece together inconsistent information from multiple sources. Ofcom's Named Access Framework data, which contains broadband speed information at individual property level, has data for 10 providers, not including everyone who is participating in the Superfast Programme.¹⁶ Ofcom's *Connected Nations* series of reports¹⁷ has data from a further 14 providers, but this information is aggregated at postcode level.¹⁸ In practice, broadband performance within postcodes can vary, particularly in rural areas, with premises furthest from the cabinet experiencing slower speeds. Ofcom's coverage data are based on actual and predicted data from network operators. The speed achieved in practice may be higher or lower than those predicted.

3.4 To identify premises for intervention, the Superfast Programme relied on a high degree of local knowledge to combine and check the various data sources. For example, local officials might identify situations, as outlined above, where data erroneously show premises with faster speeds than in practice. Or conversely, they might realise if data are missing a recently installed full-fibre connection. The Department told us that local bodies were responsible for identifying premises and that Building Digital UK (BDUK) was responsible for assuring that they met State Aid requirements. While this would have ensured that they did not include ineligible properties, it would not have provided assurance that local bodies had identified all eligible properties.

3.5 In preparation for its Future Programme, where the Department will identify premises for intervention, it has started to produce preliminary lists of properties it considers eligible for intervention. The Department has provided this information to local bodies to validate. One local body told us that they had seen an error rate of between 40% and 70% in the data for their area. This was mainly because the data included properties which had already had full-fibre installed by an alt-net. Incomplete or incorrect data about existing infrastructure and supplier plans might lead to ineligible properties being selected for public subsidy.

3.6 Good data can help to maximise value for taxpayers' money by enabling the Department to select an optimal balance of expensive and less expensive interventions. Its approach is to group individual premises into clusters, and then group clusters into contract bundles. It may choose to combine premises in a way that allows for cross-subsidisation within each contract. The way in which the Department determines bundles will be critical to successful delivery. The Department acknowledges that the data are imperfect and has told us that it recognises this is a potential risk. We have not seen the Department's plans for mitigating this risk.

¹⁶ The providers included are Openreach and Gigaclear.

¹⁷ Ofcom, *Connected Nations and infrastructure reports*, Available at: www.ofcom.org.uk/research-and-data/multi-sector-research/infrastructure-research

¹⁸ Ofcom's methodology for obtaining and analysing data from providers is explained at www.ofcom.org.uk/_data/assets/pdf_file/0021/186411/connected-nations-2019-methodology.pdf (link accessed 12 October 2020).

Lessons on contracting

3.7 The Department believes that lengthy contracts with too many premises and high numbers of change requests caused delays on the Superfast Programme. Change requests arose because of the need to avoid subsidising premises which had not yet been connected by the contracted supplier but in the meantime had been served commercially by another provider.¹⁹ Failure to remove these premises from the contract resulted in overbuild. Both the Department and suppliers told us that the contract change process to remove such premises and substitute them with alternatives was long and onerous for all parties. For its Future Programme, the Department is introducing more contracts of shorter duration involving fewer premises. Its rationale is that there will be less opportunity for individual contracts to be affected by other operators changing their plans while work is under way.

3.8 Some stakeholders have criticised the Superfast Programme for a lack of competition and because large sums of public money were awarded to a single supplier. By introducing shorter contracts with fewer premises, the Department hopes to encourage competition from smaller suppliers. It expects the number of contracts for its Future Programme to increase eightfold to up to 1,200, which has the potential to be more costly and complex to administer. However, the Department expects the use of standardised contracts to reduce complexity and administrative costs.

3.9 The Department has a specific aim to encourage growth and diversification in the supplier market and to make it easier for new entrants to join the Future Programme. While this may help achieve the timeline, different infrastructure built by multiple suppliers can increase the complexity of the network. Although this risk exists independently for the commercial roll-out, the choice of supplier in the subsidised areas is within BDUK's control. In our report *Rolling out smart meters* we set out some of the integration and standardisation challenges faced by the Department for Business, Energy & Industrial Strategy. We found that it had underestimated the complexity of creating a centralised infrastructure and of integrating the components with different suppliers' equipment and systems where a large number of organisations were involved.²⁰ We found that when consumers switched between suppliers, some of the meters lost functionality because the new supplier systems were unable to communicate with them. We have not seen any evidence that the Department is addressing potential issues around consumers switching between suppliers. The Department also has some concerns about the long-term financial stability of some smaller suppliers and there are potential risks to consumers.

¹⁹ This is known as 'overbuild'.

²⁰ Comptroller and Auditor General, *Rolling out smart meters*, Session 2017–2019, HC 1680, National Audit Office, November 2018.

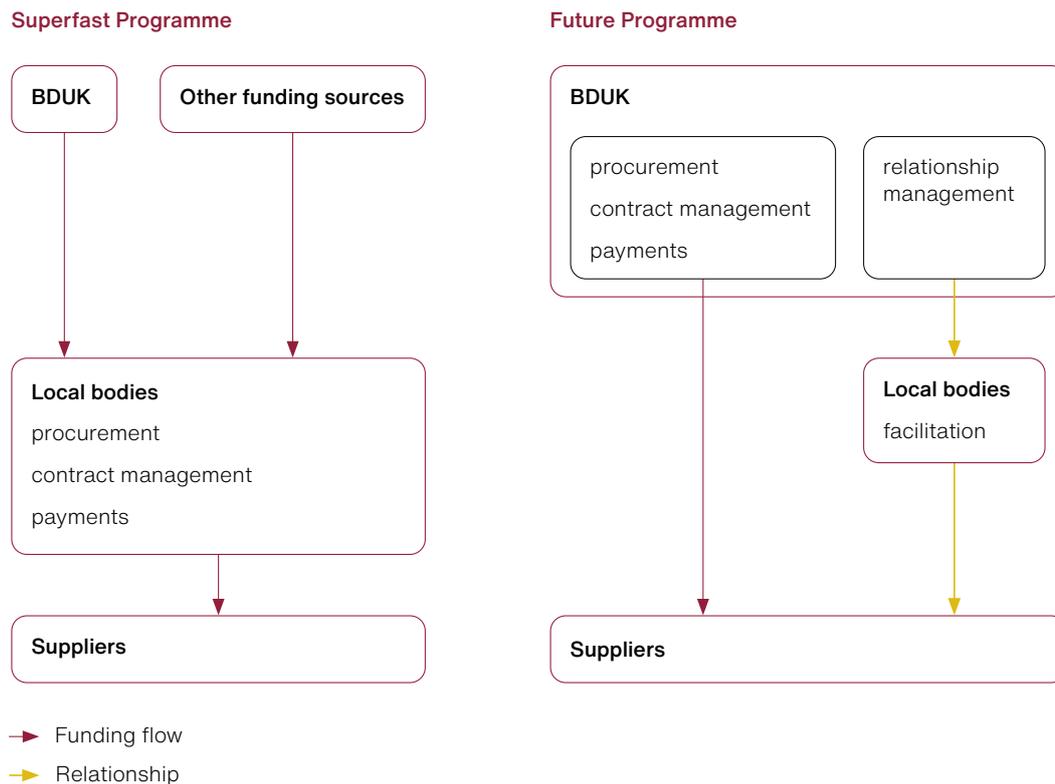
Lessons on procurement approach

3.10 The Department believes that a centrally managed, locally delivered approach is the best way to meet the challenging timeline. This is different from the Superfast Programme where, in line with government’s devolution agenda at the time, the Department followed a locally procured, locally managed approach (**Figure 8**). The Department concluded that this approach had worked well and that it was difficult to see how an alternative would have delivered a better result. However, it viewed multiple procurement layers and limited standardisation as causes of delay. Some local bodies welcome a centralised procurement model, citing difficult relationships with suppliers and limited capacity to manage contracts.

Figure 8

Difference between the Superfast and Future Programmes’ contracting models

The delivery model under the Future Programme is more centralised



Notes

- 1 Building Digital UK (BDUK) is a unit within the Department for Digital, Culture, Media & Sport that implements government’s broadband policies. It was formerly known as Broadband Delivery UK.
- 2 The contracting model for the future roll-out will not be finalised until later in 2020.
- 3 Local bodies are local authorities in England and the devolved administrations in Wales, Scotland and Northern Ireland.
- 4 BDUK anticipates that the model followed by the devolved administrations will be a continuation of the approach adopted for Superfast.
- 5 Under the Superfast Programme, local bodies matched BDUK grant funding from sources, such as, EU grants, loans or internal budgets.

Source: National Audit Office summarisation of the Department for Digital, Culture, Media & Sport’s information

3.11 The Department considers the local knowledge and experience acquired through local bodies as critical to supporting delivery and overcoming obstacles. Local officials can help in anticipating and addressing where potential problems might arise during the build phases. For example, under the Superfast Programme they drew on detailed knowledge of their terrain, contacts with highways departments and familiarity with local landowners whose permission is needed where new infrastructure crosses their land. The Department expects local body experts to continue working with communities and stakeholders to facilitate delivery and overcome barriers. It intends to achieve this through a memorandum of understanding, but some local bodies expressed doubt that this would have sufficiently strong incentives and levers. Without direct accountability for managing local performance, there is a risk that local bodies may be less engaged in the future.

3.12 There is also a risk that pressures on local government finance may lead to existing teams in local bodies being disbanded. This would result in loss of the local knowledge and experience that the Department is trying to retain. In extreme circumstances a local authority may have to fall back to supporting the minimum services it is legally required to provide. The Department is recruiting regional and area experts to work with local bodies but it is not yet clear if their numbers and expertise will match current levels of local resourcing. In our work on the Emergency Services Network²¹ we found that the centralised commercial arrangements created a risk that local emergency services teams would feel they had insufficient control over the service they received.

Lessons on capability

3.13 Under its new centralised model, the Department will need to replicate, at a national scale, the mapping and procurement functions performed by local bodies under the Superfast Programme. It expects many other functions supporting delivery and benefits realisation to remain within local bodies but, in practice, this will be subject to their ability to retain the necessary resources. It must identify and prioritise interventions for approximately 4.9 million premises and fund, procure and manage all 1,200 supplier contracts. The Department has identified that its existing systems, based largely around email and spreadsheets, will be inadequate to support this activity at the scale required. It intends to build a new system to receive, combine and process datasets from a variety of sources to build up the national picture and determine when and where contracts should be awarded. However, it will undertake this as part of a wider technology transformation programme. The Department acknowledges that it may not be ready in time for the anticipated start of the first contracts for the Future Programme in September 2021.

²¹ Comptroller and Auditor General, *Upgrading emergency services communications: The Emergency Services Network*, Session 2016-17, HC 627, National Audit Office, September 2016.

3.14 The Department is increasing its capacity and capability at the same time as addressing the challenges posed by the availability, accuracy and consistency of data, set out above. It has much to do in a short time frame. In our report on *Challenges in using data across government*, we found that investing in new technology and tools does not in itself guarantee that the underlying data are of good enough quality. The challenges of data quality need to be overcome to achieve the potential for longer-term efficiencies.²²

Lessons on managing competing objectives

3.15 Attempting to adhere to a fixed timeline, which later proves unachievable, can contribute to delays and cost overruns. Many government programmes, including the Superfast Programme, take longer to deliver than originally planned. In our report *Rolling out smart meters*, we found that the Department for Business, Energy & Industrial Strategy decided to accelerate the roll-out without making an assessment of the implications.²³ Setting a deadline of 2020 put significant timetable pressure on the programme, yet its most significant benefits would be delivered only in the longer term. This deadline has now been pushed back to 2024. The delivery dates for Crossrail were set in 2010, before construction began. In our report *Completing Crossrail*, we said that decision-making in the latter stages of the project was dominated by achieving the fixed completion date of December 2018 (for the central section of the railway) which, when combined with the absence of a sufficiently detailed delivery plan, increased risks and added unnecessary costs.²⁴ We reported that a number of stakeholders said the Crossrail executive team recognised the challenges but believed they had an exceptional team capable of delivering exceptional results and overcoming these challenges. Crossrail Ltd does not expect the central section of the railway to open until the first half of 2022, up to three and a half years later than planned.

²² Comptroller and Auditor General, *Challenges in using data across government*, Session 2017–2019, HC 2220, National Audit Office, June 2019.

²³ See footnote 20.

²⁴ Comptroller and Auditor General, *Completing Crossrail*, Session 2017–2019, HC 2106, National Audit Office, May 2019.

3.16 Should the timeline prove too ambitious and the Department chooses instead to maximise gigabit-capable build in the final 20% by 2025, it would present a constraint that works against its original ambition of working from the “outside-in”. The Department has indicated that the final 1% is likely to be prohibitively expensive. The most recent iteration of the business case indicates that suppliers might propose ‘ultrafast’ alternatives (which can achieve download speeds of up to 300 megabits per second (Mbps)) where gigabit-capable solutions might not be considered value for money. Technologies such as wireless and satellite are not currently capable of delivering true gigabit speeds. The timeline has already been a key driver in determining the procurement approach, as outlined above (paragraph 3.10), and in the shift away from full-fibre. Moving to a technology-neutral ‘gigabit-capable’ approach made government’s 2025 ambition more realistic, but some stakeholders consider this a watering down of the target because they view fibre as a superior technology.

3.17 Under the Superfast Programme, suppliers were able to maximise coverage across the UK’s hardest to reach premises by starting with the easiest. The properties left behind were largely the hardest and most expensive to reach and, mostly, in rural and remote areas. Rural stakeholders therefore strongly support an outside-in approach for the Future Programme. While the Future Programme, using the existing State Aid ruling for the Superfast Programme, will focus initially on premises lacking 30 Mbps, it may prioritise other objectives in later phases when it achieves a new State Aid ruling. If it prioritises the timeline, there is a risk that the same properties will again be left behind. Suppliers may also find it more attractive to focus on areas where they will gain the greatest potential returns, rather than where there is the greatest customer need. Such an approach risks widening the gap in broadband provision, particularly for rural areas. This means that, by the end of 2025, some premises may still lack superfast speeds, let alone gigabit connectivity.

Lessons on competition

3.18 The Department concluded that competition in infrastructure encouraged innovation and competitive pricing for the Superfast Programme but we have not seen evidence that this translated into wider choice for consumers. Under the Superfast Programme, infrastructure providers in receipt of subsidy were obliged to allow access, at prices regulated by Ofcom, to other internet service providers. These service providers would then offer their own products over these networks. However, average take-up of services offered over Openreach’s infrastructure is around 60% compared with less than 20% over smaller networks. This is partly explained by Openreach infrastructure having been available on the market for longer but a more limited choice of services over smaller networks is likely to have influenced these figures.

3.19 Internet service providers who do not have their own infrastructure may not find it commercially attractive to offer their products over multiple smaller networks, particularly where they connect to a relatively low number of premises. The cost and effort of integrating a large number of disparate suppliers into their own systems may outweigh the potential gain in revenues from customers gained in this way.

3.20 Looking forward, smaller infrastructure suppliers may gain dominant positions locally in markets which cannot attract competition. Without support to encourage service providers onto these networks, consumers may have very limited choice and find it difficult, or even impossible, to switch providers. Stakeholders told us that initiatives to address this are at a very early stage but may include a common platform. A member of the all-party parliamentary group on broadband and digital communication has also expressed concern that consumers may get locked into higher prices in rural areas where no alternative provider is available.²⁵

²⁵ Westminster eForum Seminar, *Key issues for the retail mobile and broadband market – consumer protection, infrastructure and competition*, June 2020.

Appendix One

Our audit approach

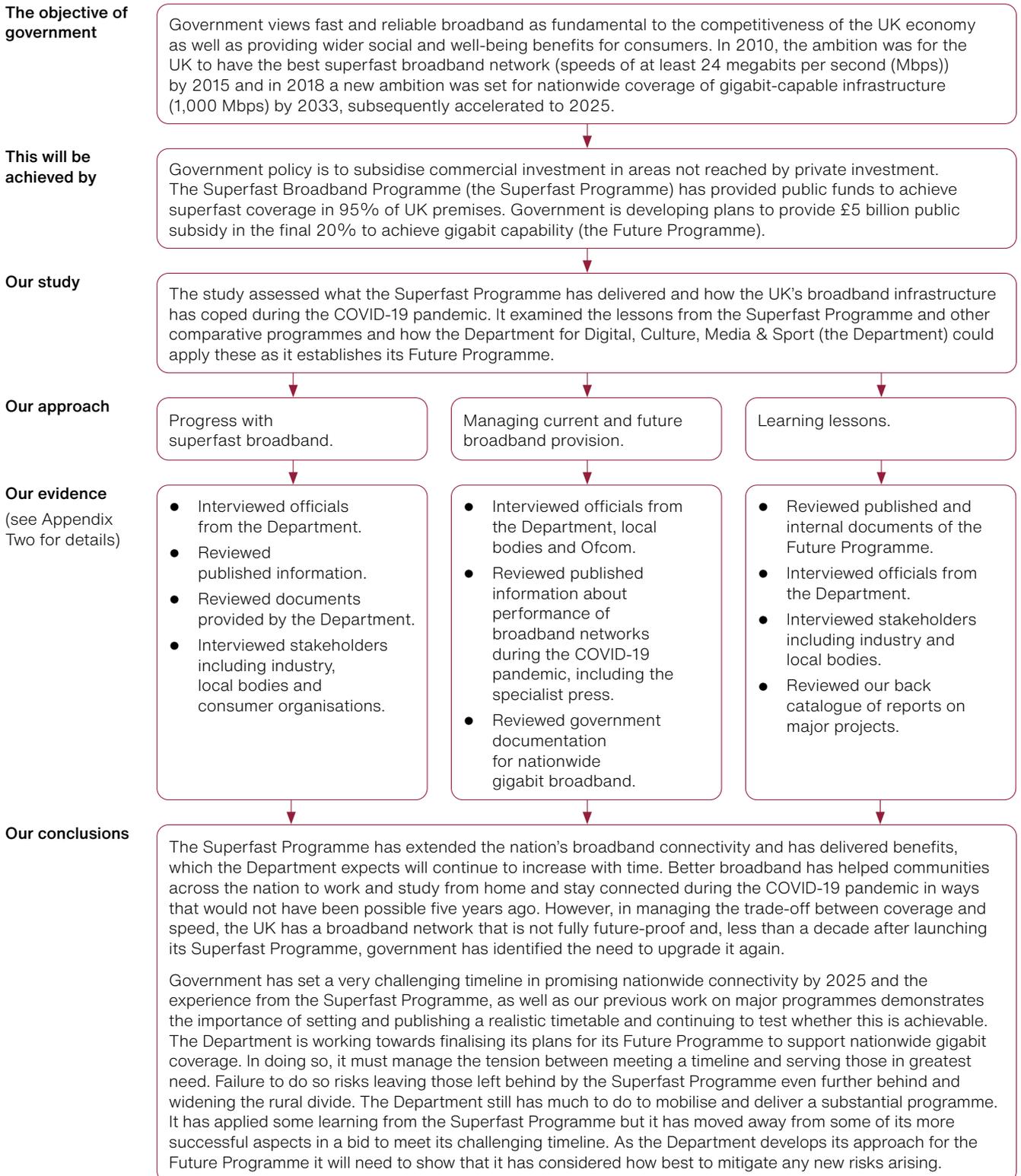
1 Major programmes are expensive, high profile and carry great uncertainties and risks, with many falling short of their objectives in terms of cost and/or outcomes. We have seen many programmes fail to deliver their vision because they were not started in the correct way. The Department for Digital, Culture, Media & Sport (the Department) is currently establishing its programme for supporting gigabit connectivity in the uncommercial final 20% of UK premises (the Future Programme).

2 This report considers what the Superfast Broadband Programme (the Superfast Programme) has delivered and how the UK's broadband infrastructure has held up during the COVID-19 pandemic. We examine the lessons from the Superfast Programme and other comparative projects, and how the Department could apply these as it establishes its Future Programme. The report focuses on the role of the Department and considers:

- progress with superfast broadband (Part One);
- managing current and future broadband provision (Part Two); and
- learning lessons (Part Three).

3 The Department is still developing its plans for the Future Programme. It expects to let its first contracts in autumn 2021 and is currently awaiting approval of its outline business case. This report therefore does not examine the Department's progress on the Future Programme in detail. Those that are digitally excluded out of choice or for financial reasons are also out of scope.

4 Our audit approach is summarised in **Figure 9**. Our evidence base is described in Appendix Two.

Figure 9**Our audit approach**

Appendix Two

Our evidence base

1 We reached our independent conclusions on learning from the Superfast Broadband Programme (the Superfast Programme) as the Department for Digital, Culture, Media & Sport (the Department) embarks on supporting nationwide gigabit connectivity by analysing evidence collected between February 2020 and July 2020.

2 To inform our understanding of potential value for money risk areas we applied an analytical framework that drew from:

- the National Audit Office's *Framework to review programmes*;²⁶ and
- reports from our back catalogue around major programmes to identify relevant learning or risks.

3 We conducted several interviews with officials from the Department to inform our audit. We also spoke with a range of other organisations to gather perspectives, experience and evidence across all our study areas.

We interviewed representatives from the following organisations:

- Other government bodies: HM Treasury; the Infrastructure and Projects Authority; Ofcom.
- Industry: 4G & Satellite Internet; BT; CityFibre; Gigaclear; Hyperoptic; the Independent Networks Cooperative Association; the Internet Services Providers Association UK; Openreach; TalkTalk; Sky; Virgin Media; Vodafone.
- Consumer organisations: Communications Consumer Panel; thinkbroadband; Which?.
- Local bodies (a local authority or group of local authorities, devolved governments or local economic partnerships): Black Country; Buckinghamshire; Cambridgeshire and Peterborough; Devon and Somerset; Herefordshire and Gloucestershire; Kent; Nottinghamshire; Shropshire; South Yorkshire; Staffordshire.
- Other stakeholders: Association of Directors of Environment, Economy, Planning & Transport; Enders Analysis; Local Government Association; PMP Conseil.

²⁶ Available at: www.nao.org.uk/report/framework-to-review-programmes/

4 To examine progress with superfast broadband, we did the following:

- Analysed secondary evidence, including published research reports from Ofcom as to coverage and take-up. In general, we have used Ofcom's definition of superfast (at least 30 megabits per second (Mbps)) but, as the Department uses a different definition (at least 24 Mbps), we have reported on both where data are available. To compare the UK's coverage of superfast and full-fibre/gigabit connectivity we reviewed sources of international data such as the European Commission's Digital Economy and Society Index (2020).
- Examined published documents and internal management information of the Superfast Programme's objectives, financial monitoring, delivery and benefits.
- We also drew on evidence from our previous broadband reports in 2013²⁷ and 2015.²⁸

5 To examine managing current and future broadband provision, which included the significant increase in internet traffic on the UK's broadband infrastructure during the COVID-19 pandemic, we did the following:

- Monitored online broadband news-sites of developments of broadband performance during the lockdown as well as the websites of key suppliers, Ofcom and the Department.
- Examined Ofcom's published research on home broadband performance before and during the lockdown.
- Spoke with officials from the Department, Ofcom and local bodies about the resilience and performance of the UK's broadband infrastructure.
- Reviewed government documentation about its plans for nationwide gigabit-capable broadband and the Department's Future Programme.

6 To examine learning lessons for the Future Programme, we did the following:

- Reviewed published documentation of government's ambitions and aims for the Future Programme as well internal documents, to understand the rationale and delivery approaches, and to identify changes from the Superfast Programme.
- Drew on our past work on other major projects to identify potential lessons for the Future Programme. In particular, we used previous National Audit Office reports relating to major infrastructure as well as learning from our *Framework to review programmes*.

27 Comptroller and Auditor General, *The rural broadband programme*, Session 2013-14, HC 535, National Audit Office, July 2013.

28 Comptroller and Auditor General, *The Superfast (Rural) Broadband Programme: update*, National Audit Office, January 2015.

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