SPICe Briefing
Digital Connectivity

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This SPICe subject profile provides an overview of the digital strategy in Scotland. It includes information on the current state of the broadband and mobile infrastructure in Scotland.

The Scottish Parliament
Pàrlamaid na h-Alba

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EXECUTIVE SUMMARY

This briefing provides an overview of the Scottish Government's digital ambition for Scotland, including its targets for access to next generation (superfast) broadband, which are to achieve: 95% of premises by the end of 2017 and 100% by the end of Session 5 of the Parliament (2021).

The paper concentrates on the first of the Government's four strands which underlies its vision for a digital Scotland, namely connectivity.

The [Digital Scotland: Superfast Broadband](#) (DSSB) programme is a £412 million investment to rollout fibre technology throughout the country.

The programme consists of two separate projects:

- The **Highlands and Islands project** led by Highland and Islands Enterprise (HIE)

- The **Rest of Scotland project** led by the Scottish Government.

The paper looks at the progress being made to reach the 95% target and how the challenges, which need to be overcome in order to reach the final 5%, are being addressed.

This paper also discusses the UK Government's plans to introduce a Universal Service Obligation (USO) – thereby giving everyone the legal right to request a connection at a minimum speed of 10Mbps, up to a reasonable cost threshold – by 2020.

DIGITAL SCOTLAND

The Scottish Government's ambition, set out initially in [A digital ambition for Scotland](#) (2010) is that

- next generation broadband will be available to all by 2020, with significant progress made by 2015

- the rate of broadband uptake by people in Scotland should be at or above the UK average by 2013, and should be highest among the UK nations by 2015.

The Scottish Government's [vision](#) for a digital future for a Scotland would mean that by 2020:

- people have access to digital technology and are capable and confident in its use at home, at work and on the move

- people do not worry about access to the Internet, caps on usage, slow upload or download speeds, patchy mobile coverage or mobile signal dropout

- future-proofed digital infrastructure supports any device, anywhere, anytime connectivity across Scotland

- Scotland's businesses have skills and confidence to exploit digital technologies

- the economic environment encourages digital innovation and supports the creation, growth and digital transformation of businesses

- businesses take advantage of real time data to deliver innovation, greater productivity and provide better services

- Scotland seen as an attractive place for inward investment in digital technologies

- all appropriate public services are delivered online, with partnerships being encouraged and valued as a source of innovation and service improvement

- healthcare, education, energy supply and provision, transport, and waste and environmental management transformed through the adoption of new technologies, information and digital access

- data is collected and turned into information and knowledge that is further transforming service delivery.

The Government's vision is based around four strands:

- connectivity

- economy

- public services

- participation.

This brefing concentrates on the first strand, digital connectivity.

BROADBAND INFRASTRUCTURE (CONNECTIVITY)

BROADBAND

Broadband is a way of connecting to the internet, which allows information to be carried at high speed to computers, laptops, tablets, smartphones, smart TVs or other devices.

In some parts of the UK, people can choose between three broadband technologies – ADSL (Asymmetric Digital Subscriber Line), fibre-to-the-cabinet (FTTC) and cable broadband services – but in other areas, many homes have limited choice because FTTC or cable is not available.

The technologies are:

- ADSL which delivers broadband using the standard copper telephone line

- Cable which uses fibre-optic lines, made of glass or plastic, to transport data from the exchange to point (a street cabinet) from there a form of copper-based cable (called a coaxial cable) is used to transmit data

- FTTC which uses fibre-optic lines to transport data to a point (a street cabinet), and from that point data is then transmitted over a standard copper telephone line.

For areas of the country not served by the fixed network infrastructure, alternative technologies have been proposed including satellite broadband. For example, in 2015, as part of the UK Government's commitment to give access to 2Mbps download speed to every premise in the UK by the end of that year, Broadband Delivery UK (BDUK) delivered a satellite broadband subsidy scheme through a number of UK Local Bodies.

This scheme was designed to provide a contribution towards the equipment and installation of a satellite broadband connection. The scheme, was available to anyone with an existing broadband speed of less than 2mbps, provided their exchange was not due to be updated within the next 12 months.

SUPERFAST BROADBAND

There is no common definition of superfast broadband but initially, in 2010, the UK Government used 24Mbps as the standard for its target access line speeds, with the aim of reaching that target by 2020. This speed was also initially used by the Scottish Government to indicate that Next Generation Access (NGA) broadband infrastructure was available.

The Scottish Government has since increased its target access speed to be at least 30Mbps. This is also Ofcom's definition of the download speed for Superfast Broadband.

Ofcom is the UK-wide independent communications regulator. It oversees the TV and radio sectors, fixed line telecoms, mobiles, postal services, plus the airwaves over which wireless devices operate.

Ofcom produces annual Infrastructure reports on the UK's fixed broadband, mobile and Wi-Fi networks, digital television, digital radio and internet infrastructure.

In April 2016, Ofcom launched its one-stop checker. Using industry speeds and coverage data this online tool allows consumers to check predicted mobile coverage and fixed broadband speed and availability by postcode.

The broadband checker uses data provided by the UK's major Internet Service Providers in June 2015 to calculate average line speeds.

Universal Service Obligation

The UK Government recently [announced](#) plans to introduce a [Universal Service Obligation](#) (USO) – thereby giving everyone the legal right to request a connection at a minimum speed of 10Mbps, up to a reasonable cost threshold – by 2020. This would put access to fast broadband on a similar footing to other basic services, such as gas, electricity and water.

At present, there is only a Universal Service Commitment of availability of services of at least 2Mbps.

A [consultation](#) by the UK Government on the Broadband Universal Service Obligation opened on 23 March 2016 and closed on 18 April 2016. It covered new enabling powers that would give the Secretary of State an explicit power to introduce a broadband USO and would require Ofcom to review the USO, as appropriate, to ensure that in future it continued to reflect the UK's connectivity needs.

On 7 April 2016, Ofcom launched a call for inputs on [Designing the broadband universal service obligation](#). The call closes on 23 June 2016.

Defining a Broadband USO is a reserved matter, and in the Queen's Speech on 18 May 2016, the UK Government announced its plan for a Digital Economy Bill which would include an initial statutory USO of at least 10mbps. The proposed Bill is also expected to include a power to direct Ofcom to review the speed over time to make sure it is still sufficient for modern life.

BROADBAND SPEEDS

On 26 January 2016, Ofcom published the [Voluntary Business Broadband Speeds Code of Practice](#). The Code aims to provide business customers purchasing standard business broadband services with transparent and accurate information on their broadband speeds.

The Code is a voluntary commitment from the Internet Service Providers (ISPs) who are signatories to the Code. They undertake to provide accurate and transparent speed information on standard business broadband services at point of sale, manage business customers' speed-related problems, and allow customers to exit contracts without penalty if speeds fall below a minimum threshold.
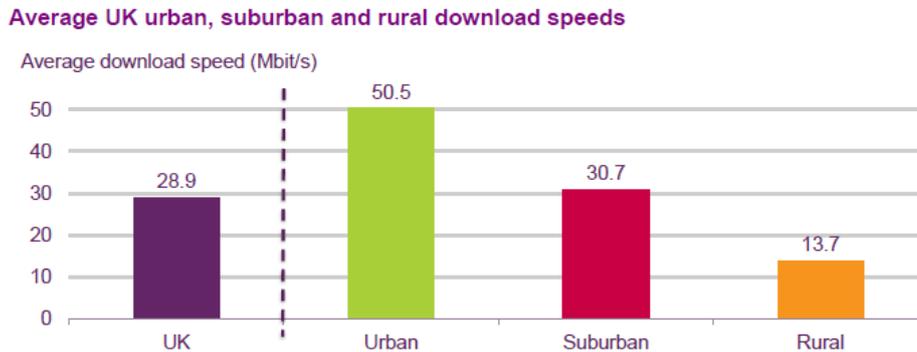
Current signatories to the Code include:

- BT Business

- Talk Talk Business

- Virgin Media.

In March 2016, Ofcom published a report on its [research](#) into the performance of UK home broadband. The report focused on three key measures relevant to the consumer experience of broadband performance:

- download speeds

- upload speeds

- video streaming quality.

The report indicated that a number of factors affect the performance of fixed-line broadband, including location, with rural areas less likely than urban areas to have access to FTTC and cable services.

The report included download speed data from November 2015:

Average UK urban, suburban and rural download speeds

Average download speed (Mbit/s)

UK	Urban	Suburban	Rural
28.9	50.5	30.7	13.7

Source: SamKnows measurement data for all panel members with a connection in November 2015. Note: Urban is defined as settlements with a population of more than 10,000, rural as settlements with a population of 2,000 or less and suburban as settlements with a population between these two values; due to statistical weighting carried out to calculate rural, urban and suburban speeds, these figures are not directly comparable to the UK national speed.

The consumer organisation, Which, is currently leading a campaign on broadband speed. It calls for:

- the majority of customers (not just 10%) to get the speeds promised in adverts

- broadband customers to be adequately compensated when things go wrong.

The organisation has also called for stricter broadband advertising rules and in May 2016, it was reported that the Advertising Standards Authority (ASA) had ruled that, from October 2016, broadband providers must make sure adverts for their products are very clear about costs and contract lengths.

THE FIRST 95% IN SCOTLAND

The Digital Scotland: Superfast Broadband (DSSB) programme is a £412 million investment to rollout fibre technology throughout the country.

Operating alongside rollout by commercial companies, the initial aim of the Scottish Government's DSSB programme was to extend access to fibre broadband to 85% of premises by 2015/16 and to at least 95% of premises (750,000 homes and businesses) across Scotland by end of March 2018. The Scottish Government's new targets, set out by in response to an oral question on 23 March 2016, are to reach 95% by the end of 2017 and 100% by April 2021.

PROJECTS

The DSSB programme is being delivered through two regional projects – one covering the Highlands and Islands, the second covering the Rest of Scotland.

The **Highlands and Islands project** is led by Highland and Islands Enterprise (HIE). After a procurement exercise, the contract for the project was awarded to BT in March 2013. The project is expected to reach at least 84% of premises in the HIE region by the end of 2016.

The Highlands and Islands project is valued at £145.8 million with:

- £126.4 million being contributed by public bodies (Scottish Government, UK Department for Culture, Media and Sport (DCMS), HIE and all seven local authorities that form part of the project area)

- £19.4 million being contributed by BT.

The Highlands and Islands contract is geared towards maximising coverage across the region, rather than having specific amounts allocated to each local authority area.

The **Rest of Scotland project** procurement was led by the Scottish Government using the broadband delivery framework produced by BDUK. An Open Market Review (OMR) was completed in July 2012, with a State Aid Public Consultation finalised in March 2013. BT was awarded the contract in July 2013.

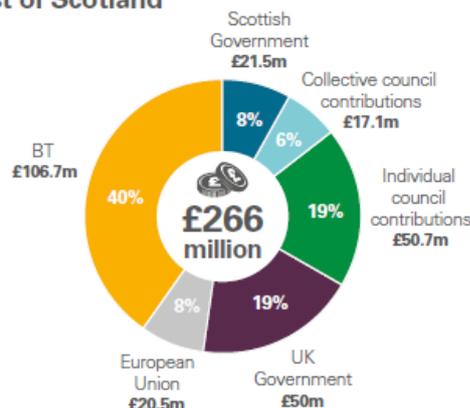The Rest of Scotland project is valued at £264 million with:

- £157 million from public sources (Scottish Government, European regional development fund, DCMS, and all 27 local authorities that form part of the rest of Scotland project area – the European funding would be used to specifically benefit small to medium size enterprises)
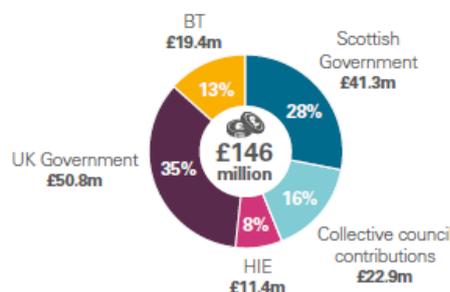
- £106.7 million from BT.

FUNDING

In its 2015 progress report on Superfast broadband for Scotland, Audit Scotland provided the following breakdown of the sources for funding the DSSB programme:

The Scottish public sector is contributing £165 million over a five-year build period towards total contract costs of about £412 million.

Rest of Scotland

Scottish Government £21.5m — 8%
Collective council contributions £17.1m — 6%
Individual council contributions £50.7m — 19%
UK Government £50m — 19%
European Union £20.5m — 8%
BT £106.7m — 40%

£266 million

Highlands and islands

BT £19.4m — 13%
Scottish Government £41.3m — 28%
Collective council contributions £22.9m — 16%
HIE £11.4m — 8%
UK Government £50.8m — 35%

£146 million

Note: Figures include a £16 million innovation fund and £2.2 million allocated for 'demand stimulation' work to encourage people to make use of broadband in the rest of Scotland contract.

The Scottish Government has not formally apportioned the collective council contributions and its own funding across the two projects.

Source: Scottish Government and Highland and Islands Enterprise

PROGRESS

Ofcom's latest annual Infrastructure report, the Connected Nations Report 2015, was published in December 2015. Its section on fixed broadband services included tables on coverage of superfast broadband: in the UK as a whole and in the individual countries.

Although, as shown in Figure one below, coverage of superfast broadband has improved, with coverage in Scotland rising from 61% in 2014 to 73% in 2015, the report also points out that many consumers and businesses have not seen improvements:

"Around 2.4 million, or 8% of premises in the UK are connected by lines that are unable to receive broadband speeds above 10Mbit/s.

Many of these premises are in rural areas, where about 1.5 million, or 48% of, premises are unable to receive speeds above 10Mbit/s. While coverage of broadband in rural areas and the nations has improved, it still lags behind the UK as a whole."

Figure 1: Coverage of superfast services has improved
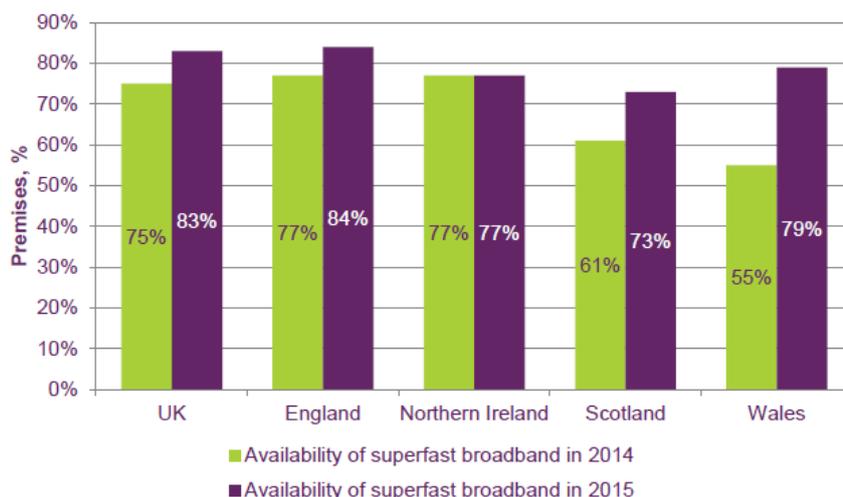
The report also pointed out that:

"only 68% of SMEs [small medium enterprises] have access to superfast broadband in the UK, compared to 85% of all premises; this leaves over 400,000 SMEs without access to superfast broadband. Similarly, almost a half of SMEs (around 130,000) in certain business areas are unable to receive speeds above 10Mbit/s."

On 23 March 2016, in response to an oral parliamentary question, John Swinney, the then Deputy First Minister and Cabinet Secretary for Finance, Constitution and Economy, confirmed that:

"The digital Scotland superfast broadband programme has delivered fibre broadband to more than 530,000 homes and businesses in Scotland and has met the initial coverage target of 85 per cent six months early. The programme remains on track to meet the 95 per cent target by the end of 2017."

This tallied with the information in the Scottish Government's Infrastructure Investment Plan Progress Report 2015 published in March 2016.

Mr Swinney went on to state that:

"The Scottish Government has given the commitment that, if we are returned to office in May, we will deliver 100 per cent superfast broadband coverage in the course of the next parliamentary session. Digital connectivity is essential to the ability of individuals and businesses to participate in our 21st century society. […] we will work during the next session to ensure that every citizen in Scotland has access to the level of connectivity that is appropriate for 21st century Scotland."

According to the independent website thinkbroadband, as at 15 June 2016, 84.6% of Scotland has a broadband infrastructure which can provide access to speed up to 30Mbps. However, access to superfast speeds can differ considerably, especially in essentially rural areas of Scotland, for example, the website showed the varying coverage in the following local authority areas:

- Dumfries and Galloway 69.5%

- Na h-Eileanan an Iar 32.4%

- Moray 75.7%

- Orkney Islands 43.6%

- Perth and Kinross 66.4%

- Scottish Borders 67.4%

- Shetland Islands 44.4%

The DSSB website has a Where & When webpage which provides a search, by postcode or telephone number, which shows the consumer which exchange area they are in, the superfast broadband delivery timescales for their exchange area and whether fibre is already available on their line.

SCOTTISH PARLIAMENT SCRUTINY

In the previous session of the Scottish Parliament, two Committees, the Infrastructure and Capital Investment Committee and the Public Audit Committee, examined the rollout of the broadband infrastructure.

Infrastructure and Capital Investment Committee

In Session 4, the Infrastructure and Capital Investment (ICI) Committee's remit included:

- assessing the coverage, availability and uptake of broadband across Scotland

- considering the ways in which different local areas are working to promote access to broadband in Scotland and how good practice might be shared

- considering what work is required by the Scottish Government, infrastructure providers and others in order to expand Scotland's digital infrastructure.

In 2012, the Committee carried out an inquiry on broadband, publishing its report, Broadband Infrastructure in Scotland, on 26 March 2012.

The Committee's main findings included that:

- public investment should only be made where it is clear there is no potential for the market to deliver

- the Scottish Government's broadband targets for 2020 must be more ambitious in order to ensure that rural areas in Scotland are not left further behind, and need to offer greater clarity to local communities and businesses about the level of broadband service that they can expect for their areas in the future

- aggregation of services to make them more commercially attractive should be balanced with the need to maintain flexibility to address local requirements

- the chosen infrastructure solutions must be future-proofed, and although any procurement specification should be technology-neutral, it must emphasise the need for a mixed-technology approach for Scotland.

The Committee continued to monitor the progress of broadband roll-out projects taking evidence from the:

- Cabinet Secretary for Infrastructure, Investment and Cities at its meeting on 12 June 2013. The Cabinet Secretary updated the Committee on the progress of the Step Change project, and the challenges in the provision of high speed broadband to remote and rural areas of Scotland

- Cabinet Secretary for Infrastructure, Investment and Cities at its meeting on 18 June 2014, who updated the Committee on the progress of the project, the challenges in the provision of high speed broadband to remote and rural areas of Scotland, digital participation and the development of digital skills

- Deputy First Minister (DFM) at its meeting on 9 September 2015. As well as hearing about the progress being made on the broadband infrastructure targets, the Committee also questioned the DFM on digital participation rates.

In its legacy paper, the Committee recommended that its successor committee continue to closely monitor developments in this area.

Public Audit Committee

Audit Scotland, the statutory body which examines how public money is spent in Scotland, published a progress report on Superfast broadband for Scotland in February 2015. The report made five recommendations for the Scottish Government and HIE, including that they should:

- develop clear plans, by June 2015, for the planned investment of a further £42 million in superfast broadband, announced by the UK and Scottish Government in February 2014. These plans should strike an appropriate balance between extending coverage in areas

where there is no access to superfast broadband, and increasing speeds in premises where access is already provided. These plans should:

- o set clear priorities and a timetable for further investment in superfast broadband

- o include an assessment of how the existing investment can best be used to help contribute towards meeting the EU aspiration of 50 per cent uptake of ultrafast broadband (speeds faster than 100 Mb/s) by households in Europe

- continue to develop their performance measurement frameworks, by including measures that address speeds delivered, the unit cost to provide access to superfast broadband to each premise and levels of take-up, as well as measures that allow benchmarking with other countries' implementation of superfast broadband. Both bodies should report publicly on these measures each year.

On 11 March 2015, the Session 4 Public Audit Committee took evidence from Audit Scotland on the findings in the report. The Committee agreed to write to the Cabinet Secretary for Infrastructure, Investment and Cities and the ICI Committee on issues raised in discussion.

On 18 May 2015, Mary Scanlon MSP and Tavish Scott MSP held a fact finding visit to Craignure to meet with representatives from GigaPlus Argyll, local businesses, Highlands and Islands Enterprise and Community Broadband Scotland to discuss the broadband issues faced by remote and rural communities.

At its meeting on 23 September 2015, the Committee considered a written submission from the Deputy First Minister on the report. The Committee agreed to note the submission and to refer the report and evidence to the ICI Committee.

The next report on broadband infrastructure produced by Audit Scotland is expected to be issued in summer 2016.

FINAL 5%

In its January 2016 report on the Creative industries in Scotland, the House of Commons Scotland Affairs Committee wrote that:

> "Access to broadband is an important issue far beyond its impact on the creative industries, but we have heard that poor internet access is a particular barrier to creative enterprises in rural Scotland. It is essential the UK and Scottish governments work together to ensure the successful rollout of broadband across Scotland."

STATE AID

State Aid refers to forms of assistance from a public body, or publicly-funded body, given to selected undertakings (any entity which puts goods or services on the given market), which has the potential to distort competition and affect trade between member states of the European Union.

Under the European Commission's State Aid rules, public sector intervention in broadband infrastructure investments is limited to those areas where there is no current or planned (within the next 3 years) commercial deployments, to avoid distorting what might otherwise be/become a competitive market.

The European Commission monitors and controls State Aid in the EU. Member States are obliged to notify and seek approval from the Commission before granting State Aid. This gives

the Commission the opportunity to approve or refuse to approve the proposed measure. In November 2012, the European Commission approved the UK Government's £530 million rural broadband scheme.

On 20 February 2015, the Scottish Government published a State Aid Public Consultation on Broadband Infrastructure Provision in Scotland. The paper set out the Scottish Government and HIE's interpretation of the potential Intervention areas for superfast and basic broadband. The purpose was to enable all interested stakeholders to comment on the Intervention Area proposals and in particular, to provide telecommunication providers with the opportunity to review the representation of their commercial plans provided through the OMR (Open Market Review) and ensure they were correct.

The consultation lasted until 20 March 2015. After carrying out an analysis of the responses received, the Scottish Government planned to submit a final Intervention Area proposal to the BDUK National Competence Centre for state aid clearance.

On 10 May 2016, the Scottish Government issued another consultation on its DSSB's plans to further extend coverage of Superfast Broadband across the rest of Scotland. At the same time, HIE issued a similar consultation for the Highlands and Islands project. The consultations run until 10 June 2016.

The purpose of these consultations is to inform decisions on state aid intervention areas by confirming the areas which do not have NGA broadband infrastructure delivering at least 30Mbps, or where there are no plans to provide such infrastructure over the next three years. Such areas are known as white NGA areas.

In her statement to the new Parliament, on 25 May 2016, the First Minister stated that:

> We will, of course, also continue to invest in the infrastructure that businesses need. Top of the list will be superfast broadband. In 2012, just 42 per cent of premises across Scotland had access to fibre broadband; now, the figure is above 85 per cent, but that is not good enough. By 2021, we intend to reach 100 per cent of premises across the country. That investment will improve productivity across Scotland and transform the connectivity of businesses in remote and rural areas. We will set out our detailed timetable for achieving that over the next few months.

COMMUNITY BROADBAND SCOTLAND

Community Broadband Scotland (CBS) is the £7.5 million Scottish Government project led by Highlands and Islands Enterprise. It aims to inspire, support, and empower remote and rural communities across Scotland to establish community broadband networks, delivering improved connectivity which should transform the way communities live, work and learn. Its focus is to support areas in the hardest to reach broadband areas which are currently unlikely to benefit from the DSSB projects.

CBS is a partnership between the Scottish Government, Scottish Enterprise, Highlands and Islands Enterprise, COSLA, Scottish Local Authorities Economic Development Group, Carnegie UK Trust, Cairngorms National Park Authority and Loch Lomond and Trossachs National Park Authority.

CBS has two products:

- an aggregated approach to deliver Next Generation Broadband services with more commercial involvement and subject to specific state aid approval processes which will

be delivered under the SRDP (Scottish Rural Development Programme) Broadband Scheme.

- a funding mechanism for smaller projects for communities which are capable of and willing to deliver the solution themselves.

Scottish Rural Development Programme

The Scottish Rural Development Programme broadband grant scheme was launched by the Scottish Government in August 2015. The £9 million scheme, which runs from 2014-2020, is being delivered by CBS on behalf of the Scottish Government Rural Payments and Inspections Division (RPID).

The fund will be used to support community-led broadband projects similar to GigaPlus Argyll – which was seen as a ground-breaking scheme where groups of hard-to-reach communities got together to procure super-fast broadband services from commercial providers.

Pioneer Projects

Community Broadband Scotland's partners initially identified six community projects as pioneers. They included:

- **Ewes Valley** (Dumfries and Galloway) - A small rural community not currently able to receive a standard broadband service due to distance from the serving BT exchange.

- **Corgarff and Glenbuchat** (Aberdeenshire) - Small dispersed settlements within glens at the edge of the Cairngorms. Area remote from serving BT exchanges with many residents having to rely on a satellite broadband provision.

These projects represented a diverse range of situations and challenges. Each community received targeted support from CBS; and the lessons learnt from these projects has influenced the development of the support CBS offers.

FUTURE DEVELOPMENTS

There are a number of developments in the area of broadband provision which may impact on the future-proofing requirements of the broadband infrastructure in Scotland.

Ultrafast broadband

In May 2016, BT outlined plans to invest £6bn over the next three years in faster broadband and mobile services.

BT had started trials of its 330Mbps G.fast ultrafast broadband in August 2015 in three areas in England and Wales. The trial was expected to run for 6-9 months, allowing Openreach, and its eight communications provider trialists, as well as BT's R&D division, to assess the technical performance of the technology across a large footprint.

BT plans to deliver new, ultrafast services of 300-500Mbps to reach 10m UK homes and smaller businesses by the end of 2020, and most UK premises within a decade. A 1Gbps service will be provided for those that want even faster speeds.

In April 2016, Virgin Media announced its 'Project Lightning' expansion plans, expected to connect 17 million premises to the network by 2019. The aim of the £3bn investment is to bring

ultrafast connectivity to more parts of the UK and to future-proof the country's network infrastructure.

Virgin Media described this as the single largest investment in the UK's broadband infrastructure in more than a decade. It is expected to offer the fastest widely-available speeds of up to 200Mbps for consumers and 300Mbps for businesses.

Gigabit Cities

CityFibre is the national builder of Gigabit Cities, and is described as the UK's largest alternative provider of wholesale fibre network infrastructure. It has major metro duct and fibre footprints in 37 cities across the UK, including Aberdeen, Edinburgh and Glasgow.

MOBILE INFRASTRUCTURE (CONNECTIVITY)

As Ofcom's latest Communication Market Report: Scotland, published in August 2015, indicated that Scotland is now a "smartphone society", with smartphones overtaking laptops as the most popular device for getting online. This change has implications for 4G mobile coverage requirements in Scotland.

The UK Government has identified two issues with mobile coverage in the UK:

- not-spots– areas where there is currently no coverage available

- partial not-spots – areas which have coverage from some but not all of the four mobile networks.

Ofcom's Connected Nations Report 2015 provided data on mobile coverage in Figure 19 below:

Figure 19: Summary of outdoor mobile coverage from all operators in the UK and the nations

Technology (coverage threshold)	Percentage of premises covered				
	Scotland	England	Wales	NI	Whole of UK
2G (-81dBm)	90%	94%	84%	83%	93%
3G (-100dBm)	79%	91%	67%	73%	88%
4G (-115dBm)	37%	50%	20%	0%	46%

Source: Ofcom analysis of operator data

Ofcom reported that:

> "Mobile coverage is highest where the population density is high, such as in towns and cities. In rural areas, where population density is lower, mobile coverage also tends to be lower. For example, outdoor coverage of voice services from all operators in the UK's rural areas is 72% of premises, compared to 99% in urban areas. Indoor coverage in rural areas is lower, at 31%, as walls, buildings and doors block mobile signals as they pass through."

In [December 2014](#), the Mobile Network Operators ([EE](#), [Vodafone](#), [Three UK](#) and [O2](#)) agreed, with the UK Government, to a £5bn investment that should deliver basic mobile (voice and text) UK landmass coverage of 90% and 85% coverage for mobile broadband/data by 2017.

The Ofcom [Mobile coverage checker](#), launched in April 2016, uses signal level predictions provided by the four UK mobile network operators, namely:

- Vodaphone

- O2

- EE

- Three.

5G

The UK Government has [asked](#) the National Infrastructure Commission, chaired by Lord Adonis, to consider what the UK needs to do to become a world leader in 5G deployment.

The Commission will carry out independent and unbiased assessments of the UK's long-term infrastructure needs and monitor the Government's and industry's progress in meeting those needs. The market is expected to deliver 5G but the UK Government will support R&D (research and development) and look at regulations, including the [Electronic Communication Code](#).

The Commission will periodically publish a National Infrastructure Assessment looking across all key sectors and geographies. It will identify the UK's long-term infrastructure requirements and prioritise the most important projects for further development. The assessment will give clear strategic direction to industry and Government and provide a firm basis for planning and investment.

On 16 May 2016, the Commission launched an 8 week [call for evidence](#) on the deployment of 5G telecommunications in the UK, which ends on 11 July 2016.

The Commission's assessment and recommendations, will be reported back to Government by the end of 2016, and will underpin the UK Government's 5G strategy, due to be announced in spring 2017.

ANNEXE 1: GLOSSARY

This glossary provides definitions for the terminology commonly used in digital connectivity. The source of definitions is Ofcom's [Future Broadband Glossary](#) (2008)

ADSL (Asymmetric Digital Subscriber Line) : A technology used for sending data quickly over a conventional copper telephone line. It is used in current internet services with download speeds up to 24Mbit/s.

Backhaul: The middle of the network, this is a high capacity line which links the core network with local exchanges. This is the infrastructure beyond the local exchange.

Broadband: An internet service which provides high speed access.

Ducts: Existing trenches and pipes which hold copper and fibre lines.

Duct Access: When the owners of ducts and trenches let other service providers pay to access them.

Exchange: A building which houses electronic equipment that connects telephone calls. Backhaul links from a content provider are terminated here to connect access links to end users.

Fibre-to-the-cabinet (FTTC): An access network structure in which the optical fibre extends from the exchange to the cabinet. The street cabinet is usually located only a few hundred metres from the subscriber's premises. The remaining part of the access network from the cabinet to the customer is usually copper wire but could use another technology, such as wireless.

Fibre-to-the-home (FTTH): An access network structure in which the optical fibre runs from the local exchange to the end user's living or office space.

Narrowband: A service which provides internet data speeds up to 128 kilobits per second otherwise known as dial up. This is most commonly used for making phone calls over a copper wire.

Next Generation Access (NGA): New or upgraded access networks that will allow substantial improvements in broadband speeds and quality of service compared to today's services. Can be based on a number of technologies including cable, fixed wireless and mobile. Most often used to refer to networks using fibre optic technology.

Not-spots: Areas where there is not sufficient broadband access.

Street cabinet: A green box close to your house that connects your telephone line to the exchange.

Universal Service Obligation (USO): BT, along with KCom in Hull, has a duty to provide a basic telephone and narrowband (or dial up) internet service to everyone in the United Kingdom.

WiFi: Short range wireless technologies that allow an over-the-air connection between a wireless device and a base station, or between two wireless devices. WiFi has a range of over 30 metres indoors, and around a kilometre outside.

ANNEXE 2: 2016 ELECTION MANIFESTO COMMITMENTS

Party	Manifesto commitment
Scottish Conservatives	To connect rural Scotland, we need to prioritise and accelerate rural superfast broadband rollout. Reliable broadband access it vital for rural Scotland – for families, businesses and the third sector. The UK and Scottish Governments are today spending over £400 million in Scotland to improve connectivity to superfast broadband and to date, more than two million homes and businesses have been linked to the superfast network, including 220,000 premises in Scotland. But we need to go further. The introduction of a Universal Service Obligation for broadband by 2020 announced by our UK colleagues - and originally recommended by our Rural Commission - will mean a step change in broadband access in Scotland. In the meantime, expanding and reprofiling Community Broadband Scotland to support individuals, businesses and charities too, would go a long way to supporting some of the most hard to reach areas.
Scottish Greens	High-speed broadband access for all. Households and businesses throughout Scotland should have access to high-speed broadband and good telephone signal, so no part of the country is left behind. Scotland can become digital: Digital access. Applying for jobs, joining clubs or local events, finding out about social security, accessing digital healthcare or getting information on all aspects of life – access to the internet is becoming vital. Greens will seek to ensure that digital access is available for all. High speed broadband. Vast areas of Scotland still do not have reliable access to broadband. Households and businesses throughout Scotland should have the opportunity to connect for social, health and economic reasons. We will continue to support the Scottish Government in its endeavour to have fibre broadband reach 95% of Scotland by March 2018 and will push for faster action on

	the remaining 5% – the most remote and hard-to-reach places.

Improving IT skills. The digital technology industry generates £5 billion per year for our economy. However, many firms have expressed difficulty in finding people with the right skills. Not only that, but having the appropriate skills would allow more people to participate in digital life. Green MSPs would call for transferable digital skills to be taught in schools and for businesses to better engage with the education sector on the issue. |
| Scottish Labour | The internet and new technology are making business more efficient, providing access to new markets and improving collaboration. But with connection rates at 75%, Scotland lags behind the rest of the UK.

We will make the provision of superfast broadband, in islands and rural areas as well as towns and cities, a national infrastructure priority. We will invest £500 million over the lifetime of the next Parliament.

We will establish ultrafast broadband zones for digital and creative industries with speeds of 1GB/s. As a result, no business in Scotland will go without access to a 10MB/s broadband connection.

We will introduce a Digital Services Bill, making us a world leader in e-government, simplifying the relationship between government and business and boosting Scottish IT businesses. In a digital era, Scots have high standards for the service they receive. Dealing with the government should be no exception. A Labour Government will ensure higher standards and a better client experience for Scots and Scottish business when they interact with government. We will also guarantee quality and timeliness in the delivery of services.

We will invest in creating and supporting connectivity hubs in our major cities, where the high-tech companies of the future can grow and thrive with ultrafast broadband and strong links to our universities and research.

To make sure the benefits of the connectivity revolution are spread fairly we will create an innovation fund that will improve mobile |

	coverage, and we will invest £50 million to tackle the gap in digital skills in the workplace and in our communities
Scottish Liberal Democrats	Extend super-fast broadband and mobile phone coverage to all of Scotland Create a Fit For The Future Investment Fund for […] broadband For the rural economy and businesses two of the biggest things we can do are to restore competence and timeliness to agricultural payment schemes for farmers and crofters, and to extend super-fast broadband and modern mobile phone coverage to business in all parts of Scotland. We will do both. For the rural economy we will also: • Complete coverage of super-fast broadband and mobile phone across Scotland, using additional support from our Fit For The Future Investment Fund for innovative ways to do this, for example using unused TV channels where appropriate • Campaign for the principle of a universal service obligation to be extended to energy prices, broadband, postal charges and telecoms to prevent the price discrimination against remote communities More rapid expansion of super-fast broadband and modern mobile phone coverage into remote areas by trebling the community broadband fund
Scottish National Party	£400 million to deliver superfast broadband to 95 per cent of properties across Scotland by the end of 2017. And, we'll reach 100 per cent by 2021. We will deliver 100 per cent superfast broadband coverage for Scotland by the end of the next Parliament. Digital connectivity is critical to opening up economic opportunity in every part of Scotland. We will ensure that 100 per cent of premises across Scotland have access to super-fast broadband by 2021. We will also focus our business development

	interventions to effectively capitalise on the benefits of digital connectivity – crucial to transforming Scotland's productivity and overcoming the challenges of geography that affect businesses.
	We will refresh our internet safety action plan, linking it to our strategy on digital participation, so that appropriate frameworks of training, support and information are in place for professionals and families, including children and young people
	Our digital learning and teaching strategy will give all children appropriate time and activity to develop digital skills.

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