

Digital Connectivity Infrastructure Strategy Refresh and Connecting Cambridgeshire Programme

To: Environment & Green Infrastructure Committee

Meeting Date: 20 January 2022

From: Steve Cox, Executive Director Place & Economy

Electoral division(s): All

Key decision: No

Outcome: The Committee is asked to consider progress to date and a revised Digital Connectivity Infrastructure Strategy 2021-2025 for Cambridgeshire and Peterborough which sets out the plans and objectives to ensure that the area retains leading edge digital connectivity infrastructure that will:

- Support a strong local economy
- Enable Cambridgeshire communities to thrive
- Facilitate efficient and effective public service delivery
- Contribute to the Council's strategic objectives to combat climate change impacts and support climate change mitigation.

Recommendation: The Committee is recommended to:

- a) Note and endorse the Cambridgeshire and Peterborough Digital Connectivity Infrastructure Strategy 2021-2025 which was recently approved by the Cambridgeshire and Peterborough Combined Authority's Housing and Communities Committee;
- b) Note the progress of the Superfast Broadband rollout;
- c) Note the progress of the Light Blue Fibre joint venture organisation with the University of Cambridge and Cambridgeshire County Council

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1. Background

- 1.1 Connecting Cambridgeshire was established as a multi-agency programme in 2011 by Cambridgeshire County Council to improve Superfast Broadband (24mbps+) coverage for Cambridgeshire and Peterborough which at that time was running significantly behind the national average for the country at less than 60%.
- 1.2 The remit of the joint programme, funded by both Cambridgeshire County Council (CCC) and Peterborough City Council (PCC) was extended to incorporate all aspects of digital infrastructure, including mobile, public access Wi-Fi and “IoT” (Internet of Things)/Smart technology as well as broadband.
- 1.3 When the City Deal for Greater Cambridge was created as the Greater Cambridge Partnership (GCP) in 2015 a “Smart Cities” programme, funded and governed by the GCP was incorporated into the Connecting Cambridgeshire Programme
- 1.4 With the establishment of the Cambridgeshire and Peterborough Combined Authority (CPCA) in 2017 the Connecting Cambridgeshire Programme was further extended with funding and governance oversight from the CPCA. A digital connectivity infrastructure strategy for Cambridgeshire and Peterborough for 2017-2021 was approved by the CPCA, to be delivered via the Connecting Cambridgeshire programme and supported by a partnership agreement between CCC and the CPCA.
- 1.5 The CPCA’s Housing and Communities Committee has recently approved an update to the Digital Connectivity Infrastructure Strategy for the period 2021-2025, which builds on previous work with updated targets and objectives.
- 1.6 Much of the current funding and governance in relation to the Connecting Cambridgeshire programme is delivered from Government, GCP or the CPCA. The two exceptions to this are the two Superfast Broadband (SFBB) contracts currently in place, for which the Council is the accountable body and operation of Light Blue Fibre, which is a joint venture organisation between the Council and the University of Cambridge to market fibre assets on a commercial basis.
- 1.7 This report includes a progress update on: the refreshed Cambridgeshire and Peterborough Digital Connectivity Infrastructure Strategy for 2021-25; the operation of the two SFBB contracts; the operation and current status of Light Blue Fibre.

2. Main Issues

- 2.1 Cambridgeshire and Peterborough Digital Connectivity Strategy 2021-25
 - 2.1.1 The full strategy is included at Appendix A, a summary of the key points is set out below.
 - 2.1.2 Digital connectivity is hugely important for meeting some of the key challenges of our age, from sustainable growth to climate change mitigation to the management of scarce resources including water and energy.

- 2.1.3 Reliance on connectivity accelerated in an unprecedented manner during the Covid pandemic and is still incredibly important as we move towards recovery, however at a time when access to healthcare, education and jobs has become increasingly reliant on digital connectivity it has also highlighted and exposed inequality of access.
- 2.1.4 Cambridgeshire and Peterborough is a hugely diverse area with a rich mix of cities, market towns and rural areas which presents both challenges and opportunities in achieving the leading edge digital infrastructure needed for businesses and communities to thrive.
- 2.1.5 The strategy proposes a set of challenging targets that reflect the ambitions and aspirations of the area alongside a multi-layered approach that is tailored to needs and priorities at a local level. Each area within the Cambridgeshire & Peterborough Combined Authority is unique with its own challenges and priorities, requiring a local approach to digital infrastructure planning.
- 2.1.6 Collaborative work with several of the Combined Authority's constituent Local Authorities is already underway to create local digital infrastructure plans, taking into account the geography, opportunities and needs in each locale. The 2021-2025 strategy will further develop this local approach, working with each of the District and City Councils to co-create a dashboard and digital infrastructure plan.
- 2.1.7 The strategy for the period 2021-2025 builds on the foundations of the existing programme, incorporating multiple workstreams, targeting the different aspects of digital connectivity from broadband, mobile, 'Smart' technology and public access Wifi to ensure that the Cambridgeshire & Peterborough Combined Authority area has the leading digital connectivity infrastructure required so that:
- All businesses have access to the leading-edge digital connectivity needed to help them succeed and to deliver sustainable growth.
 - Communities, particularly in rural areas, are digitally connected and able to access education, jobs, health, social care and other public services.
 - Digital connectivity supports home working and remote training alongside other agile working practises, which can contribute to reduced commuting, less traffic congestion and more flexible and more inclusive job opportunities.
 - 'Smart' technology, including 'Internet of Things' based connectivity helps to provide ready access to real-time transport information and environmental monitoring, leading to increased use of sustainable transport solutions, reducing private car usage and contributing to a reduction in carbon emissions and meeting climate change targets.
 - As a key part of the Oxford-Cambridge Arc, businesses, communities and public services in our area are able to harness digital connectivity and advanced technology to support sustainable growth, good quality of life and a strong local economy with no communities left behind.

2.1.8 The strategy was approved by the CPCA's Housing and Community Committee in November 2021 and the CPCA board will consider the associated business plan and proposed budget allocation of £6.3m in January 2022.

2.2 Superfast Broadband

2.2.1 In 2011 CCC allocated up to £20m capital investment to the Connecting Cambridgeshire programme with £2.25m from PCC and initially £6.75m from Government.

2.2.2 In 2012, following a procurement exercise, CCC entered into a gap funded contract with BT/Openreach to improve the Superfast Broadband coverage across the area, with a target to achieve over 90% coverage by 2015. The contract included a "clawback" mechanism to repay profits over a certain threshold linked to service take-up into a joint investment pot which could then be used to further extend coverage. More information about the SFBB contract delivery is included in the Background section of the 2021-2025 Strategy at Appendix 1.

2.2.2 The 90% target was met and subsequently incrementally extended to 97% and then over 99% with additional phases of SFBB delivery. As part of the extended target a second gap funded Superfast Broadband (SFBB) contract was agreed with BT/Openreach via a further procurement process. Phases 1, 2 and 3 (targeting >97% coverage) of the SFBB contract have been delivered under Contract 1 and Phase 4 (targeting >99% coverage) is still in delivery as part of Contract 2.

2.2.4 The Contract 1 closedown process with BT/Openreach is currently underway, with VFM and state subsidy oversight provided by the BDUK team at the Department for Digital, Culture, Media and Sport (DCMS). There is a contractual underspend of just over £1m, for which the CCC portion is £900k. This reduces the Council's initial £20m capital allocation to £19.1m.

2.2.5 Superfast Broadband coverage across Cambridgeshire and Peterborough currently stands at 98.25% and it is anticipated that the target for over 99% coverage will be achieved at the conclusion of the Contract 2 Phase 4 SFBB rollout which is expected to complete by mid-2022.

2.2.6 All current SFBB rollout is being delivered as full fibre to the premise (FTTP) infrastructure which is future proofed and will directly contribute to new challenging target to achieve over 85% Gb capable infrastructure coverage by 2025 (Further details in Appendix 1 2021-2025 Strategy Broadband section).

2.2.7 The SFBB gap funded contract includes a contractual mechanism for a joint investment (clawback) pot which ensures that if take-up is high and results in higher profits, the provider (BT/Openreach) pay any "excess" profits into the investment pot, which in turn can be used to provide further investment in broadband.

Although the two contracts have not yet been completed, given the evidence of very high take-up since the rollout began, it was clear from an early stage that a substantial pot would build up during the life of the contract. To this end BT/Openreach forward funded the

£5.3m Phase 3 of the contract by borrowing against the investment pot at their risk, and the CCC's Environment and Economy Committee approved forward funding up to £3.6m prudential borrowing for Phase 4 in 2017 (supplemented by up to £5m DEFRA - Department For Environment, Food and Rural Affairs - and EU funding). Projections to date indicate that costs relating to both Phase 3 and Phase 4 delivery will be comfortably met by joint investment pot.

Going forward to 2030 it is anticipated that future requirements for public funding to mitigate broadband market failure will be met by the Government's Project Gigabit Programme, for which Cambridgeshire and Peterborough is one of the pilot areas (further details in Appendix 1 Strategy 2021-2025 Broadband section), and therefore further recourse to the investment pot is not anticipated.

The SFBB Contract 1 joint investment pot will mature and become payable in 2023/24, with the total figure calculated in late 2023, at which point the remaining pot will be divided amongst Government (HMT), PCC and CCC according to the original investment ratios.

2.3 Light Blue Fibre

2.3.1 Following on from the Councils policy decision in 2017 to investigate options to deploy fibre ducting in all Council commissioned infrastructure schemes (a policy which was also adopted by the GCP and CPCA) and success in bidding for Government funding to develop Council assets under the Local Full Fibre Networks Programme (LFFN), a commercial venture was established to market both Council and University owned fibre assets.

2.3.2 *Light Blue Fibre*, is a joint venture company with the University of Cambridge, established following approval by the Council's Commercial and Investment Committee on 26th April 2019, to develop and market fibre assets on a commercial basis. The aims behind setting up the venture were to further the Councils objectives to increase the fibre footprint across the County and to ensure the enterprise was commercially viable.

2.3.3 Following approval to proceed, the company setup was formally completed on the 2nd October 2019, including agreement of:

- Articles of Association
- Joint Venture Shareholders Agreement
- Licence Agreement (Cambridgeshire County Council to Light Blue Fibre Ltd)
- Licence Agreement (University of Cambridge to Light Blue Fibre Ltd)
- Consultancy Agreement

2.3.4 The company was created with a 50/50 control basis and with equal investment of £20k per annum by both shareholders over the first two years.

2.3.5 The Covid-19 pandemic created a difficult environment for the establishment of a new commercial venture, however overall progress to date has been good with income and expenditure in line with the original projections. The confidential annex (Appendix B) which contains commercially sensitive information, also details delivery against the proposed plan as detailed in the original business case, from April 2020 to date.

- 2.3.6 It is proposed that future updates will be provided to Committee in June or July (subject to Committee dates) on an annual basis following on from Light Blue Fibre's financial year end.

3. Alignment with corporate priorities

- 3.1 Communities at the heart of everything we do
The report above sets out the implications for this priority in Sections 2.1.2-2.1.17 above
- 3.2 A good quality of life for everyone
The report above sets out the implications for this priority in Sections 2.1.2-2.1.17 above
- 3.3 Helping our children learn, develop and live life to the full
The report above sets out the implications for this priority in Sections 2.1.2-2.1.17 above
- 3.4 Cambridgeshire: a well-connected, safe, clean, green environment
The report above sets out the implications for this priority in Sections 2.1.2-2.1.17 above
- 3.5 Protecting and caring for those who need us
The report above sets out the implications for this priority in Sections 2.1.2-2.1.17 above

4. Source documents

- 4.1 Source documents

None

Appendix 1 **Cambridgeshire and Peterborough Digital Connectivity
Strategy 2021-2025**

Cambridgeshire and Peterborough Digital Connectivity Strategy 2021-2025

In collaboration with



Foreword



Dr Nik Johnson, Mayor of Cambridgeshire & Peterborough

Digital connectivity is hugely important for meeting some of the key challenges of our age -from sustainable growth to climate change mitigation and the management of scarce resources including water and energy.

I want Cambridgeshire and Peterborough to have a future-facing digital connectivity infrastructure that reflects the ambitions and aspirations of our area, shaped by our core values of compassion, co-operation, community, and tackling climate change.

Reliance on connectivity accelerated in an unprecedented manner during the Covid pandemic and is still incredibly important as we move towards recovery. However, at a time when access to healthcare, education and jobs has become increasingly dependent on digital connectivity it has also highlighted inequality of access and the need for us to show compassion by supporting digital inclusion.

Cambridgeshire and Peterborough is a hugely diverse area with a rich mix of cities, market towns and rural areas, which presents both challenges and opportunities in achieving the leading edge digital infrastructure needed for businesses and communities to thrive. Therefore, it is right that we have a unified digital infrastructure strategy that takes a multi-layered, co-operative approach that is tailored to needs and priorities at a local level.

This updated digital infrastructure strategy builds on the past success of our collaborative work with local councils, government and commercial providers, and sets new challenging targets to help ensure that we remain at the leading edge and well positioned to take full advantage of current and emerging technology advances.

Whilst the delivery of digital connectivity infrastructure involves a complex combination of technology, civil engineering and investment, the overarching objectives of this strategy are about community; connecting people and places and supporting businesses to meet their full potential.

A handwritten signature in black ink, reading 'Dr Nik Johnson'.

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Introduction

The Cambridgeshire and Peterborough area has long had a reputation for the advanced use of technology but has not always had a digital connectivity infrastructure to match. In 2011 when 'Superfast Broadband' (24+mbps) coverage issues reached national prominence and became a pressing local concern the area lagged behind the national average with less than 60% coverage.

Over the last decade this deficit has been addressed with an ambitious strategy that has focused not only on broadband connectivity but on mobile coverage, 'Smart' technologies and the provision of public access Wifi.

This strategy for the period 2021-2025 builds on the foundations of the multi-agency Connecting Cambridgeshire Programme which is hosted by Cambridgeshire County Council and has been primarily led by the Cambridgeshire & Peterborough Combined Authority since 2017.

It incorporates multiple workstreams, targeting the different aspects of digital connectivity from broadband, mobile, 'Smart' technology and public access Wifi to ensure that the Cambridgeshire & Peterborough Combined Authority area has the leading digital connectivity infrastructure required to ensure that:

- All businesses have access to the leading-edge digital connectivity needed to help them succeed and to deliver sustainable growth.
- Communities, particularly in rural areas, are digitally connected and able to access education, jobs, health, social care and other public services.
- Digital connectivity supports home working and remote training alongside other agile working practises, which can contribute to reduced commuting, less traffic congestion and more flexible and more inclusive job opportunities.
- 'Smart' technology, including 'Internet of Things' based connectivity helps to provide ready access to real-time transport information and environmental monitoring, leading to increased use of sustainable transport solutions, reducing private car usage and contributing to a reduction in carbon emissions and meeting climate change targets.
- As a key part of the Oxford-Cambridge Arc, businesses, communities and public services in our area are able to harness digital connectivity and advanced technology to support sustainable growth, good quality of life and a strong local economy with no communities left behind.

Building on success

This strategy builds on Connecting Cambridgeshire's strength in delivering leading-edge digital connectivity, particularly the successful rollout of broadband and public access Wifi. The programme has established a national reputation for collaborative working at the forefront of innovation, which has attracted significant public and private sector funding to invest in future facing digital infrastructure.

Highlights include:

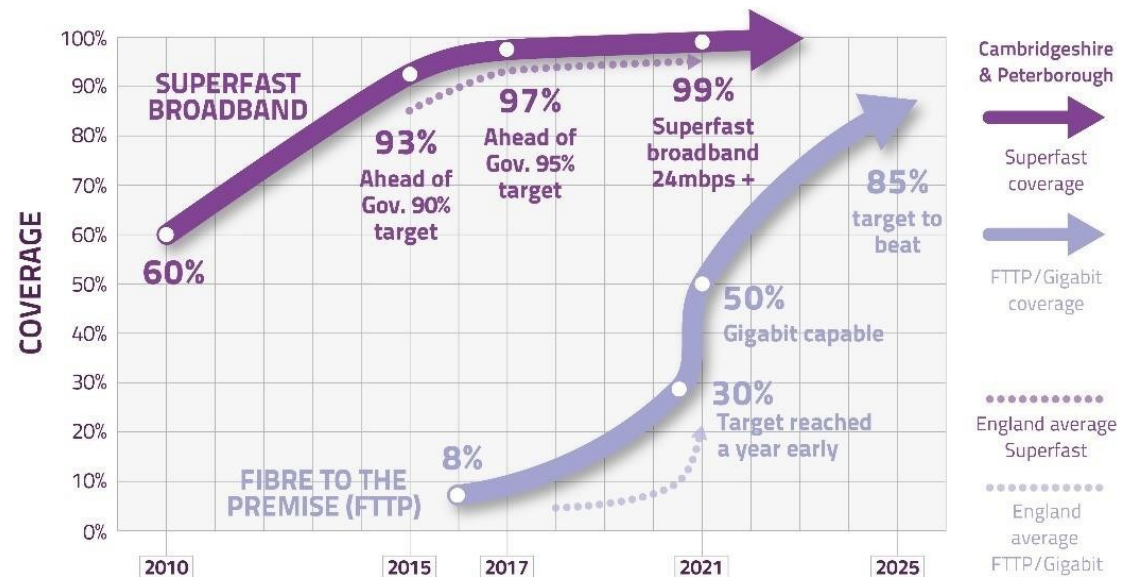
Broadband Rollout

Connecting Cambridgeshire's ambition to improve broadband connectivity for all has meant setting stretch targets to ensure that the programme not only delivers the infrastructure needed, but also keeps pace with evolving technology.

When the Superfast Broadband Programme was first launched in 2012, fewer than 60% of homes and businesses could access superfast broadband. The majority of premises can now upgrade to superfast broadband speeds of at least 24mbps and less than 1% of premises that are harder to reach get below 10mbps.

Both the superfast and the full fibre broadband coverage figures are above the national average and ahead of Government targets.

Full fibre coverage is increasing at pace through a mix of direct intervention and stimulating the market to provide commercial coverage. The full fibre target of 30% by 2022 was reached more than a year early and gigabit capable coverage has climbed rapidly to 50% in 2021.



Broadband champions

Convening a network of 150 broadband champions to work with local communities and business groups to explain and promote the benefits of superfast broadband helped boost take-up of the gap-funded superfast broadband infrastructure to record levels of over 70%.

Community benefit

Residents and businesses in the rural Huntingdonshire village of Spaldwick have experienced the benefits of upgrading from superfast to gigabit broadband speeds since July 2021, following a successful Community Fibre Partnership with Openreach using the Government's Gigabit Broadband Voucher scheme to fund the installation of Fibre to the Premises (FTTP) to the majority of premises.

Broadband Champion Mark Heath said: *"While Fibre-to-the-Cabinet (FTTC) improved speeds over basic broadband, some businesses and families in the village still needed greater speeds and reliability. Fibre-to-the-Premises (FTTP) has transformed the village by giving every single building the opportunity to reliably access ultrafast speeds up to 900 Mbps. Those who have already taken up FTTP are reporting improved reliability and much faster speeds at affordable prices. For example, my next door neighbour is delighted that he has doubled his speeds while saving £3 per month."*

Significant investment

The programme has been successful in attracting several competitive funding streams to improve the digital infrastructure for businesses, communities and public services including over £8m from Government's Rural Development for England (RDPE) and Local Full Fibre Networks (LFFN) programmes to supplement CPCA funding.

As well as supporting the full fibre rollout, this funding has enabled: 117 public sites including council buildings, schools and libraries to be upgraded with full fibre to support gigabit-capable services; the inclusion of fibre ducting in several Cambridgeshire transport infrastructure schemes to avoid costly retrospective installation; and the delivery of public access Wifi across Cambridgeshire market towns at affordable cost by leveraging existing infrastructure.

Free CambWifi

Public access Wifi, is available at over 200 public buildings, village halls and community sites across Cambridgeshire and Peterborough. The secure CambWifi network has recently been expanded to market town and city centres, working in partnership with District and City Councils, to support digital inclusion and Covid recovery initiatives.

Following the rollout of CambWifi across Huntingdonshire market towns, Councillor Ryan Fuller, Executive Leader of Huntingdonshire District Council said: *“Free wifi on our high streets offers opportunities for businesses, previously unable to operate digitally, to diversify their offering. Residents and visitors can now be seamlessly connected online from town to town, just one of the steps we are taking to promote the market town experience.”*

Business impact

Digital connectivity has proved vital for business survival and recovery throughout the Covid pandemic. The programme has supported businesses through grant schemes, information and advice enabling SMEs to make the most of digital technology to grow and compete in a rapidly changing market.

Digital Technology Grants

Over 156 SMEs across Cambridgeshire and Peterborough have benefitted from the allocation of more than £1m of Digital Technology Grants funded by the Cambridgeshire & Peterborough Combined Authority leveraging EU money to boost growth and recovery.

Butlers Auto Electrical Ltd used a digital technology grant to buy the latest diagnostic equipment for hybrid and electric vehicles together with a laptop to develop the business’s online presence.

David Butler, Director, said: *“We have been able to future proof the business... which is getting noticed for being able to deliver faster, more accurate results than most garage workshop diagnostic equipment.”*

Agile working and virtual training

World leading engineering group Marshalls of Cambridge is a traditional engineering company with a large, skilled workforce of over 1,600 people based in Cambridge. The experience of remote working using digital connectivity during the Covid pandemic has helped to develop their future business plans for agile working to support employees, from apprentices to skilled technicians and engineers.

Patrick Wood, Chief Technology Officer, said: *“Before the pandemic we had design engineers using workstations with powerful computer-aided software on-site. Covid 19 has meant we’ve had to adapt to remote working for over half of our employees, invest in our digital capacity and resilience, and modify our office environment to support ‘smart’ working. We’ve also had to be flexible for those who have to be on-site. Feedback has been very positive and it has improved the work/life balance for many of our employees.”*

Enabling Digital Delivery

Connecting Cambridgeshire’s proactive approach to ‘barrier busting’ has been instrumental in speeding up digital delivery for fixed and mobile infrastructure. This has been achieved by working closely with Government’s Barrier Busting Taskforce, telecoms providers, Street Works permitting teams, local authority planners and landowners to identify and resolve challenges ranging from complex wayleaves to planning applications for new mobile masts.

Since 2019, public sector organisations in Cambridgeshire and Peterborough have adopted new policies for the delivery of fibre trunking in all transport infrastructure schemes, which both minimises delivery costs and the disruption of retrofitting fibre infrastructure. As part of this initiative a joint venture, Light Blue Fibre, was set up between the University of Cambridge and Cambridgeshire County Council to develop and make both organisations’ existing extensive duct and fibre networks available on a commercial wholesale basis.

Dig once policy

As part of the 'dig once' policy, fibre ducting has been successfully installed during extensive re-working of a major road junction in Cambridge and will form part of the extensive Kings Dyke road scheme at Whittlesey providing a springboard for the development of fibre infrastructure.

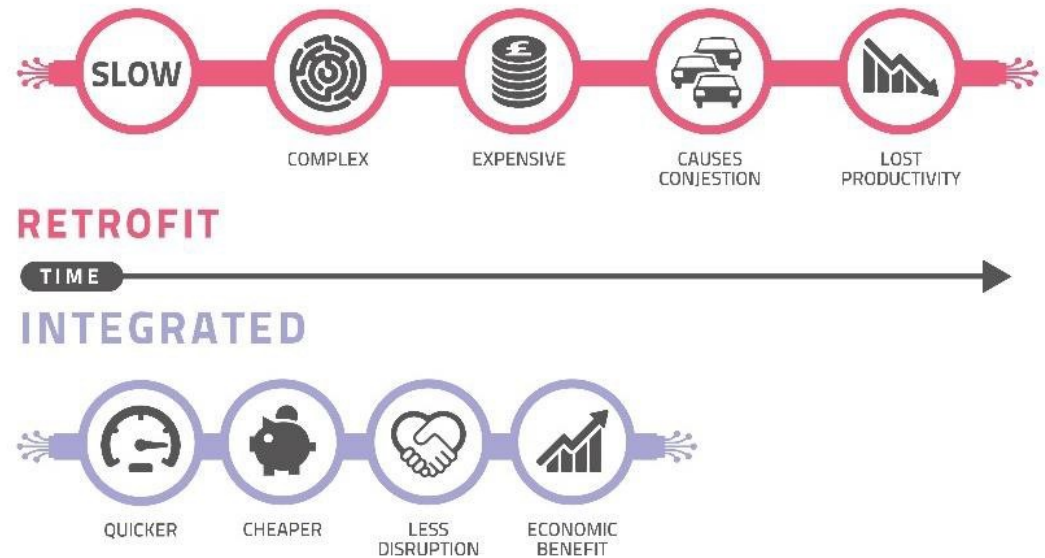


Image: Fibre ducting in transport infrastructure schemes

Mobile

Local surveys mapping mobile coverage have provided more accurate data which has been shared with mobile operators and Ofcom. This has made a significant contribution to understanding of the issues and has resulted in a number of solutions being found to improve coverage, particularly at key train stations, business parks and research campuses.

Smart Innovation

Improving mobile coverage

Following liaison with mobile operators, coverage has improved at Cambridge Station and work is underway to highlight gaps in coverage on main train lines because of the impact for the economy.

Optimising the range and capacity of mobile coverage at the Wellcome Genome Campus has supported staff and students undertaking internationally significant scientific research.

The Connecting Cambridgeshire Programme has developed and delivered the 'Smart Cambridge' programme in partnership with the University of Cambridge for the Greater Cambridge area as part of the Greater Cambridge Partnership Programme over the last five years. A new workstream, sponsored by the Combined Authority was established in 2020/21 to extend elements of the Smart programme to Cambridgeshire market towns.

New technologies are now supporting market towns in their post-Covid recovery plans. Digital totems, and smart panels are being installed to provide useful visitor and journey planning information. Sensor networks are being deployed to collate data on air quality, traffic movements and flooding.

Smart market towns

Digital totems are being installed in Huntingdon town centre to display useful information for residents and visitors about what's on, shopping, and travel options, which will also be accessible via mobile phones.

Pocket SmartPanels have been launched in 11 market towns - providing real time bus and train information via smartphones.

SmartPanels displaying location-specific travel information on large screens are also being deployed in a range of buildings to help people make sustainable transport choices.

Cambridgeshire and Peterborough Digital Connectivity Strategy 2021-2025

Digital connectivity has never been more important for businesses, communities and public services and the key objectives for the future strategy, which builds on the current programme, are set out below. However, each area within the Cambridgeshire & Peterborough Combined Authority is unique with its own challenges and priorities, requiring a local approach to digital infrastructure planning.

Collaborative work with several of the Combined Authority's constituent Local Authorities is already underway to create local digital infrastructure plans, taking into account the geography, opportunities and needs in each locale. The 2021-2025 strategy will further develop this local approach, working with each of the Combined Authority Councils to co-create a dashboard and digital infrastructure plan.



Broadband

Introduction

Although reliance on mobile data continues to increase at a rapid pace, this does not change the need for broadband (or ‘fixed’ connectivity), which provides connectivity directly as well as underpinning mobile and Wifi solutions. In fact, faster and higher capacity mobile connections have an even greater reliance on fibre connectivity to provide the ‘backhaul’ between mobile towers and other wireless infrastructure.

Increased home and remote working during the pandemic has significantly impacted the bandwidth requirements for domestic users and key providers saw an immediate 30% increase in data usage by their subscribers in March 2020. However this trend was clear even before the Covid-19 pandemic, as this graph shows.

Broadband Infrastructure

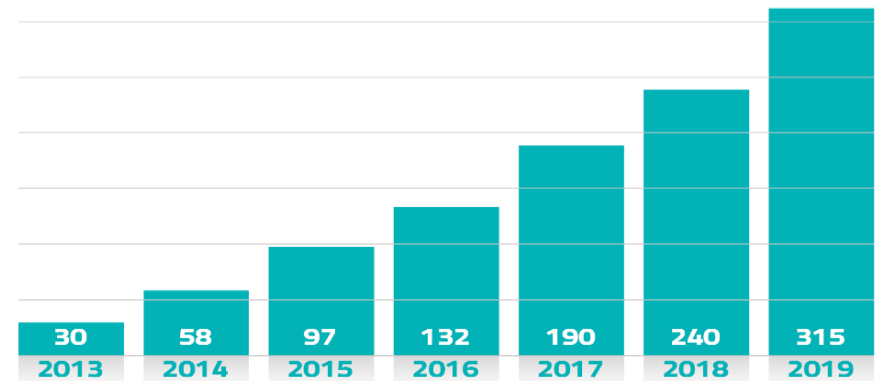
Target

Government has a target of 85% gigabit-capable coverage for the UK by 2025, however this is an average for the country and there is a danger that without a specific focus, as a predominantly rural area, we will no longer be at the leading edge and will not have the ubiquitous forward facing infrastructure we need for our area to prosper. Therefore it is important to set a target to meet 85% coverage by 2025 and we will be aiming to exceed this if possible.

This coverage target will be met by a combination of coverage provided by commercial operators, investing their own funds to rollout infrastructure in our area, and by coverage provided on a ‘gap funded’ basis, which uses public funding to supplement market investment for those areas which would otherwise not be commercially viable.

MONTHLY BROADBAND DATA USE IS INCREASING EVERY YEAR

Average fixed broadband use per month, gigabytes (GB)



Source: House of Commons Briefing Paper (April 2021): Gigabit-broadband in the UK: Government targets and policy.

Our area now has a very dynamic commercial environment with a number of active suppliers planning significant investments in gigabit-capable infrastructure, however the challenges involved in rolling out broadband infrastructure means that the operators need a supportive local environment in order to deliver successfully.

Challenges

The rollout of broadband infrastructure is increasingly complex and there are a number of factors which can make the process time consuming and expensive, increasing the potential for market failure.

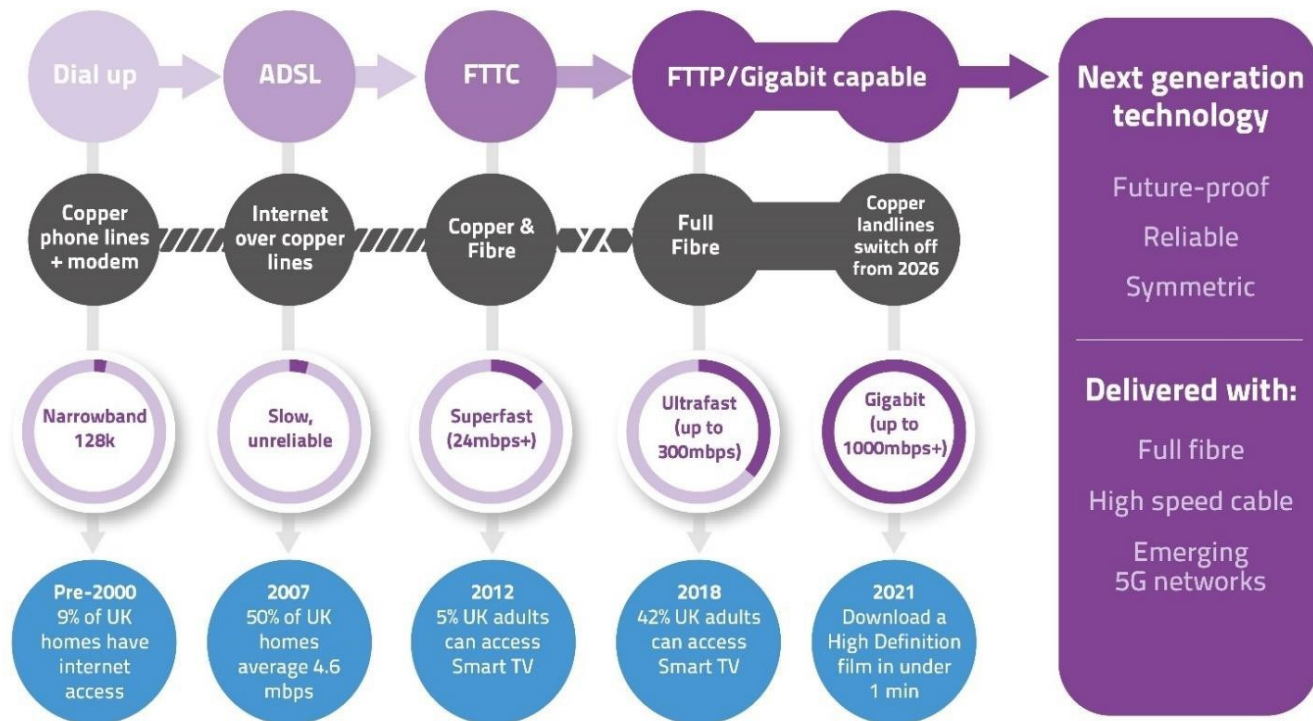
- The wide range of challenges includes: obtaining wayleaves and planning permissions from unresponsive landowners; securing Streetworks permits, including road closures; lack of accurate data in relation to the location and condition of some existing infrastructure; and high cost civils causing unpopular disruption to streets and pavements.

Solutions

Building on existing work, over the next four years we will target exceeding 85% gigabit-capable coverage by:

- Working with commercial providers and continuing to facilitate industry investment. The target to reach over 30% full fibre by 2022 has been met early and gigabit-capable coverage is currently just under 50%. Work with operators to support investment, remove barriers and facilitate coverage will help to ensure planned commercial investment is delivered.
- Working with government to deliver public funded solutions where commercial coverage is not viable – this includes being in the vanguard of the government's new 'Project Gigabit' programme which will attract ~£40m central government investment to the area. This also includes supporting/extending the national Gigabit Broadband Voucher scheme, which provides government funded vouchers, with a local top-up where needed, for homes and businesses that will not be covered by commercial or gap funded schemes.
- Integrating fibre ducting in transport and other infrastructure schemes where it is feasible to do so, including exploring innovative new solutions such as fibre in water infrastructure and making public sector ducting available to operators on a wholesale basis, via the Light Blue Fibre joint-venture with the County Council and the University of Cambridge.

The Evolution of Broadband



Copper switch off

The Public Switched Telephone Network (PSTN) will start to be phased out from 2026 and replaced with digital systems delivered over broadband connections. This will affect all public services, businesses and domestic premises, making people even more reliant on digital connectivity and will require signposting and awareness raising, particularly among those who do not use mobile phones, or cannot access the internet.

Digital Infrastructure resilience and risk

With increased reliance on digital technology comes greater risk of the impacts of system failures, cybersecurity risks and cascade failures in relation to extreme climate events. Telecommunications is one of 13 sectors overseen by Government as part of the Critical National Infrastructure (<https://www.ncsc.gov.uk/section/private-sector-cni/cni>). The Programme team will work with local and national stakeholders and suppliers to mitigate and protect against systems failures which might impact on the availability of telecommunications services.

Mobile – 4G and 5G

Introduction

Mobile services are now at the heart of how most people stay in touch and go online. 95% of adults have access to a mobile phone while Ofcom reported that in 2020, the vast majority (85%) of all adults used a smartphone to go online for a wide range of activities, particularly when face-to-face interactions were restricted due to the Covid pandemic.

People of all ages increasingly rely on mobile internet access for socialising, shopping, home working, banking, public service information, news, and entertainment. Mobile internet has also supported a move to digital payments, particularly where businesses are unable to access fixed-line broadband. Mobile connectivity is also an important underpinning technology to the Cambridgeshire & Peterborough Combined Authority's work to improve bus services. To be successful, Demand Responsive Transport and new travel hubs will need travellers to be able to book, track services and understand disruptions to give the best possible customer experience.

5G is the next generation of mobile communications and is required to underpin future connectivity including 'Internet of Things' (IoT) technology.

Challenges

There are several key challenges that are slowing the delivery of mobile infrastructure:

- **Planning** – Planning authorities have seen a marked increase in planning applications to upgrade masts for 4G and 5G from mobile operators and new legislation has revised guidance on permitted infrastructure. The provision of mobile masts continues to divide public opinion and mast upgrade planning submissions are problematic for both planning teams and the infrastructure providers supporting mobile operators. 65% of the 44 planning applications for new mobile phone masts across Cambridgeshire and Peterborough decided between April 2019 and August 2021 were refused - particularly taller structures of 18-20m required to upgrade 4G and deliver 5G coverage.
- **Access to Infrastructure** – street lighting columns are key structures for 'small cell' based deployment of mobile services. As in many other areas of the UK, streetlights in Cambridgeshire are managed under a Private Finance Initiative (PFI) contract with terms which do not allow for the deployment of telecoms equipment and limit opportunities for other uses. Working with the Government's newly established

Digital Connectivity Infrastructure Accelerator (DCIA), offers an opportunity to model a new approach, which includes trialling multi-use utility poles called 'Smart Poles' hosting a range of functions including electric vehicle charging, environmental sensors, small cells and Wifi as well as micro energy generation systems.

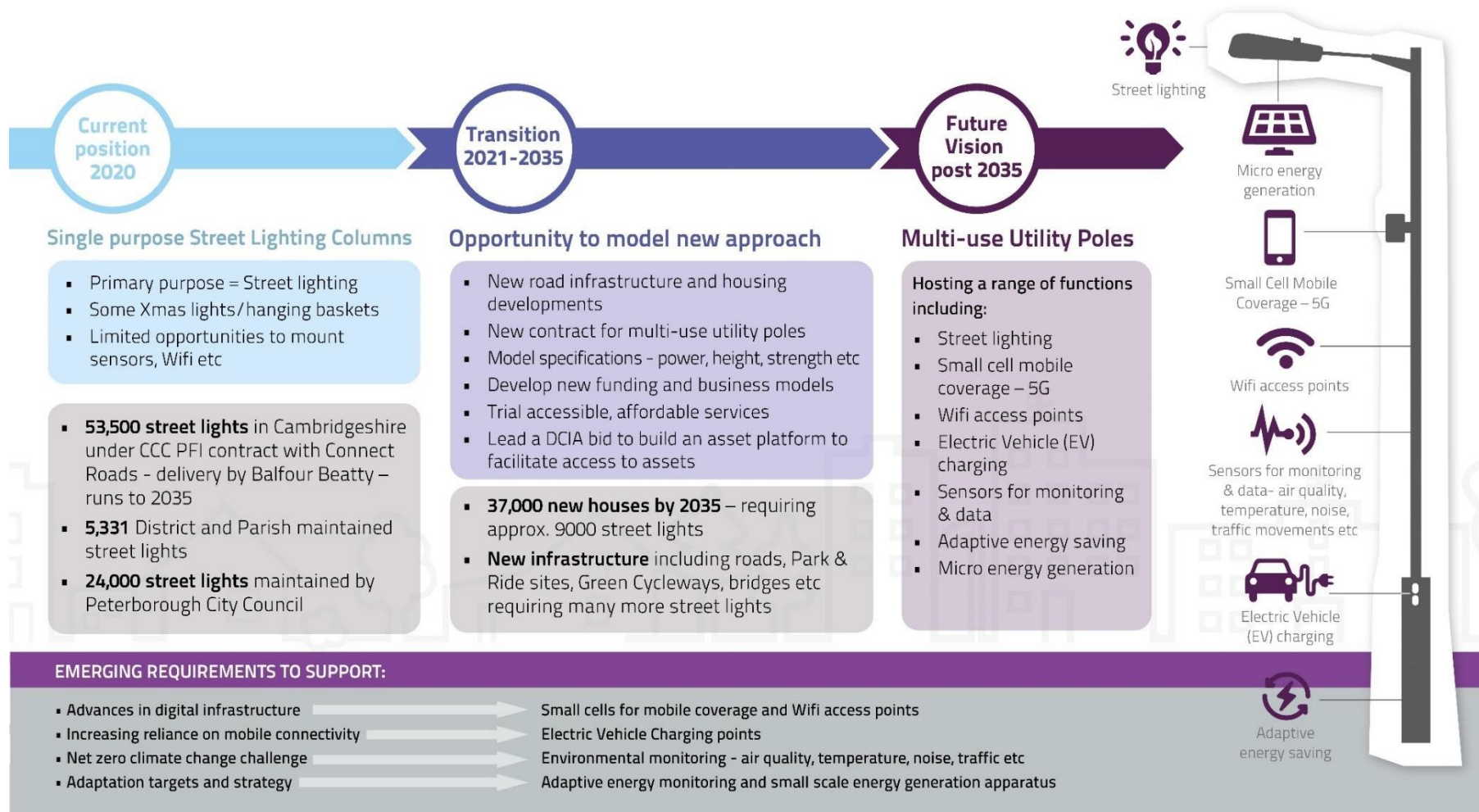


Image: Future Smart Streets

Solutions

The Connecting Cambridgeshire programme is working with planning authorities, mobile operators, leading businesses, and government to improve mobile coverage and capacity to:

- Continue to identify areas of poor mobile coverage affecting businesses and communities and work with stakeholders and operators to find solutions.
- Continue to facilitate mobile infrastructure delivery, supporting operators in deploying masts and equipment to improve connectivity by liaising with key stakeholders.
- Put in place specialist telecommunications planning resource to support operators deploying both 4G and 5G and target increasing successful applications related to new phone masts by 100% over the next two years. The planning resource will ensure that all mobile applications are determined within the statutory limit of 56 days.
- Be at the forefront of innovative use of local authority assets to support the rollout of mobile connectivity by submitting a bid to the Governments Digital Connectivity Accelerator Programme, which is developing online tools to digitalise and, where possible, automate the process of finding and securing rights-of-use of suitable locations.
- Explore opportunities for initial trial deployments of small cells and a longer-term strategy to support access to street furniture.
- Work with Government to develop standards for Smart Poles that will accelerate their development and deployment.
- Collaborate and learn from other leading areas, such as the West Midlands Combined Authority's WM5G unit, to explore barriers to mobile connectivity in greater depth and to trial and test solutions.

5G

Introduction

The Future Communications Challenge Group estimates that if the UK takes full advantage of the opportunities offered by 5G - the next generation of mobile services - the economic impact could be around £164bn (or £2,500 by head of population) by 2030. With a local economy well-placed to take advantage of technology advances, it is imperative that mobile operators are able to deploy 5G in Cambridgeshire and Peterborough as early as possible. However, given the high costs of deployment and the relatively low population density, this area would not naturally achieve ubiquitous coverage very soon. Reducing the barriers to deployment and encouraging rapid 5G infrastructure deployment is therefore extremely important to ensure that this area maintains its leading edge.

Mobile operators are at the beginning of the rollout of 5G, which is more than just faster mobile Internet. 5G will become a vital building block of the wider digital transformation that is taking place throughout society. With 5G peak speeds will reach and exceed 1Gbps with the ability to manage traffic more efficiently than with 4G and network capacity will increase. New techniques including 'network slicing', 'software defined networks' (SDN) and 'virtualisation' will mean that a single network can be 'sliced' into multiple virtual networks that can support different radio access. For example, a network may be partitioned to allow consumer access, secure access to emergency services and to allow Internet of Things (IoT) devices to connect, which can then be controlled via software, allowing the spectrum of radio frequencies to be used differently.

These advances mean that users will be able to enjoy higher and more consistent average speeds. Even in crowded scenarios or in areas with less-than-ideal coverage, 'real-time' applications will become possible and more devices will be able to connect to a 5G cell site - supporting the expected explosion in the number of devices as part of the IoT.

Consequently, 5G will unlock a number of technology developments including: the provision of high-speed broadband to properties using mobile networks particularly in areas where it is hard to deploy fibre; delivering telehealth care into people's homes using high definition video and Artificial Intelligence (AI); and Agritech technologies and mass-sensing of infrastructure, for improved industrial processes.

Agritech

Agricultural IoT devices will allow farmers to better measure crop health: using sensors to monitor moisture, fertilization and nutrition levels and report on current/predicted weather patterns to allow for improved crop management. This will mean agriculture can become more productive and more sustainable, with benefits such as a reduction in the amount of water needed to grow crops.

Challenges

To deliver increased speeds and capacity, mobile operators will need to deploy a network of small cells which will be located on-street. Issues include:

- Access to infrastructure to deploy small cells, lighting columns are the ideal location to deploy small cells and issues with the PFI contractual arrangements will slow the deployment of 5G.
- Additional 'street clutter' and capacity on street lighting columns could be a problem if all four main mobile network operators attempt to deploy small cells in similar locations. Potential solutions include greater infrastructure sharing and the deployment of a 'neutral host model'.
- Roll out of 5G into areas such as market towns, villages and rural areas is not currently a priority for mobile operators. A study has been recently commissioned to understand more about the challenges and opportunities to accelerate 5G deployment in market towns and rural areas, and the analysis will be used to inform future planning.

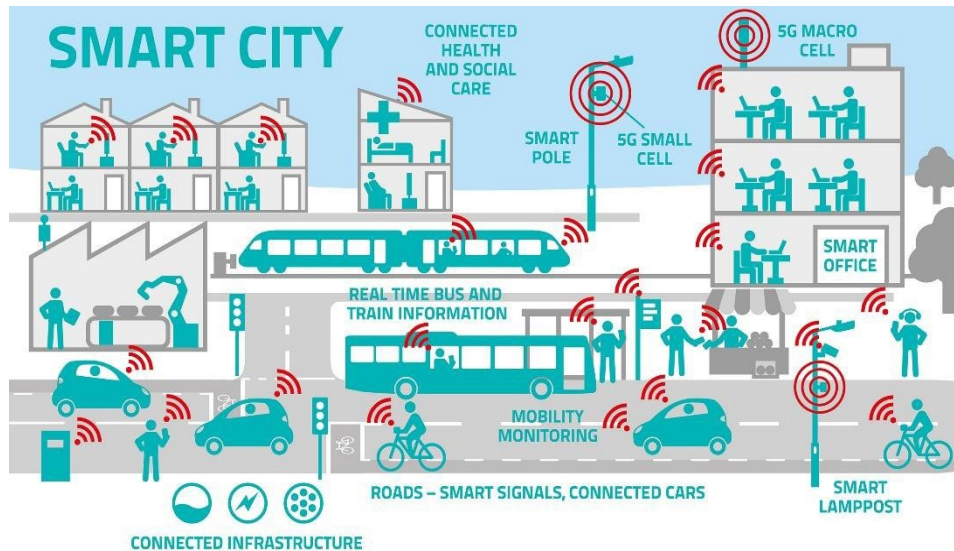
Solutions

- Work with operators to support the initial deployments of 5G ready infrastructure including small cells, which will result in the first 5G deployments in Cambridge and Peterborough.
- Work with business and campuses to support the deployment of private 5G networks (deployed for the use of private companies or developments) and identify opportunities for private networks to support public connectivity through network slicing.
- Develop an approach to support a passive neutral host model while working with operators to understand how an active neutral host model could support 5G connectivity.
- Work with operators and industry to submit bids for Government funding through the Department for Digital, Culture, Media and Sport (DCMS) to fund the trialling of 5G technologies specifically small cells which will support the development of a deployment model and use cases.
- Work with Government on reducing the barriers to the deployment of 5G services.

Smart

Introduction

Advanced data techniques, sensor technology and digital connectivity are creating opportunities to support the sustainable growth of local economies, create better places and to help address some of significant challenges of our time, such as moving towards net zero, climate change mitigation and adaptation and the reduction in transport congestion and air pollution.

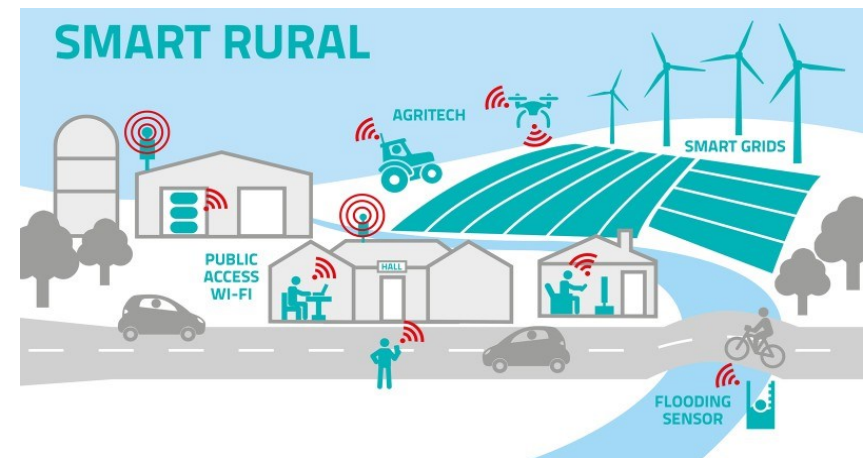


These infographics illustrate the range of opportunities for smart technology and digital connectivity to enhance how we live and work in our cities, towns and rural areas.



IoT – Internet of Things - where things such as sensors, devices and cars are connected to the internet.

LoRA – a low powered communication network for sensors.



Data collected from sensors can help in addressing these issues, for example:

- Health and Social care - supporting in-home care by sensing whether someone has fallen, is using their cooker and kettle, or has left their home.
- Water Consumption - monitoring of water usage and flooding, allowing better management regimes to lower water consumption and give better warning of flooding events. Low-cost IoT-based networks such as LoRa can support the deployment of flood sensors which are inexpensive to install and maintain due to their long battery life. The sensors can measure the level of water in streams and culverts giving an early warning alert and even averting flooding.
- Air Pollution - air quality sensors can measure pollution, informing policies to reduce the impact on residents' health.
- Better real-time travel information can help residents make more sustainable journeys.
- Smart Energy Grids Data underpins advances in the way energy is managed through smart grids.
- Monitoring of new developments - sensors can be used by planners and developers to understand the impact new developments are having on infrastructure such as water and power, traffic movements and the impact on air quality, for the site and surrounding communities.

Challenges

To be able to begin to collect and exploit data to address these challenges there needs to be in place:

- Connectivity – Making sure sensors can connect via local low power wide area networks (LPWAN). Because these networks are low power, batteries can last for up to 10 years and the networks cover large areas. LoRa networks have already been deployed in Cambridge, Ely, South Cambridgeshire and St Neots and work with district council partners is underway to extend the networks to Soham, Huntingdon, St Ives and Ramsey.
- Data Platform – A means to collect data into one place, making the sharing and re-use of data easy as well as making it available to be fed into tools which support the modelling and visualisation of data to draw intelligence and insight from it.

Solutions

- Once initial deployment of gateways has been completed (2021/22), a gap analysis of the network will be undertaken and additional gateways deployed as needed to ensure complete coverage.
- Working with the District Councils, County Council and the GCP, a data hub will be developed that allows data sharing between public sector organisations and with businesses and communities.
- Collaborating with partners on pilots and trials of new technologies including deployment of air quality sensors, water level and flooding sensors as well as a investigation of use cases driven by the needs of the District and Town Councils.
- Assisting the inclusion of future proof digital connectivity infrastructure in the Local Plan, with consideration of how emerging technologies may support sustainable developments. Providing input to the NE Cambridge Area Action Plan (AAP) process, and supporting the development of other AAP documents, to incorporate Future Mobility, Advanced Connectivity and Environmental Monitoring.
- Collaborating with infrastructure delivery, utility and housing organisations to exploit advanced connectivity, including Anglian Water, UK Power Networks, , Network Rail and Highways England.
- Working with the Greater Cambridge Partnership to deliver its Smart Workstream, which will support more sustainable travel, create more sustainable developments and support work in addressing climate change.

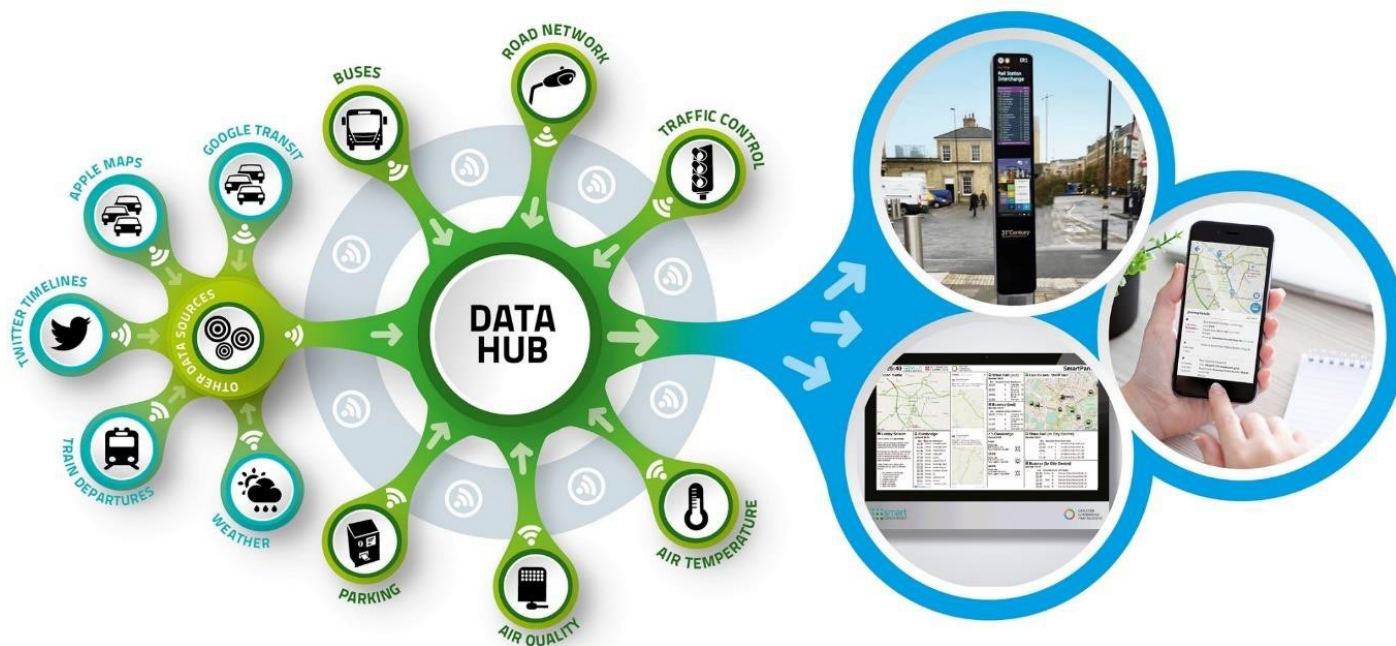


Image: Real world applications using data collated through the digital platform

Flooding resilience

The LoRa network and the increasing availability of other types of low powered networks will make it increasingly simple to deploy sensors that measure water levels and flow. An application could show waterway segments, allowing thresholds to be set on each sensor for high, normal and low water levels. Alerts can then be set that warn of problems such as blocked culverts and drainage ditches or give early warning of flooding. This information can then be passed on to the County Council's Flood Risk team, or other responsible bodies, to ensure that early interventions are made. Residents could also receive an early warning of potential flooding giving them more time to prepare and helping communities to become more resilient.

Access and Inclusion

Introduction

Many more people are now connected to the Internet as a direct result of the challenges of Covid-19, however whilst simultaneously accelerating our reliance on connectivity, the pandemic has also sharpened and exacerbated the digital divide in the UK.

Whilst the reasons for digital exclusion are multi-layered, research from Dr Gemma Burgess at the Cambridge Centre for Housing and Planning Research highlights that access to digital connectivity is one of the key issues.

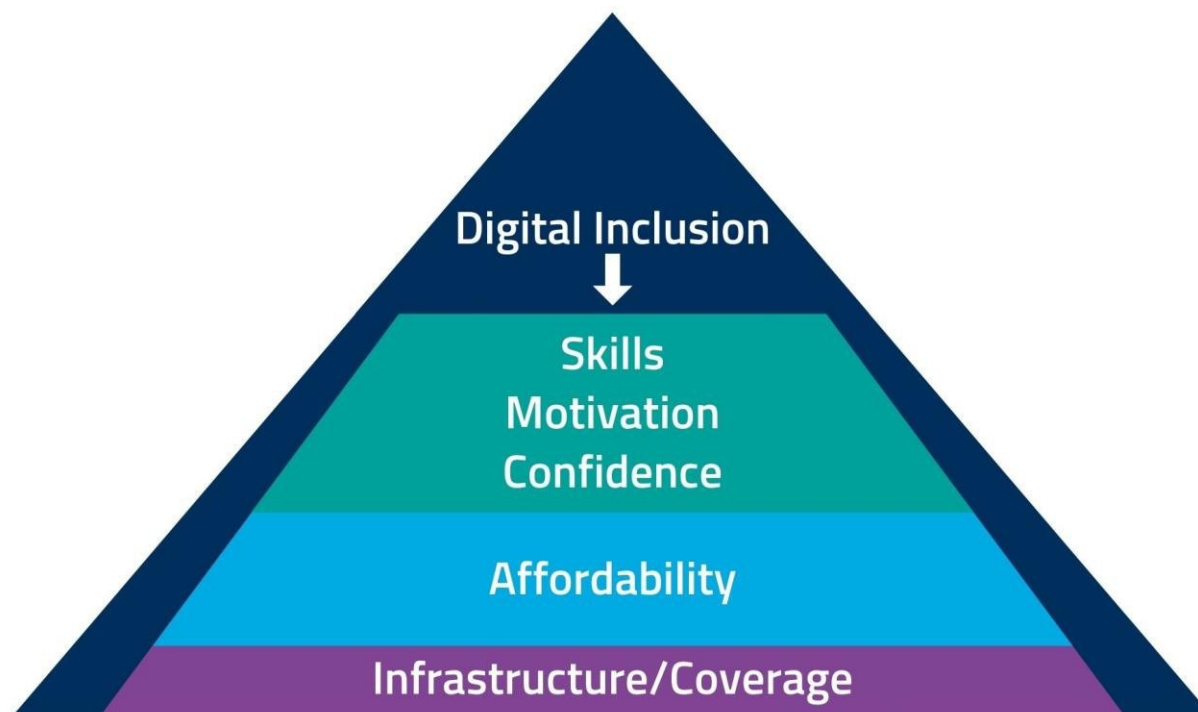


Image: Factors influencing digital inclusion

***“Pay the Wifi or feed the children”
Coronavirus has intensified the UK’s
digital divide... What we are seeing is an
increasing divide between those who have
access to information and
communications technology and those
who do not, giving rise to inequalities in
access to opportunities, knowledge,
services and goods....***

This point is emphasised by the Lloyds Bank 2021 Consumer Digital Index Study, whose research shows that manual workers with high or very high digital engagement, earn £421 more per month than their less digitally engaged peers, in the same roles.

Challenges

Whilst addressing the full range of issues which impact on digital inclusion – motivation, skills, confidence and affordability – is beyond the scope of the digital infrastructure strategy, supporting increased access to digital connectivity is a key part of the picture and this strategy focuses on two specific aspects: public access Wifi provision and digital connectivity infrastructure for social housing residents.

Public Access Wifi

Free to use public access Wifi can be an important factor in helping to ensure that as many people as possible have access to digital connectivity as well as supporting struggling high streets as part of the economic recovery from the Covid pandemic.

In recent years the Connecting Cambridgeshire programme has enabled the roll-out of the single-sign-on ‘CambWifi’ service which provides free to use, seamless Wifi connectivity in hundreds of locations across the area, including cities, market towns and rural village halls in both indoor and outdoor places.

In Peterborough the newly installed public access Wifi service will play a key part in supporting the vibrant nature of the revitalised City Centre, encouraging a wider demographic and increased dwell time. Additionally, some of the most rural village halls now have access to CambWifi, enabling a range of community activities supporting community cohesion and greater well-being, and in Huntingdonshire CambWifi will provide connectivity to support service delivery to residents of the Oxmoor Estate.

Targets

Moving forward the focus for public access Wifi will be to:

- Investigate opportunities and funding to further expand the CambWifi services into more locations across Cambridgeshire and Peterborough.
- Consolidate existing public access Wifi services by broadcasting CambWifi in as many locations as possible.
- Publicise logon information and the locations where CambWifi is available to ensure that as many people as possible benefit from the service.

Social Housing Broadband Infrastructure Access

It is estimated that out of the 11m people in the UK without access to the Internet, 37% live in social housing and anecdotally it's clear that reliable access to the Internet amongst social housing tenants across Cambridgeshire and Peterborough is far lower than in market housing. Although affordability is a factor, initial research amongst local Registered Social Landlords (RSLs), telecommunications providers and Council Housing Teams highlights that the commercial provision of broadband infrastructure is poor, which means connectivity options are limited. There appear to be multiple reasons why commercial broadband infrastructure coverage is lower than in market housing, including: wayleaves and access; complex ownership models; legacy gaps in infrastructure and the capacity of housing associations to engage in the technical and legal steps required. Meanwhile telecommunications providers find it difficult to find an appropriate point of contact within RSLs and Government-funded connectivity vouchers are oriented towards owner occupiers rather than tenants.

Some local Councils which operate their own housing stock have been able to address this issue for their properties. For example, Cambridge City Council has recently devised and implemented a standard 'bulk' wayleaves scheme for their properties, which has resulted in a marked increase in access to full fibre provision for tenants. However, only a small proportion of social housing across Cambridgeshire and Peterborough is overseen directly by local Councils and therefore a wider approach is needed to resolve the current issues.

Solutions

- Explore the issues that affect digital connectivity for social housing and develop approaches to resolve these issues.
- Make more public access Wifi available via CambWifi: seek further funding streams and look to extend and expand current provision, working with local District and City Councils.
- Continue to liaise with partners and key stakeholders to signpost digital inclusion activities to support access to jobs, health and education.

Targets

- Improving gigabit-capable broadband coverage for social housing, matching the 85% target for market housing by 2025.
- Develop and agree policy for all new homes commissioned by the Combined Authority from 2022 to include gigabit-capable broadband provision.

Glossary

A comprehensive [glossary of digital connectivity infrastructure terms](#) can be viewed as a pdf on the Connecting Cambridgeshire website.

Useful links

Broadband

House of Commons Briefing Paper (April 2021): [Gigabit-broadband in the UK: Government targets and policy](#)

Openreach re.Covid impact <https://www.fiercetelecom.com/telecom/openvault-covid-19-pandemic-drives-51-spike-broadband-traffic-2020>

Copper Switch off <https://www.openreach.co.uk/cpportal/products/product-withdrawal/wlr-withdrawal>

Mobile

Ofcom [Adult's Media Use and Attitudes report 2020/21 \(ofcom.org.uk\)](#)

5G [Microsoft Word - 5G Literature Review - final report 05062018c.DOCX \(publishing.service.gov.uk\)](#)

Smart

[Connected Nations Spring Update 2021 \(ofcom.org.uk\)](#)

Housing data <https://cambridgeshireinsight.org.uk/housing/>

Access and Inclusion

Dr Gemma Burgess, Cambridge Centre for Housing and Planning Research, University of Cambridge

<https://www.cam.ac.uk/stories/digitaldivide>

Lloyds Bank 2021 Consumer Digital Index Study <https://www.lloydsbank.com/banking-with-us/whats-happening/consumer-digital-index.html>

Good Things Foundation <https://www.goodthingsfoundation.org/the-digital-divide/>

Contact

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