# Whitepaper

## Next generation access


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**The Dedicated Fibre Network Company**
**7th in the Sunday Times Tech Track 100 list for 2009**


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# Summary

Geo has unrivalled expertise in delivering fibre network infrastructure both for the private sector and for major public sector projects. Geo's national and London networks are the newest non-legacy networks in the UK and its business is focused on providing customers with data network solutions based on dedicated optical fibre. Geo is currently developing proposals for next generation access (NGA) projects, both for public sector investors and privately. Further, Geo's experience in building and operating the FibreSpeed network with the Welsh Assembly Government in North Wales provides an excellent model for NGA investment in the UK.

***(a) What is NGA***

There is industry consensus that widespread NGA deployment will pave the way for a faster, efficient and a more innovative digital society with people now considering NGA as the "fourth utility". With the recent launch of the European Commission's Digital Competitiveness Report,[1] Commissioner, Neelie Kroes, said "*Europe's Digital Economy is crucial to economic growth and prosperity. ICTs and high speed internet are as revolutionary in our lives today as the development of electricity and transport networks were over a century ago*".

NGA is not just about broadband speeds. NGA networks must be capable of providing super fast broadband, able to handle next generation applications such as HD, 3DHD and interactive video for gaming, tele-medicine and social interaction. NGA will improve business facilities, public services, health, education, and government services. It will enable smarter energy grids, smarter transportation and environmental systems, reduce road congestion and transportation costs, improving general wellbeing and family life. As Jeremy Hunt, Secretary of State for Culture has said "*Superfast broadband is not simply about doing the same things faster. It's about doing totally new things – creating a platform on which a whole generation of new businesses can thrive...But it isn't*

[1] Commission Staff Working Document Europe's Digital Competitiveness Report Vol 1. Brussels 17.05.2010 (SEC 2010) 627

*only about business. Next generation broadband will open up new opportunities to improve public services such as education and healthcare.*"[2]

We believe that policy and regulatory intervention in true NGA should focus on long life fixed infrastructure rather than short life active technology investments. This is analogous to prioritising the building of infrastructure such as roads in preference to subsidising the latest generation of cars or lorries. Optical fibre and its related infrastructure is completely service agnostic; it is capable of transmitting the widest possible range of digital and analogue signals, even radio frequencies and there is no comparable technology known to the global scientific community. Investing in a future proofed fibre network will create a long life asset with the greatest flexibility and choice regarding service, symmetry, latency and reliability, allowing active products to change and upgrade in line with market and technology developments, evolving user expectations and patterns of use. With the anticipated 20 to 30 year lifespan for fibre, and flexibility for bandwidth growth, it allows investors to plan for almost unlimited increases in bandwidth.

### *(b) Conditions for investment*

When procuring NGA networks, it is vital that the procurement design encourages a diverse range of bidders. Investment should follow a competitive procurement process to ensure that funding goes to those who will use it effectively and efficiently and at the best price to the community. As set out above, it is also essential that the design and deployment of any NGA network allows service providers to lease the "open access" infrastructure. This creates maximum competition in the market and lowers the barrier to entry by allowing operators to come in and compete at the most cost effective level of the network. A competitive procurement process and an open access network (including access to fibre, duct and co-location) is also a requirement under the European Commission State Aid Guidelines[3] for networks built using public funds.

[2] http://www.culture.gov.uk/news/ministers_speeches/7132.aspx
[3] Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks (2009/C 235/04)

Where incumbent infrastructure exists, the incumbent should contribute its infrastructure (ie provide a reference offer for duct and fibre access) before it participates in any procurement in order to make the process fair and competitive to all bidders. This will ensure that the community receives the best value for money NGA network with the greatest choice and flexibility around the products supplied over the network. Further, the European Commission, in its State Aid Guidelines state that this should be mandatory where there is any public money used.[4] Finally, Geo welcomes regulatory and legislative reform to enable NGA deployment. Such initiatives include, reform of the fibre rates regime, simplifying planning laws and the Electronic Communications Code to add clarity to the processes for securing access rights to land with certainty around costs and timescales.

### *(c) A strategy for intervention*

It is important that any intervention is strategically planned and well targeted to correct market failure and enhance competitiveness. To ensure the procurement design allows the maximum scope for bidders to secure funding in the most innovative ways possible we would encourage exploration as to how as much of the scope of the funding process can be included within the project definition against which private sector bidders tender. Public sector funding that calls for matched private funding and investment (such as RDPE and ERDF) reduces the level of intervention required and encourages market competition and business opportunities through private investment.

Geo favours a public private partnership (PPP) model for investment, a model also promoted by the European Commission. PPPs provide efficiency in public services through risk sharing and harnessing private sector expertise. They also relieve the immediate pressure on public finances by providing an additional source of capital.[5] There are numerous benefits from using a PPP model including, value for money by exploiting private sector efficiency and innovation, improved risk sharing and sustainability, innovation and development efforts from a competitive tender process and the private party's delivery undertaking. In addition to a PPP model, authorities can maximise savings by aggregating

[4] Ibid page 79, 3rd bullet point.
[5] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Mobilising private and public investment for recovery and long term structural change: developing Public Private Partnerships Brussels 19.11.2009 COM (2009) 615 final.

public sector demand and a commitment to use the procured network. Investment in NGA and deployment of future proofed fibre based networks is critical to economic and social well being. It is vital that Government and public authorities establish a clear perspective of the underlying rationale to justify NGA investment, a set of conditions and requirements for NGA networks, and a clear strategy for intervention.

# Next generation access

## 1. Introduction

**The fourth utility:** NGA is a hot topic for consumers, businesses, the public sector and governments globally. Although there are differing opinions about what NGA means, there is a consensus that widespread NGA deployment will pave the way for a faster, efficient and a more innovative digital society. It is beyond doubt that demand for broadband is increasing at a rapid rate. New applications, networks, online tools and cloud computing are putting greater strains on existing bandwidth capacity and pushing broadband capabilities to their limits. In addition to the internet, people understand that an NGA infrastructure will greatly improve many other sectors of industry including transportation, utilities, environment, education and healthcare to name a few, and as a result, people now view NGA networks, and the services that run over them, as a "fourth utility". With the recent launch of the European Commission's Digital Competitiveness Report,[6] EC Commissioner, Neelie Kroes, said "*Europe's Digital Economy is crucial to economic growth and prosperity. ICTs and high speed internet are as revolutionary in our lives today as the development of electricity and transport networks were over a century ago*".

**More than just speed:** In his first media speech, Secretary of State for Culture, Jeremy Hunt emphasised that "*Superfast broadband is not simply about doing the same things faster. It's about doing totally new things – creating a platform on which a whole generation of new businesses can thrive. The Federation of Small Businesses has estimated that a superfast network could add £18 billion to GDP and create 60,000 jobs. NESTA thinks it could be ten times that – 600,000 new jobs….But it isn't only about business. Next generation broadband will open up new opportunities to improve public services such as education and healthcare.*"[7]

[6] Commission Staff Working Document Europe's Digital Competitiveness Report Vol 1. Brussels 17.05.2010 (SEC 2010) 627
[7] http://www.culture.gov.uk/news/ministers_speeches/7132.aspx

NGA should not be limited to just broadband speeds. NGA will facilitate a move to new online transactions and activities. It will improve business facilities, public services, health, education, and government services. It will pave the way for smarter energy grids, smarter transportation and environmental systems making activities more efficient and effective. NGA will facilitate new tele-presence conferencing, e-healthcare in the home and improved IT systems such as cloud computing. It will reduce costs incurred during every day life, make home and business tasks smarter and faster, improving general wellbeing and family life. It will reduce road congestion and transportation costs and lay a foundation to develop new and groundbreaking services and facilities.

## 2. Next generation access defined

**Definition:** The definition of NGA should focus on replacing first generation copper networks with future proofed next generation fibre networks. It is important that authorities do not invest in solutions that fall short of true NGA because short term active technology investments quickly become stranded unless further funds are sunk into upgrades and enhancements.

NGA means:

"*Point to point open access fibre networks which consist wholly of optical elements and which are capable of delivering broadband access services with enhanced characteristics (such as higher throughput) which cannot be delivered to the mass market over first generation copper networks. NGA networks are service agnostic, fully symmetrical, uncontended with high capacity and low latency.* "

**NGA vs USC:** It is important not to confuse NGA with the Government's Universal Service Commitment (USC) to provide 2Mbs broadband to every home in the UK. This is a commitment to ensure that everyone has access to basic broadband and internet facilities. NGA is much greater than this, as set out above; NGA networks must be capable of providing super fast broadband, able to handle next generation applications such as HD, 3DHD and interactive video for gaming, tele-medicine and social interaction. By way of example, Sweden has over 850,000 Distance Electrical Meter Readers running off the country's new NGA networks. Any public funds invested in meeting the USC should be spent on infrastructure that can be used for NGA. Any investment in the 2Mbps USC that cannot be reused for NGA is a wasted investment. Authorities should be encouraged to invest once and invest right into long life, future proofed fibre infrastructure. We explain below that this will provide the optimal platform to run active services with symmetrical bandwidth, low latency, uncontended characteristics and the greatest flexibility and scalability to change and upgrade services in line with market demands. This minimises future investment and avoids short term technology fixes.

**Long life and future proofed:** We believe that investment in NGA should focus on future proofed infrastructure with the greatest flexibility and capacity to handle technological development and public demand, focussing on long life fixed infrastructure rather than short life active technology investments. This is analogous to prioritising the building of infrastructure such as roads in preference to subsidising the latest generation of cars or lorries. There are fundamental differences between the infrastructure required for modern data networks, the network equipment used to supply services over them, and the subsequent active products. Indeed, it is “infrastructure” that is central to NGA (replacing the old legacy copper networks with next generation fibre networks).

**Uncontended and low latency:** Optical fibre and its related infrastructure is a completely service agnostic medium; it is capable of transmitting the widest possible range of digital and analogue signals and even radio frequencies and there is no comparable technology known to the global scientific community. The characteristics have been stable for 30 years making it a trusted technology. Investing at the passive layer will create a long life asset with the greatest flexibility and choice regarding service, latency and reliability, allowing active products to change and upgrade in line with market and technology developments, evolving user expectations and patterns of use.

**Flexible and scalable:** Fixed infrastructure investments, such as optical fibre assets, are critical enablers for efficient delivery of higher bandwidth wireless solutions, particularly in rural areas. With the anticipated 20 to 30 year lifespan for fibre, and flexibility for the type of bandwidth growth, it allows investors to plan for almost unlimited increases in bandwidth. Further, in evaluating its options, an investor should also consider the cost effectiveness over the whole lifecycle of the infrastructure. A solution that minimises repeated investments in technology upgrades will, in the long run, demonstrate superior value for money, compared to the upgrade cycles associated with some solutions. To this end we suggest that point to point (PtP) networks, rather than shared fibre Passive Optical Network (PON or GPON) architecture favoured by many incumbents, are the basis of the most effective network model, as it provides the greatest flexibility and scalability to meet increasing bandwidth demands.

**Symmetrical and high capacity:** Just as important as nominal bandwidth is the largely unsatisfied need for more symmetrical capability. Unlike current copper telco and co-axial cable TV systems, fibre based networks are inherently capable of providing fully symmetrical services, at much higher and dependable quality and without any significant distance limitations. Our view is that the fibre based networks of the future will be full communication networks capable of sending information as fast upstream as downstream (just as large businesses have come to use them over the last 15 years). Consumers are likely to move to large-scale usage of data centre services as the quantity of data overwhelms the storage capacity of residential IT equipment.

**Open access:** It is also important that the design and deployment of any NGA network will allow for multiple service providers to lease the "open access" infrastructure, including access to the underlying fibre and duct elements. This business model for infrastructure ownership, separate from the downstream services, is being used in a number of countries around the world for FTTP roll-out (for the above reasons). Further it has the advantage of being consistent with the European Commission's position as set out in its EU Framework (due for implementation by the UK this year) and the State Aid Guidelines[8] for investment in NGA networks using public funds.

[8] Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks (2009/C 235/04)

## 3. A vision for next generation access

**The UK:** In the UK, the Government's commitment to NGA was highlighted in the Queen's speech where she confirmed *"Countries around the world are moving ahead with rolling out high-speed 'next generation' broadband based on fibre optics rather than copper….The Government will be looking at ways of ensuring a strong, competitive, market-led approach to next generation broadband roll-out across the country."*[9] Jeremy Hunt reaffirmed the position in his first media speech setting out his plans to see *"the UK having a broadband infrastructure that meets the needs of all its citizens and businesses, and that will stand comparison with anywhere in the world."* [10]

**The EU:** NGA is also high on the European Commission's agenda with it recently releasing its Europe 2020 strategy for smart, sustainable and inclusive growth[11] and its Work Programme for 2010 setting out an aggressive timetable to develop and release a set of NGA directives and recommendations for implementation by Member States.[12] The Europe 2020 Strategy has underlined the importance of broadband deployment to promote social inclusion and competitiveness in the EU. It states the objective to bring basic broadband to all Europeans by 2013 and seeks to ensure that, by 2020, (i) all Europeans have access to internet speeds of above 30Mbps and (ii) 50% or more of European Households subscribe to internet connections above 100Mbps. In its Communication on the Digital Agenda for Europe[13], the Commission said: *"The development of high speed networks today is having the same revolutionary impact as the development of electricity and transportation networks had a century ago. With ongoing developments in consumer electronics, the lines between digital devices are fading away. Services are converging and moving from the physical into the digital world, universally accessible on any device, be it a smartphone, tablet, personalcomputer, digital radio or high definition television. It is*

[9] http://www.number10.gov.uk/queens-speech/2010/05/queens-speech-high-speed-broadband-connections-50591
[10] http://www.culture.gov.uk/news/ministers_speeches/7132.aspx
[11] Communication from the Commission, Europe 2020. A strategy for smart, sustainable and inclusive growth Brussels, 3.3.2010 COM (2010) 2020.
[12] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Commission Work Programme 2010 Time to act Brussels, 31.3.2010 COM (2010) 135 final Vol 1.
[13] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A Digital Agenda for Europe Brussels 19.05.10 COM (2010) 245

*projected that, by 2020, digital content and applications will be delivered almost entirely online."*[14]

**Government's approach:** Notwithstanding the Government's commitment to NGA, it is clear that it is encouraging a market first approach by ensuring access rights to BT's infrastructure and other third party assets (Ofcom is currently consulting on new market remedies under its Wholesale Local Access Market Review). There is little public money available for NGA deployment, other than the Government's plan to use part of the BBC's licence fees. In the light of tight fiscal budgets and limited public sector funding, it is essential that Government and local authorities carefully plan and invest wisely into NGA networks. As set out above, any investment, using public funds, should be for long life future proofed fibre networks, capable of expansion and upgrade to meet evolving user demands.

[14] Ibid page 5

## 4. Conditions for NGA investment

**Public procurement:** When procuring NGA networks, it is vital that the procurement design encourages a diverse range of bidders without unfairly disadvantaging those who have no existing asset base in the areas concerned. Investment should follow a competitive procurement process to ensure that funding goes to those who will use it effectively and efficiently and at the best price to the community. Government and public authorities should avoid investing in current generation networks or any attempt to sweat existing copper networks as these are short term and ultimately stranded investments. It is also important that the procurement design allows the maximum scope for bidders to secure funding in the most innovative ways possible.

**Open access:** It is important that the design and deployment of any NGA network must allow service providers to lease the "open access" infrastructure including the fibre and ducts. A truly open access network should not favour a priori any given technology solution. The open access network should be technology neutral, providing services to all competing service providers in an equal and non-discriminatory way. This creates maximum competition in the market place, lowers the barrier to entry by allowing operators to come in and compete at the most cost effective level of the network. By giving service providers open access to the passive elements of the network, they will have the freedom to deploy their own active products with the choice and flexibility over broadband speeds, usage caps and pricing. It allows service providers to further differentiate their service offering, upgrade and change as the market and technology develops and essentially compete on a level playing field with large vertically integrated players such as BT.

We do not accept that the traditional model of tightly coupled vertical integration between infrastructure operation and service provision is the right way forward – with current and future IP based technologies, the two roles are very different, have widely divergent business characteristics and should offer the opportunity for clearly separate investment decisions. If access to the network is restricted to the active layer only, service providers are limited to reselling the incumbent's prescribed active products, leaving little

room for product differentiation or competitive pricing. The provision of only active access will prevent more efficient and competition enhancing "unbundling", which is generally anticompetitive and not true open access. In most of the mature FTTH deployments (e.g. the Netherlands, Sweden) there is no active bundle. This makes possible unbundling at the basic fibre level, allows competition for the passive layer and ultimately increases the variety of services available while driving down costs out of the network.

Open access networks are also promoted by the European Commission in its draft Recommendation on regulated access to NGA networks[15] (to be finalised and published this summer). The Recommendation encourages an open access, technology neutral NGA model with spare capacity to allow several operators to deploy fibre lines, including sufficient space in ducts. Open access networks, at both the passive and active layer is also a key requirement for State aid approval under the State Aid Guidelines[16] for investment using public funds. The Guidelines specify that the network must be operated on an open access basis: "*In addition, whatever the type of NGA network architecture that will benefit from State aid, it should support effective and full unbundling and satisfy all different types of network access that operators may seek (including but not limited to* ***ducts, fibre and bitstream****)."*[17]

**Access to existing infrastructure:** As stated above, NGA deployment should always start with a competitive procurement process. Where incumbent infrastructure exists, the incumbent should contribute its infrastructure (ie provide a reference offer for duct and fibre access) before it participates in the procurement in order to make the process fair and competitive to all operators. This will ensure that the community receives the best value for money NGA network with the greatest choice and flexibility around products supplied over the network. The European Commission, in its State Aid Guidelines state that this should be mandatory where there is any public money used. Specifically, the Guidelines

[15] Draft Commission Recommendation on regulated access to Next Generation Access Networks (NGA) Brussels, [Draft 12 June 2009 for 2nd public consultation] C (2009) page 13, paragraph 20.
[16] Community Guidelines for the Application of State Aid Rules in Relation to Rapid Deployment of Broadband Networks (2009/C 235/04)
[17] Ibid, paragraph 79, 3rd bullet point.

anticipate an environment where the incumbent's infrastructure is made available for use in any network deployment. Paragraph 51 of the Guidelines provide that, in assessing the proportional character of the notified measures in "white" or "grey" areas, through its decision making process, the Commission has highlighted a number of necessary conditions to minimise any State aid involved and the consequent potential distortions of competition. The lack of any [condition] would require an in-depth assessment and it would likely lead to a negative conclusion on the compatibility of the aid with the common market. Condition (e) Use of Existing Infrastructure is as follows:

"*Where possible, Member States should encourage bidders to have recourse to any available existing infrastructure so as to avoid unnecessary and wasteful duplication of resources. In order to try and limit the economic impact on existing network operators, the latter should be given the possibility to contribute their infrastructure to a notified project. At the same time****, this condition should not end up favouring existing incumbents especially in cases where third parties may not have access to this infrastructure or inputs that are necessary to compete with an incumbent***."

There must be a level playing field for operators contending to build an NGA network using public funds. There should always be a requirement that any operator with existing infrastructure must make that infrastructure available to other bidding operators to avoid unnecessary and wasteful duplication of resources and so as not to favour that operator in the procurement by denying others access to that infrastructure in order to compete.[18] It is vital for the creation of competition that the procurement design encourages a diverse range of bidders to engage without unfairly disadvantaging those who have no existing asset base in the areas concerned, which are by definition not currently highly competitive.

[18] Community Guidelines for the Application of State aid rules in relation to rapid deployment of broadband networks, para 51(e)

**Other:** Geo would welcome steps by the Government to improve the processes for building NGA networks. Overcoming these issues will lower the cost and improve the timescales for NGA deployment:

- **Reform the fibre rates regime:** The UK is one of the only countries in the EU that imposes tax on optical fibre networks. Further to this, the tax regime is confusing, unclear and extremely disruptive to operators. The unequal application of this tax on different operators and the uncertainty about how it is properly calculated poses a direct disincentive to the roll out of NGA networks in the UK. The absence of a level playing field will discourage investment by players other than BT since the current regime places a greater tax burden on new market entrants and those operators with a small network footprint. The current system also gives BT an unfair advantage over other operators due to BT's tax bill being essentially insensitive to new network investment. This tax on fibre optic networks will deter investors and raise the barrier to investment in NGA networks.

- **Simplify planning laws:** Complicated and unworkable processes for building NGA networks increase the cost to operators and delay timescales for roll out. With the increased perception that NGA networks are the fourth utility, there is growing consensus that processes for installing NGA networks should be similar to those for gas, water and electricity. The Electronic Communications Code pursuant to the Communications Act 2003 prescribes absolute rights for a network operator to install its apparatus under the principle that "*no person should unreasonably be denied access to an electronic communications network*". Notwithstanding this, the processes surrounding installation, timescales and costs are confusing and unworkable, often delaying roll out and jeopardising projects to the detriment of businesses and consumers. The Government needs to ease planning laws to allow the fast and efficient roll out of NGA networks. The Code needs reform and a clear process for operators to obtain the prescribed access rights, with certainty of terms, timescales, and costs.

## 5. A strategy for intervention

**General:** There are some areas of the UK where the market will not deliver an adequate NGA remedy. There are two particular dangers here: first, that some areas will not benefit from any NGA networks at all; and secondly, that ill directed interventions may create or perpetuate de facto regional service monopolies, thus depriving citizens of the dynamic and other benefits of competition. The Government and industry agree that intervention in the market is necessary. However it is important that any intervention is strategically planned and well targeted to correct market failure and enhance competitiveness. We have set out above what we consider to be the essential conditions for NGA investment to achieve the most effective and value for money network. In this section we propose a strategy and model for intervention.

**Maximise private investment:** To ensure the procurement design allows the maximum scope for bidders to secure funding in the most innovative ways possible we would encourage exploration as to how as much of the scope of the funding process can be included within the project definition against which private sector bidders tender. There is various funding available to public authorities from the specific RDPE funding to the ERDF both calling for matched funding for investment. In order to comply with the funding models supported by the European Commission, we advocate an investment model to stimulate and attract as much private investment in NGA as possible. Public sector funding that calls for matched private funding and investment reduces the level of intervention required and encourages market competition and business opportunities through private investment.

**PPPs:** Geo favours a PPP model for investment, a model also promoted by the European Commission. PPPs promote efficiency in public services through risk sharing and harnessing private sector expertise. They also relieve the immediate pressure on public finances by providing an additional source of capital. The European Commission has said[19]:

[19] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Mobilising private and public investment for recovery and long term structural change: developing Public Private Partnerships Brussels 19.11.2009 COM (2009) 615 final.

*"Investment in infrastructure projects is an important means to maintain economic activity during the crisis and support a rapid return to sustained economic growth. Public Private Partnerships (PPPs) can provide effective ways to deliver infrastructure projects, to provide public services and to innovate more widely in the context of these recovery efforts. At the same time, PPPs are interesting vehicles for the long term structural development of infrastructures and services, bringing together distinct advantages of the private sector and the public sector respectively."*[20]

The Commission lists the following key benefits from a PPP model for infrastructure investments:

- Improved delivery of projects with PPPs having a track record of on time and on budget delivery.
- Better value for money from infrastructure by exploiting the efficiency and innovation potential of the private sector.
- Spread the cost of financing the infrastructure over the life of the asset and reduce immediate pressure on the public sector budget.
- Improve the risk sharing between the private and public parties.
- Boost sustainability, innovation and development efforts underpinned by the competitive tender process and the private party's delivery undertaking.
- Give the private sector a central role in developing and implementing the project strategies.
- Enlarge the private market share in the field of government procurement in third party markets.

PPPs will deliver long term returns on investment to both the public and private investor, allowing returns to be re-invested into other community projects in the area. An appropriately designed PPP investment model will see returns back into the public sector, often with the requirement of a claw back mechanism over time. The return on investment will vary from project to project and bidders for an NGA network should be asked to tender the proposed return to the public investor(s).

[20] Ibid page 2

In addition to the PPP model, a local authority can create efficiencies, encourage investment and increase take up by implementing initiatives to promote the NGA network services. Authorities should consider aggregating demand across the local authorities with a commitment to using the deployed network. This not only saves money and reduces wasted and duplicated expenditure, the aggregated commitment to use the resulting network leverages public sector investment to the greatest extent for the public sector investor, making the public sector as effective as possible. Finally, it is equally important for local authorities to educate consumers and businesses on the benefits of NGA and encourage take up of NGA services. This could be done in a number of ways from holding community courses to educate people on how to use new technology, promote new services to businesses and offer incentives to take up new services.

**Target areas for investment:** Investment in NGA and deployment of future proofed fibre based networks is critical to the economic and social well being, and has become a major element of current public policy making, in the UK and Europe. Decisions about NGA policy are being made that will have a fundamental effect on how the UK fares in an increasingly globalised digital world.

Funding should be invested in areas where the market has not and will not deliver. There is no demonstrable international precedent for the incumbent alone (or indeed any other commercial player) undertaking the substantial investment which will be required to deploy future proof optical fibre access networks for rural and disadvantaged areas, hence public intervention is clearly appropriate.

Intervention should happen in those areas where private operators acting independently do not have any sufficient confidence of reasonable profitability to act as an effective incentive to invest. This will stimulate private investment and provide commercial returns to investors against ongoing costs over the life of the network. By focusing on regional and metropolitan “not spots” and

by setting strict criteria for funding, authorities can effectively invest funds in partnership with private investment.

We strongly believe that intervention is required now but that it must be done in a controlled environment. Many comparator nations, both in the EU and more widely have already concluded that immediate intervention is justifiable and are well on the way with NGA deployment. As stated above, we believe intervention should be in those areas where private investment does not exist and the market will not deliver. This is most likely to be the rural and remote areas but not in all cases. There are pockets in central cities and areas of new development that would qualify as “white” or “grey” zones under the State Aid Guidelines.

The definition of what is “white” or “grey” needs to be clearly understood. Although other operators may have a presence in a given area, a careful analysis at street level (down to the postcode) is important. An operator might have a network in one street but not in the four on either side, if there is no evidence that the operator will expand its network there should be a business case for intervention to ensure that all residential and business premises have NGA. Further public authorities should clearly distinguish first generation networks and copper based networks from NGA networks. Although other operators may have a network presence, a copper (or partly) network, it should not change the status of the region from white or grey to black because the copper (or part) copper network is not a NGA network.

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