

## Extending Local Full Fibre Networks

### INCA Response to the DCMS Consultation

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We are delighted to respond to this consultation and apologise that personal circumstances affecting a member of our small team has delayed the submission of this paper. We refer at several points to INCA's [Building Gigabit Britain](#) report, which is available for download.

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#### **Question 1:**

**What local approaches have been taken to date or are planned - either in the UK or internationally - to stimulate the market delivery of full fibre networks, in both urban and rural areas, and what results have they achieved? Where appropriate please provide evidence and any other additional information.**

Several local full fibre approaches have been identified in the consultation document including those taken by CityFibre (metronet and FTTP, passive utility model), Hyperoptic (MDU, FTTB, active service provider), and Gigaclear (rural FTTP, active service provider/wholesale offer through FluidOne). These and other examples are referred to in INCA's Building Gigabit Britain report.

#### **Segmented Strategies for a Segmented Market**

The alternative networks providers tend to be young, smaller companies that employ a variety of strategies and technologies to address different market segments. Some of these have been identified in the consultation document including CityFibre, Hyperoptic and Gigaclear. These and other examples are described in Building Gigabit Britain. Below is a summary of some of the strategies and approaches adopted.

#### **Passive Utility Model**

CityFibre operates a model in cities around the UK that starts with a metro network and aims to deliver full fibre, passive infrastructure to all premises: public services, businesses, homes, masts etc. In this respect CityFibre is a passive, dark fibre utility

provider. The model relies on third party service providers, local authorities and others to ‘consume’ the network provided. Early evidence from the market suggests that service providers benefit from using a high capacity, modern, purely passive network. For example one of the partner companies in the York project, speaking at a recent meeting of investment analysts explained that unlike the BT network, customer satisfaction on the CityFibre network is very high and churn is zero. The key to expanding the model is developing the long-term relationships with a variety of consumers of the networks, thus attracting the capital to build out from the initial core.

### **The MDU Play**

Hyperoptic and Community Fibre are the main operators focusing on apartment blocks in cities and towns with Hyperoptic now reaching around 0.5m premises. Here the key initial relationship is with the property owners and their agents to gain access to the MDUs. The model followed by these operators is to provide the end-user services, as well as the FTTB connections to the apartments. As has been noted around 50% of Hyperoptic’s footprint is in BDUK white areas. They aim to attract around 30% of the residents in the first year to their offering of broadband and telephony with 20Mbps, 100Mbps and 1Gbps symmetric packages.

### **Connecting SMEs**

Some INCA members focus on connecting SMEs either with point-to-point connections, or connecting groups of SMEs in business parks. The first category includes MetronetUK offering high capacity wireless services, Venus in London offering fibre connections and a number of other providers. The second category includes Fibre Options, Warwicknet, Bridge Fibre, ITS Technology and others. Some build pure fibre networks, others use BT’s services (in some cases with PIA), some offer a mix of fibre and wireless networks depending on the circumstances. In all cases they deliver superfast or ultrafast services to businesses that otherwise have to rely on basic broadband or buy expensive leased lines.

### **The Full Fibre Rural Play**

Gigaclear has become the best-known rural fibre provider, having built a business around rural demand stimulation ahead of investment. With significant wins in BDUK procurement, plus growing popularity amongst local authorities and end users, Gigaclear looks set to achieve and exceed its targets of 10% coverage of rural homes and businesses. Other companies operate in the same space, but have yet to achieve the financing and scale needed to complement Gigaclear’s work. One of INCA’s aims is to help facilitate growth amongst a wider range of providers, to build capacity to meet future demand.

### **Community Ownership**

Community-owned projects have not developed as quickly in this sector as might have been expected. Several schemes were attempted as part of the RCBF initiative but in almost all cases were stymied by a combination of BT opposition and bureaucratic hurdles. B4RN is the best-known full fibre project that has grown into a

serious, community-owned operation. It is a form of co-operative enterprise and has demonstrated some notable advantages:

- Strong community engagement and commitment
- Very patient community capital,
- Very low civils/installation costs,
- £0 wayleave costs,
- The highest levels of take-up of any superfast/ultrafast service in the UK,
- Reliable gigabit services
- Positive local economic benefits

Challenges include: scaling and replicating – a project like this requires significant community buy-in and knowledgeable local leadership. Effectively B4RN is at one end of the scale of community involvement in improving local services (*see the diagram from Adrian Wooster below<sup>1</sup>*).

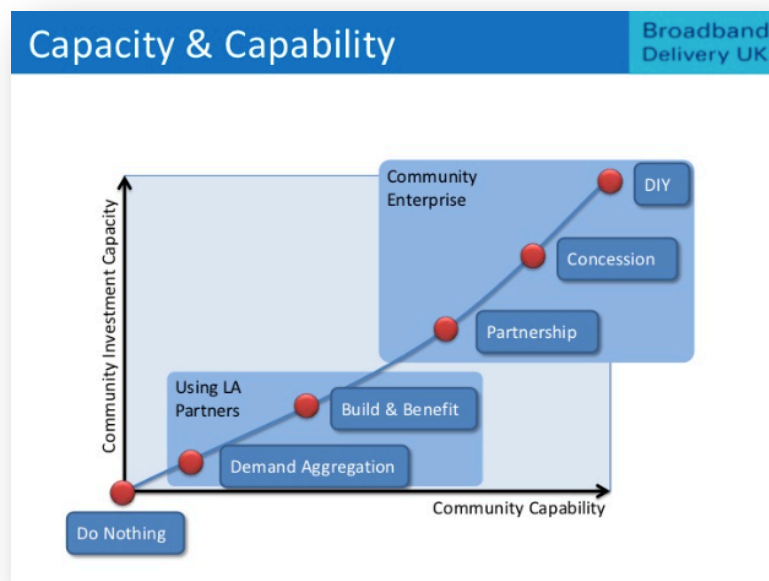


Figure 1 Adrian Wooster for BDUK

The scaling challenge can be addressed if one or more existing operators were willing to work with communities on a shared ownership basis – e.g. the community owns (or part owns) the asset, the operator runs an OpCo to deliver services. This maintains the benefits of patient capital and strong community engagement, but obviates the need for the local community to build and operate its own network.

The replication challenge can be addressed through one or more support projects. For example the Plunkett Foundation<sup>2</sup> has developed programmes supporting

<sup>1</sup> [http://www.slideshare.net/INCA\\_NextGen/inca-industry-day-adrian-wooster-presentation/14](http://www.slideshare.net/INCA_NextGen/inca-industry-day-adrian-wooster-presentation/14)

<sup>2</sup> <http://www.plunkett.co.uk>

community ownership to retain local services like village shops and pubs. Several hundred projects like this have been created through Plunkett's support programme. Support networks like this have been a significant factor in aiding the development of many rural Scandinavian full fibre projects (see below).

### **Local Fixed Wireless Provision**

Although the scope of this consultation is full fibre, it is worth noting that FWA providers have been around for more than ten years delivering basic and superfast services in very challenging areas. In the context of full fibre, an advantage of this approach is that it establishes an actual customer base from which to build the investment case for full fibre services. Several INCA members either have or are developing both fibre and wireless projects notably UK Broadband (Relish wireless and Keycom campus fibre networks), ITS Technology Group, Air Broadband/Bridge Fibre. Even smaller, more local providers are working on plans to build fibre networks – e.g. County Broadband (Essex/Suffolk) and Lothian Broadband.

We do not yet know the implications of the minister's 'Full Fibre & 5G' policy – but we argue that innovative wireless operators should be given the opportunity to engage in programmes that extend both fibre and high-capacity wireless services. During a period of pilot projects and experimentation, giving more power to local communities and local operators to develop services will pay real dividends in terms of service delivery (particularly rural) and learning. Fixed wireless operators in INCA membership are happy to engage with government and Ofcom to help define what local pilot projects can look like.

INCA will run a seminar on **Full Fibre and 5G** during Q2 2017

### **International Experience**

#### **Netherlands**

INCA members have been studying and learning from international projects for more than 10 years. One of our earliest visits was to the town of Nuenen near Eindhoven to learn about the OnsNet project, supported by the local mayor and local housing corporation, and led by the redoubtable Kees Rovers. OnsNet was substantially financed by the civils firm employed to build the FTTH network, Volker Wessels. This led them to create a new FTTH telecoms company, Reggefiber.

Reggefiber and other new entrants like CIF use a demand stimulation process to identify areas that provide a good investment case – pre-registration. The most notable UK example using this approach is Gigaclear. Reggefiber changed the dynamics of the Dutch competitive landscape, which had hitherto been dominated by KPN and Liberty (cable). Local initiatives by municipalities and housing corporations were no longer isolated but became linked, with Reggefiber taking 'first mover advantage'. This led KPN to create a JV with Reggefiber to provide nationwide

FTTH, which included a 41% share in Reggefiber, later increased to a majority position in 2008.<sup>3</sup>

### **Nordic Countries**

Nordic countries have long been taking action to improve rural broadband coverage to the extent that today they have amongst the highest penetration of full fibre connections in the world. This is despite often having small, sparse populations, over huge rural areas. There are many initiatives that could be quoted. Here are just a few.

### **Suupohja Network, Finland<sup>4</sup>**

The West of Finland is forested and very sparsely populated. The Suupohja regional council created a company, Suupohjan Seutuverkko, to install FTTP connections starting with the hardest to reach farms and communities first. Their rationale was that otherwise they would never be covered. They built an open access network, and although owned by the local council the project was financed in part through commercial debt. INCA members visited this project in 2013 and observed the fibre network extending deep into a forest, serving a timber yard 30km from the nearest small town. The project ran a conference in the local school of the small town of Kauhajoki<sup>5</sup>. Participants were invited to watch interactive maths and geography lessons that use the gigabit connections, supplied to all classrooms. Finland has one of the most successful education systems in the world.

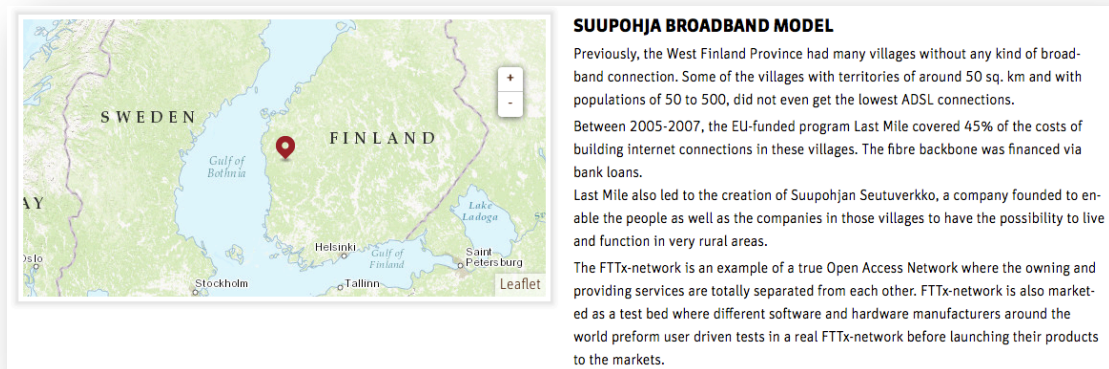


Figure 2 From the Engage Project - <http://www.engage-interreg.eu>

<sup>3</sup> The Dynamics of Broadband Markets in Europe: Realizing the 2020 Digital Agenda, edited by Wolter Lemstra, William H. Melody

<sup>4</sup> <http://www.engage-interreg.eu/bestpractice#14/>

<sup>5</sup> <http://engage-interreg.eu/finland/details/19-partnership>

**As at 2013:** <sup>6</sup>

**Size of network:** 5000 homes passed (50 % of all homes); 2500 subscribers (15 % — 60 % of all homes, businesses and public centres depending on the municipality)

**Time to deploy:** 2005—2013 and continuing

**Deployment method:** Open-access network

**Sweden**

Sweden has long been a European leader in fibre (FTTB and FTTP). According to the FTTH Council Europe annual survey more than 35% of Swedish households and businesses now subscribe to full fibre connections. <sup>7</sup>

In rural areas Swedish government intervention focused on ensuring that dark fibre backhaul reached to within a few kilometres of all homes and businesses, but residents had to fund the final connection, supported by a tax rebate scheme that allowed them to recover 50% of the costs. There are over 1000 local municipal fibre networks in Sweden, ensuring widespread rural availability of full fibre connections. <sup>8</sup>

INCA member Rala is a Swedish company that helped create hundreds of local rural schemes. Rala's co-founder and Director Karin Ahl was introduced to Matt Hancock at the INCA Conference in 2017 and explained how the rural Swedish full fibre model works.

The B4RN scheme in the UK has similarities with Swedish rural networks in that local people are expected to contribute investment in cash or kind to the project. Subscriptions to community shares can qualify for tax relief under the EIS scheme and has been used successfully by B4RN and some other projects.

**Stokab**

Stokab in Stockholm is one of the world's leading municipal dark fibre networks. 90% of households and nearly 100% of businesses are connected to the full fibre network. Stokab operates a dark fibre model, it does not sell active products, hence it supports a wide variety of service providers offering services direct to end customers, both residential and business.

- Each household can freely choose among the operators present in the node to which The property is connected, independently of their neighbours;

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<sup>6</sup> <http://www.ftthcouncil.eu/documents/CaseStudies/SUUPOHJA.pdf>

<sup>7</sup> [http://www.ftthcouncil.eu/documents/PressReleases/2016/PR20160217\\_FTTHranking\\_panorama\\_award.pdf](http://www.ftthcouncil.eu/documents/PressReleases/2016/PR20160217_FTTHranking_panorama_award.pdf)

<sup>8</sup> [http://www.ftthcouncil.eu/documents/Opinions/2013/Rural\\_FTTH\\_Nordics\\_Final.pdf](http://www.ftthcouncil.eu/documents/Opinions/2013/Rural_FTTH_Nordics_Final.pdf)

- Operators can streamline their networks in terms of both environmental impact and robustness;
- The introduction of societal services, such as ehealth, are facilitated;
- Operators can create new business models targeted to households and businesses.<sup>9</sup>

As pointed out by Benoit Felten of Diffraction Analysys, Stokab's financial structure is often misunderstood<sup>10</sup>. Although the company is directly owned by the City of Stockholm via a holding company, Stadshus AB, it was not originally financed using taxpayers' money (except for the initial company incorporation fee).

*"Stokab's initial purchase of a pre-existing municipal duct network and the operation's initial deployment were financed exclusively by loans backed by the City. This set-up allowed Stokab to deploy its initial network and commercialize the dark fiber, and by 1998 Stokab was cash flow positive. The financial situation was stable and positive until 2003. In the wake of an over-extension into the archipelago islands, the combination of a heavy investment to deploy the network and lackluster demand in the new market inverted the financial situation and Stokab ended up SEK32 million (€2.7 million) in the red. The ensuing loss and the generally morose business perspective led the municipality of Stockholm – through its holding structure Stadshus AB5 – to write off SEK600 million (€50 million) of assets. In 2004 Stokab was in the black again."*

From 2008 profits have steadily grown, reaching more than 150m SEK per year since 2010.

The impact of Stokab on the local economy has been measured by ACREO-Swedish ICT. In their 2013 report ACREO<sup>11</sup> *"describe Stokab's model and present the outcome of the study in terms quantification of some of Stokab's effects on the different stakeholders: Stokab's own financial result, cost savings for the municipality and the county administration, as well as benefits for businesses and end users. These effects alone amount to **16 billion SEK** (or €1.9 billion), which is nearly three times the investment."*

In the UK the nearest equivalent to the Stokab model is CityFibre in that it is a passive-only, commercially financed fibre company. However CityFibre was created as a purely private sector company, not with the support of any particular municipality.

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<sup>9</sup> <https://www.stokab.se/Global/Pdf-filer/Nyheter/TeknoekoAnalysFTTHvsFTTBStockholm150304en.pdf>

<sup>10</sup> <https://www.stokab.se/Documents/Nyheter%20bilagor/Stokab%20helps%20build%20a%20smarter%20Stockholm.pdf>

<sup>11</sup> [https://www.acreo.se/sites/default/files/pub/www.acreo.se/upload/publications/acr055698en\\_-\\_stokab\\_-\\_a\\_socio-economic\\_analysis.pdf](https://www.acreo.se/sites/default/files/pub/www.acreo.se/upload/publications/acr055698en_-_stokab_-_a_socio-economic_analysis.pdf)

There are many, many international examples of projects and approaches that facilitate the deployment of new digital infrastructure. INCA's members know many of them very well and we are happy to assist with learning how they started, how they were financed and what the results have been.

**Question 2:**

**What evidence is there to demonstrate the effectiveness and potential of approaches A to F above, specifically in the context of stimulating the rollout of local full fibre networks in urban and rural areas?**

**Demand side approaches**

*A. Public sector demand aggregation*

Both examples cited in the consultation document highlight the potential benefits of public sector aggregation. If coupled with an enlightened approach to granting wayleaves, local authorities can play a much bigger role in fostering new digital infrastructure deployment – both full fibre and wireless – without recourse to state aid and indeed create opportunities for cost savings.

*B. Voucher schemes for private sector demand aggregation.*

Use of vouchers under the SuperConnected Cities scheme demonstrated that they are an effective means of stimulating demand and supply, particularly for businesses. In the original scheme local bodies and suppliers requested greater clarity over processes for aggregation of vouchers to improve the economics for providing higher capacity services - e.g. FTTP, fibre backhaul for a fixed wireless network or use of BT's network under PIA. Supporting businesses and communities to aggregate vouchers offers a good way of ensuring the public support has maximum impact whilst not undermining the de minimis nature of the intervention. In our view a voucher scheme with a range of accredited suppliers would be a very good way to run the USO, offering an opportunity for many small communities to leapfrog basic 10Mbps services to superfast FWA or ultrafast full fibre services.

**Supply side approaches**

*C. Making public sector assets available*

Duct access - As noted in the consultation, some altnets and local authorities are pioneering use of public sector ducts under concession schemes. This creates a win-win opportunity for local authorities and suppliers, bringing underused assets into use for provisioning fibre networks. INCA members are keen that a range of options like this are actively explored for the obvious reasons that capital costs are reduced, existing infrastructure is re-used and the public sector benefits from both enhanced local services and a source of new income.



The JANET network is a major public sector asset that is already being commercialised through JISCOM. This is a good example of creative thinking being put into practice and offers an opportunity to provide backhaul and local connectivity in underserved areas. Indeed connections to local schools are already being used to help improve connectivity in a number of rural areas.

Network Rail has an extensive network of fibre running alongside railway lines throughout the country. There are significant barriers to getting access to the fibre for local networks, in terms of physical safety requirements, commercial constraints and concerns about the state aid implications. However INCA members are working with Network Rail to try to resolve some of these issues and have succeeded in creating a Cybermoor-led project as part of a BDUK Innovation Pilot scheme.

One of INCA's board members is actively involved with Network Rail on efforts to commercialise the fibre network.

*D. Access to location data on infrastructure assets*

*"One approach is to consider how a single source could be made available which provides access to such information. For example, this could comprise a GIS (Geographic Information System) location-based database that could be accessible by local authorities, and also by other parties on a commercial basis. This could potentially include information that Ofcom expect to require Openreach to provide on the physical location and characteristics of its ducts and poles."*

Good plan.

*E. Directly funding fibre routes in uneconomic areas*

For some (though not all) rural providers backhaul remains a challenging issue in many areas. For that reason public support to ensure backhaul availability is potentially very useful. At least one group of INCA members has been active in promoting such a solution in Scotland.

*It has never been clear to this author why BT is not contractually obliged to provide full open access to the publicly subsidized cabinets and fibre routes under the BDUK phase 1 and 2 programmes. The taxpayer has largely funded them and they reach deep into many rural communities offering 'spines' that could feed local access networks, whether fibre or wireless. The PIA product exists but has many, well documented limitations, although a group of INCA members is actively working with Openreach to improve the processes.*

Backhaul is not just a problem for rural fixed access networks. It affects mobile services as well, but current and future. As we noted in Building Gigabit Britain "5G will require fibre backhaul ... insufficient FTTP rollout means that 5G could be delayed."

## F. Potential pilots

INCA would be happy to promote a programme of pilot projects to test the viability of copper switch-off.

### **Question 3:**

**What is the most effective and efficient delivery model Government can use to stimulate future delivery of full fibre networks across the UK in both urban and rural areas, building on and integrating approaches that have been taken to date?**

The answer to the question is that there is not simply one model. Building Gigabit Britain argues that a combination of private sector players can deliver 80% full fibre coverage over the next 10 years on a commercial basis. For areas that are more challenging it is important to consider approaches other than simply gap funding an incumbent network. Some of the international examples given in answer to Question 1 point to a variety of models for state intervention, working with local communities in ways that maximise coverage and minimise the need for state aid. Several models were codified in the **EU Guide to High Speed Broadband Investment**<sup>12</sup> (to which key INCA members contributed).

State aid using gap funding is attractive to incumbents and local authorities taking a procurement approach – and it has delivered significant benefits in terms of superfast coverage. But its limitations for reaching the most difficult areas and the tendency towards a monopoly approach (though granted this would be less likely in future) have become very clear.

In the process of setting up new delivery models to meet the UK's 'Full Fibre and 5G' challenge, one size definitely does not fit all.

### Question 4

**What other changes, locally and/or nationally, are needed to reduce the cost of full fibre rollout, such as opening access to publicly and privately owned facilities, or changes to wayleaves, streetworks and other areas? What evidence is there to demonstrate the effectiveness of such changes?**

Wayleaves – as noted above and featured strongly in Philip Virgo's response to this consultation, wayleaves can be a significant barrier to investment. An approach that encourages local authorities and other public bodies to grant access at reduced or zero rates would yield significant benefits in new infrastructure deployment.

INCA noted a number of other regulatory challenges in Building Gigabit Britain including street works, the new ECC, business rates on fibre and the way that 'fibre'

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<sup>12</sup> <https://ec.europa.eu/digital-single-market/news/broadband-investment-guide>

products are advertised. These are subject to discussion with officials in DCMS, Treasury and other departments.