

Irish Central Border Area Network

Regional Telecommunications Action Plan

A STRATEGIC WAY FORWARD FOR
TELECOMMUNICATIONS INFRASTRUCTURE
IN THE CENTRAL BORDER REGION

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European Union
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Central Border Region
Working Together
A Spatial Planning Initiative



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0 Foreword



Foreword by Councillor Sean Mc Dermott
Chair, ICBAN Telecommunications Working Group

As the Chair of the Irish Central Border Area Network's (ICBAN) Telecommunications Working Group, I am delighted to commend to you this summary report on the 'Strategic Way Forward for telecommunications infrastructure in the Central Border Region' (main report available on ICBAN website at www.icban.com).

This report has been driven by ICBAN and undertaken as part of a wider Central Border Region Spatial Planning Initiative, which is supported by the European Union's INTERREG IVA Programme¹. This wider initiative aims to ensure regional commitment to joined-up planning practices amongst stakeholders and seeks to maximise future investment in and development of the Central Border Region. This work includes the development of a Vision Plan for the region, a Vision in which it is expected that advances in telecommunications connectivity will be seen as key to the future functionality of the Central Border area.

We continue to witness fast-paced advancements in the world of telecommunications technology. This project attempts to provide a clear picture of the existing telecommunications infrastructure provision, together with the related deficiencies which exist within this region. Furthermore and most importantly it has produced a series of actions and recommendations.

As the report explains, rural deficiencies are a reality and a source of genuine frustration to those who are experiencing them, whether it is as a domestic or business user. Telecommunications technologies, such as mobile telephones and broadband, are of paramount importance to SMEs - the lifeblood of this region's economy. To enable this sector to grow and expand and indeed to attract much needed investment, it is vital that we have the technology to do so. Our concern is that whilst our region currently lags behind in many aspects, if little is done to redress such imbalances then the region stands to lose potential investment opportunities, exacerbating an inequitable quality of life for rural communities.

A real challenge will undoubtedly be in delivering this on a cross-border basis. This initiative is a unique and ambitious approach to helping tackle such challenges right across our border area, in both jurisdictions of the Republic of Ireland and Northern Ireland.

For our region to be competitive in the future, it is vital that we have comparable levels of connectivity to other advanced areas.

¹ The views and opinions expressed in this document do not necessarily reflect those of the European Commission or the Special EU Programmes Body.

The publication of this work is only an initial step, albeit an important one. It is the implementation of the report that is the key next stage. ICBAN has an important role to play in facilitating the coming together of all the stakeholders identified, for it is only through combined efforts and joined-up working that we can make good on efforts to implement these actions and recommendations.

Finally, I would wish to record our gratitude to the participants at the consultation events, to everyone who completed surveys and to all those who provided input to the preparation of the report.

Sean Mc Dermott Chair, ICBAN Telecommunications Working Group

1 Executive Summary

1.1 Introduction

The Irish Central Border Area Network (ICBAN) commissioned this report to provide a comprehensive assessment of the current broadband and mobile telecommunications infrastructures and services within this cross-border region, and to draw up a detailed action plan to help drive the development of the telecommunications environment in the region.

The ICBAN region contains 10 local council areas in the Central Border region of Ireland, 5 councils in Northern Ireland and 5 in the Republic of Ireland. It is largely rural with low population densities and low rates of urbanisation, making it commercially challenging for communications providers.

The research uses a combination of workshops and surveys to examine the demand issues affecting with business and residential users, and a combination of interviews and desktop research to examine the supply issues impacting communications providers. It builds an in-depth picture of the telecommunications infrastructure and services in the region and develops a fuller understanding of the infrastructural deficiencies and the issues affecting users and operators.

The result is an action plan that has implications for ICBAN in how to support current central government initiatives, and how to highlight the region's issues in order to influence evolving government policy. It has impacts on the participating councils in terms of streamlining and aligning the planning regimes, and the role and potential for council sites in addressing coverage gaps. The action plan also involves the private sector in the form of the Communications Providers, who will benefit from the above improvements and consequently increase their investment in the region.

1.2 Key Findings

The main challenge for the ICBAN region is encouraging further investment in telecommunications infrastructure. Communications Providers do not have a sufficiently robust business case to adequately address the broadband and mobile requirements of rural areas, with their low population densities and low rates of urbanisation. Neither technology nor topography is a barrier to progress.

Current broadband infrastructure is not an issue for large corporates, mainly based in the towns, as evidenced in **Appendix B**. However it does adversely impact SMEs, the economic backbone of the region, and residential users.

Northern Ireland

- Northern Ireland currently has the best fixed line broadband infrastructure in the UK, in terms of speed and access. However there remain fixed broadband not-spots in rural areas that need to be addressed.
- Northern Ireland has substantially lower mobile broadband coverage than any other region in the UK. This prevents many potential subscribers from accessing a mobile broadband service. It also reduces the level of competition in the market because the fixed broadband platform in rural areas lacks a widespread mobile broadband competitor.

- The planning regime for mobile infrastructure in Northern Ireland may be too onerous, being tougher than the corresponding regimes for England, Scotland and Wales. This may have acted as a disincentive for operators, encouraging them to install sites elsewhere in the UK, with long-term implications for mobile broadband availability in the ICBAN region.

Republic of Ireland

- The fixed line broadband infrastructure in the main county towns in the ICBAN region meets the national and international connectivity requirements of larger enterprises based in those towns.
- There is extensive mobile broadband coverage in the Republic. This has helped competition in the market by providing a competitor broadband platform to fixed broadband.
- The major infrastructural weakness in the Republic is the fixed line broadband telecommunications infrastructure addressing smaller enterprises (and residential users), especially those businesses based outside the main towns. The main contributory factor is a lack of investment in fibre-based technologies such as Fibre to the Cabinet (FTTC). This adversely impacts the speed and quality of broadband available to subscribers.
- The installation of new telecommunications infrastructure is subject to planning regulations. Many (though not all) local authorities impose development contribution fees on telecommunications infrastructure. These fees, and the delays and the additional administrative burden imposed by regulation on a local authority basis, impose costs on operators looking to rollout or extend telecommunications networks.

1.3 The ICBAN Vision

The ICBAN vision for telecommunications infrastructure is that:

The ICBAN region will have an advanced broadband infrastructure capable of delivering download speeds of at least 100Mbps to 50% of premises, and delivering download speeds of at least 24Mbps to the remaining 50% of premises by 2017.

This vision is achievable - these speeds are already available in the main cities in the Republic and Northern Ireland. The realisation of the ICBAN vision will necessitate a mix of private and public investment. Communications Providers do not have a sufficiently robust business case to adequately address the broadband requirements of rural areas, with their low population density and low rate of urbanisation. The business case therefore needs government support.

Each Government has already positively demonstrated its commitment to supporting the provision of broadband telecommunications infrastructure, as evidenced by DETI's support of the Next Generation Broadband project in Northern Ireland and DCENR's support of the National Broadband Scheme in the Republic. Further support from both Governments will be required to fully address the broadband requirements of the ICBAN region.

The ICBAN vision will only be achieved through the combined efforts of communications providers, central government and local government. The communications providers will invest in infrastructure and services, once there is a sufficient return on investment. Central

government must support the business case for broadband in rural areas, through public funding and through ensuring the availability of state assets to facilitate the rollout of broadband infrastructure.

Local government has a critically important facilitative role in the areas of planning, asset availability and local engagement. The next section summarises the recommendations that must be addressed so that participating councils become the facilitators in the provision of better broadband services in the ICBAN region and achieve the 2017 vision.

1.4 Summary of Recommendations and Actions

Pillars	Recommendations	Actions	Actors
<p>I. PLANNING</p>	<p>I.1: Determine the changes necessary to the current planning regime regarding mobile infrastructure to encourage better mobile coverage in the ICBAN Region. (NI)</p>	<ul style="list-style-type: none"> • Examine planning legislation/practice as it relates to mobile infrastructure in Northern Ireland, compared to that operating in other regions in the UK; • Consult with mobile operators to identify what planning legislation or practices act as barriers to the rollout of mobile infrastructure in Northern Ireland; • Engage with the relevant planning authorities to consider the best ways of addressing any barriers in terms of planning practice; and • Engage with legislators to consider the best ways of addressing any barriers in terms of legislation. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Planning Authorities • Operators • DETI • Legislators
	<p>I.2: Align telecommunications infrastructure planning regulation in the ICBAN region. (ROI)</p>	<ul style="list-style-type: none"> • Apply a consistent approach to telecommunications infrastructure planning across the ICBAN councils in relation to planning policy, procedures and charges; • Agree and implement a transparent and consistent system of (ideally low or no) development contributions for telecommunications infrastructure across the ICBAN councils; • Engage with communications providers to ensure that any barriers in terms of planning and development contributions are addressed; • Consult with the Department of Environment, Community and Local Government (DECLG) regarding national planning guidelines, and with the Department of Communications, Energy and Natural Resources (DCENR) regarding national broadband policy and planning. ICBAN can act as a pilot region for new and revised processes relating to masts, street furniture and road works. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators • DCENR • DECLG

Pillars	Recommendations	Actions	Actors
<p>II. PUBLIC ASSETS</p>	<p>II.1: Identify council owned sites that are suitable for hosting mobile or wireless infrastructure. (NI)</p>	<ul style="list-style-type: none"> • Undertake an audit of all council properties; • Engage with operators in the UK to identify gaps in mobile infrastructure and coverage, and to help select properties of interest; • Agree a common approach by the councils to commercial terms and conditions; • Operate an open and transparent process in providing access to council assets across the ICBAN region, and • Encourage operators to share sites. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators
	<p>II.2: Identify council owned sites that are suitable for hosting mobile or wireless infrastructure. (ROI)</p>	<ul style="list-style-type: none"> • Undertake an audit of all council properties; • Engage with operators in ROI to identify gaps in mobile infrastructure and coverage, and to help select properties of interest; • Agree a common approach by the councils to commercial terms and conditions; • Operate an open and transparent process in providing access to council assets across the ICBAN region, and • Encourage operators to share sites. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators
<p>III. INVESTMENT</p>	<p>III.1: Support DETI in the identification of broadband not-spot areas for the forthcoming fixed and mobile procurement project. (NI)</p>	<ul style="list-style-type: none"> • Share survey data relating to address and post code information with the department, and • Support the department in its dimensioning of fixed and mobile not-spots as part of its forthcoming fixed and mobile services procurement processes. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • DETI

Pillars	Recommendations	Actions	Actors
<p>III. INVESTMENT (Continued)</p>	<p>III.2: Lobby for greater investment in telecommunications infrastructure in the ICBAN region. (NI)</p>	<ul style="list-style-type: none"> • Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning 4G mobile networks; • Lobby DETI to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and • Evaluate the EU's Connecting Europe Facility (CEF) as it develops from 2014 onwards and determine if there's a potential application for this funding in the ICBAN region. 	<ul style="list-style-type: none"> • ICBAN • Operators • DETI • EU Commission
	<p>III.3: Lobby for greater investment in telecommunications infrastructure in the ICBAN region. (ROI)</p>	<ul style="list-style-type: none"> • Monitor the ongoing development of broadband policy, in particular the development by DCENR of a National Broadband Plan due to be finalised and released in July 2012; • Engage with DCENR to highlight the broadband initiatives being undertaken by ICBAN to remove barriers to infrastructure, and to attract greater investment by operators; • Lobby DCENR to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and • Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning 4G mobile networks, and Eircom and its Next Generation Access (NGA) programme. 	<ul style="list-style-type: none"> • ICBAN • DCENR • Operators
	<p>III.4: Monitor investment resulting from ICBAN activities. (NI & ROI)</p>	<ul style="list-style-type: none"> • Monitor the level of infrastructure investment and delivery arising directly from the broadband initiatives being undertaken by ICBAN and its participant local councils. 	<ul style="list-style-type: none"> • ICBAN • Operators • Local Councils

Pillars	Recommendations	Actions	Actors
<p>IV. LOCAL ACTIVISM</p>	<p>IV.1: Support local broadband initiatives. (NI & ROI)</p>	<ul style="list-style-type: none"> • Engage with communities looking to implement local broadband access solutions, providing support in terms of planning and access to public assets; • Harness local technology expertise in the form of technical R&D skills from local third level institutions, and ICT support skills from local businesses; • Track access and quality issues through an annual survey of communications services across the ICBAN region; • The Regional Telecommunications Action Plan (RTAP) should be led by a Programme Manager, responsible for the overall delivery of the action plan, and • There should be a Programme Champion within each local council to ensure that each council fully engages with the programme across all the functions under its remit. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Local Communities
<p>V. DEMAND STIMULATION</p>	<p>V.1: Increase awareness of broadband. (NI & ROI)</p>	<ul style="list-style-type: none"> • Support national broadband awareness campaigns aimed at prospective business and residential users; • Promote increased availability of online government services; • Encourage eWorking initiatives in local government, and • Track take-up through an annual survey of communications services across the ICBAN region. 	<ul style="list-style-type: none"> • ICBAN • Local Councils

2 Introduction

2.1 Context and Background

The ICBAN region comprises the local authority areas covered by ten stakeholder local councils. Five councils are from Northern Ireland and they include: Armagh City & District, Cookstown, Dungannon and South Tyrone, Fermanagh and Omagh. Five councils are from the Republic of Ireland: Cavan, Donegal, Leitrim, Monaghan and Sligo.

Previous research has confirmed that the Central Border Region has less availability, choice and coverage in terms of numbers of fixed, mobile and broadband operators. Residents have lesser access to broadband and mobile technologies and are generally less satisfied with their telecommunications services. Businesses in the region believe that access to better telecommunications services, both mobile and broadband, would directly benefit their enterprises.

The region has a strong and growing micro business and Small Medium Enterprise (SME) community, enormous tourism potential and is continually seeking to target inward investment. However this is dependent upon a world class telecommunications infrastructure, without which the region, its businesses and residents are at a permanent and significant disadvantage.

ICBAN has established a Telecommunications Working Group to look at the telecommunications issues in the region, with the aim of adopting a more strategic approach, focusing on lobbying central government, proactively responding to new economic challenges, making representations to telecommunications companies and collaborating with other regions.

This report is grounded within ICBAN's Spatial Planning Initiative, which facilitates the strategic planning and coordinated action for regional development and future economic functionality. The initiative is underpinned by clear identification of middle and longer term public investment priorities in the areas of infrastructure, telecommunications, energy etc. It will produce a 'Vision' which will be used to influence central and local government alike, and will also provide an agreed basis for any future co-operation in respect of investment in the Central Border area.

2.2 Research Already Undertaken by ICBAN Member Councils

2.2.1 Cookstown District Council

In July 2011, Cookstown District Council undertook a broadband survey examining the quality of broadband available to business and residential users in the council area.

The survey based on 187 respondents highlighted the following issues:

- Lack of Availability – 29% of respondents had no access to a broadband service.
- Low Quality – 45% of respondents reported regular loss of service and 64% reported very low speeds

- Geographic Concentrations of Disadvantage – a lack of access to broadband, or poor quality broadband were concentrated in particular rural locations.

2.2.2 Sligo County Council

In June 2010, the Sligo County Community Forum produced a report on broadband availability in County Sligo.

The report contains evaluations of broadband service availability and quality across the following broadband technologies:

- **Mobile.** Completed evaluations took into account actual mobile network coverage measures versus predicted coverage plots.
- **Fixed Wireless.** Analysis of Fastcom's network as a representative of this industry sector. Evaluations were limited to sample throughput tests versus predicted network coverage.
- **Fixed Line.** Broadband services available via Eircom's DSL (Digital Subscriber Line) infrastructure. Analysis was supported by a technical online survey.

2.3 Report Overview

Section 3 outlines the telecommunications infrastructure in Northern Ireland, describing the fixed line, mobile and fixed wireless infrastructures, as well as the services offered by each of the main communications providers. It highlights Northern Ireland's recent developments in fibre-based fixed line technology and the limitations in mobile broadband coverage.

Section 4 outlines the telecommunications infrastructure in the Republic Ireland, describing the fixed line, mobile and fixed wireless infrastructures, as well as the services offered by each of the main communications providers. It highlights recent planned developments in fibre-based fixed line technology, the impact of cable broadband on the market and the extent of mobile broadband coverage.

Section 5 presents an overview of fixed line, mobile and fixed wireless access (FWA) technologies currently operational in the market. It examines future technologies such as 4G (4th generation mobile) and describes the satellite services available in both jurisdictions.

Section 6 reviews three relevant international case studies of regional broadband projects, in areas with issues similar to those of the ICBAN region. More specifically, this section focuses on the lessons learned from these projects, and the relevance of those lessons for ICBAN.

Section 7 gives a synopsis of current government telecommunications initiatives, commencing with the EU's 2020 targets and its planned Connecting Europe Facility. It then goes on to describe the current telecommunications plans and programmes in Northern Ireland and the Republic.

Section 8 documents the user survey undertaken as part of this study. The survey process commenced with a series of workshops held for business and residential users in each local council area. A comprehensive survey resulted in over 1,900 responses from across the region. Broadband take-up among correspondents was over 80% in both jurisdictions with BT dominating service provision in Northern Ireland, while market share is more distributed in the Republic. Satisfaction levels were higher in the Republic across the topics of choice,

speed and quality. The survey results also underlined the importance to residential users of broadband access for education purposes.

Section 9 summarises the study findings. It highlights infrastructural strengths such as Fibre to the Cabinet (FTTC) in Northern Ireland and 3G coverage in the Republic. With an eye on issues to be addressed, the focus is on the infrastructural deficiencies, such as patchy broadband coverage and fixed line not-spots in Northern Ireland, and the lack of investment in fibre-based broadband in the Republic. Underlying issues with the planning regimes, both North and South, are also explored.

Section 10 describes ICBAN's vision for telecommunications infrastructure.

Section 11 identifies and describes the recommended actions to support and promote the case for upgrading the telecommunications infrastructure across the ICBAN region. An implementation plan with timelines and milestones is included. The actions are broken down for each jurisdiction, as each is a separate market operating under its own regulatory and planning regimes. Finally, high level infrastructure costs are provided for the implementation of a fibre-based solution throughout the council areas in the Republic, and for the extension of mobile broadband coverage in council areas in Northern Ireland.

2.4 Methodology

Figure 2.1 below presents an overview of the methodology followed for this assignment.

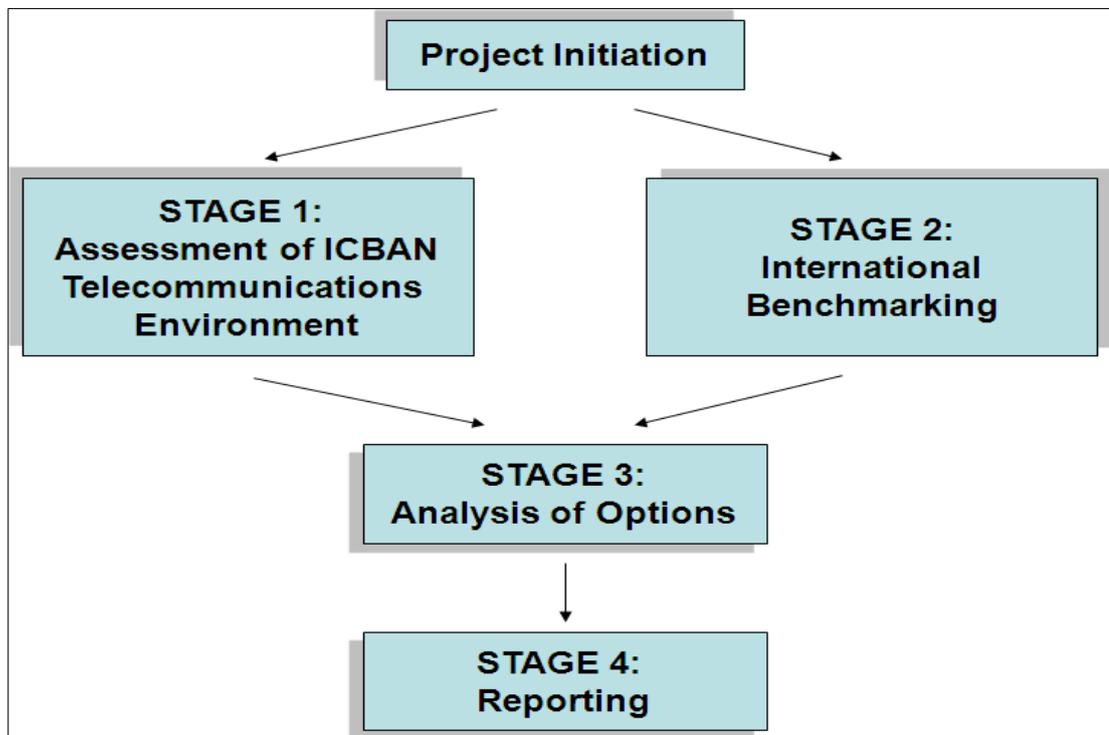


Figure 2.1: Assignment Methodology

The remainder of this chapter details the proposed methodology which is made up of four main stages.

2.4.1 STAGE 1: Assessment of ICBAN Telecommunications Environment

This stage of the assignment comprised two main activities: Supply Assessment and Demand Assessment.

This Supply Assessment activity documented the existing and planned telecommunications infrastructure and services in the ICBAN region, separately for each jurisdiction to take account of the different governmental policies, regulatory regimes and competitive environments. The assessment is primarily based on information gathered from the fixed, mobile and Fixed Wireless Access (FWA) communications providers active on each side of the border, and market data sourced from the relevant regulator in each jurisdiction. The potential impact on the region of planned initiatives by governments and regulators is also documented.

The Demand Assessment examines the issues on the ground that act as a barrier to take-up of affordable broadband services, and that influence mobile use in the region. The assessment is based on a series workshops held for each council area, combined with a survey of business and residential users. Over 1,900 survey responses were collected.

2.4.2 STAGE 2: International Benchmarking

This is an examination of the experiences of other European regions in addressing issues similar to those faced by the ICBAN region, such as low population densities, low urbanisation, geographical remoteness and topographical challenges. Of particular interest are those regions where proactive initiatives by a combination of local government and business have boosted the availability of and demand for telecommunications infrastructure and services.

2.4.3 STAGE 3: Analysis of Options

The main findings of the study are derived from the outputs of the telecommunications environment assessment and the lessons learned from international exemplars. The result is a telecommunications infrastructure vision for the ICBAN region and a set of detailed recommendations to best address the findings.

2.4.4 STAGE 4: Reporting

The main output of the study is a Regional Telecommunications Action Plan to support and promote the case for improving the telecommunications infrastructure and services across the ICBAN region.

3 Telecommunications Infrastructure in Northern Ireland

This section describes the telecommunications infrastructure in Northern Ireland in relation to fixed line, mobile and fixed wireless services.

Satellite services are described separately in **Section 5.4** of this report.

3.1 Fixed Line Telecommunications Services

This section presents an overview of fixed broadband connectivity in Northern Ireland and then outlines the infrastructure of the main fixed line communications providers.

3.1.1 Fixed Broadband Connectivity

In November 2011, Ofcom released maps and data sets² for fixed broadband connectivity, based on council areas in the UK. This was accompanied by a communications infrastructure report for fixed broadband data³ for the UK.

Figure 3.1 and Table 3.1 overleaf show the fixed broadband data for each district council area in Northern Ireland, in a ranking of 1 to 5 in terms of decreasing coverage. This data shows that fixed broadband in the ICBAN region in Northern Ireland is picture of contrasts. Whereas it has the highest superfast⁴ availability in the UK, it also has some of the lowest average sync speeds and some of the highest percentages of subscribers getting less than 2Mbps in the UK:

- **Average Sync Speeds:** Fermanagh is the lowest, Cookstown the second lowest, Dungannon the fourth lowest, Armagh the twelfth lowest and Omagh the twenty third lowest of the 200 council areas in the UK;
- **Percentages Getting Less Than 2Mbps:** Cookstown is the highest, Dungannon the second highest, Fermanagh the third highest, Omagh the fourth highest and Armagh the fifth highest of the 200 council areas in the UK.

² <http://maps.ofcom.org.uk/broadband/index.html>

³ *Ofcom Communications Infrastructure Report 2011: Fixed Broadband Data*. Ofcom, 06/07/2011. <http://maps.ofcom.org.uk/broadband/downloads/ofcom-uk-broadband-speed-report-2011.pdf>

⁴ Superfast broadband is defined by Ofcom as delivering a download speed of 24Mbps or more.

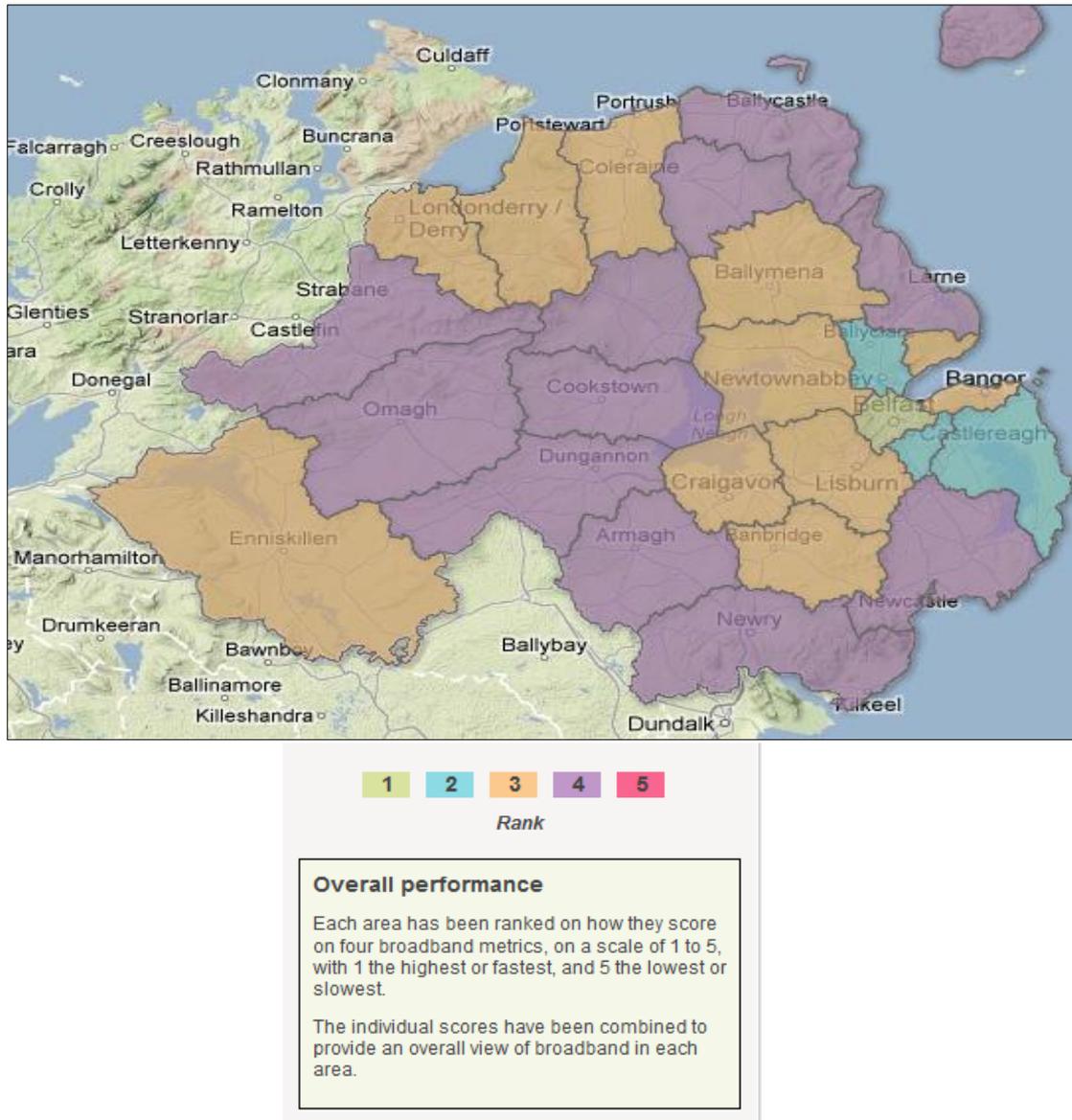


Figure 3.1: Fixed Broadband Ranking [Source: Ofcom]

Table 3.1 below shows the fixed broadband data for each of the ICBAN council areas in Northern Ireland.

	Average Sync Speed (Mbps)	Percentage Getting Less than 2Mbps	Superfast Broadband Availability	Broadband Take-Up	Ofcom Ranking (1 to 5)
Armagh City and District	5.3	30.2	94%	58%	4
Cookstown District	4.4	35.9	98%	57%	4
Dungannon and South Tyrone Borough	4.7	33.2	97%	57%	4
Fermanagh District	4.3	32.9	96%	60%	3
Omagh District	5.5	31.9	99%	56%	4

Table 3.1: Fixed Broadband Data for Each Council Area [Source: Ofcom]

3.1.2 BT

BT is the incumbent fixed-line communications provider in Northern Ireland. It provides broadband access to businesses via leased line connections for larger businesses, and DSL connections for smaller enterprises. BT’s market share of the fixed broadband connections in the UK is 28%⁵. No corresponding figure exists for Northern Ireland.

In December 2009, following a competitive tender process, the Department of Enterprise Trade and Investment (DETI) announced that the contract for the delivery of the **Next Generation Broadband** project was awarded to BT. With public funding of £18m in addition to £30m from BT, the project aimed to increase the availability of next generation broadband speeds to 85% of businesses by 2011, providing a minimum downstream speed of 10Mbps to businesses in urban areas and 2Mbps to businesses in rural areas. Over 1,250 cabinets were fibre enabled throughout Northern Ireland as part of this project, in addition to another 1,000 cabinets being fibre enabled by BT through its own resources.

Existing Infrastructure

BT has the most extensive fixed-line network in Northern Ireland with approximately 200 local exchanges and 3,000 cabinets.

- Backbone Network

BT’s backbone network is fibre-based and connects approximately 190 exchange sites throughout Northern Ireland. There are connections to Great Britain via Belfast, Downpatrick and Larne and a cross-border link to the Republic via Newry.

Figure 3.2 below shows BT’s backbone network in Northern Ireland.

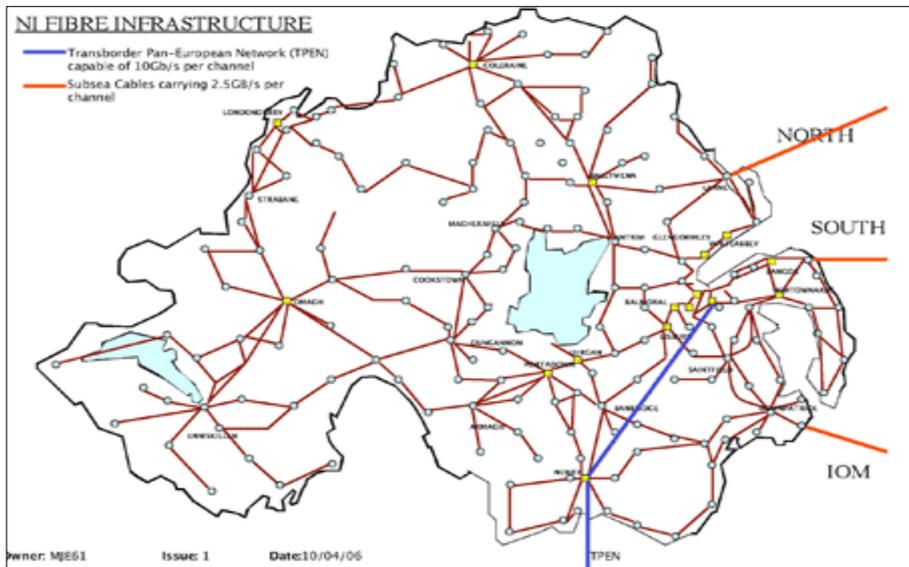


Figure 3.2: BT’s Backbone Network in Northern Ireland. [Source: DETI⁶]

⁵ <http://media.ofcom.org.uk/facts/>

⁶ www.detini.gov.uk/deti-telecoms-index/deti-telecoms-infrastructure/deti-telecoms-infrastructure-bt.htm

- Distribution Network

All of BT's local exchanges in Northern Ireland are ADSL-enabled, allowing download speeds of up to 20Mbps to subscribers within the operating range of the exchange. 75% of BT's local exchanges are Local Loop Unbundled (LLU) exchanges that allow other operators use BT's copper network to provide broadband services to businesses and households.

Figure 3.3 below show BT's exchange network in Northern Ireland.

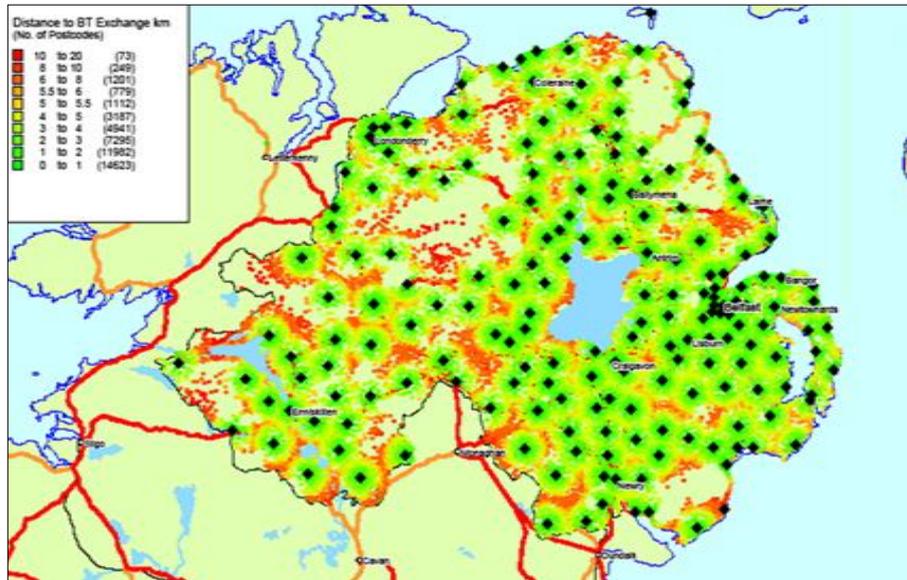


Figure 3.3: BT's Exchange Network in Northern Ireland. [Source: DETI⁷]

- Access Network

There are approximately 450,000 subscribers using BT access lines in Northern Ireland. In June 2011, 81% of households in Northern Ireland were passed by Fibre to the Cabinet (FTTC) connection. BT has 89% of households in the province passed by fibre broadband since the end of Q1 2012.

In November 2011, BT announced that all street cabinets in Derry City had been upgraded with fibre broadband, making it the first city in the UK to achieve this milestone.

BT currently offers two types of broadband service:

- **Total Broadband.** This broadband service is based on a direct ADSL⁸ connection between the local exchange and the subscriber's premises. It provides download speeds up to 20Mbps. Access is shared between users. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any particular time.
- **Infinity Broadband.** This 'superfast' broadband service is based on Fibre to the Cabinet (FTTC) technology. It originally provided download speeds of up to 40Mbps, but this was increased to 80Mbps in April 2012. Access is not shared between users. Speed performance is consistent throughout the day. A 100Mbps

⁷ www.detini.gov.uk/deti-telecoms-index/deti-telecoms-infrastructure/bt_exchanges.htm

⁸ Asymmetric Digital Subscriber Line (ADSL)

product, based on Fibre to the Premises (FTTP) technology, is currently being introduced to the UK market.

Download/upload speeds are dependent on line quality and distance from the exchange.

Planned Developments in ICBAN Region

No further rollout of FTTC technology is planned, once the current programme is completed at the end of March 2012.

BT is currently planning its Fibre to the Premises (FTTP) programme which will deliver much greater speeds (from 100Mbps up to 300Mbps) to subscribers. However this initiative will commence in the cities and it is unclear when it will impact the ICBAN region.

3.1.3 Virgin Media

Virgin Media has the second highest market share of fixed broadband connections in the UK at 22%⁹, behind BT at 28%. No corresponding figure exists for Northern Ireland. However Virgin Media only passes 30% of homes in Northern Ireland compared to 48% of all UK households¹⁰.

Figure 3.4 below underlines the urban focus of Virgin Media’s cable broadband network, passing 55% of residential premises in urban areas in the UK, but only passing 21% of homes in rural areas.

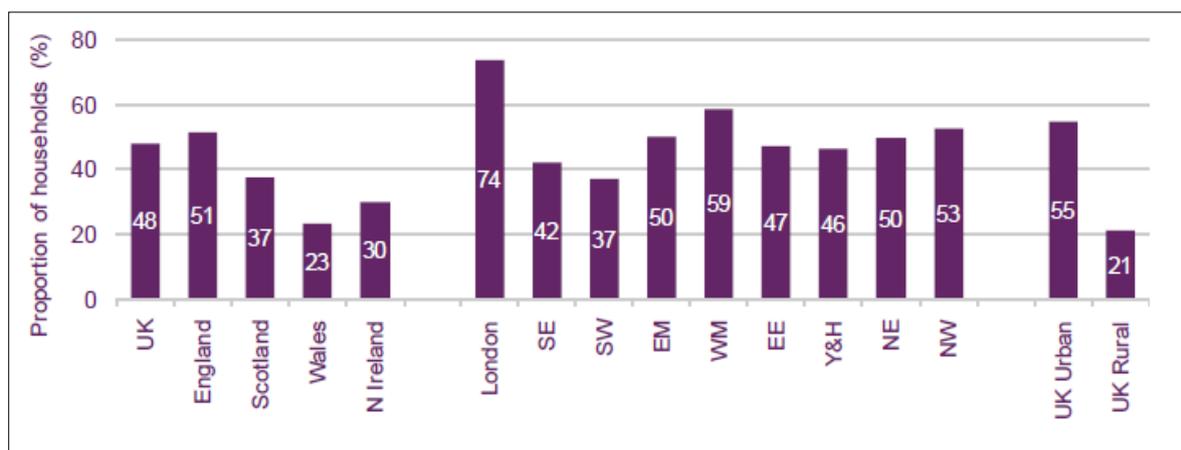


Figure 3.4: Proportion of Households passed by Virgin Media’s Network [Source: Ofcom]

In Northern Ireland, Virgin Media’s network is concentrated in the cities and larger towns providing download speeds of up to 50Mbps, and up to 100Mbps in some areas of Belfast and Derry city.

⁹ <http://media.ofcom.org.uk/facts/>

¹⁰ Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011. <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

Existing Infrastructure

- Backbone Network

Virgin Media’s backbone network, shown in Figure 3.5 below, is based on the Saturn Ring connecting Belfast, Armagh, Derry/Londonderry and Coleraine.

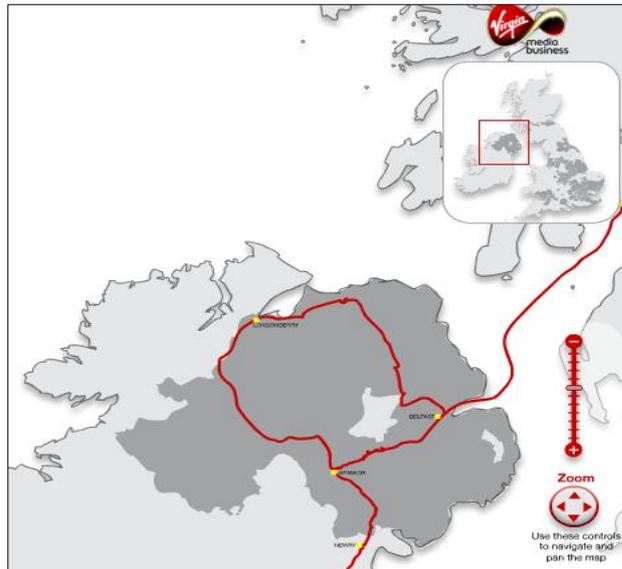


Figure 3.5: Virgin Media’s Backbone Network in Northern Ireland. [Source: Virgin Media Business¹¹]

- Distribution Network

Figure 3.6 below shows Virgin Media’s distribution network comprising twelve Points of Presence (POPs) in Northern Ireland. Only two of these POPs, based in Armagh and Omagh, are in the ICBAN area. Virgin Media does not have a POP in Dungannon, even though the Saturn Network passes through there.



Figure 3.6: Virgin Media’s Distribution Network in Northern Ireland. [Source: Virgin Media Business]

¹¹ <http://www.virginmediabusiness.co.uk/files/tlw105-VRB.html>

- Access Network

Virgin Media provides broadband services based on two different means of access:

1. **Cable Modems** within the areas where it has its own cable network as shown in Figure 3.7 below, i.e. Belfast, Derry/Londonderry, Larne and Bangor. Virgin Media provides four broadband offerings of up to 10Mbps, 30Mbps, 50Mbps and 100Mbps download respectively, each with unlimited usage.
2. **Third Party Access** for business subscribers not on its cable network, via wholesale access provided by other operators, e.g. BT. Virgin Media provides an ADSL-based service with up to 20Mbps download depending on the subscriber's distance from the nearest exchange.

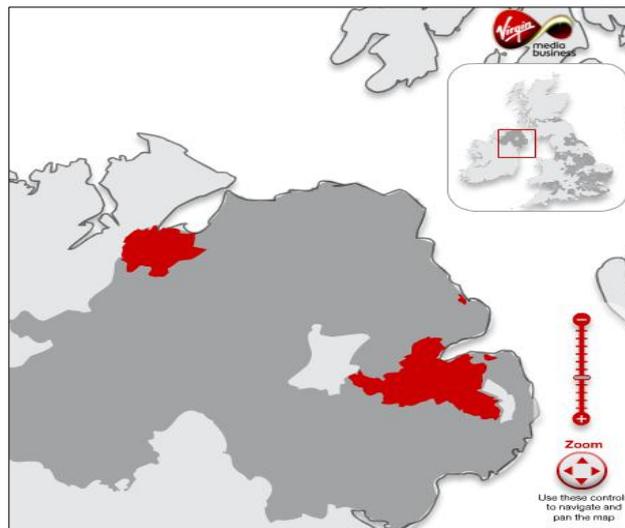


Figure 3.7: Virgin Media's Cable Modem Coverage in Northern Ireland. [Source: Virgin Media Business]

Planned Developments in ICBAN Region

Virgin Media have no current plans to extend its network presence in the ICBAN region.

3.1.4 Eircom Northern Ireland

Eircom Northern Ireland is a subsidiary of the incumbent telecommunications operator in the Republic of Ireland. Eircom NI primarily focusses on the provision of telecommunications services to the public sector and to corporate enterprises. Eircom NI does not market services to the Small and Medium Enterprise (SME) sector and currently does not plan to do so.

Existing Infrastructure

- Backbone Network

Eircom NI's backbone network is based on the Saturn Ring connecting Belfast, Armagh, Derry/Londonderry and Coleraine. The network is connected to Great Britain via Belfast to Manchester.

There are international connections to the Republic via Newry to Dublin and via Derry/Londonderry to Letterkenny.

- Distribution Network

Figure 3.8 below shows Eircom NI's distribution network. The network's Points of Presence (POPs) in the ICBAN region include Armagh, Irvinestown and Omagh.



Figure 3.8: Eircom NI's Distribution Network [Source: Eircom Northern Ireland]

- Access Network

Eircom NI provides access to its customer base using fibre, microwave links, as well as taking circuits from BT and Virgin Media.

Planned Developments in ICBAN Region

Eircom NI currently plans to install new POPs in Enniskillen and Newry.

Eircom NI is also considering the provision of wholesale access to their network to other operators.

3.1.5 Atlas Communications

Atlas Communications provides communications and hosting solutions to government and business sectors in Northern Ireland.

Existing Infrastructure

- Backbone Network

Atlas' backbone network is based on the southern half of the Saturn Ring linking Belfast, Armagh and Derry/Londonderry. This network is supplemented by a connection from Belfast to Southport in England as well as international connections: To Dublin via Armagh and Monaghan, and to North America via Hibernia Atlantic in Belfast.

- Distribution Network

Atlas has Points of Presence (POPs) in Armagh, Belfast, Derry/Londonderry, Omagh and Portadown.

- Access Network

Atlas connects its customer base to its POPs either directly through a fibre connection or via a tail circuit from another communications provider.

3.2 Mobile Telecommunications Services

Five operators provide mobile services in Northern Ireland: Vodafone, Orange, O2, T-Mobile and 3. The first four operators run a combination of second generation (2G) network and third generation (3G) networks to provide voice and broadband services. 3 provides voice and broadband services over a 3G network.

2G, also called GSM, is an older low-speed mobile technology supporting voice and narrowband data services (e.g. texting) for subscribers. 3G is a more recent high-speed mobile technology supporting broadband data and voice services for subscribers.

Mobile operators do not release information on their network infrastructures for commercial and security reasons. Many operators provide coverage maps on their web-sites. These maps are high level in nature showing where mobile reception may be available. However they do not take adequate account of local topographies and are not therefore a guarantee of mobile reception in any specific location.

3.2.1 2G Coverage

The most recent report on the Northern Ireland communications market¹² by Ofcom, the UK's communications regulator, highlights that 2G mobile coverage is 87% in Northern Ireland, below that of the UK as a whole at 96%. This reflects Northern Ireland's lower population density combined with its challenging topography, where mountains and hills reduce the effective range of cellular infrastructure.

Figure 3.9 below compares the 2G mobile phone coverage for the various regions in UK. The figures show the percentage of population within postcode districts with at least 90% area coverage. The 2G coverage for Northern Ireland is roughly comparable to that of Scotland and Wales, though 12% less than that of England.

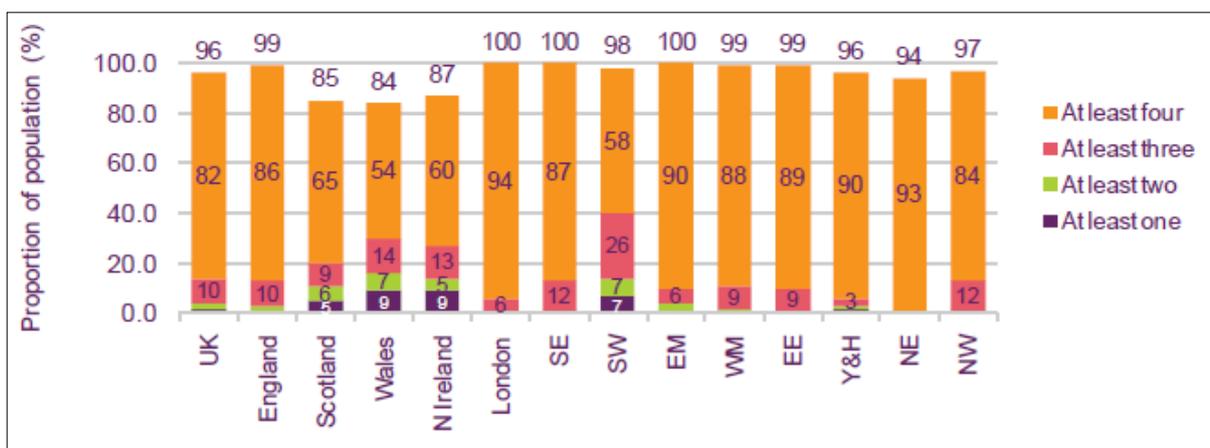


Figure 3.9: 2G Mobile Phone Population Coverage [Source: Ofcom]

¹² Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011. <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

Furthermore in November 2011, Ofcom released maps and data sets¹³ for mobile coverage, based on council areas in the UK. This was accompanied by Ofcom’s first communications infrastructure report¹⁴ for the UK.

Figure 3.10 below shows the 2G coverage of premises in each district council area in Northern Ireland, in a ranking of 1 to 5 in terms of decreasing coverage.

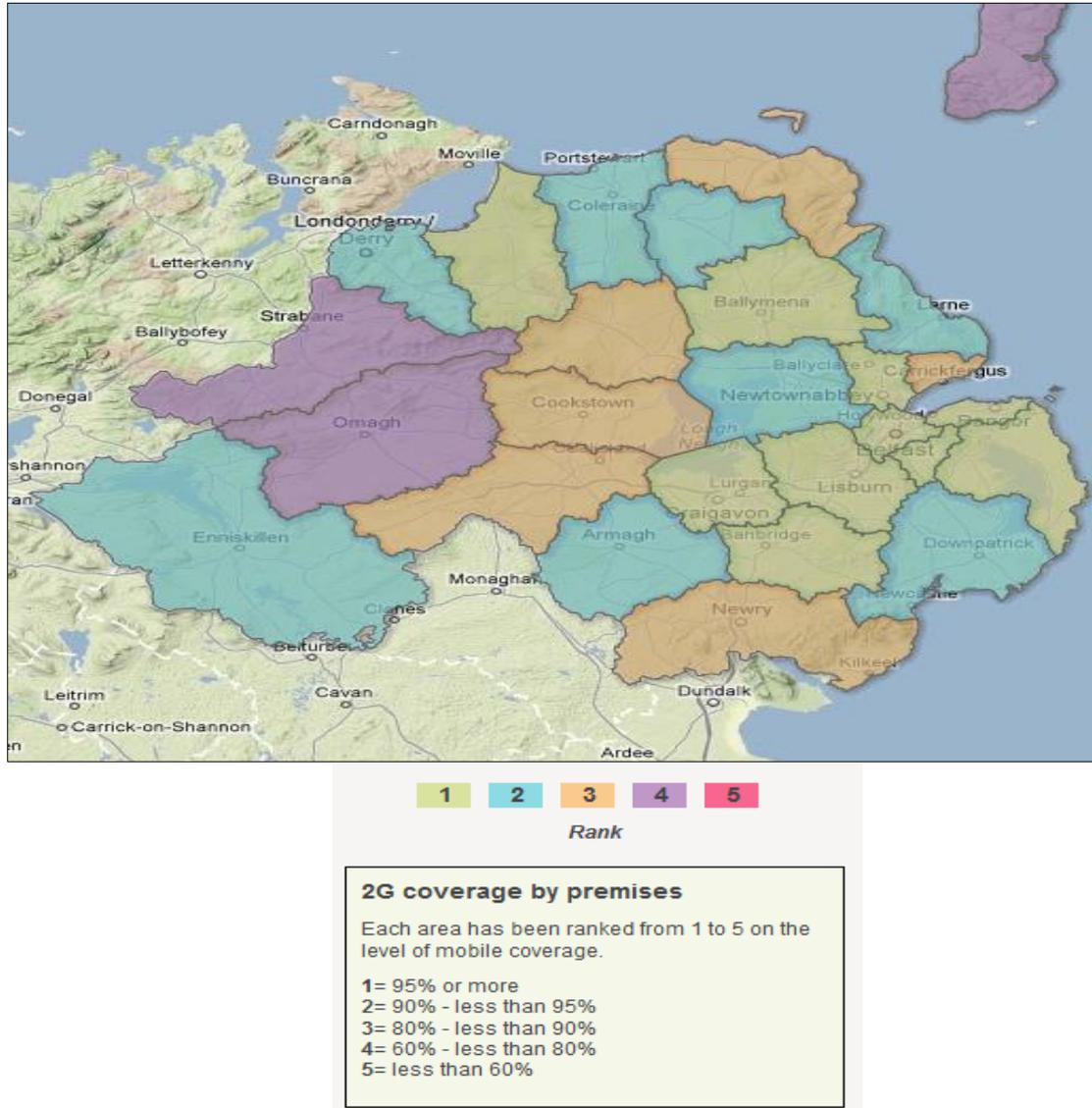


Figure 3.10: The Percentage of Premises Covered by 2G [Source: Ofcom]

Table 3.2 below shows the coverage for each of the ICBAN council areas in Northern Ireland. Omagh has the worst coverage at 77% of premises, with both Armagh and Fermanagh having the best coverage at 93% of premises.

¹³ <http://maps.ofcom.org.uk/mobile/index.html>

¹⁴ *Ofcom Infrastructure Report: The first Communications Infrastructure Report*. Ofcom, 01/11/2011. <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/comms-infrastructure-report/>

	Coverage from All Operators	No Reliable Signal	Ofcom Ranking (1 to 5)
Armagh City and District	93%	<1%	2 (90 < 95%)
Cookstown District	84%	<1%	3 (80 < 90%)
Dungannon and South Tyrone Borough	81%	<1%	3 (80 < 90%)
Fermanagh District	93%	<1%	2 (90 < 95%)
Omagh District	77%	<1%	4 (60 < 80%)

Table 3.2: The Percentage of Premises Covered by 2G for Each Council Area [Source: Ofcom]

3.2.2 3G Coverage

The most recent report on the Northern Ireland communications market¹⁵ by Ofcom highlights that 3G mobile coverage is 54% in Northern Ireland, substantially lower than that of the UK as a whole at 95%. This is by far the lowest 3G coverage in the UK.

Figure 3.11 below compares the 3G mobile phone coverage for the various regions in UK. The figure shows the percentage of population within postcode districts with at least 90% area coverage. It's worth noting the large gap in coverage between Northern Ireland at 54% and the region with the next lowest coverage - Wales at 82% coverage.

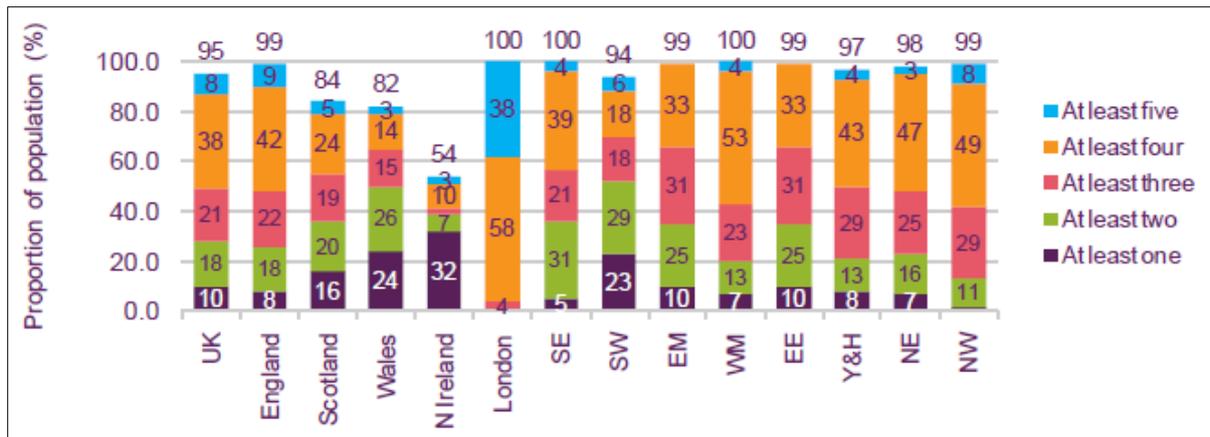


Figure 3.11: 3G Mobile Phone Population Coverage [Source: Ofcom]

There are several factors contributing to the particularly low coverage for Northern Ireland:

- Northern Ireland has a lower population density than the UK as a whole;
- The topography of Northern Ireland, especially in the west, is defined by mountains and hills that reduce the effective range of cellular base stations, thereby requiring a greater number of base stations to provide coverage; and
- 3G uses higher frequencies (2.1GHz) than 2G (900MHz and 1.8GHz) and these frequencies do not propagate as far as 2G frequencies, again requiring a greater number of base stations to provide coverage.

¹⁵ Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011. <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

However, these factors also apply to large swathes of Scotland (84% coverage) and Wales (82% coverage). The discrepancy in coverage suggests that the 3G operators, each mandated to cover 95% of the UK population, have largely ignored rural Northern Ireland and included it in the 5% of the UK population that need not be covered.

In November 2011, Ofcom released maps and data sets¹⁶ for mobile coverage, based on council areas in the UK. This was accompanied by Ofcom’s first communications infrastructure report¹⁷ for the UK. Figure 3.12 below shows the 3G coverage of premises in each district council area in Northern Ireland, in a ranking of 1 to 5 in terms of decreasing coverage.

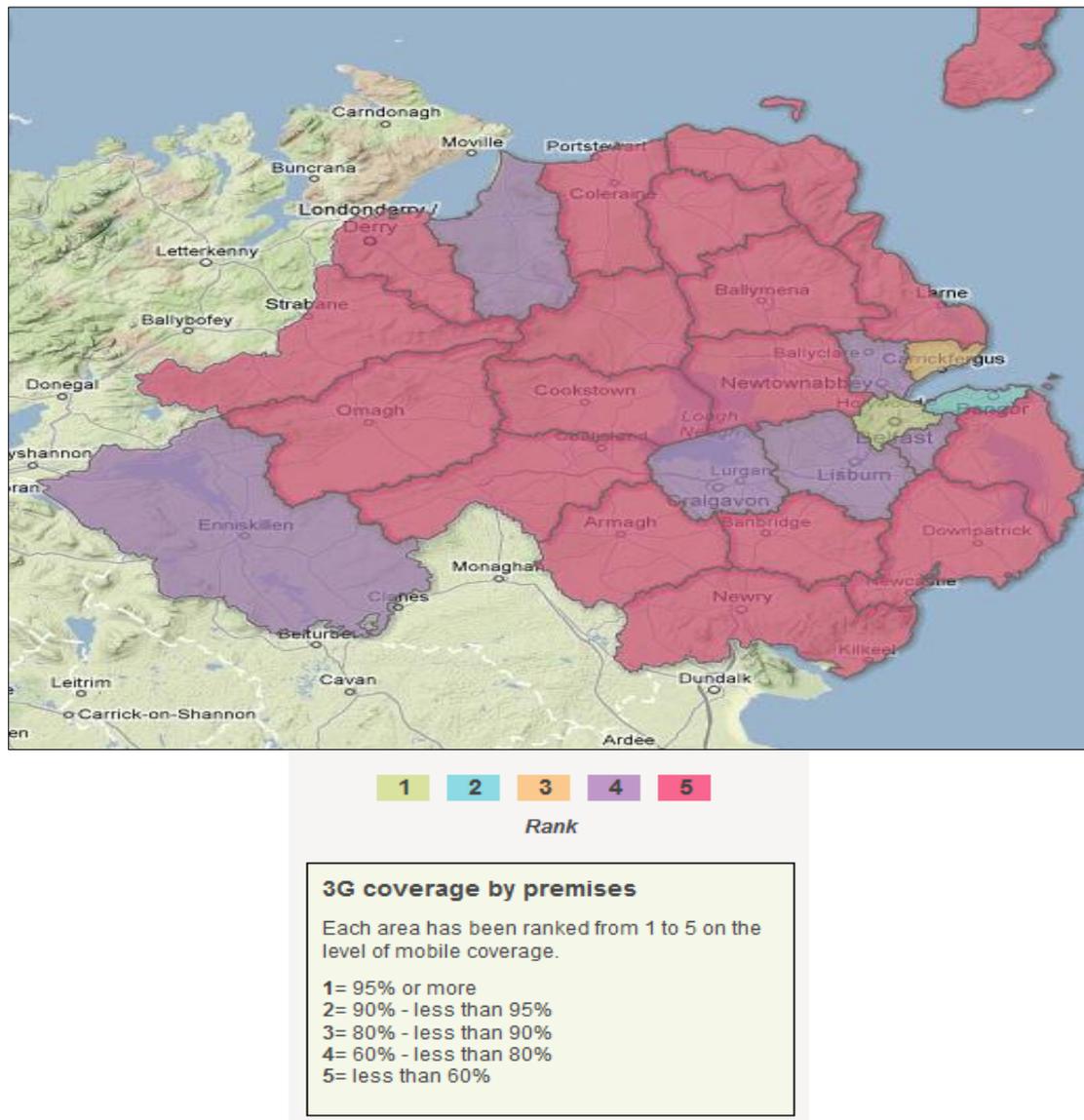


Figure 3.12: The Percentage of Premises Covered by 3G [Source: Ofcom]

Table 3.3 below shows the 3G coverage for each of the ICBAN council areas in Northern Ireland. Dungannon and South Tyrone Borough and Omagh District have less than 1% of

¹⁶ <http://maps.ofcom.org.uk/mobile/index.html>

¹⁷ Ofcom Infrastructure Report: The first Communications Infrastructure Report. Ofcom, 01/11/2011. <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/comms-infrastructure-report/>

their areas covered by the five 3G operators. This implies that one or more of the operators have decided not to provide 3G coverage in these council areas.

	Coverage from All Operators	No Reliable Signal	Ofcom Ranking (1 to 5)
Armagh City and District	16%	15%	5 (< 60%)
Cookstown District	38%	11%	5 (< 60%)
Dungannon and South Tyrone Borough	<1%	70%	5 (< 60%)
Fermanagh District	60%	12%	4 (60 < 80%)
Omagh District	<1%	46%	5 (< 60%)

Table 3.3: The Percentage of Premises Covered by 3G for Each Council Area [Source: Ofcom]

3.2.3 Mobile Broadband Services

O2

O2’s main dongle-based mobile broadband offering provides up to 7.2Mbps download depending on quality of coverage. The maximum usage allowance is 1GB and there’s unlimited access to O2’s Wi-Fi hotspots throughout the UK.

O2 also offers a fixed line broadband service offering download speeds from up to 8Mbps to up to 24Mbps, depending on line quality and distance from exchange. The maximum usage allowance is unlimited.

Vodafone

Vodafone’s main dongle-based mobile broadband offering provides actual download speeds of between 1 – 2 Mbps depending on quality of coverage. The maximum usage allowance is 2GB. There’s also access to BT Openzone’s Wi-Fi hotspots throughout the UK, with a maximum usage allowance of 4GB.

Vodafone offers a fixed line broadband service offering download speeds up to 24Mbps, depending on line quality and distance from exchange. The maximum usage allowance available is unlimited.

Orange

Orange’s main dongle-based mobile broadband offering provides up to 7.2Mbps download. The maximum usage allowance is 3GB. There’s also unlimited access to BT Openzone’s Wi-Fi hotspots throughout the UK.

Orange also offers a fixed line broadband service offering download speeds from up to 20Mbps, depending on line quality and distance from exchange. The maximum usage allowance is unlimited.

T-Mobile

T-Mobile’s main dongle-based mobile broadband offering provides up to 4.5Mbps download. The maximum usage allowance is 5GB.

3

3's main dongle-based mobile broadband offering provides up to 21Mbps download. The maximum usage allowance is 15GB.

3.3 Fixed Wireless Telecommunications Services

Some operators provide broadband access to subscribers in Northern Ireland via a selection of Fixed Wireless Access (FWA) technologies. These operators have the following characteristics:

- They operate regionally rather than nationally, mainly in rural areas poorly served in fixed line broadband services;
- Their market focus is on residential and small business subscribers; and
- The subscriber's receiver (normally roof-mounted) must have line-of-sight to the operator's base station or building-mounted antenna.

These small operators usually have an engineering background, and are technically competent. But they are often limited in terms of customer support services. They operate under capital constraint, and usually identify and quantify unserved demand for broadband services in a local area before installing their network infrastructure in that area.

The two main FWA operators providing broadband services in Northern Ireland are North West Electronics (NWE) and Net1.

3.3.1 North West Electronics (NWE)

NWE¹⁸, based in Derry/Londonderry, provides FWA services, claiming to be '*the largest independent Broadband Network operating throughout Northern Ireland and County Donegal*'. NWE focusses on providing broadband services to residences and businesses that cannot access broadband services via a fixed line connection.

Existing Infrastructure

Figure 3.13 below shows NWE's coverage within the ICBAN region in Northern Ireland. NWE uses a wireless technology called WiMAX based on the IEEE 802.16 standard. NWE markets a selection of broadband packages up to a maximum download speed of 50Mbps at a (line-of-sight) distance of up to 15km. However this speed is rarely achieved in practice as capacity is contended (in this instance the contention is 48:1), i.e. it is shared among the subscribers connected to each base station.

¹⁸ www.nwewn.com

a selection of broadband packages up to a maximum download speed of 8Mbps at a contention of 8:1. Net1 claims a line-of-sight range of up to 17miles from their hilltop base station sites.

Existing Infrastructure

Figure 3.14 below shows Net1's coverage within the ICBAN region. It lists coverage in the following townlands within the ICBAN region in Northern Ireland:

- **ARMAGH:** Ballsmill, Carrickasticken, Forkhill, Glasdrummand, Middletown, Mounthill, Silverbridge and Tullydonnell;
- **FERMANAGH:** Aghavass, Belcoo, Belleek, Clabby, Coa, Colebrook, Derrygonnelly, Enniskillen (excluding urban areas), Florencecourt, Garrison, Irvinestown, Killadeas, Kinnawley, Lack, Lattone, Letterbreen, Marlbank, Tempo and Tullvavy; and
- **TYRONE:** Aughnacloy, Ballygawley, Caledon, Clogher / Augher Valley, Fintona, Fivemiletown, Golan, Omagh (excluding urban areas), Trillick.

In 2009, Net1 was awarded funding by the Department of Enterprise, Trade and Investment (DETI) under its Northern Ireland Broadband Fund, to extend its network to areas in Fermanagh and Tyrone running from Augher to the south-east of Lough Melvin.

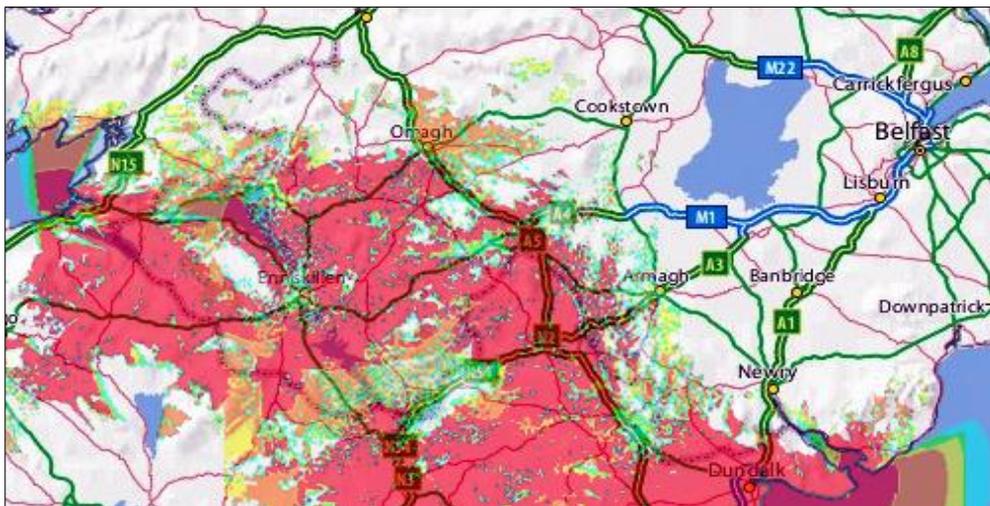


Figure 3.14: Net1's Fixed Wireless Coverage in ICBAN region [Source: Net1]

Net1's main broadband offerings are:

- **Nat-R-Net Lite** providing up to 5Mbps download. The advertised contention ratio is 25:1.
- **Nat-R-Net Plus** providing up to 6Mbps download. The advertised contention ratio is 15:1.
- **Net1 Business Pro** providing up to 8Mbps download combined with an unlimited usage allowance. The advertised contention ratio is 8:1.

All offerings depend on line-of-sight coverage.

4 Telecommunications Infrastructure in the Republic of Ireland

This section describes the telecommunications infrastructure in the Republic of Ireland in relation to fixed line, mobile and fixed wireless services.

Satellite services are described separately in **Section 5.4** of this report.

4.1 Fixed Line Telecommunications Services

This section outlines the infrastructure of the main fixed line communications providers in the Republic of Ireland.

4.1.1 Eircom

Eircom is the incumbent fixed-line communications provider in the Republic of Ireland having a 55.8%²¹ share of fixed-line market revenues. Eircom provides broadband access to businesses via leased line connections for larger businesses and Digital Subscriber Line (DSL) connections to smaller enterprises. In Q1 2012, Eircom's market share of fixed broadband subscriptions was 43.4%, and its retail arm accounted for 64.7% of all DSL subscriptions nationally.

Eircom's **Next Generation Broadband** service delivers broadband download speeds of between 8Mbps and 24Mbps to business and residential subscribers via DSL technology. However, Eircom has announced a multi-year **Next Generation Access (NGA)**²² investment programme, which will increase download speeds to 50Mbps within those areas being upgraded.

Existing Infrastructure

Eircom has the most extensive fixed-line network in the Republic of Ireland.

- Backbone Network

Figure 4.1 below shows Eircom's **National Fibre Network (NFN)** extending over 12,000kms connecting 500 cities, towns and villages in the Republic. The backbone network also includes a fibre ring in Northern Ireland.

²¹ *Irish Communications Market – Quarterly Key Data Report Q1 2012*, ComReg [14/06/2012]

²² www.nextgenerationnetwork.ie/the-ngn



Figure 4.1: Eircom’s National Fibre Network (NFN) in the ICBAN region. [Source: Eircom]

- Distribution Network

Figure 4.2 below shows Eircom’s **NGN Core** high capacity IP transport network which includes over 600 nodes nationwide.

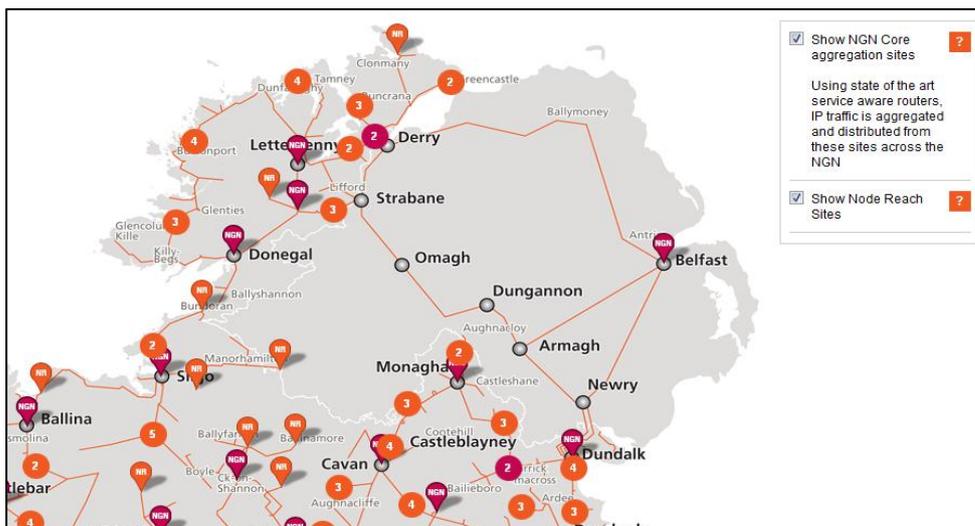


Figure 4.2: Eircom’s Next Generation Core Network in the ICBAN Region [Source: Eircom]

- Access Network

Eircom currently offers two types of broadband service:

- **Standard Broadband** up to a minimum of 1Mbps and a maximum of 24Mbps where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any at any particular time. Unlimited usage is set to 250GB per month.
- **Next Generation Broadband** up to 8Mbps or up to 24Mbps where access uncongested. Speed performance is consistent throughout the day. Usage is set to 250GB per month.

Figure 4.3 below shows the areas in the ICBAN region covered by Eircom's **Next Generation Broadband** service delivering broadband speeds of between 8Mbps and 24Mbps to business and residential subscribers.



Figure 4.3: Eircom's Next Generation Broadband Coverage [Source: Eircom]

Download/upload speeds are dependent on line quality and distance from exchange.

Planned Developments in the ICBAN Region

In 2011, Eircom announced a multi-year programme to roll out **Next Generation Access (NGA)** to 100,000 businesses and 900,000 homes nationally. This technology, primarily based on Fibre to the Cabinet (FTTC) access, is expected to deliver broadband speeds of up to 50Mbps to business and residential users, with expectations that speeds can be further increased up to 100Mbps using the latest technologies, such as VDSL2 Vectoring²³. The first phase, reaching over 100,000 premises, is to be completed by summer 2012 at a cost of €100m. Letterkenny is one of the ten areas nationally, and the only area in the ICBAN region, to be included in this phase.

Currently NGA pilot schemes are being rolled out to 16,000 businesses and homes in South Dublin and Wexford, with Fibre to the Cabinet (FTTC) access offering up to 50Mbps download speed and Fibre to the Premises (FTTP) access providing a download speed of up to 150Mbps.

4.1.2 UPC

UPC is the largest cable operator in Ireland providing fixed voice, fixed broadband and digital television services (i.e. triple play) to residential and business users. It is the second largest fixed broadband provider in subscription terms, with a 25.2% market share of fixed broadband subscriptions. It is the third largest fixed-line telecommunications operator in revenue terms, with 6.9%²⁴ of fixed-line market revenues.

Cable broadband is the fastest growing segment in the broadband market with 26.1% growth in the year to Q1 2012, in a market that grew 2.6% overall in the same period. UPC had just

²³ VDSL2 Vectoring eliminates all the noise and interference in a VDSL2 line bundle, so that every VDSL2 line can operate at peak speeds as if it were the only line in the bundle.

²⁴ *Irish Communications Market – Quarterly Key Data Report Q1 2012*, ComReg [14/06/2012]

over 275,000 broadband subscriptions out of a total of over 1.67m broadband subscriptions nationally.

The growth in cable broadband penetration has created intense competition between UPC and other operators providing broadband services via the traditional copper telephone line. However, this competition is focussed in the cities and larger towns, where the cable modem network is concentrated. UPC claims that in urban areas, 87pc of its subscriber base can receive 30Mbps broadband while 60pc can achieve 100Mbps. UPC’s customer base is overwhelmingly residential, with less than 1% of its customer base being business subscribers.

Existing Infrastructure

UPC has the most extensive cable network in the Republic of Ireland.

- Backbone and Distribution Network

UPC’s backbone network links the five main cities and connects a cluster of regional towns – primarily in the east of the country. It also provides international connectivity to Europe and North America.

- Access Network

Figure 4.4 below shows UPC’s coverage nationally. Sligo has the only cable network in the ICBAN region.

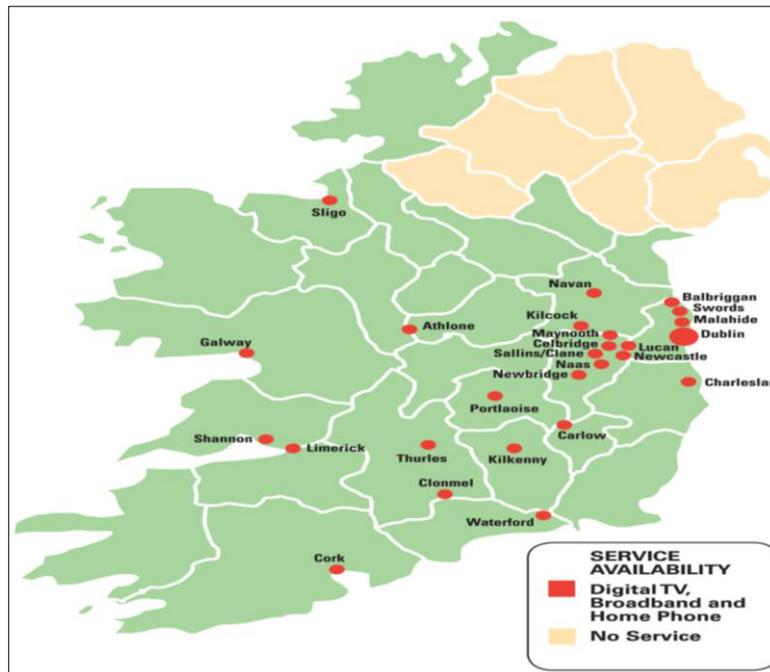


Figure 4.4: UPC’s Service Availability [Source: UPC]

Planned Developments in the ICBAN Region

UPC is currently focussed on increasing its market penetration in those areas already served by its HFC network. Consequently UPC has no plans to expand their network in the ICBAN region.

4.1.3 Vodafone

Vodafone is the fourth largest fixed-line communications provider in the Republic of Ireland with a 6.6%²⁵ share of fixed-line market revenues. It is the third largest fixed broadband provider, with 17.1% market share of fixed broadband subscriptions.

Vodafone's participation in the fixed broadband market was founded through the acquisition of Perlico in 2008, followed by the transfer of BT's consumer and small business operations in 2009.

Existing Infrastructure

- Access Network

Vodafone's fixed line network is based on 60 unbundled local exchanges owned and operated by BT Ireland, outlined further in **Section 4.1.4** of this report. Vodafone also takes wholesale fixed line access from Eircom.

Vodafone currently offers two types of fixed broadband service:

- **Value Broadband / Ideal Broadband** up to 8Mbps download where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any at any particular time. Value Broadband has a usage allowance of 40GB per month while Ideal Broadband has a usage allowance of 300GB per month.
- **Enhanced Broadband** up to a minimum of 8Mbps and a maximum of 24Mbps download where access is not shared between users. Speed performance is consistent throughout the day. The maximum usage allowance available is 350GB per month.

Download/upload speeds are dependent on line quality and distance from exchange.

4.1.4 BT Ireland

BT is the second largest fixed-line communications provider in the Republic of Ireland having a 13.7%²⁶ share of fixed-line market revenues. Its main market focus is the provision of networked IT services to the government and corporate sectors, providing a wide range of products in the areas of network optimisation, IT optimisation, collaboration services and voice solutions.

BT also offers wholesale network services to other operators, in the areas of data connectivity, voice termination and switchless reseller services. It has a particular expertise in the area of wireless infrastructure and mobile managed services.

Existing Infrastructure

BT has an extensive fixed-line network in the Republic of Ireland.

- Backbone and Distribution Network

²⁵ *Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]*

²⁶ *Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]*

Figure 4.5 below shows BT's **National Fibre Network (NFN)** extending over 2,500kms and 22 POPs supporting its business and wholesale clientbase. There is also international connectivity to the UK and further beyond.

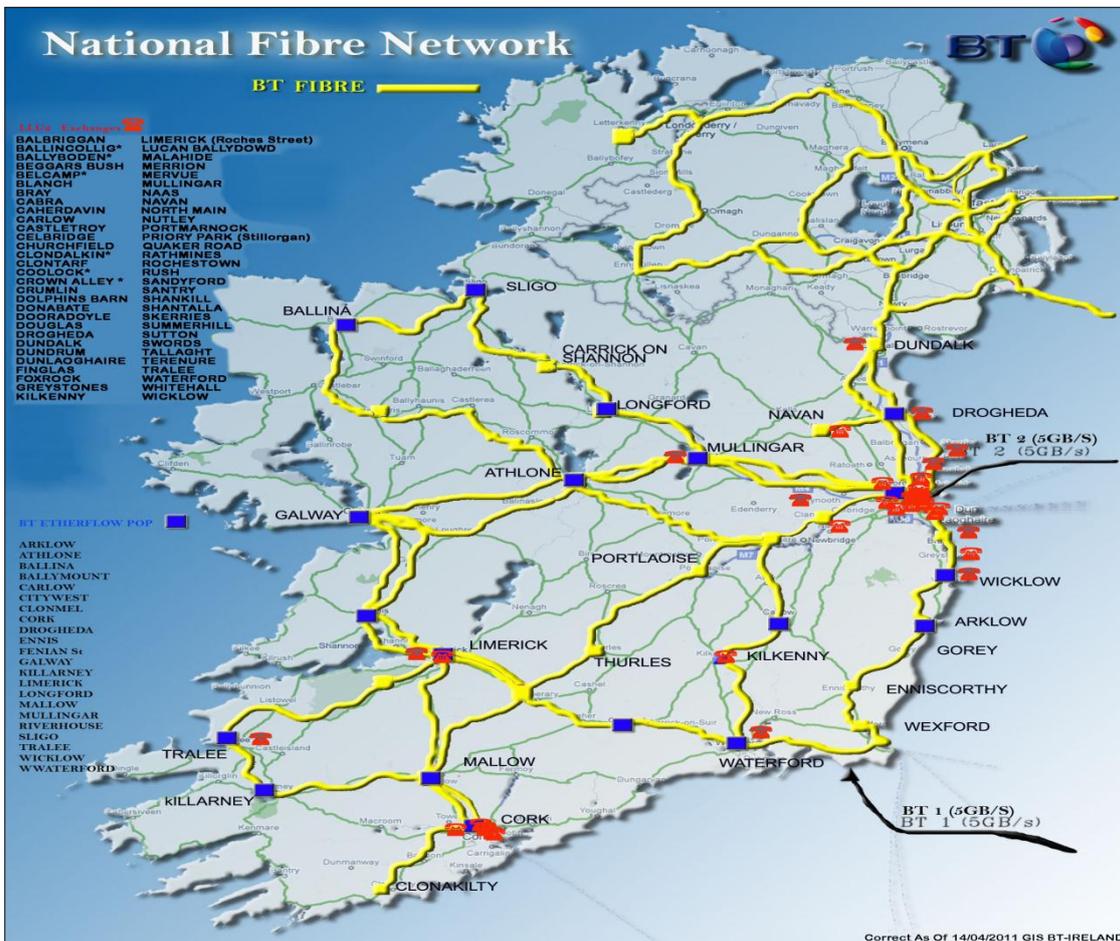


Figure 4.5: BT's National Fibre Network (NFN). [Source: BT]

- Access Network

BT has 60 unbundled local exchanges nationwide where it provides wholesale broadband products to other operators, e.g. Vodafone. BT does not currently have any exchanges in the ICBAN region and has only one POP (Sligo Town) in the region. There is a fibre link from Letterkenny to Derry which connects Letterkenny to the National Fibre Network via BT's Northern Ireland network. BT uses ADSL2+ technology providing a download speed of up to 24Mbps, depending on line quality and distance from the exchange.

Planned Developments in the ICBAN Region

BT is planning to rollout another 29 LLU exchanges before the end of 2012, one of which will be in Letterkenny.

4.1.5 Enet

Enet manages the Metropolitan Area Network (MAN) programme nationally on behalf of the Irish Government.

The programme includes 94 MANs throughout the country. Each MAN is made up of a duct, sub-duct and fibre network connected to a Co-Location facility.

Enet primarily operates as a 'carriers' carrier', providing fibre-based services to operators on a wholesale basis. It acts on a carrier-neutral basis enabling open access to its MAN infrastructure by licensed operators, who then use that infrastructure to provide communications services to their client base.

Enet's customers include UPC, BT, Digiweb, Imagine, Vodafone and O2 amongst others.

There are 19 MANs in the ICBAN region:

- Cavan – 4 MANs: Bailieborough, Cavan, Cootehill and Kingscourt;
- Donegal – 8 MANs: Ballybofey-Stranorlar, Ballyshannon, Bunrana, Bundoran, Carndonagh, Donegal Town, Gweedore and Letterkenny;
- Leitrim – 2 MANs: Carrick-on-Shannon and Manorhamilton;
- Monaghan – 4 MANs: Clones, Carrickmacross, Castleblaney and Monaghan Town, and
- Sligo – 1 MAN: Sligo Town.

4.2 Mobile Telecommunications Services

Four operators provide mobile services in the Republic of Ireland: Vodafone, O2, Meteor and 3. The first three operators run a combination of second generation (2G) network and third generation (3G) networks to provide voice and broadband services. 3 provides voice and broadband services over a 3G network.

2G, also called GSM, is an older low-speed mobile technology supporting voice and narrowband data services (e.g. texting) for subscribers. 3G is a more recent high-speed mobile technology supporting broadband data and voice services for subscribers.

Mobile operators do not release information on their network infrastructures for commercial and security reasons. Many operators provide coverage maps on their web-sites. These maps are high level in nature showing where mobile reception may be available. However they do not take adequate account of local topographies and are not therefore a guarantee of mobile reception in any specific location.

4.2.1 3

3 is the fourth largest mobile communications provider in the Republic of Ireland having a 7.9%²⁷ share of mobile market revenues. It is the largest mobile broadband operator with 32.8% of market share in terms of subscriptions. 3 claims to cover 96% of the Republic's population and provides extensive coverage in the ICBAN region.

In December 2008, the Irish government awarded the contract to 3 for the National Broadband Scheme²⁸ (NBS), a scheme designed to address areas where there were insufficient broadband services. The rollout was completed in October 2010.

²⁷ *Irish Communications Market – Quarterly Key Data Report Q1 2012*, ComReg [14/06/2012]

²⁸ <http://www.dcenr.gov.ie/Communications/Communications+Development/National+Broadband+Scheme>

3 subscribers roaming into Northern Ireland can roam on the 3 UK network at no extra charge for voice calls.

Existing Infrastructure

Nationally, 3 currently offers a broadband service with a maximum download speed of up to 7.2Mbps and a maximum upload speed of up to 5.76Mbps depending on quality of coverage.

The mobile broadband service offered through the NBS has a minimum download speed of 1.6Mbps and a minimum upload speed of 1.2Mbps. These speeds are contracted to increase to a minimum of 2.3Mbps download and 1.4Mbps upload in October 2012. For the most remote 5% of users in the NBS coverage area, 3 also provides a satellite broadband service delivering a download speed of 1Mbps and an upload speed of 128kbps, the speeds of which are contracted to increase in July 2012²⁹ and again in October 2014³⁰.

Figure 4.6 below shows the areas in the ICBAN region in the Republic covered by 3’s 3G network, with orange denoting areas with indoor coverage and green those areas with outdoor coverage.

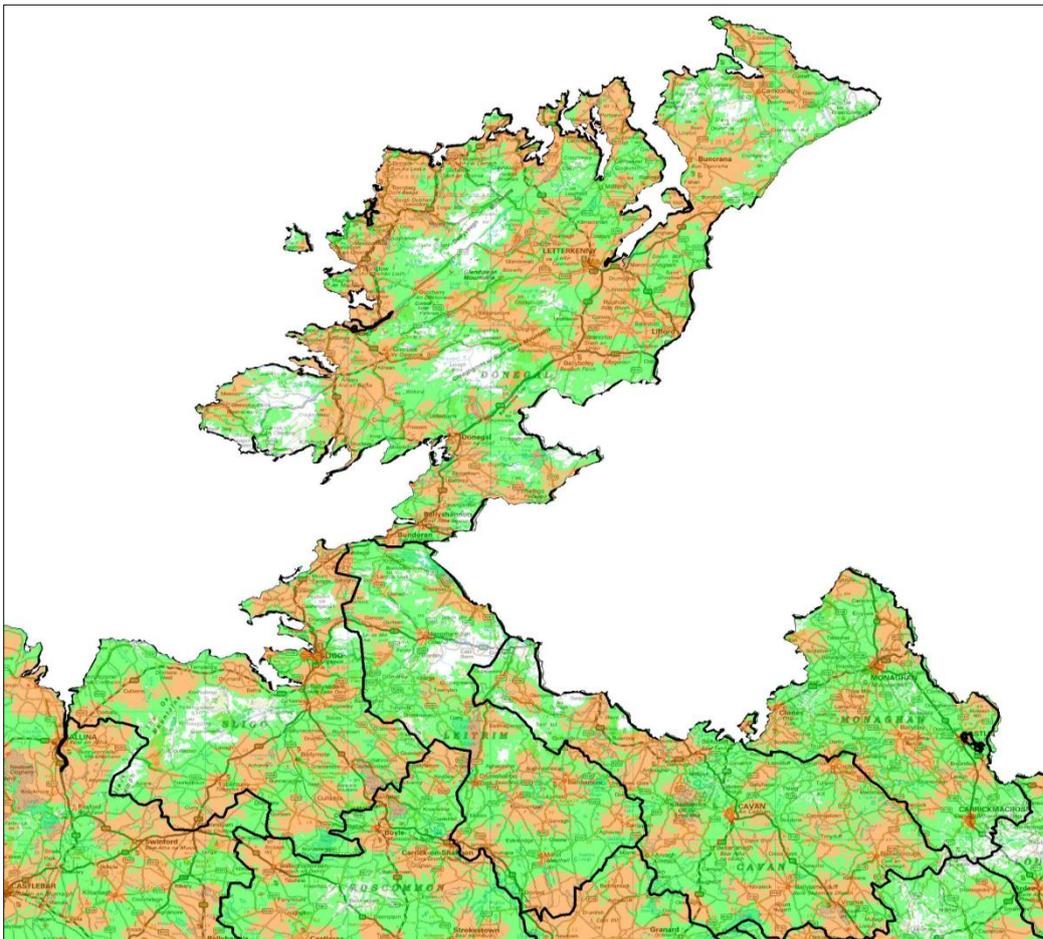


Figure 4.6: 3’s 3G Coverage in the ICBAN Region [Source: 3]

²⁹ Download speed: 1.6Mbps, upload speed 256kbps

³⁰ Download speed: 2Mbps, upload speed 256kbps

Planned Developments in the ICBAN Region

3G completed their NBS rollout in October 2010. There are no current plans to extend their network in the ICBAN area.

4.2.2 Vodafone

Vodafone is the largest mobile communications provider in the Republic of Ireland having a 44.4%³¹ share of mobile market revenues. It is the third largest mobile broadband operator with 28% of subscription market share. Being the third largest fixed broadband provider in terms of subscriptions (see **Section 4.1.3** of this report), Vodafone markets a mix of fixed and mobile broadband products to business users. Vodafone claims that it provides 99% population coverage and 95% geographical coverage.

Existing Infrastructure

Figure 4.7 below shows the areas in the ICBAN region in the Republic covered by Vodafone's 3G network, with dark red denoting areas with indoor coverage and light red those areas with outdoor coverage.

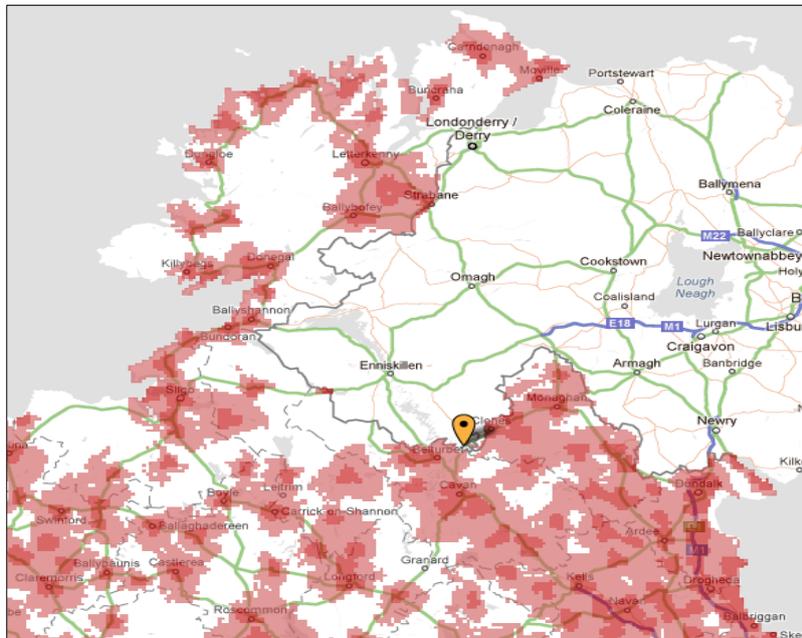


Figure 4.7: Vodafone's 3G Coverage in the ICBAN Region [Source: Vodafone]

Vodafone offers three levels of mobile broadband access to subscribers:

- **Mobile Broadband**, using HSPA technology, provides up to 7.2Mbps download depending on quality of coverage. The maximum usage allowance is 10GB. Coverage is show in figure 4.7 above.
- **Performance Plus**, using HSPA+ technology, provides up to 14.4Mbps download depending on quality of coverage. The maximum usage allowance is 10GB. Coverage is currently limited to the main cities and larger towns, with no coverage in the ICBAN region.

³¹ *Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]*

- **Performance Pro**, using HSPA+ Dual Carrier technology, provides up to 24Mbps download depending on quality of coverage. The maximum usage allowance is 10GB. Coverage is currently limited to the main cities and some larger towns, with no coverage in the ICBAN region.

4.2.3 O2

O2 is the second mobile communications provider in the Republic of Ireland having a 28.8%³² share of mobile market revenues. It is the second largest mobile broadband operator with 27.7% of market share in terms of subscriptions.

O2 states that its voice (2G) network covers 99.6% of the population and 95% of the geographic areas of the Republic. It also maintains that its broadband (3G) network covers 90.5% of the Republic’s population.

Existing Infrastructure

Figure 4.8 below shows the areas in the ICBAN region in the Republic covered by O2’s 3G network.

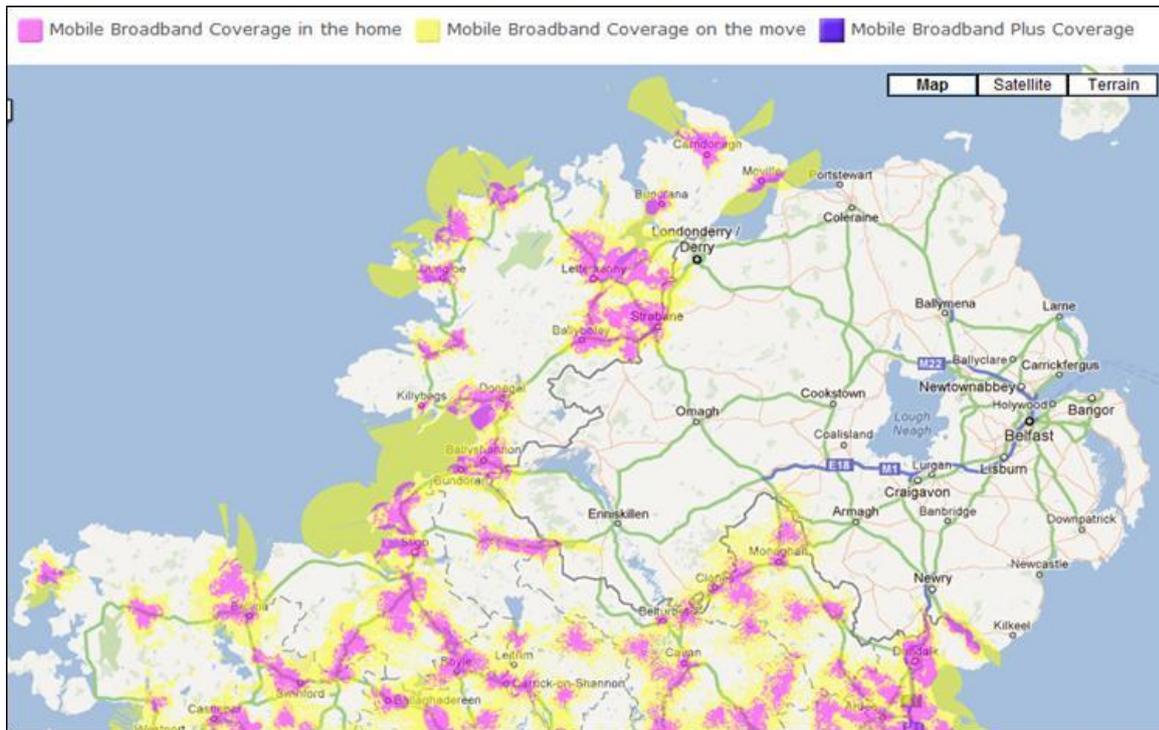


Figure 4.8: O2’s 3G Coverage in the ICBAN Region [Source: O2]

O2’s main mobile broadband offerings are:

- **Clear Broadband** providing up to 7.5Mbps download depending on quality of coverage. The maximum usage allowance is 15GB.
- **Broadband Plus** providing up to 7.5Mbps download depending on quality of coverage. The maximum usage allowance is 2GB.

³² Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]

O2 also offers a fixed line broadband service offering download speeds from up to 8Mbps to up to 24Mbps, depending on location. The maximum usage allowance available is unlimited.

4.2.4 Eircom Group Mobile

Eircom Group Mobile is the third mobile communications provider in the Republic of Ireland having a 17.5%³³ share of mobile market revenues. It is the fourth largest mobile broadband operator with 11.5% of market share in terms of subscriptions.

Eircom Group Mobile includes the **Meteor** and **emobile** brands.

Existing Infrastructure

Meteor and emobile share the same infrastructure. Figure 4.9 below shows the areas in the ICBAN region in the Republic covered by Meteor’s mobile network, which it claims covers 99% of the population.

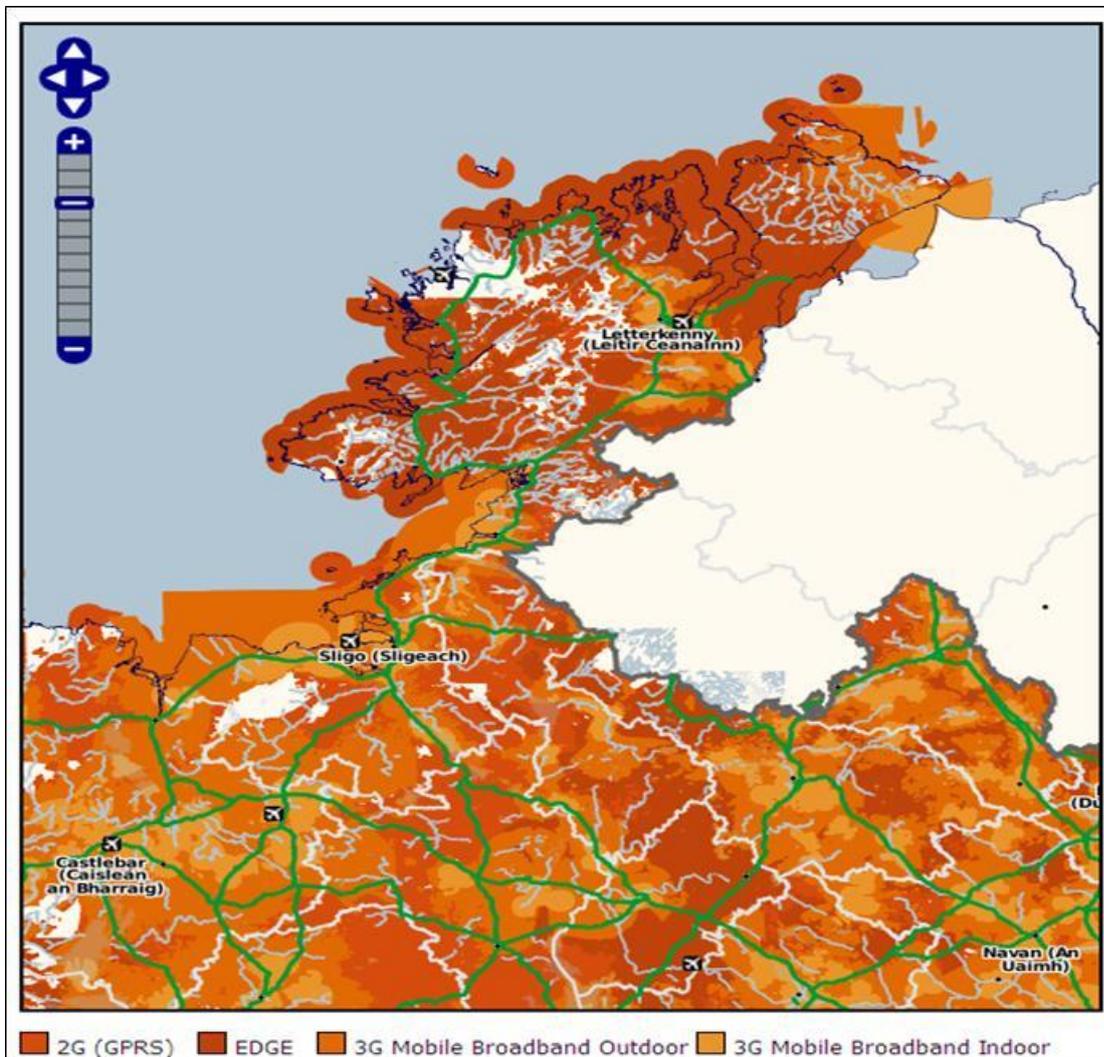


Figure 4.9: Meteor’s Mobile Coverage in the ICBAN Region [Source: Meteor]

³³ Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]

Meteor

Meteor's main dongle-based broadband offerings provide a choice of download speeds of up to 7.2Mbps or up to 14.4Mbps, depending on quality of coverage. The usage allowance ranges from as 1GB per month up to 20GB per month.

emobile

Emobile's main dongle-based broadband offerings provide a choice of download speeds of up to 7.2Mbps or up to 14.4Mbps, depending on quality of coverage. The maximum usage allowance is 10GB. There's also free access to Eircom's Wi-Fi hotspots throughout Ireland.

Vodafone offers a fixed line broadband service offering download speeds from up to 24Mbps, depending on line quality and distance from exchange. The maximum usage allowance available is unlimited

4.3 Fixed Wireless Telecommunications Services

Some operators provide broadband access to subscribers in the Republic of Ireland via a selection of Fixed Wireless Access (FWA) technologies. FWA operators such as Digiweb and Imagine operate nationally, providing a range of services to urban and rural businesses.

Other FWA operators operate regionally, mainly in rural areas usually poorly served in terms of fixed line broadband services. Their market focus is on residential and small business subscribers. These small operators usually have an engineering background, are technically competent but are often limited in terms of customer support services. They operate under capital constraint, and usually identify and quantify unserved demand for broadband services in a local area before installing their network infrastructure.

There are many regional FWA operators providing broadband services in the ICBAN region in the Republic, such as Arden, Ciaracom, Fastcom, Net1 and North West Electronics (NWE). This is by no means an exhaustive list.

According to the most recent ComReg Quarterly report for Q1 2012³⁴, FWA subscriptions in the Republic fell that quarter by 2.6% to a total of 69,566, representing a year-on-year fall of 7.9%. FWA accounts for 4.2% of all broadband subscriptions, a decrease of 0.4% year-on-year.

4.3.1 Digiweb

Digiweb is the fifth largest fixed broadband provider in the Republic, with 2.5%³⁵ market share of fixed broadband subscriptions. Founded in 1997, it has expanded its operations in Ireland through a combination of organic growth and the acquisitions of Smart Telecom, Internet Ireland and Talk Talk.

Digiweb provides a range of network and hosting services to business, public sector and residential users. It uses a selection of fixed line, fixed wireless and satellite technologies to provide broadband services to the market.

Existing Infrastructure

³⁴ *Irish Communications Market – Quarterly Key Data Report Q1 2012*, ComReg [14/06/2012]

³⁵ *Irish Communications Market – Quarterly Key Data Report Q1 2012*, ComReg [14/06/2012]

- Access Network

Digiweb uses a variety of access technologies to provide broadband services to the market:

- **Wireless Access.** Digiweb provides several types of wireless broadband service for businesses:
 - The **Metro** broadband service provides up to 30Mbps download (for the **Metro Express** Service) where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any particular time. It has a usage allowance of up to 60GB per month. The service, available in Letterkenny and Sligo in the ICBAN region, is based on line-of sight and has a range of 10-14km from the base site.
 - The **Bizwave Wireless** broadband service provides up to 2Mbps download where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention – the advertised contention ratio is 10:1. The usage allowance is 60GB per month.

Figure 4.10 below shows the areas in the ICBAN region in the Republic covered by Digiweb's wireless broadband network, with Metro coverage shown in blue and Bizwave coverage shown in green.

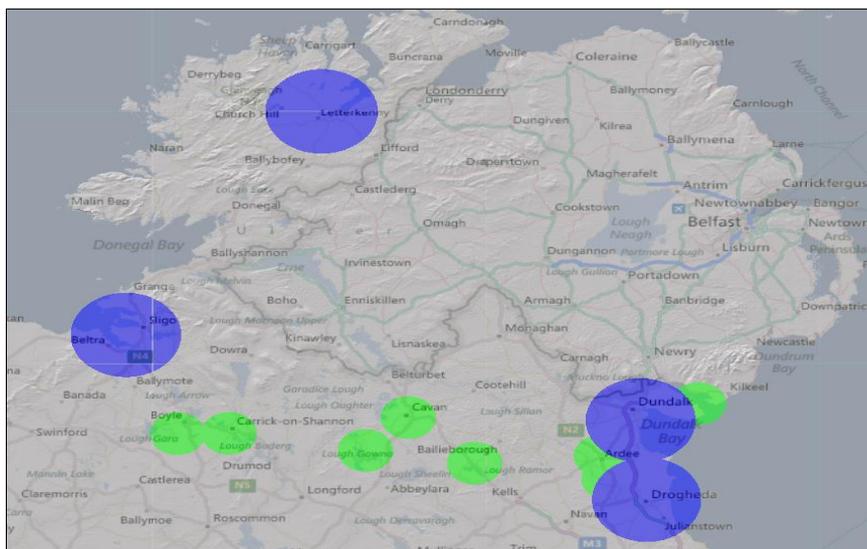


Figure 4.10: Digiweb's Wireless Broadband Coverage in the ICBAN Region [Source: Digiweb]

- **DSL Access.** Digiweb provides several types of DSL access for businesses:
 - The **DSL** broadband service provides up to 24Mbps download where access is not shared between users. Speed performance is consistent throughout the day. The maximum usage allowance is 150GB per month. In the ICBAN region, this service is available from unbundled exchanges in Letterkenny and Sligo.
 - The **NGB** broadband service provides up to 8Mbps or up to 24Mbps where access is uncongested. Speed performance is consistent throughout the day. The maximum usage allowance is 150GB per month. Based on a wholesale service from Eircom, it's available wherever Eircom has **Next Generation Broadband** technology rolled out (see Figure 4.3 in **Section 4.1.1**).
- **Satellite Access.** The **Digiweb Tooway™** broadband service provides up to 10Mbps download where access is shared between users. Speed performance can

vary throughout the day depending on the amount of contention at any particular time. It has a usage allowance of 25GB.

Planned Developments in the ICBAN Region

Digiweb does not plan to install any new infrastructure in the ICBAN region, but it is increasing the broadband speeds available from the existing network.

4.3.2 Imagine

Imagine is the sixth largest fixed-line communications provider in the Republic of Ireland having a 2.0%³⁶ share of fixed-line market revenues. It is the fourth largest fixed broadband provider, with 4.2% market share of fixed broadband subscriptions.

In addition to DSL services based on Eircom products, Imagine uses a range of FWA technologies to provide services ranging from residential broadband to dedicated high capacity leased circuits. For the residential users, Imagine primarily uses WiMAX wireless access technology to provide broadband services to the market.

Existing Infrastructure

- Backbone and Distribution Network

Imagine's backbone and distribution network is based on a tiered architecture with resilient connectivity between access sites and the core network. Connectivity between nodes is based on a combination of resilient fibre circuits from multiple providers and high capacity microwave.

- Access Network

Imagine has been deploying FWA technology since 2003 and currently has over 200 high sites locations and over 1000 base stations deployed. Imagine currently mainly uses WiMAX wireless access technology to provide broadband services to the small business and residential markets. The first Phase of WiMAX rollout was completed in early 2011 with 134 sites and over 500 base stations deployed.

Imagine's WiMAX broadband service provides users with a range of download speeds from 1Mbps, 3Mbps, 7Mbps and 10Mbps, where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any particular time. There is an unlimited usage allowance subject to an acceptable usage policy.

³⁶ *Irish Communications Market – Quarterly Key Data Report Q1 2012, ComReg [14/06/2012]*

Figure 4.11 below shows the areas in the ICBAN region in the Republic covered by Imagine's WiMAX network.



Figure 4.11: Imagine's WiMAX Coverage in the ICBAN Region [Source: Imagine]

Imagine also provides other means of broadband access to potential subscribers:

- **Mobile WiMAX** service by means a laptop broadband dongle offering up to up to 7Mbps download. Speed performance can vary throughout the day depending on the amount of contention, i.e. the number of users sharing the access, at any particular time. Access is shared between users and there is a 15GB monthly usage allowance.
- **DSL** service up to 24Mbps download where access is shared between users. The advertised contention ratio is 12:1. There is an unlimited usage allowance.
- **Breeze Contended** service up to 6Mbps download where access is shared between users. The lowest contention ratio is 4:1. The maximum usage allowance available is unlimited.

Planned Developments in the ICBAN Region

Imagine is currently planning the next phase of its wireless access rollout. It is expected that this will include the deployment of 4G³⁷ technology commencing in late 2012. While exact locations for this rollout are yet to be determined, it is expected that towns in the ICBAN region will be considered subject to the existence of suitable mast locations and sufficient customer demand.

³⁷ Time Division Long Term Evolution (TD-LTE)

4.3.3 Arden Broadband

Based in Belturbet County Cavan, Arden Broadband³⁸ provides FWA services to users in Counties Cavan, Leitrim and Longford.

Existing Infrastructure

Figure 4.12 below shows the areas in the ICBAN region in the Republic covered by Arden Broadband's FWA network.



Figure 4.12: Arden's Broadband Coverage in the ICBAN Region [Source: Arden]

Arden's main broadband offerings are:

- **Home Starter** providing up to 1Mbps download. The maximum usage allowance is 20GB per month.
- **Home Plus** providing up to 2Mbps download. The maximum usage allowance is 60GB per month.
- **Home Office** providing up to 2.5Mbps download. The maximum usage allowance is 80GB per month.
- **Business** providing up to 3Mbps download. The maximum usage allowance is 90GB per month.

All offerings depend on line-of-sight coverage.

4.3.4 Ciaracom

Based in Ballyconnell County Cavan, Ciaracom³⁹ provides FWA services to users in Counties Cavan and Leitrim.

³⁸ www.ardenbroadband.ie



Figure 4.14: Fastcom Telecom's Coverage in the ICBAN Region [Source: Fastcom Telecom]

Fastcom Telecom's main business broadband offerings provide up to between 4Mbps and 6Mbps download combined with unlimited usage. Contention varies between 16:1 and 8:1.

All offerings depend on line-of-sight coverage.

4.3.6 Net1

Net1, based in Drogheda, provides FWA broadband services in border counties both in the Republic and Northern Ireland. Net1 offers a selection of broadband packages up to a maximum download speed of up to 8Mbps at a contention of 8:1. Net1 claims a line-of-sight range of up to 17miles from their hilltop base station sites.

Existing Infrastructure

Figure 4.15 below shows Net1's coverage within the ICBAN region. Net1 lists coverage in the following townlands within the ICBAN region in the Republic of Ireland:

- CAVAN: Bailieborough, Ballyhaise, Ballyjamesduff, Blacklion, Butlersbridge, Kilnaleck, Kingscourt, Mullagh and Swanlinbar;
- DONEGAL: Ballyshannon East, Bundoran North, Frosses, Knocknashangan and Mountcharles;
- LEITRIM: Dromahair, Glenade, Glencar, Glenfarne, Kiltyclogher, Kinlough, Lurganboy, Manorhamilton and Rossinver
- MONAGHAN: Ardaghy, Ballybay, Carrickmacross, Clara, Corcaghan, Davagh, Dunraymond, Drumcondra, Emyvale, Golan, Inniskeen, Lough Egish, Moy Bridge and Tydavnet.

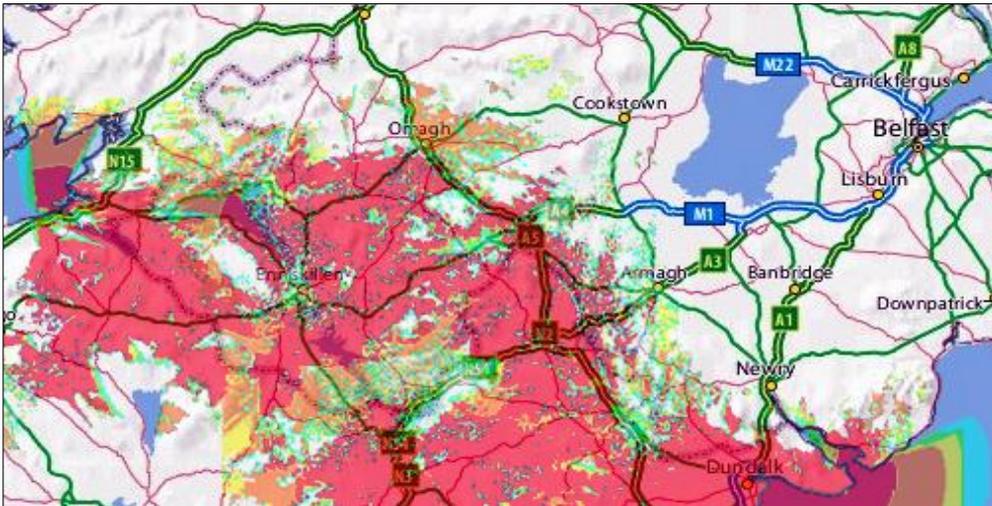


Figure 4.15: Net1's Fixed Wireless Coverage in ICBAN region [Source: Net1]

Net1's main broadband offerings are:

- **Nat-R-Net Lite** providing up to 5Mbps download. The advertised contention ratio is 25:1.
- **Nat-R-Net Plus** providing up to 6Mbps. The advertised contention ratio is 15:1.
- **Net1 Business Pro** providing up to 8Mbps combined with an unlimited usage allowance. The advertised contention ratio is 8:1.

All offerings depend on line-of-sight coverage.

4.3.7 North West Electronics (NWE)

NWE, based in Derry, provides FWA services, claiming to be '*the largest independent Broadband Network operating throughout Northern Ireland and County Donegal*'. NWE focusses on providing broadband services to residences and businesses that cannot access broadband services via a fixed line connection.

Existing Infrastructure

Figure 4.16 below shows NWE's coverage within the ICBAN region in Northern Ireland. NWE uses a wireless technology called WiMAX based on the IEEE 802.16 standard.



Figure 4.16: NWE's Fixed Wireless Coverage in ICBAN region in the Republic [Source: NWE]

NWE's main broadband offerings are:

- **Next Gen Business 10** providing up to 5Mbps download. The advertised contention ratio is 48:1.
- **Next Gen Business 50** providing up to 50Mbps download. The advertised contention ratio is 48:1.
- **Bronze, Silver and Gold** providing up to 3Mbps, 5Mbps and 8Mbps download respectively. **Diamond and Platinum** also offer 8Mbps download but offer 2Mbps and 4Mbps upload respectively. Advertised contentions ratios range from 30:1 to 10:1.

All offerings depend on line-of-sight coverage.

5 Overview of Technologies

This section describes the technologies used to deliver broadband and mobile services.

5.1 Fixed Line Technologies

The two main means of fixed line access currently used to provide data services to subscribers are: copper networks originally designed to deliver voice telephony services, and cable network originally designed to deliver cable TV services. The technologies listed and described below have been developed to enable these networks to also carry and distribute high-speed data.

5.1.1 Digital Subscriber Line (DSL)

Copper access networks were originally designed and deployed to carry voice telephony traffic from the local exchange to the subscriber. **DSL** (Digital Subscriber Line) technologies were developed to relay data and voice simultaneously over these networks, thereby saving operators the expense of completely reengineering their access networks. DSL is also referred to as **Asymmetric Digital Subscriber Line** (ADSL), in reference download speeds exceeding upload speeds by design.

There are many variants of DSL technology currently being used by operators:

- **ADSL** supports a download speed 8Mbps at a distance of up to 2.5km from the local exchange.
- **ADSL2+** delivers a download speed of 24Mbps at a distance of up to 1km from the local exchange.
- **VDSL** (Very high speed DSL) provides a download speed of 40Mbps at a distance of up to 750m from the local exchange.
- **VDSL2**, an enhancement to VDSL, supports a download speed of 80Mbps at a distance of up to 750m from the local exchange.

Figure 5.1 below shows the relationship between download speeds and distance for different DSL technologies.

The disadvantage of DSL is that download (and upload) speeds are dependent on the quality of the copper line and the distance of the subscriber from the local exchange. Distance from the local exchange or cabinet becomes an even more limiting factor for the higher speed DSL variants.

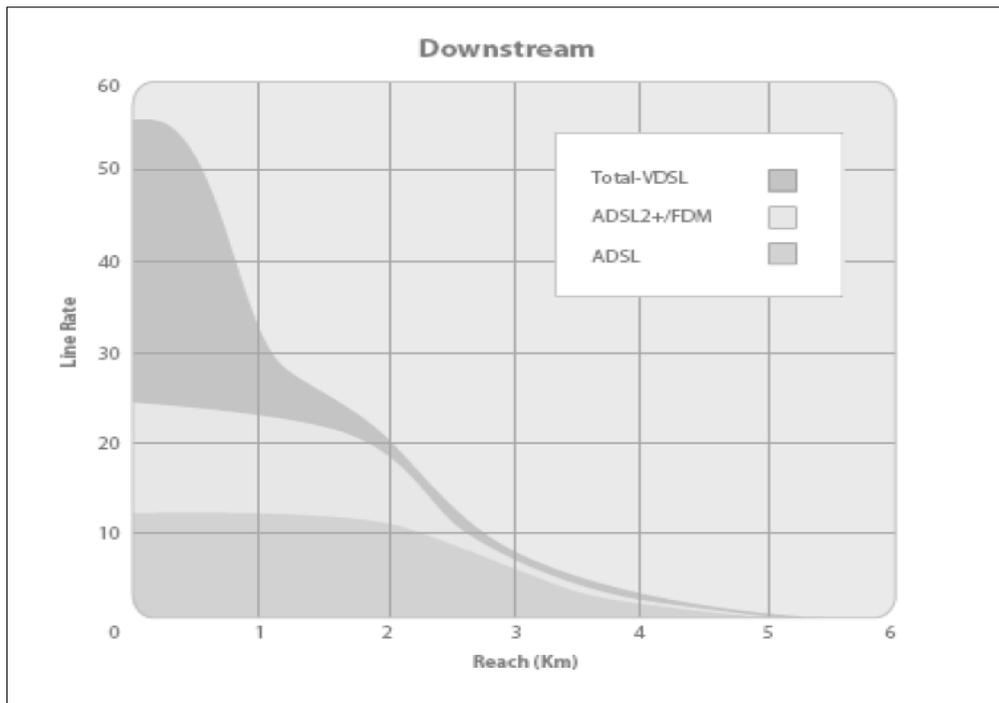


Figure 5.1: Relationship between Download Speeds and Distance [Source: OECD⁴⁰]

The copper access networks are owned by the incumbent operator in each market, i.e. BT in Northern Ireland and Eircom in the Republic. In a regulatory process known as Local Loop Unbundling (LLU), other operators gain control of a copper connection directly by installing their own DSL technology in the incumbents' local exchanges. These exchanges are called unbundled exchanges.

5.1.2 Fibre to the Cabinet (FTTC)

In the ICBAN area, with its low population densities and low rates of urbanisation, many business and residential users are at considerable distances from their local exchanges. This can greatly reduce the broadband speeds available to these subscribers, via a direct copper connection to the local exchange.

Operators are increasingly installing hybrid fibre copper technologies, where a portion of the copper connection is replaced by fibre, to mitigate the distance limitations of DSL technologies. The most common hybrid solution currently employed is **Fibre to the Cabinet (FTTC)**, where the operator places a street cabinet between the local exchange and the user, with the cabinet connected to the local exchange by a fibre link, and connected to a set of subscribers by (now shorter) copper connections.

By placing VDSL2 technology in the cabinet as opposed to the local exchange, greater numbers of subscribers can be provided with **Superfast Broadband (SFBB)** services, defined by Ofcom as delivering a download speed of 24Mbps or more.

Sub-Loop Unbundling (SLU) is the unbundling of the access line at the street side cabinet (rather than the local exchange as for LLU) so that a non-incumbent operator can gain control of the access line to the customer.

⁴⁰ *Developments in Fibre Technologies and Investment*, OECD [03/04/2008]

FTTC has been rolled out extensively in Northern Ireland by BT whereby 89% of all lines in the province are currently connected to an FTTC solution. It provides download speeds of up to 40Mbps, increasing to 80Mbps in April 2012. However, not all these lines will have access to these speeds as there is still a dependency on the quality of the copper line and the distance of the subscriber from the street cabinet.

In the Republic, Eircom is piloting FTTC access providing up to 50Mbps download speed.

5.1.3 Fibre to the Premises (FTTP)

Fibre to the Premises (FTTP), also known as Fibre to the Home (FTTH), uses **Gigabit Passive Optical Network (GPON)** technology to deliver a point-to-multipoint fibre connection to subscribers. It provides an **Ultrafast Broadband (UFBB)** service, defined by Ofcom as a download speed of 100Mbps or more.

BT is currently planning its Fibre to the Premises (FTTP) programme in the UK which will deliver much greater download speeds to subscribers, from 100Mbps initially and increasing to 300Mbps later this year. However this initiative will commence in the cities and it is unclear when it will impact the ICBAN region.

In the Republic, Eircom is piloting FTTP access providing up to 150Mbps download speed.

5.1.4 Hybrid Fibre-Coaxial (HFC)

Cable operators use a **Hybrid Fibre-Coaxial (HFC)** network to connect their subscribers. This type of network, a combination of optical fibre and coaxial cable, was originally developed for the distribution of cable TV services. **DOCSIS** (Data Over Cable Service Interface Specification) technology enables the transmission of high-speed data services on the same network.

DOCSIS 3.0 enables downstream channel bonding, thereby supporting greater download speeds to users. In 2011 Virgin Media (using DOCSIS 3.0 technology) ran a trial in London successfully delivering broadband speeds of 1.5Gbps. Another important advantage of HFC is that relay signals over distance much better than DSL technology.

Virgin Media provides four broadband offerings of up to 10Mbps, 30Mbps, 50Mbps and 100Mbps download respectively in the areas of Northern Ireland that it serves.

UPC provides four broadband offerings of up to 20Mbps, 25Mbps, 50Mbps and 100Mbps download respectively to its subscriber based in the Republic.

5.2 Mobile Technologies

Since the advent of the mobile phone, mobile technologies have migrated from First Generation (1G) proprietary analog cellular networks in the 1980s, to Second Generation (2G) standardised digital cellular networks in the 1990s, to Third Generation (3G) high-speed networks in the 2000s.

5.2.1 Second Generation (2G) Mobile

2G is a generation of mobile technology systems. It is often referred to as **GSM** (Groupe Spéciale Mobile), a European standard developed in the 1980s for digital mobile services.

Rolled out in the 1990s, this low-speed mobile technology supporting voice and narrowband data services (e.g. texting) for subscribers. It enabled subscribers to roam on other networks at home and abroad, which wasn't possible with first generation mobile proprietary analog networks.

The most recent report on the Northern Ireland communications market⁴¹ by Ofcom, the UK's communications regulator, highlights that 2G mobile population coverage is 87% in Northern Ireland. There is higher 2G population coverage in the Republic, with Vodafone, O2 and Meteor claiming 99% population coverage.

5.2.2 Third Generation (3G) Mobile

3G is a generation of mobile technology systems supporting high-speed data transmission, including internet access and multi-media applications, alongside voice services for subscribers. Derived from the 2G standard, 3G networks work in parallel with 2G networks.

The 3G system used in Europe is **UMTS** (Universal Mobile Telecommunications System). UMTS provides greater bandwidth to operators, and hence to subscribers, through more efficient use of radio spectrum.

Since 3G was first rolled out in the 2000s, new technologies have been developed and evolved to support faster download (and upload) speeds:

- **HSPA** (High Speed Packet Access) supports a download speed of up to 7.2Mbps;
- **HSPA+** supports a download speed of up to 14.4Mbps, and
- **HSPA+ Dual Carrier** supports a download speed of up to 24Mbps.

The speeds outlined above depend on multiple quality of coverage factors, such as distance of the user from the nearest mobile base station, the number of users sharing the cell, and quality of signal.

The most recent report on the Northern Ireland communications market⁴² by Ofcom, the UK's communications regulator, highlights that 3G mobile coverage is 54% in Northern Ireland, which is substantially lower than that of the UK as a whole at 95%. There is higher 3G population coverage in the Republic, e.g. 3 claims 96% population coverage with its 3G network.

5.2.3 Fourth Generation (4G) Mobile

4G is a future generation of mobile technology systems currently under development. Most networks being planned will use **LTE** (Long Term Evolution), a technology designed to achieve download (and upload) speeds approaching current fixed broadband services. LTE is a successor to the UMTS technology outlined above and facilitates the use of 4G networks in parallel with 3G networks, an advantage to existing 3G operators.

Originally a Fixed Wireless Access (FWA) technology, **WiMAX** (Worldwide Interoperability for Microwave Access) is another 4G mobile technology designed to achieve download (and

⁴¹ Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

⁴² Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

upload) speeds approaching current fixed broadband services. A competitor to LTE, it is not yet clear how many potential 4G operators in the UK and Irish markets will roll out a WiMAX network.

Auctions of 4G spectrum are planned to take place in the UK and the Republic this year. Ofcom has predicted that data rates for 4G technologies will grow from 20Mbps currently to 2.9Gbps by 2020⁴³.

5.2.4 Licensing of 4G in Northern Ireland

Ofcom plans to auction Fourth generation (4G) spectrum in early 2013. This new spectrum (at 800MHz and 2.6GHz) will be equivalent to three quarters of the mobile spectrum currently in use.

Ofcom is considering means of increasing the coverage provided by at least one of the 800MHz licences. Ofcom originally envisaged that the 800MHz band licence would cover 95pc of the UK with a 4G network. However, after a period of consultation, Ofcom now plans to include a special condition to strengthen the coverage provision.

Ofcom has proposed two options for increasing the coverage of the 800MHz licence:

- OPTION 1: The regulator extends the coverage obligation to 98% of the UK population, or
- OPTION 2: The operator extends its coverage beyond current 2G coverage to incorporate the mobile 'not-spot' areas throughout the UK, in combination with the £150m that the UK government plans to make available to improve mobile coverage (see **Section 7.2.2** of this document).

Ofcom will make a final decision on the auction design by the summer.

5.2.5 Licensing of 4G in the Republic of Ireland

ComReg plans to auction Fourth generation (4G) spectrum in Q3 2012. The auction process will include 28 spectrum blocks in the 800MHz (old analogue TV spectrum), and 900MHz and 1800 MHz (both old GSM spectrum) bands.

The population coverage requirements for the licences are that:

- Existing operators provide 70% population coverage within three years, and
- New entrants provide 35% population coverage within three year and 70% population coverage within seven years.

5.3 Fixed Wireless Access (FWA) Technologies

FWA operators use many different technologies to connect subscribers. A typical FWA deployment is point-to-multipoint, i.e. it consists of a wireless base station transmitting signals to and receiving signals from multiple users within coverage of the base station. User must be within line of sight of the base station without any obstructions between the user and the base station. Base stations are usually positioned on high sites or masts to maximise coverage and minimise line-of-sight issues.

⁴³ <http://stakeholders.ofcom.org.uk/market-data-research/other/technology-research/2011/4G-Capacity-Gains/>

Unlike mobile networks, FWA operators have no requirement to operate via a common technology standard. Operators use a wide range of wireless technologies, many of which are proprietary to specific technology suppliers. In an effort to avail of the cost advantages of a widely adopted technology standard, many FWA operators are migrating to WiMAX technology based on the IEEE 802.16 standard. WiMAX, already introduced above in a 4G mobile context (see **Section 5.2.3** of this report), combines high-speed broadband capability with wireless metropolitan area network coverage.

FWA operators use both licensed spectrum and licence exempt spectrum, i.e. operating on a non-exclusive basis in spectrum bands not occupied by licensed operators.

5.4 Satellite Services

Satellite technology is a viable wireless alternative for users in remote areas not served by other broadband technologies such as DSL, cable, mobile broadband or FWA. Its main advantage is coverage, although this can be adversely impacted by topography and weather. Its main disadvantage is the signal latency (or delays) resulting from the formidable distances travelled when a signal goes from the user to the satellite to the Operator's core infrastructure and back again. High latency impacts real-time applications such as voice over the internet (VOIP), video-conferencing and gaming. Additional disadvantages compared to other broadband technologies include: more restricted usage allowances due to the satellite resource being shared between large numbers of users, and higher connection fees.

Available download and upload speeds have improved with the commissioning of new satellites in recent years. The latest generation of satellites uses ka-band spectrum at 20GHz to 30GHz spectrum, delivering higher capacity services. For example, Eutelsat's KA-SAT satellite has a throughput of over 70Gbps, which combined with its connectivity technology is enough to provide an ADSL equivalent broadband service to 1m premises. Higher capacity satellites are currently being developed.

5.4.1 Onwave

Onwave partners with Eutelsat's **Tooway™** service to provide a satellite broadband service to users in the Republic and Northern Ireland. Tooway™ is based on Eutelsat's KA-SAT satellite which went into operation in May 2011. KA-SAT provides download speeds of up to 10Mbps and upload speeds of up to 4Mbps.

In the Republic, Onwave offers a range of broadband packages with download speeds of up to between 6Mbps and 10Mbps combined with usage allowances of between 4GB and 25GB per month.

As part of the National Broadband Scheme (NBS) managed by 3, Onwave provides a satellite service for the most remote 5% of users in the NBS coverage area, delivering a download speed of 1Mbps and an upload speed of 128kbps, the speeds of which are contracted to increase in July 2012⁴⁴ and again in October 2014⁴⁵.

In Northern Ireland, Onwave was awarded a three-year Remote Broadband Services⁴⁶ (RBS) contract in January 2012 to provide satellite broadband services to Northern Ireland

⁴⁴ Download speed: 1.6Mbps, upload speed 256kbps

⁴⁵ Download speed: 2Mbps, upload speed 256kbps

⁴⁶ <http://www.detini.gov.uk/deti-telecoms-index/deti-telecoms-remote-broadband-services.htm>

consumers that cannot access fixed-line broadband services. Onwave offers a range of broadband packages with download speeds of up to between 6Mbps and 10Mbps combined with usage allowances of between 4GB and 16GB per month.

5.4.2 Q Sat

Q Sat has an agreement with Avanti for capacity on its HYLAS1 system (launched in 2010) to provide satellite broadband services in the Republic and Northern Ireland. Q Sat offers a range of broadband packages with download speeds of up to between 1Mbps and 8Mbps combined with usage allowances of between 1GB and 20GB per month.

In January 2012, Q Sat bought over Avanti's consumer business in Ireland, allowing Avanti to concentrate on its wholesale business.

5.4.3 Other Satellite Communications providers

Digiweb

Available in the Republic and other European markets, the **Digiweb Tooway™** broadband service provides up to 10Mbps download where access is shared between users. Speed performance can vary throughout the day depending on the amount of contention at any particular time. It has a usage allowance of 25GB.

Eircom

Eircom's **Satellite Broadband** offering provides up to 3.6Mbps download where access is shared between users. Usage allowance options vary between 2.4GB up to a maximum of 12GB per month.

5.5 Other Technologies

5.5.1 White Spaces

The expression 'white spaces' refers to unused spectrum in areas in bands reserved for TV broadcasting. These spaces, at frequencies between 490 and 790MHz, can be used to transmit and receive wireless signals over large distances and are not dependent on line-of-sight.

Potential application areas include:

- **Enhanced Wi-Fi** where the area covered by a Wi-Fi signal can be expanded to cover a much larger area, such as a town, and
- **Rural Broadband** where the distance advantages of white spaces are harnessed to connect rural premises to the nearest urban centre.

In the UK, Ofcom has decided to make white spaces licence exempt, which means that operators do not need a licence as long as there is no interference with existing users of that spectrum. Ofcom expects that the use of white space technology could commence in the UK by 2013.

6 International Best Practice Comparisons

6.1 Introduction

Three international projects were selected for review, in consultation with ICBAN. These are:

- Arge Glasfaser Waldviertel, Austria.
- Midtsoenderjylland, Denmark.
- Superfast Cornwall, UK.

Each of the three international exemplars are detailed in **Appendix A** in this study.

6.2 Key Learnings in an ICBAN Context

Reviews of these projects, and consultations with those involved, have highlighted the following lessons learned from the implementation of the projects:

6.2.1 The Importance of Localism

It is vital to engage locally with communities in all areas, for many reasons. Firstly, engaging with local users, or potential users in deficient areas, will help to clarify the extent of demand at a local level, and thus build the business case to support a new broadband initiative. ICT projects that have focussed on local communities have discovered that local assets or support may become available. In other projects, these assets and support have come in the form of utility network access, ICT support skills from local businesses, sites being made available for network equipment, and technical R&D skills and knowledge from local universities. Local co-operation, for example with local universities and industrial companies, has led to the successful sharing of resources, information, and skills, often resulting in significant cost savings, and the achievement of the project objectives in a shorter timescale.

In addition, broadband initiatives often need to be instigated at local level, rather than waiting for national government or incumbent operators to act.

6.2.2 Key Role: Programme Leader/Director

Each of the projects assessed had a Programme Director who was responsible for the overall delivery of the strategy. His role was to liaise with all stakeholders, to influence the relevant local, regional and national authorities, to ensure that the projects were delivered according to the strategy and according to expectations.

6.2.3 Key Role: Project Champion

There is a need for a 'Project Champion' within the local authority. In the context of these rural broadband initiatives, the Project Champion is almost a 'go between', who is responsible for driving the project within the local authority, to ensure that no unreasonable

planning or procedural barriers are put in the way of the implementation of the project. The Champion liaises with the relevant departments within the local authority, with a balanced view of the requirements of the authority and the objectives of the project. In this way, any potential difficulties are identified and addressed early. Criticism has often been levelled at local authorities, both in Ireland and abroad, for hindering broadband and mobile network projects. Delays in planning permission for wireless masts, for example, are often cited as barriers to the provision of broadband and mobile services.

6.2.4 Local Authority Involvement

Aligned with the need for a Project Champion is the need to involve the local authorities in formalising and supporting the broadband needs and strategy for the region.

The local authority members of ICBAN have a key role to play in facilitating the planning and network rollout processes, and in stimulating demand at local level, so that there is a proven demand for new broadband services, and an acceptable payback period for the private sector (telco) investors.

6.2.5 Utility Network Projects

For many years, telecoms broadband initiatives have taken advantage of other utility company network rollout projects (electricity, gas, water). For example, when a road is opened for the installation of electric cable ducting, it makes commercial sense to use the opportunity to also install telecoms ducting and/or fibre cables. In this way the project rollout is accelerated, and significant costs are saved in duct installation. Road upgrade projects can also be leveraged for duct installation.

6.2.6 Competitive Reaction from Incumbents

Incumbent operators, who were previously not interested in supplying services to certain rural areas, have responded to local broadband initiatives by extending their services to those same areas.

6.2.7 Technology Breeds Technology

The supply of broadband in a previously deficient area will stimulate the emergence of new technology companies, and the growth of existing businesses. Many international projects have resulted in technology clusters being established, often in innovation centres or business start-up incubation facilities.

6.2.8 University Inclusion

As mentioned above, several projects have benefited from the involvement of local Universities. This has come in the form of technical network design services at the beginning of the project, and the development and testing of new technologies and services that would complement and enhance the new network.

6.2.9 Value Added Services

Offering value-added services over the new network, for example IPTV and video-on-demand, not only enhances the service offering for the end-user, but also helps to stimulate demand and contribute additional revenues to the operator, thus reducing the payback period.

In this way, it may become more compelling and commercially practical to use fibre for infill areas instead of wireless technologies. Superfast Cornwall, for example, is deferring the deployment of infill technologies until the latter end of their project, in 2015. They expect that wired and wireless technologies will have advanced to a higher level by that time and should be more technically effective or more cost-efficient.

6.2.10 New Demand Drivers

The farming community, along with primary, secondary and third-level students at home have emerged as important new user groups. In education, for example, the need for broadband internet access has extended from the schools and universities to home-level.

6.2.11 Other Challenges

Other challenges in the broadband projects studied have included:

- Convincing local residents of the merits of the project, and overcoming initial scepticism;
- Managing the expectations of project stakeholders and residents;
- Difficulties in working without the incumbent operator;
- Lack of a nearby backbone connection, and
- Lack of interconnection between towns in the same area

6.3 Focus Areas for ICBAN

Each of the lessons learned above, can be applied, to varying degrees, to address the issues faced by ICBAN. ICBAN intends to act as an influential representative body that will lobby and convince national governments and relevant agencies, along with service providers, to recognise and address the broadband deficiencies that exist in the region. In this way many of the 'hands-on' activities above will not apply directly to ICBAN.

ICBAN's most important areas of focus will be:

- The important aspects of localism, including demand stimulation;
- Appointing Champions, who will drive the strategy at local and local authority level.
- The members of ICBAN using their status as local authorities to positive effect in the planning and network rollout processes, so that network rollout is facilitated and not unreasonably hindered.
- Lobbying the relevant national Governments and agencies, and service providers effectively, to ensure that the objectives of this strategy are delivered.

6.4 International Exemplar Profiles

See **Appendix A** for further details on each of the three international exemplars covered in this study.

7 Government Initiatives

7.1 EU Initiatives

7.1.1 2020 Targets

In 2010 the EU's **Europe 2020 Strategy** set the following broadband targets under its **Digital Agenda for Europe**⁴⁷ flagship initiative:

- Basic broadband for all by 2013: basic broadband coverage for 100% of EU citizens;
- Fast broadband by 2020: broadband coverage at 30Mbps or more for 100% of EU citizens; and
- Ultra-fast broadband by 2020: 50% of European households should have subscriptions above 100Mbps.

7.1.2 Connecting Europe Facility

In October 2011 the EU Commission announced the €50 billion **Connecting Europe Facility**⁴⁸ (CEF), with €9.2 billion being invested in telecommunications and IT from 2014 to 2020.

Of the €9.2 billion, at least €7 billion will be targeted at superfast and ultrafast broadband networks. The aim of the funding is to complement and catalyse private investment in challenging broadband projects, for example addressing demand for broadband services in rural areas. It will be available through various financial instruments (investment funds, loans, bond issues, guarantees and so on). The Commission hopes that this investment will encourage further market investment of between €50 and €100 billion. Projects can be proposed by telecoms operators, utility companies, construction companies or public bodies taking part in public-private partnerships.

7.2 Government Initiatives – Northern Ireland

Telecommunications policy in the UK is a reserved matter with overall responsibility lying with the Department for Culture, Media and Sport (DCMS) in London. The Telecommunications Policy Unit⁴⁹ in the Department of Enterprise Trade and Investment

⁴⁷ http://europa.eu/press_room/pdf/complet_en_barroso_007_-_europe_2020_-_en_version.pdf

⁴⁸ <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/11/1200>

⁴⁹ <http://www.detini.gov.uk/deti-telecoms-index.htm>

(DETI) in Belfast influences and shapes national policy to address telecommunications issues specific to Northern Ireland⁵⁰.

This section outlines the telecommunications related initiatives currently being undertaken by either the UK government or the Northern Ireland Executive.

7.2.1 Universal Service Commitment (USC)

Broadband Delivery UK (BDUK) is the organisation within the Department of Culture, Media and Sports (DCMS) responsible with delivering government broadband policy, which is to ensure that the UK has the best superfast broadband network in Europe by 2015.

The government aims to ensure that 90 per cent of homes and businesses in each local authority area (Northern Ireland in this case) have access to superfast broadband and for everyone in the UK to have access to at least 2Mbps by 2015. The latter target of 2Mbps is known as the Universal Service Commitment (USC). Superfast broadband is currently available to 97%⁵¹ of Northern Ireland households, the highest availability in the UK. However, 23% of Northern Ireland households currently receive less than 2Mbps, the highest equivalent figure in the UK.

BDUK has a total fund of £530m to bring superfast broadband to the third of UK homes and businesses that won't be provided for by broadband market. £4.4m⁵² of this fund has been earmarked for Northern Ireland. It's expected that the Northern Ireland Executive will use this investment to address USC, i.e. provide everyone with at least 2Mbps broadband, concentrating particularly in rural areas.

Separately, the Department of Agriculture and Rural Development (DARD) is planning to augment this level of funding by a further £5m to address the broadband needs of Northern Ireland's farming community. With supplementary EU funding, the total funding is expected to be circa £20m.

DETI plans to invest this funding, through a public procurement process commencing in Q3 2012, to address the fixed broadband deficit areas (or 'Not-Spots') within Northern Ireland. Government expects that the private sector will at least match this funding, bringing the total potential level of investment to be circa £40m.

In addition, DETI plans to run a parallel procurement process in the same timeframe, to invest circa £12m to improve access to mobile broadband (3G/4G) services in Northern Ireland.

7.2.2 Mobile Infrastructure Project (MIP)

In October 2011, the UK government announced plans to make £150m available to improve mobile coverage⁵³. The objectives⁵⁴ of the MIP are to increase mobile coverage to 99% of the UK population and improve the quality of mobile service for the 5% to 10% of consumers

⁵⁰ <http://www.detini.gov.uk/telecoms-action-plan-for-ni>

⁵¹ <http://stakeholders.ofcom.org.uk/binaries/research/telecoms-research/bbspeeds2011/infrastructure-report.pdf>

⁵² http://www.culture.gov.uk/news/news_stories/8385.aspx

⁵³ http://www.hm-treasury.gov.uk/press_112_11.htm

⁵⁴ http://www.culture.gov.uk/images/publications/Mobile_Infrastructure_engagement_Rel_1_0.pdf

and businesses in areas of poor mobile coverage. At present, mobile broadband coverage only reaches 54%⁵⁵ of the Northern Ireland population, compared to 95% of the UK population as a whole.

This project is aimed at mobile voice not-spots (i.e. areas where no voice service provision is available from any mobile operator) identified in the Ofcom Infrastructure report⁵⁶ published in November 2011. It will invest in new mast infrastructure through a procurement process which is expected to commence in mid-2012, with the project being completed by 2015. The government estimates that 6m people in the UK will benefit from this initiative.

According to the announcement, the installation of the masts will take place "in consultation with local communities", and the Treasury has identified parts of Wales, Scotland and Northern Ireland as being in particular need.

Two procurement options are under consideration:

- The **Serviced Sites** approach, procuring sites with passive infrastructure (cabinet, power, mast, and connectivity) that are ready for a network operator to install its network equipment and antennae, and
- The **Service** approach, procuring a mobile service to enable increased mobile voice coverage and service quality.

The procurement process through which the funds will be invested is currently being decided by DCMS. Even though the focus of this project is on mobile voice, the procurement process is likely to favour a 3G solution, thereby improving mobile data coverage also.

Further details concerning this fund will be released by the DCMS in due course.

7.2.3 Remote Broadband Services (RBS)

In 2009, the Department of Enterprise, Trade and Investment (DETI) awarded a three-year Remote Broadband Services⁵⁷ contract with Avanti Communications to provide satellite broadband services to Northern Ireland consumers that cannot access fixed-line broadband services. In June 2011, there were over a thousand satellite customers in the province.

In January 2012 DETI awarded a follow-on three year Remote Broadband Services contract to Onwave Ltd⁵⁸.

7.2.4 Northern Ireland Broadband Fund

The Northern Ireland Broadband Fund supported broadband-related technology initiatives in Northern Ireland. The £1.9m fund provided practical financial support to organisations that

⁵⁵ *Ofcom Communications Market Report: Northern Ireland*. Ofcom, 04/08/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

⁵⁶ *Ofcom Infrastructure Report: The first Communications Infrastructure Report*. Ofcom, 01/11/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/comms-infrastructure-report/>

⁵⁷ <http://www.detini.gov.uk/deti-telecoms-index/deti-telecoms-remote-broadband-services.htm>

⁵⁸ www.onwave.co.uk/northern_ireland

were either trialing broadband technologies or deploying broadband solutions in locations that could not avail of a fixed line broadband service.

Recipients of Broadband Fund support included BT for a Fibre to the Cabinet (FTTC) project, and NWE and Net1for Fixed Wireless Access (FWA) projects. The fund has now been closed.

7.3 Government Initiatives – Republic of Ireland

The section outlines the telecommunications related initiatives currently being undertaken by the Irish government.

7.3.1 Next Generation Broadband Taskforce (NGBT)

In June 2011, the Department of Communications, Energy and Natural Resources (DCENR) set up the Next Generation Broadband Taskforce (NGBT) comprising the CEOs of the main telecoms providers in the republic.

The taskforce's main task was to examine the best way of accelerating the delivery of broadband infrastructure in every region to meet the EU's 2020 targets. The NGBT's areas of focus included optimising the policy environment to promote investment, reducing any barriers to investment, and identifying investment plans (both private and public).

Dedicated working groups were set up to examine the following five areas: (i) targets, (ii) the removal of infrastructure barriers, (iii) spectrum policy, (iv) broadband demand stimulation and (v) the role of state entities and assets.

The NGBT released its report⁵⁹ in May 2012 detailing its analysis and making over fifty recommendations concerning the five areas outlined above. The recommendations covering infrastructure barrier removal and states assets and entities are of particular relevance to local authorities.

A National Broadband Plan is expected to be completed and published in Q3 2012.

7.3.2 National Broadband Scheme (NBS)

In December 2008, the Irish government awarded the contract to 3 for the National Broadband Scheme⁶⁰ (NBS), a scheme designed to address areas where there were insufficient broadband services. The rollout was completed in October 2010.

The mobile broadband service offered through the NBS has a minimum download speed of 1.6Mbps and a minimum upload speed of 1.2Mbps. These speeds are contracted to increase to a minimum of 2.3Mbps download and 1.4Mbps upload in October 2012. For the most remote 5% of users in the NBS coverage area, 3 also provides a satellite broadband service providing a download speed of 1Mbps and an upload speed of 128kbps, the speeds of which are contracted to increase in July 2012⁶¹ and again in October 2014⁶².

⁵⁹ *Enabling a Connected Society*, DCENR [May 2012]. <http://www.dcenr.gov.ie/NR/rdonlyres/1AE24C27-40AD-4A73-879F-4536250C87BC/0/FullReport.pdf>

⁶⁰ <http://www.dcenr.gov.ie/Communications/Communications+Development/National+Broadband+Scheme>

⁶¹ Download speed: 1.6Mbps, upload speed 256kbps

7.3.3 Rural Broadband Scheme (RBS)

In May 2011, the Department of Communications, Energy and Natural Resources (DCENR) in cooperation with the Department of Agriculture, Fisheries and Food (DAFF) announced the Rural Broadband Scheme (RBS) to provide a broadband service to individual rural premises that are unable to obtain a broadband service. The RBS is a measure under the Rural Development Plan using funding from the European Agriculture Fund for Rural Development.

The scheme is operating in three phases:

1. **Application Phase.** Individual applicants submit an application to the Department. The application phase closed on 29th July 2011 with around 5,000 applications received.
2. **Verification Phase.** The Department checks with existing communications providers if they are willing to provide a service to the premises concerned. If so, the application under the scheme will be closed. If none of the communications providers are prepared to offer a service, then the application will progress to the final phase in the scheme.
3. **Procurement and Rollout Phase.** The Department will procure a communications provider who will offer a basic internet service to the remaining applicants. While the Department will be paying part of the cost of the infrastructure necessary to provide a service, the applicant will be responsible for paying the costs of the service itself.

The procurement process is expected to commence once the Verification Phase has been completed. Rollout of the service under the Scheme is expected to be completed by the end of 2012.

⁶² Download speed: 2Mbps, upload speed 256kbps

8 User Survey

8.1 Introduction

This section presents a demand-side assessment of the ICBAN region, as conveyed by residential and business users in each council area. The feedback presented below has been gathered through the following research activities:

- A comprehensive end-user survey, involving over 1,918 responses from across the region.
- User workshops completed for each Council area.

This exercise is a fundamental part of the study as it presents the experiences of people ‘on the ground’ in the ICBAN area. Their feedback is important in supporting the findings presented in the next section.

8.1.1 End-User Survey – Regional Overview

A comprehensive end-user survey was conducted in each council area, and 1,918 survey responses were collected. The results of these survey responses were collated together and analysed, and the results are presented below. Firstly, we present a regional overview, showing how each council area compares under various key headings. This is then followed by a breakdown of the key survey results for each council area.

A copy of the full survey is contained in **Appendix C**.

8.1.2 Number of Survey Responses

Table 8.1 below presents the number of survey responses received back from users in each council area. It should be noted that although the numbers of responses in two council areas in particular (Armagh and Donegal) are low, the same effort went into encouraging users to complete the surveys in each council area. Various distribution channels were used to promote the survey, including: distribution through schools, email notification to council databases, direct mailings, website promotion, and other media.

Council Area	No. of Responses	Council Area	No. of Responses
Armagh	17	Cavan	289
Cookstown	500	Donegal	20
Dungannon	186	Leitrim	507
Fermanagh	79	Monaghan	141
Omagh	96	Sligo	86
Total (NI)	878	Total (ROI)	1,043
OVERALL TOTAL			1,921

Table 8.1: Number of Survey Responses Received

The figures below present a council-by-council comparison of the main broadband and mobile service issues addressed in the survey, along with an overview of user satisfaction

levels. These charts allow us to identify problems that are common between council areas, and situations that exist in one jurisdiction (ROI or NI) over another.

8.2 End-User Feedback and Experiences

The following key observations can be extracted from the overall survey analysis:

- Broadband service take-up by respondents is high, with averages of 89% in ROI and 79% in NI.
- BT is the dominant broadband communications provider in NI, but the ROI market is shared between multiple providers, with Eircom, Vodafone and 3 dominating.
- Vodafone is the leading mobile communications provider in ROI, and O2 is the leading player in NI.
- Satisfaction levels vary across councils areas, but are generally higher in ROI than NI.
- Roaming issues are experienced by users in all areas, but less so in ROI.
- Education and home-based/rural businesses are the key broadband usage drivers. Enterprise and economic development are commonly promoted as the main drivers of broadband strategy. But it is also clear that education is a key driver across all regions.

In the following charts, red represents NI council areas and blue represents ROI council areas. This colour coding has been applied to make the visual comparison easier.

8.2.1 Broadband Take-Up

Figure 8.1 on the next page the broadband take-up for respondents in each of the council areas.

The number of respondents using broadband services on average is lower in Northern Ireland (79%), than in the Republic of Ireland (89%), and particularly lower in the council areas of Dungannon and Fermanagh.

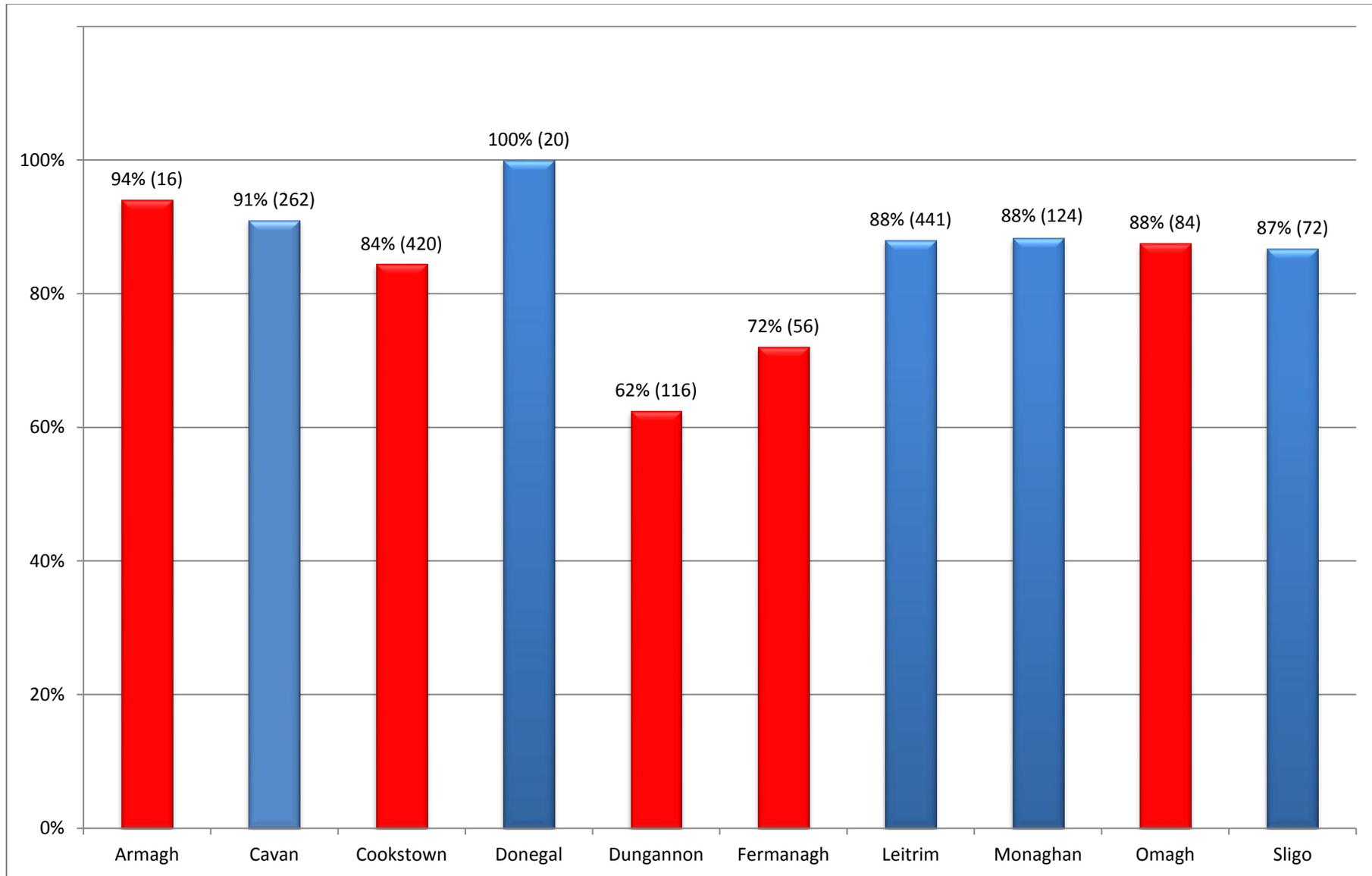


Figure 8.1: Percentage of Respondents with a Broadband Service. (Absolute numbers of Respondents with a Broadband Service are presented in brackets).

Figure 8.2 on the next page shows the percentage of respondents without a broadband service available. The respondents in the Dungannon and Fermanagh council areas have notably low availability.

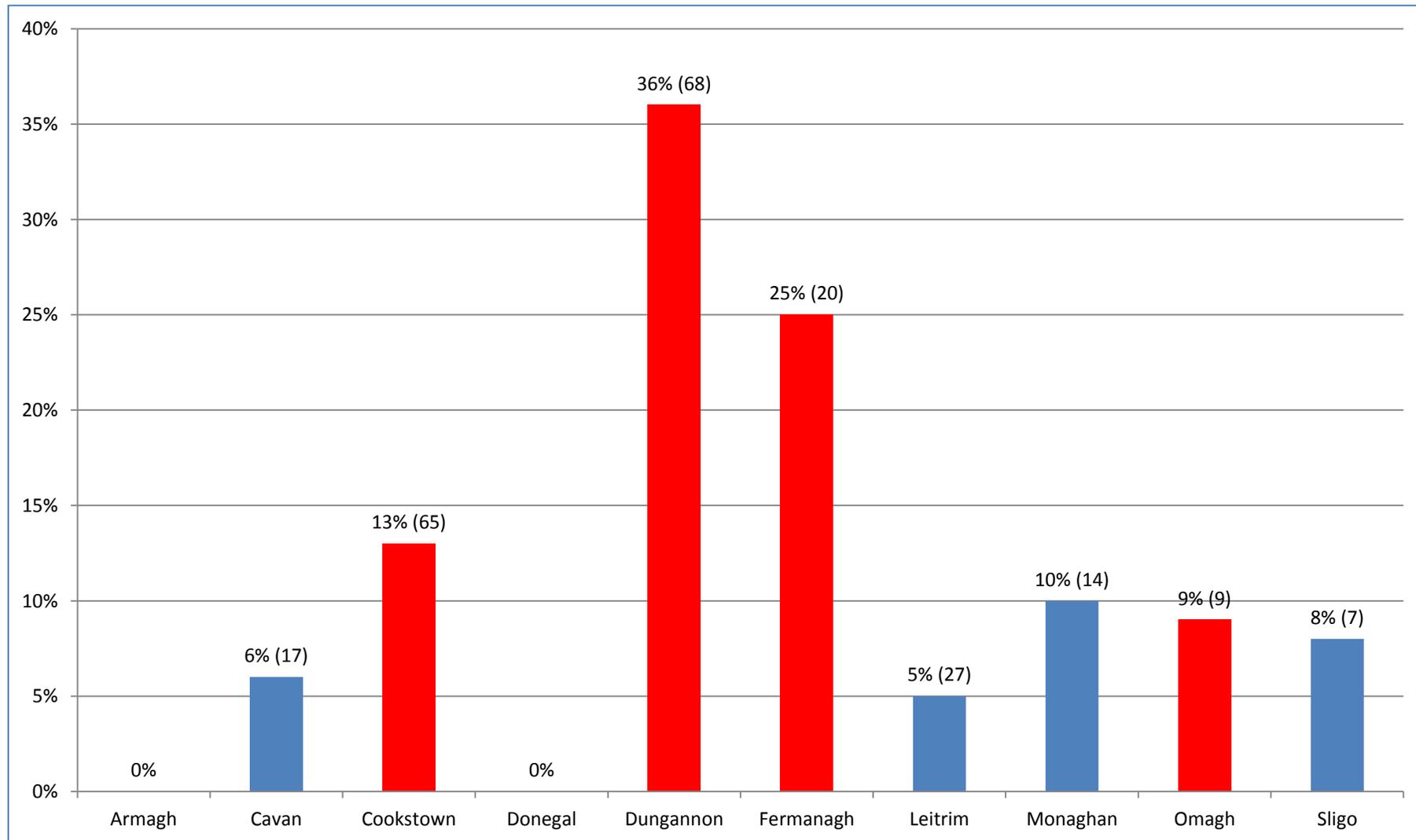


Figure 8.2: Percentage of Total Survey Respondents who do not have a Broadband Service Available in their area. (Absolute numbers of Respondents are presented in brackets).

8.2.2 Broadband User Satisfaction

Broadband Choice

Figure 8.3 on the next page shows the respondents' satisfaction levels with the choice of broadband communications providers. Satisfaction levels in the Republic are at 43%, with satisfaction levels outweighing dissatisfaction levels across most of the southern council areas. This may reflect the availability of a competitive mobile broadband platform, provided by 3 under the NBS contract, for respondents who cannot avail of a fixed broadband service.

Dissatisfaction levels in Northern Ireland are at 38%, with dissatisfaction levels outweighing satisfaction levels across most northern council areas. Dungannon, Fermanagh and Armagh have the highest levels of dissatisfaction. This may reflect of the lack of mobile broadband alternative when a fixed broadband service is not available to respondents.

For each Council area, the percentages of respondents who are Satisfied or Very Satisfied are represented by the dark colour bars on the left, with the percentages of respondents who are Dissatisfied or Very Dissatisfied are represented by the lighter colours on the right.

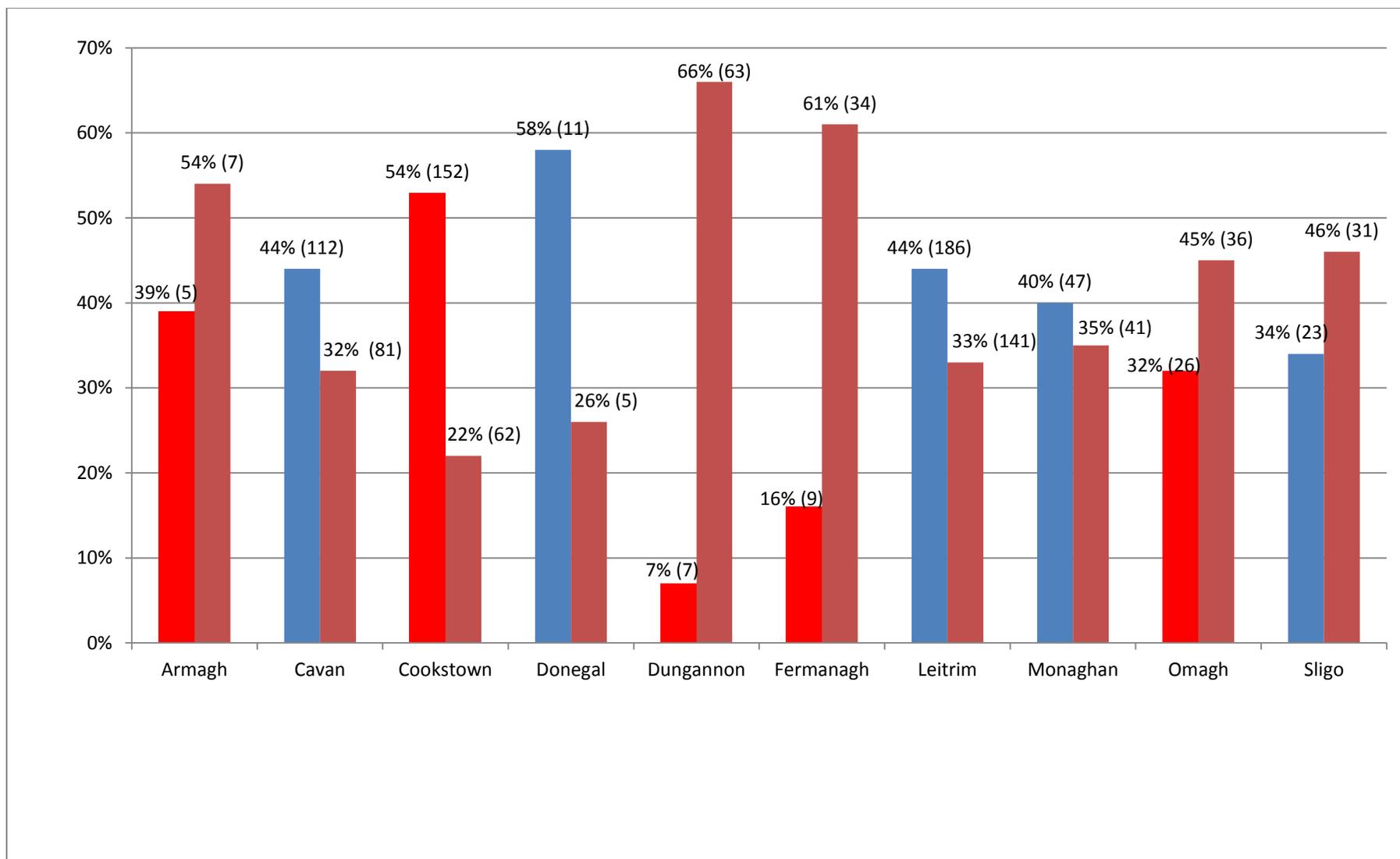


Figure 8.3: Respondents' Satisfaction with the Choice of Communications Provider. Bars on the left represent those Satisfied or Very Satisfied. Bars on the right represent those Dissatisfied or Very Dissatisfied. (Absolute numbers of Respondents are shown in brackets).

Broadband Speed

Figure 8.4 on the next page shows the respondents' satisfaction levels with broadband speeds. Satisfaction levels in the Republic are at 44%, with satisfaction levels outweighing dissatisfaction levels across most southern council areas.

Dissatisfaction levels in Northern Ireland are at 53%, with dissatisfaction levels outweighing satisfaction levels across most northern council areas. Dungannon, Fermanagh and Armagh have the highest levels of dissatisfaction. Dungannon registers the highest level of dissatisfaction at 92%.

For each Council area, the percentages of respondents who are Satisfied or Very Satisfied are represented by the dark colour bars on the left, with the percentages of respondents who are Dissatisfied or Very Dissatisfied are represented by the lighter colours on the right.

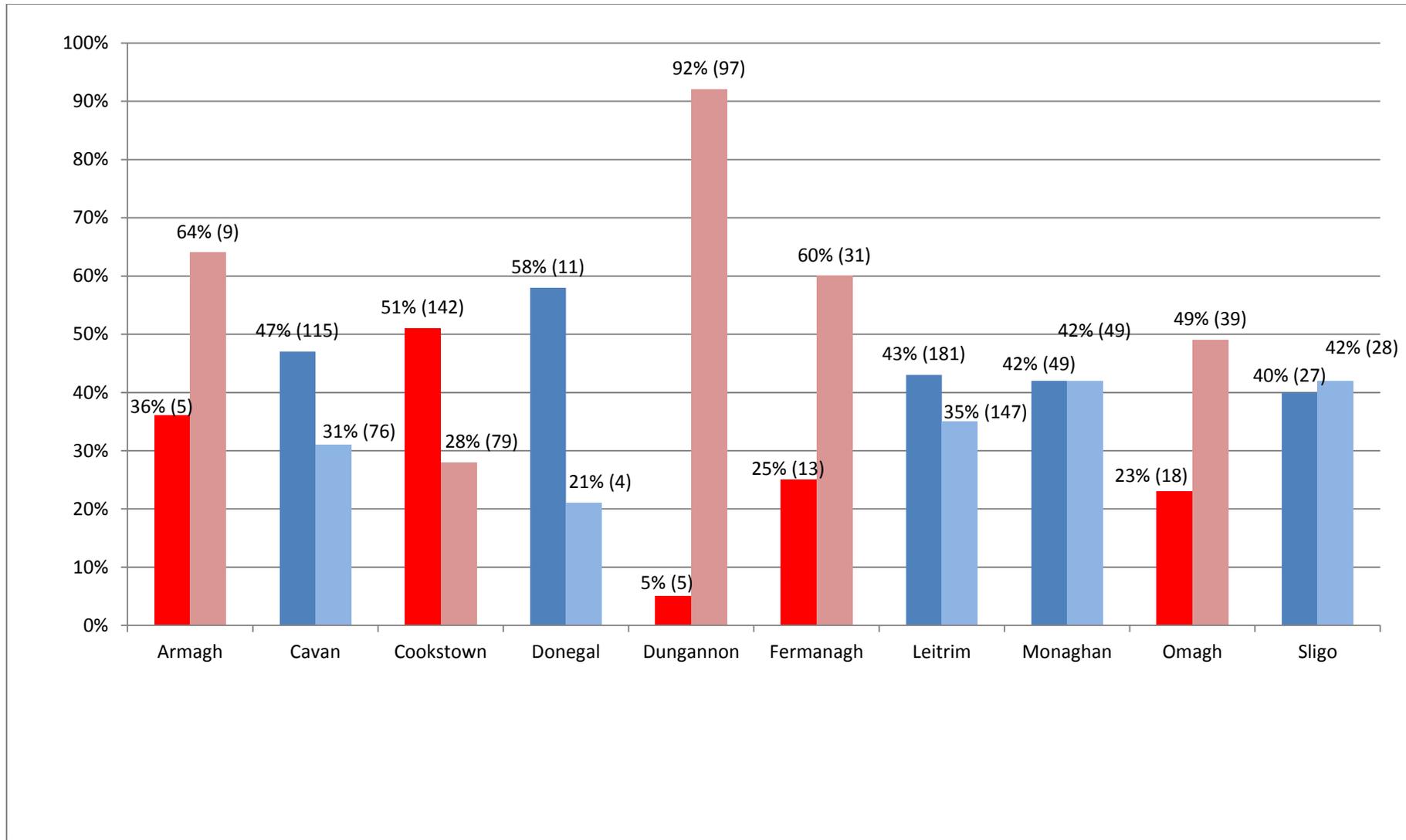


Figure 8.4: Respondents' Satisfaction with Broadband Speed. Bars on the left represent those Satisfied or Very Satisfied. Bars on the right represent those Dissatisfied or Very Dissatisfied. (Absolute numbers of Respondents are shown in brackets).

Broadband Quality and Reliability

Figure 8.5 on the next page shows the respondents' satisfaction levels with the quality and reliability of broadband services. Satisfaction levels in the Republic are at 50%, with satisfaction levels outweighing dissatisfaction levels.

Dissatisfaction levels in Northern Ireland are at 41%, with dissatisfaction levels outweighing satisfaction levels across most northern council areas. Dungannon registers the highest level of dissatisfaction at 90%.

For each Council area, the percentages of respondents who are Satisfied or Very Satisfied are represented by the dark colour bars on the left, with the percentages of respondents who are Dissatisfied or Very Dissatisfied are represented by the lighter colours on the right.

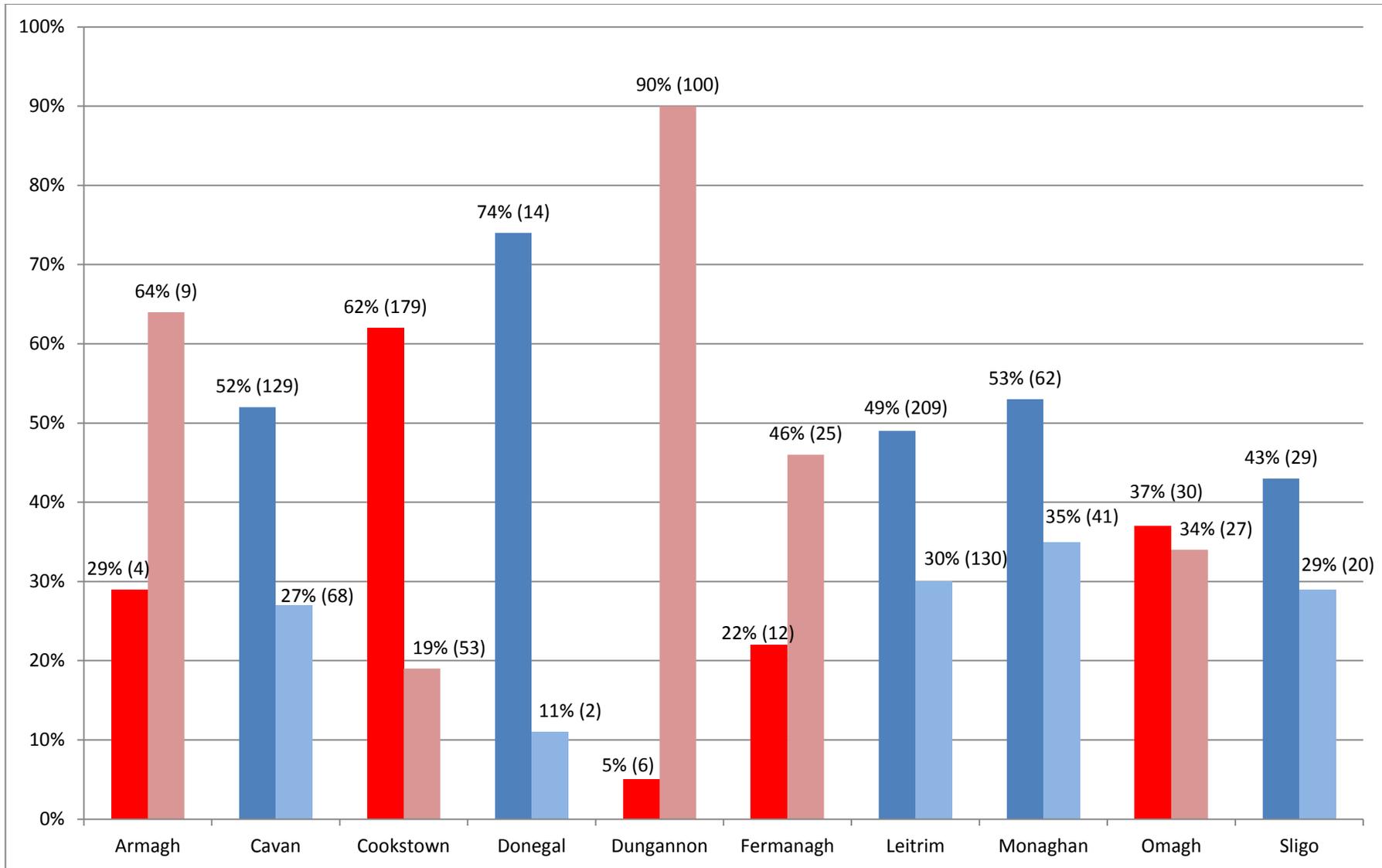


Figure 8.5: Respondents' Satisfaction with the Quality & Reliability of Broadband Service. Bars on the left represent those Satisfied or Very Satisfied. Bars on the right represent those Dissatisfied or Very Dissatisfied. (Absolute numbers of Respondents are shown in brackets).

8.2.3 Broadband Use

Figure 8.6 on the next page shows the main uses for broadband for residential respondents. It is very clear that education is at the fore as one of the main uses, and thus a major driver for addressing broadband deficiencies.

In the past, broadband has been important at school premises level, to enable schools to educate through the Internet. However, in recent years there has been an increased focus on the following in education:

- Schools assigning homework or project work that requires access to the internet for research;
- School networks within a community, enabling students in a cluster of schools to access education resources contained within the common network.
- Teachers encouraging students to use online educational sites, e.g. *Mathletics.com*, as challenging education tools that involve an element of competition whilst learning in a fun environment.
- Books and information packs that can be downloaded from home.

Feedback gained through the survey and from the workshops shows that the absence of reliable broadband can adversely affect third-level students, forcing them to live away from home nearer to their educational institutions, so that they can better access broadband services.

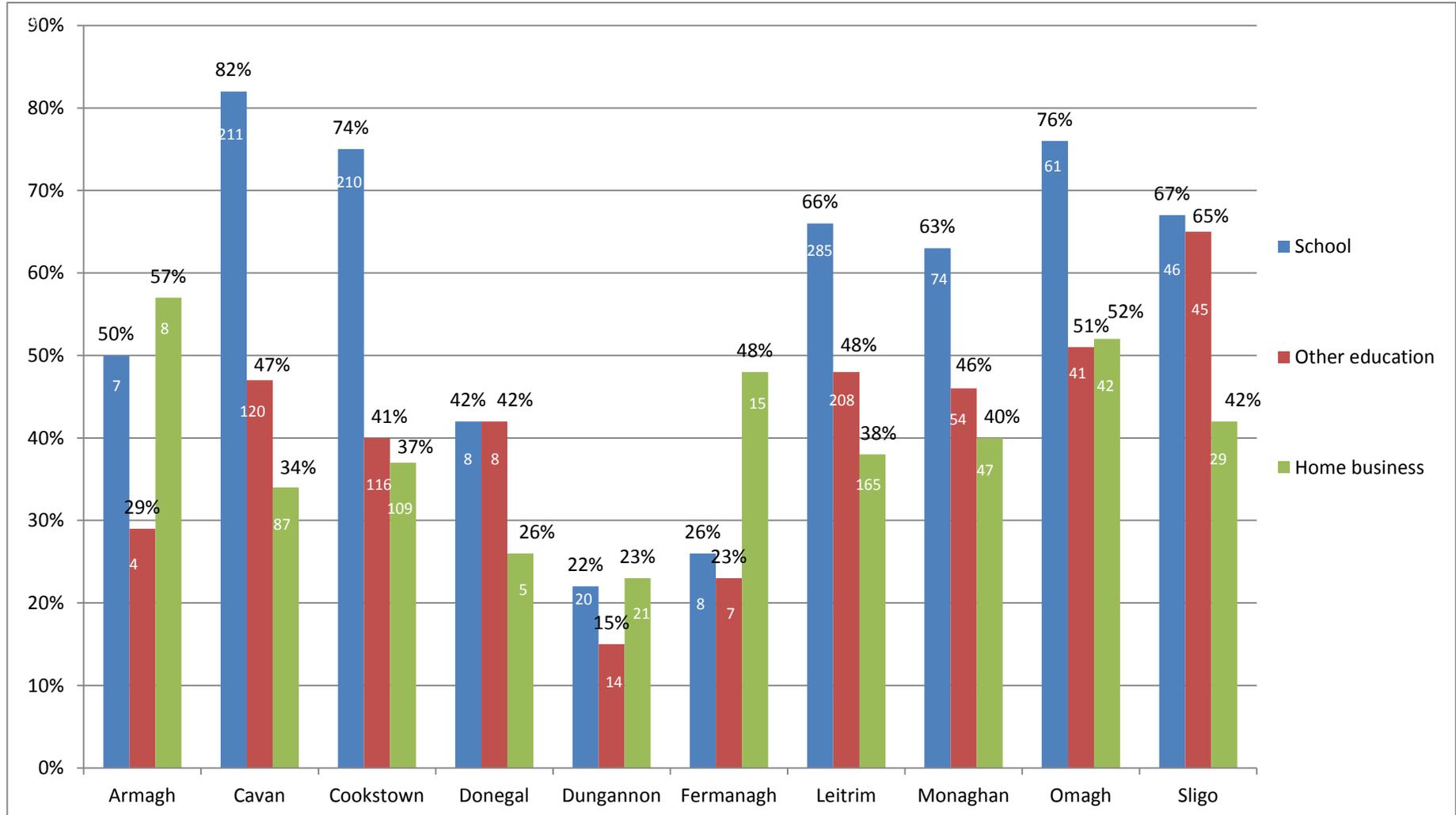


Figure 8.6: The Main Residential Uses for Broadband – Percentage of Affirmative Responses to each category of use. Absolute numbers of Respondents are shown within each bar.

8.2.4 Mobile User Satisfaction

Figure 8.7 on the next page shows the levels of satisfaction with mobile coverage among respondents and the number of respondents experiencing mobile roaming issues. The levels of satisfaction with mobile coverage vary noticeably between council areas, from 17% in Omagh and Fermanagh, up to 66% in Cavan.

The majority of users in all ten council areas experience mobile roaming issues, ranging from dropped calls to unplanned changes in networks. There is some correlation between the satisfaction levels and the extent of roaming difficulties. For example, Omagh and Fermanagh have the lowest satisfaction levels, and some of the highest levels of roaming difficulties.

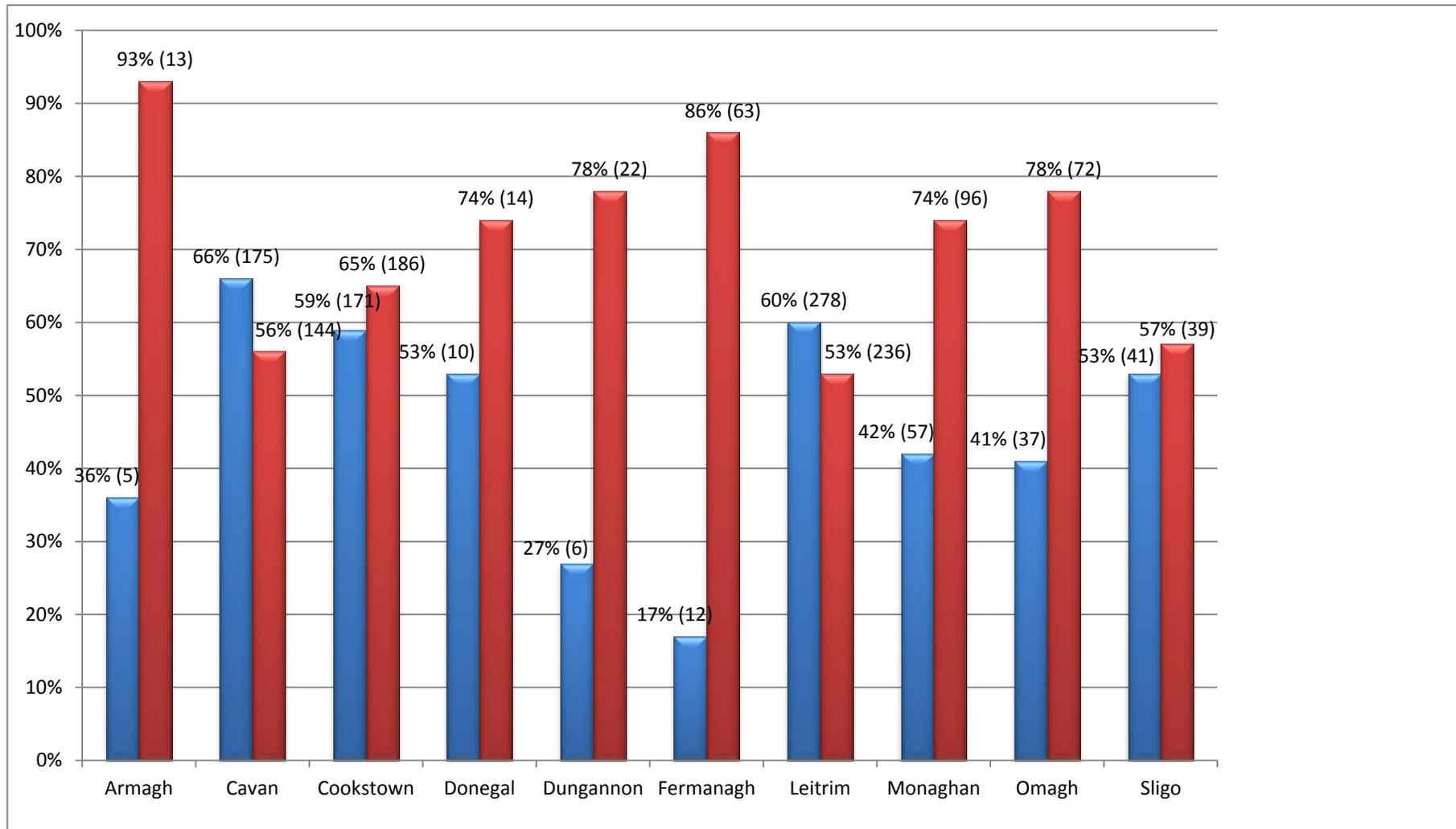


Figure 8.7: Respondents' Satisfaction with Mobile Coverage, and Experiencing Roaming Difficulties. (Absolute numbers Respondents are shown in brackets).

8.3 Market Share

There is a wide choice of broadband communications providers for respondents in the Republic, with three major players in the market: Eircom, Vodafone and 3, along with a number of smaller providers. In Northern Ireland, BT is by far the dominant communications provider to respondents, with limited penetration by other communications providers.

Regarding mobile communications providers, Vodafone is the leading provider to the respondents in the Republic, and O2 is the leading provider to the respondents in Northern Ireland.

8.3.1 Broadband Communications Providers Market Share – Republic of Ireland

Figure 8.8 shows the market share of respondents that each of the main broadband communications providers have in four of the five council areas in the Republic of Ireland. The figure shows that Eircom is the market leader, with Vodafone and 3 also prevalent.

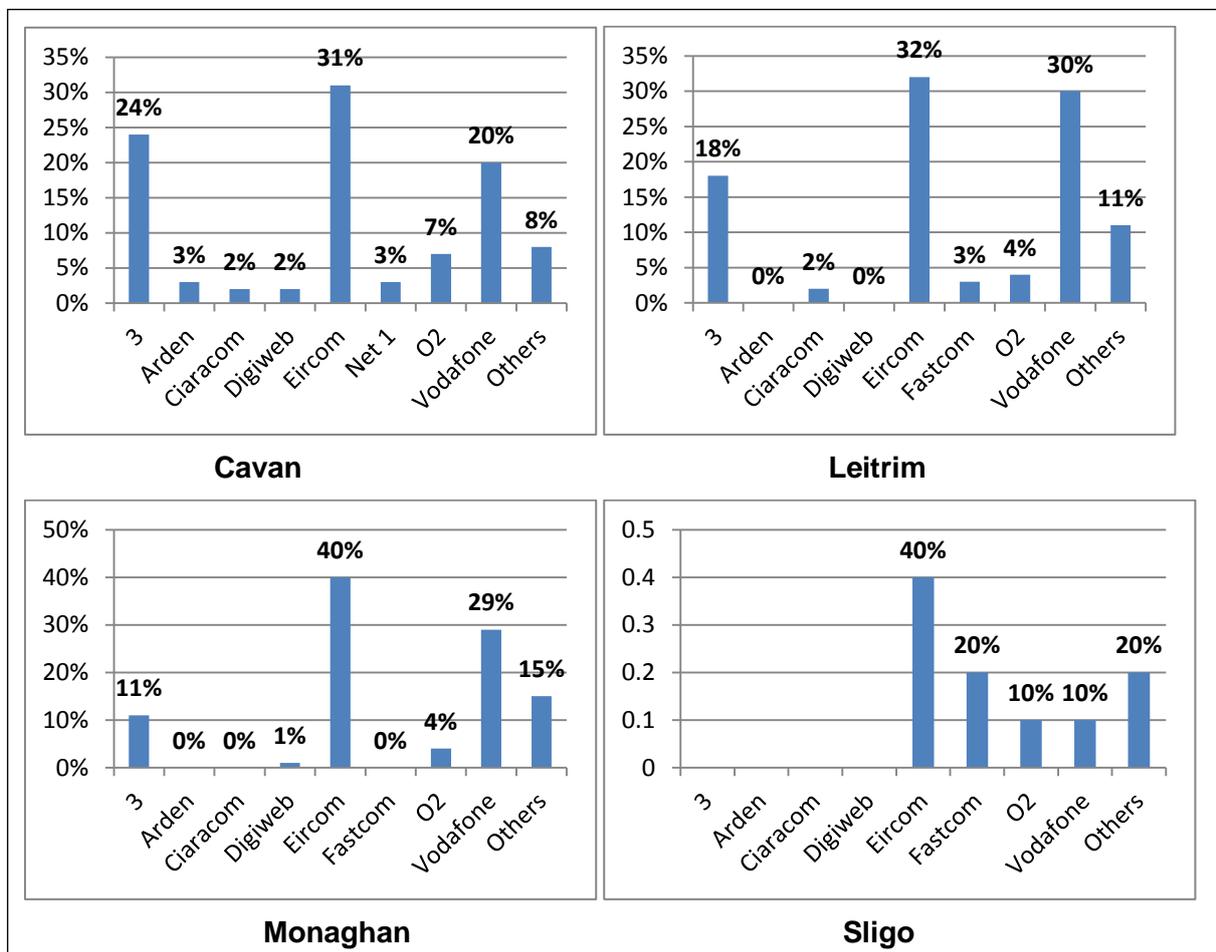


Figure 8.8: Broadband Communications Providers used by ROI Respondents.

NOTE: Eircom was the only Communications Provider referenced by respondents in Donegal.

8.3.2 Broadband Communications Providers Market Share – Northern Ireland

Figure 8.9 below shows the market share of respondents that each of the main broadband communications providers have in four of the five council areas in Northern Ireland. It highlights BT’s dominance of the broadband market in Northern Ireland, with little to no competition being provided by mobile operators.

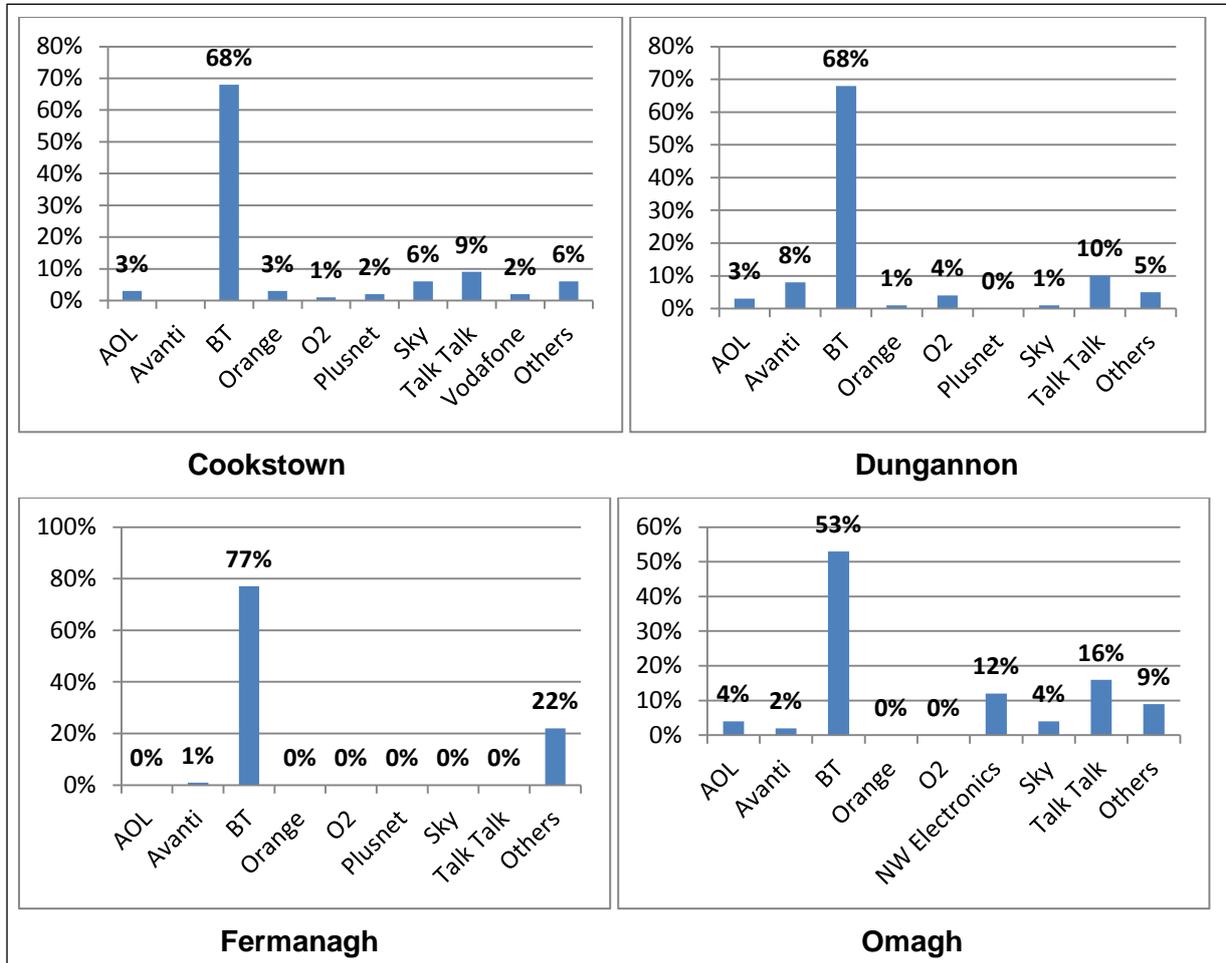


Figure 8.9: Broadband Communications Providers used by NI Respondents.

NOTE: Of the 16 Armagh respondents with broadband, only 5 stated their service provider. 2 are BT subscribers, 2 are Vodafone subscribers, and 1 is a Bytel (Atlas Communications) subscriber.

8.3.3 Mobile Communications Providers Market Share

Figure 8.10 on the next page shows the market share of respondents that each of the main mobile communications providers have in the ten council areas in the ICBAN Region. Vodafone is the leading mobile communications provider in each of the ROI council areas. O2 is the leading mobile communications provider in each of the NI council areas

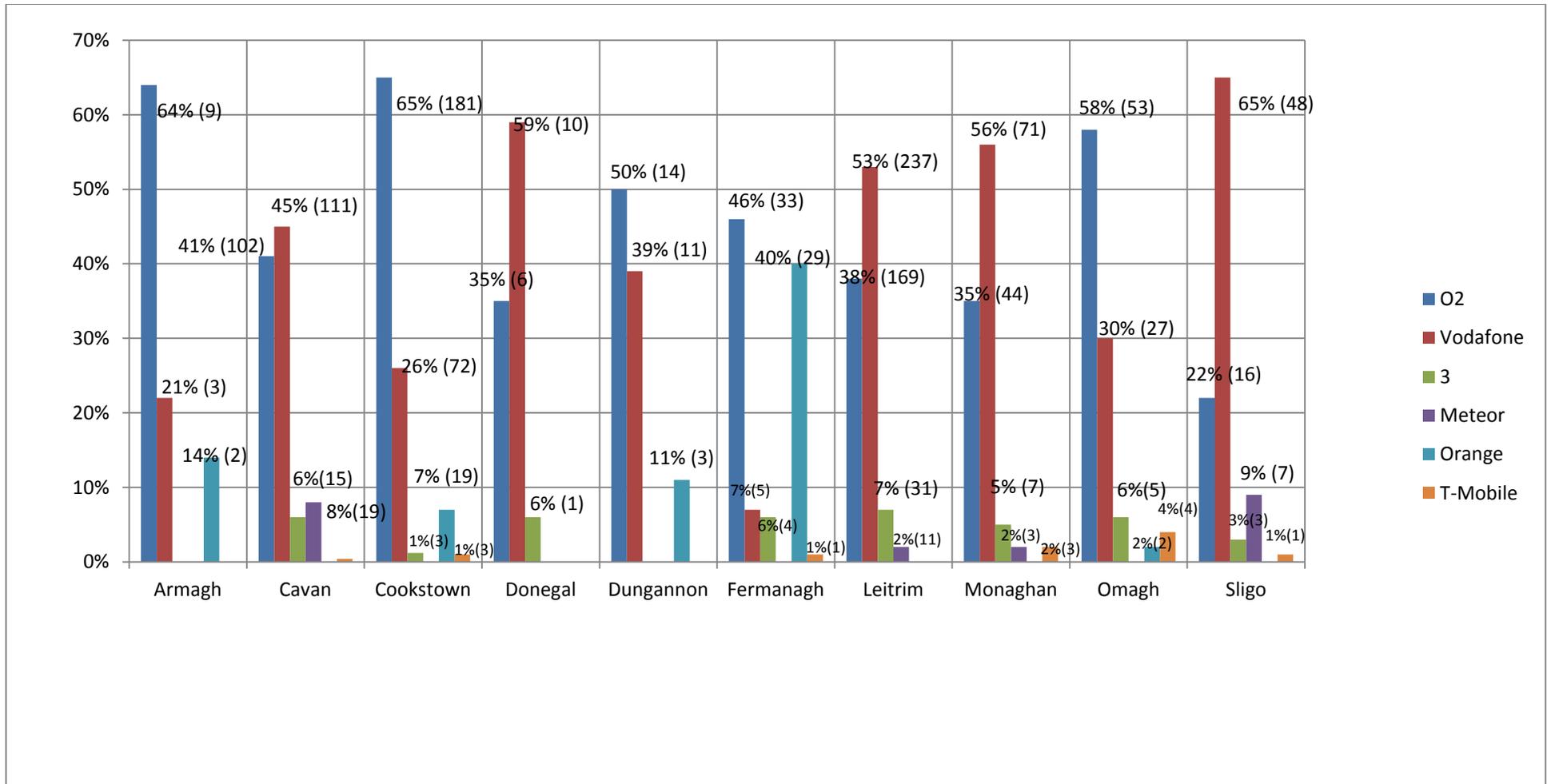


Figure 8.10: Mobile Communications Service Providers used by Respondents. (Absolute numbers of Respondents are shown in brackets).

8.4 Survey Profiles by Council Area

The following section presents the key survey findings from each separate council area. Each profile includes a list of the specific areas that survey respondents identified as having no available broadband service.

8.4.1 Armagh City and District Council

No. of Survey Respondents: 17

Due to the low number of responses, we would question whether or not the survey responses could be regarded as being representative of the issues across the council area. However, the results do help us to identify the areas that are encountering broadband or mobile service difficulties.

Key survey results:

- 94% (16) of respondents have a broadband service.
- There is a mix of communications providers, including BT, Vodafone, and Bytel (Atlas Communications).
- The single respondent who stated that they do not have a broadband service also stated that they do not require a broadband service.
- Of those respondents with a broadband service, and that specified their broadband access technology 40% (6) have fixed line broadband, 47% (7) have wireless broadband, and 7% (1) have a satellite service.
- 47% (7) did not know what broadband speed they have. Of the remainder, 40% (6) have speeds of 8MBit/s or higher.
- 43% (6) would like to change their communications provider within the next 12 months.
- Of those wishing to change, 56% (5) of those believe that they have the option to do so.
- 50% (7) of respondents require broadband for school homework and 29% (4) for other education purposes.
- 39% (5) are Satisfied or Very Satisfied with the choice of broadband communications providers in their area.
- 36% (5) are Satisfied or Very Satisfied, with their current broadband speed, with the remainder being Dissatisfied or Very Dissatisfied.
- Only 29% (4) are Satisfied or Very Satisfied with the reliability and quality of their broadband service.
- O2 and Vodafone dominate the mobile market among the Armagh respondents, with 64% (9) and 21% (3) of the respondents, respectively. Orange has 14% (2).
- 85% (11) of respondents use their mobile phone for internet and email access.
- Only 36% (5) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, and a high 93% (13) suffer roaming issues.

8.4.2 Cavan County Council

No. of Survey Respondents: 289

Key survey results:

- 91% (262) of respondents have a broadband service.
- There is a good mix of communications providers, including Eircom at 31% (82), Vodafone at 20% (53), 3 at 24% (63), and O2 at 7% (18), and other smaller operators.
- Of the 9% (27) without broadband, 63% (17) say that broadband is not available at their premises.
- 29% (75) have fixed line broadband, and 49% (126) have wireless broadband. However, we believe that the respondents may have been confused between wireless broadband and having a wi-fi wireless broadband router in the house, using a fixed line service.
- 43% (75) did not know what broadband speed they have. Of the remainder, 42% (73) have speeds of 2MBit/s or more.
- 33% (78) would like to change their communications provider within the next 12 months, with 52% (123) preferring to stay with their current provider.
- Of those wishing to change, only 24% (19) of those believe that they have the option to do so. 51% (40) don't know if they have the option to change.
- 82% (211) of respondents require broadband for school homework, and 47% (120) for other education purposes.
- 44% (112) are Satisfied or Very Satisfied with the choice of broadband communications providers in their area.
- 47% (115) are Satisfied or Very Satisfied, with their current broadband speed.
- 52% (129) are Satisfied or Very Satisfied with the reliability and quality of their broadband service.
- Vodafone and O2 share the mobile market in Cavan, with 45% (111) and 41% (102) of the respondents, respectively. Meteor has an 8% (19) share and 3 has 6% (15).
- 34% (90) of respondents use their mobile phone for internet and email access.
- 66% (175) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 56% (144) suffer roaming issues.

Areas where broadband is said to be not available:

Ballymannan (1)	Loughduff (1)
Belturbet (2)	Tullyvin (1)
Crosserlough (1)	Killinkere, Virginia (3)
Doogary (1)	Stramatt, Virginia (1)
Drung (1)	Tievenaman, Virginia (1)
Killycluggin, Ballyconnell (1)	Lisduff, Virginia (1)
Mullagh (1)	Redhills (1)

The number of Respondents in each area is shown in brackets

8.4.3 Cookstown District Council

No. of Survey Respondents: 500

Key survey results:

- 84% (420) of the 500 respondents have a broadband service. 13% (65) of respondents do not have a broadband service available to them. The remaining 3% (15) have a broadband service available but have not subscribed.
- Of those respondents with a broadband service, and that specified their communications provider, BT has the lion's share, with 68% (123) of respondents in the Cookstown district. Other communications providers include Talk Talk, Plusnet, Sky, AOL and Orange.
- Of those respondents with a broadband service, and that specified their broadband access technology, 38% (109) have fixed line broadband, and 54% (155) have wireless broadband. Satellite (5 users) and mobile broadband (5 users) make up the very small proportions of the remainder.
- Of those respondents with a broadband service, and that responded concerning broadband speed, 60% (149) did not know their broadband speed. Of the remainder, 31% (77) have speeds of 8MBit/s or less.
- Of those respondents with a broadband service, and that expressed an opinion on changing service provider, 30% (81) would like to change their communications provider within the next 12 months. 19% (52) were 'Undecided'. Of those who wished to change, or were undecided, only 17% (21) believed that they have the option to do so. 62% (75) of those who wished to change, or were undecided responded 'Don't Know', indicating that they are unsure if they have the option to change.
- 74% (210) of the respondents that specified their use of broadband services, require broadband for school-related purposes and 41% (116) require broadband for other education reasons.
- Of those respondents with a broadband service, and that indicated their level of satisfaction, 54% (152) are Satisfied or Very Satisfied with the choice of broadband communications provider in their area.
- Of those respondents with a broadband service, and that indicated their level of satisfaction, 62% (179) are Satisfied or Very Satisfied, with the reliability and quality of the broadband service that they receive.
- O2 is the leading mobile communications provider, with a 65% (181) share of the respondents, followed by Vodafone at 26% (72).
- Of those respondents that have a mobile, and that indicated their level of satisfaction, 59% (171) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 65% (186) suffer roaming difficulties.

Areas where broadband is said to be not available:

Ardboe (4)	Moneymore (3)
Claggan Road (2)	Mountfield (1)
Dunnamore (4)	Oaklands (5)
Killycolpy (19)	Orritor & Orritor Road (2)
Killymoon (2)	Pomeroy (1)
Lissan (6)	Sandholes (16)

The number of Respondents in each area is shown in brackets.

Areas suffering broadband availability or service performance issues:

Ardboe (13)	Moneymore (4)
Claggan Road (2)	Newbuildings (1)
Coagh (4)	Oaklands (22)
Dunnamore (11)	Oldtown (4)
Gortalowry (3)	Orritor & Orritor Road (1)
Killycolpy (41)	Pomeroy (3)
Killymoon (5)	Sandholes (49)
Lissan (17)	Stewartstown (8)
The Loup (1)	Tullagh (3)
Mountfield (1)	

The number of Respondents in each area is shown in brackets

8.4.4 Donegal County Council

No. of Survey Respondents: 20

Only 20 people responded to the Donegal survey. We would therefore question whether or not the survey responses could be regarded as representative of the issues across the council area. Of the 20 respondents, all have a broadband service, and all expressed high levels of satisfaction with their service and communications providers.

Key survey results:

- All of the 20 respondents have a broadband service.
- Only 2 respondents stated their communications provider, being Eircom.
- 58% (11) have fixed line broadband, and 37% (7) have wireless broadband.
- 78% (14) have speeds of 2MBit/s or more.
- 16% (3) would like to change their communications provider within the next 12 months.
- 42% (8) of respondents require broadband for school homework and other education purposes.
- 58% (11) are Satisfied or Very Satisfied with the choice of broadband communications provider in their area.
- 58% (11) are Satisfied or Very Satisfied, with their current broadband speed.
- 74% (14) are Satisfied or Very Satisfied, with the reliability and quality of the broadband service that they receive.
- Vodafone and O2 are the leading Mobile communications providers, with 59% (10) and 35% (6) respectively.
- 53% (10) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 74% (14) suffer roaming issues.

8.4.5 **Dungannon and South Tyrone Borough Council****No. of Survey Respondents:** 186**Key survey results:**

- 62% (116) of respondents have a broadband service.
- BT is the dominant provider, servicing 68% (80) of respondents, with Talk Talk next at only 10% (12).
- Of those without broadband, 99% (68) state that broadband is not available at their property.
- 73% (75) of respondents did not know what broadband speed they have.
- 22% (20) of respondents require broadband for school homework, and 15% (14) for other education purposes. 91% (84) use or would use broadband for sending and receiving emails.
- A high 66% (63) are Dissatisfied or Very Dissatisfied with the choice of broadband communications provider in their area.
- 92% (97) are Dissatisfied or Very Dissatisfied, with their current broadband speed.
- Similarly, 90% (100) are Dissatisfied or Very Dissatisfied with the reliability and quality of their broadband service.
- O2 and Vodafone share the mobile market in Dungannon, with 50% (14) and 39% (11) of the respondents, respectively. Orange has the remaining 11% (3) of the market in the area.
- Regarding mobile phone services, 27% (6) are Satisfied or Very Satisfied, and 38% (11) are Dissatisfied or Very Dissatisfied. A high 78% (22) suffer from roaming difficulties.

Areas where broadband is said to be not available:

Aghnabeg Road (3)	Coalisland (1)
Ackinduff Park (1)	Corlea Road (3)
Altaglushan Rd (3)	Dergenagh Rd (3)
Annaghbeg Road (2)	Dernanaught Rd (10)
Ardboe (1)	Derrylaughan (1)
Augher (1)	Drumard Cross Rd (1)
Ballygawley (4)	Galbally (3)
Ballynakelly Cottages (1)	Glassdrummond Rd (1)
Ballyvaddy Road (2)	Killsallagh Rd (1)
Bolies Rd, Fivemiletown (1)	Kilnacart (2)
Bovean Rd (1)	Kilshannagh Lane (1)
Cappagh (7)	Lurgylea Rd (2)
Carnteel (1)	Mountjoy Rd (5)
Castletown Rd (1)	Rehaghy Rd (1)
Cluaneo Meadows (1)	Sessiadonaght Rd (2)

The number of Respondents in each area is shown in brackets.

8.4.6 Fermanagh District Council

No. of Survey Respondents: 79

- 72% (56) of respondents have a broadband service.
- BT is the dominant provider, servicing 77% (17) of respondents.
- 91% (20) of those without broadband stated that broadband is not available at their property.
- 53% (30) have fixed line broadband, and 30% (17) have wireless broadband. The other access types are satellite at 9% (5) and mobile broadband at 7% (4).
- 38% (14) of respondents with broadband have broadband speeds of 2Mbit/s or higher, but 41% (15) did not know what broadband speed they have.
- 26% (8) of respondents require broadband for school homework, and 23% (7) for other education purposes.
- 61% (34) are Dissatisfied or Very Dissatisfied with the choice of broadband communications provider in their area.
- 60% (31) are Dissatisfied or Very Dissatisfied, with their current broadband speed.
- 46% (25) are Dissatisfied or Very Dissatisfied with the reliability and quality of their broadband service.
- O2 and Orange share the mobile market in Fermanagh, with 46% (33) and 40% (29) of the respondents, respectively. Vodafone has only a 7% share in this area.
- 74% (53) are Dissatisfied or Very Dissatisfied with mobile phone service coverage and reliability in the area. A high 86% (63) suffer from roaming difficulties.

Areas where broadband is said to be not available:

Boho (4)	Farnaconnell, Boho (1)
Corr, Boho (2)	Cooneen Road (1)
Carrickbeg, Boho (1)	Greaghcastle, Lisnaskea (1)
Agho, Belcoo (1)	Magheraveely (2)
Gortgall, Boho (1)	Newtownbutler (2)
Corflugh, Roslea (1)	Tully, Roslea (2)
Coolmarrow, Roslea (1)	Tullyrossmearan, Belcoo (1)
Drumna, Roslea (1)	

The number of Respondents in each area is shown in brackets.

8.4.7 Leitrim County Council

No. of Survey Respondents: 507

Key survey results:

- A high 88% (441) of respondents have a broadband service.
- There is a good mix of communications providers, with Eircom at 32% (84), Vodafone at 30% (78), and 3 at 18% (46) being the major players.
- Of the 12% (62) without broadband, 40% (27) of them say that broadband is not available in their area, with 36% saying that they do not require a broadband service.
- Of those respondents with a broadband service, and that specified their broadband access technology, 37% (161) have fixed line broadband, and 42% (183) have wireless broadband, although we believe that there may have been some confusion amongst respondents between having a wireless broadband service and having a wi-fi network in their house from a fixed line service.
- 51% (221) did not know what broadband speed they have. Of the remainder, 38% (163) have speeds of 2MBit/s or more.
- 38% (157) would like to change their communications provider within the next 12 months, with 52% (218) preferring to stay with their current provider.
- Of those wishing to change, and those who were 'undecided', only 24% (50) of those believe that they have the option to do so. 47% (99) don't know if they have the option to change, but the variety of communications providers with other customers in the county would indicate that they would have the option to change.
- 66% (285) of respondents require broadband for school homework, and 48% (208) for other education purposes.
- 44% (186) are Satisfied or Very Satisfied with the choice of broadband communications providers in their area.
- 43% (181) are Satisfied or Very Satisfied with their current broadband speed.
- 49% (209) are Satisfied or Very Satisfied with the reliability and quality of their broadband service.
- Vodafone and O2 share the mobile market in Leitrim, with 53% (237) and 38% (169) of the respondents, respectively. 3 has a 7% (31) share and Meteor has 2% (11).
- 79% (356) of respondents do not use their mobile phone for anything other than phone calls and texting.
- 60% (278) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 53% (236) suffer roaming issues.

Areas where broadband is said to be not available:

Aughavas (2)	Dun Carrig Ceibi (1)	Drumkeeran (1)
Ballinamore (1)	Drumlaheen (1)	Gowel (1)
Bornacoola (1)	Drumcong (1)	Leitrim Village (1)
Carrigallen (2)	Drumsna (2)	Newtowngore (1)
Carrick-on-Shannon (2)	Killavoggy, Dromahair (1)	Tullaghal (1)
Drumshanbo (2)	Kinlough (3)	Keshcarrigan (1)

The number of Respondents in each area is shown in brackets

8.4.8 Monaghan County Council

No. of Survey Respondents: 141

Key survey results:

- A high 88% (124) of respondents have a broadband service.
- There is a good mix of communications providers, with Eircom at 40% (21), Vodafone at 29% (15), and 3 at 11% (6) being the major players.
- Of those respondents without broadband, 93% (14) say that broadband is not available at their property.
- 47% (55) have fixed line broadband, and 40% (46) claim to have wireless broadband. 10% use mobile broadband.
- 43% (48) did not know what broadband speed they have. Of the remainder, 39% (44) have speeds of 2MBit/s or more.
- 35% (41) would like to change their communications provider within the next 12 months. Of those wishing to change, only 24% (18) of those believe that they have the option to do so. 50% (38) don't know if they have the option to change.
- 63% (74) of respondents require broadband for school homework, and 46% (54) for other education purposes.
- 40% (47) are Satisfied or Very Satisfied with the choice of broadband communications providers in their area.
- 42% (49) are Satisfied or Very Satisfied, with their current broadband speed.
- 53% (62) are Satisfied or Very Satisfied with the reliability and quality of their broadband service.
- The mobile market share among respondents in Monaghan is Vodafone at 56% (71), O2 at 35% (44), 3 at 5% (7), and Meteor at 2% (3).
- 42% (57) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 74% (96) suffer roaming issues.

Areas where broadband is said to be not available:

Carrickaderry, Clontibret (1)
Doohamlet (1)
Drumnalive (1)
Glaslough (3)
Killark, Carrickmacross (1)
Magoney (1)
Rack Wallace (1)
Scotstown (3)
Tydavnet (2)

The number of Respondents in each area is shown in brackets.

8.4.9 Omagh District Council

No. of Survey Respondents: 96

Key survey results:

- 88% (84) of respondents do have a broadband service.
- BT is the dominant provider, servicing 53% (46) of respondents, with Talk Talk next at 16% (13), and North-West Electronics at 12% (10).
- Of those respondents without broadband, 91% (9) stated that broadband is not available at their property.
- 43% (35) have fixed line broadband, 43% (35) have wireless broadband, and 12% (10) have a satellite service.
- 28% (23) of respondents have broadband speeds of 2Mbit/s or higher, but a high 58% (47) did not know what broadband speed they have.
- 43% (34) would like to change their communications provider within the next 12 months.
- A high 76% (61) of respondents require broadband for school homework, and 51% (41) for other education purposes. 52% (42) use broadband for a home-based business.
- 45% (36) are Dissatisfied or Very Dissatisfied with the choice of broadband communications providers in their area.
- 49% (39) are Dissatisfied or Very Dissatisfied, with their current broadband speed.
- 34% (27) are Dissatisfied or Very Dissatisfied with the reliability and quality of their broadband service, but 37% (30) are Satisfied or Very Satisfied.
- O2 and Vodafone dominate the mobile market among Omagh respondents, with 58% (53) and 30% (27) of the respondents, respectively.
- 41% (37) are Dissatisfied or Very Dissatisfied with mobile phone service coverage and reliability in the area. 78% (72) suffer from roaming difficulties.

Areas where broadband is said to be not available:

Termon (Whitebridge Road, Carrickmore) (1)
Casorna (1)
Dromore (Co. Tyrone) (1)
Blackfort Road, Omagh (1)
Glenhull (1)
Greencastle (Co. Tyrone) (1)
Plumbridge (3)

The number of Respondents in each area is shown in brackets.

8.4.10 Sligo County Council

No. of Survey Respondents: 86

Key survey results:

- 87% (72) of respondents have a broadband service.
- Of those that have broadband, and stated their communications provider, 40% (12) use Eircom, with 20% (6) using Fastcom and 10% (3) using Vodafone.
- Of the 13% (11) without broadband, 64% (7) say that broadband is not available to them, and 36% (4) say that they consider it to be too expensive.
- 40% (27) of respondents with broadband have fixed line broadband, and 43% (29) have wireless broadband. Satellite, mobile and cable broadband make up the remainder.
- 38% (25) did not know what broadband speed they have. Of the remainder, 42% (28) have speeds of 2MBit/s or less.
- 42% (28) would like to change their communications provider within the next 12 months.
- 67% (46) of respondents require broadband for school homework and other education purposes.
- 46% (31) are Dissatisfied or Very Dissatisfied with the choice of broadband communications providers in their area.
- The level of satisfaction with broadband speeds is balanced, with 40% (27) being Satisfied or Very Satisfied, and 42% (28) being Dissatisfied or Very Dissatisfied.
- Vodafone is the leading Mobile communications provider, with a 65% (48) share of the respondents, followed by O2 at 22% (16).
- 53% (41) are Satisfied or Very Satisfied with mobile phone service coverage and reliability in their area, but 57% (39) suffer roaming issues.

Areas where broadband is said to be not available:

Ballisodare (1)
Calry (1)
Glen Upper, Glencar (2)
Cloonmull, Drumcliffe (1)
Gortnagrelly, Glencar (1)
Leckaun PO (1)

The number of Respondents in each area is shown in brackets.

9 Summary of Findings

9.1 Introduction

The findings summarised in this section of the report are the results of a comprehensive engagement with operators and users in the ICBAN region, through:

- **Interviews** with the main national and regional Communications Providers (CPs) on their current infrastructure and services and future plans;
- **Workshops** held in each council area examining the experiences of business and residential users relating to the local availability of broadband and mobile services, and
- **Surveys** of business and residential users across the region.

Economic activity in the region is primarily based on micro businesses and SMEs, primarily in the agriculture, tourism, professional services and technology sectors. Many businesses are increasingly looking to export markets for growth to compensate for the reduction in local demand. This underpins the importance of telecommunications infrastructure and services in eliminating the distance between the North-West of Ireland and the main European and international markets.

The ability to meet the communications requirements of larger enterprises in the region, in the main Multi-National Corporations (MNCs) attracted to the region through Foreign Direct Investment (FDI), has also been examined. **Appendix B** describes the telecommunications infrastructure available to business in a main town within each council area.

9.2 Findings – Northern Ireland

Northern Ireland currently has the best fixed line broadband infrastructure in the UK. BT has upgraded 2,500 cabinets with Fibre to the Cabinet (FTTC) technology, as a result of the Next Generation Broadband project (described in **Section 3.1.1**), and the upgrading of all street cabinets in Derry City to mark its role as UK City of Culture. 89% of all lines in Northern Ireland are connected to an FTTC solution since the end of Q1 2012. This is in addition to the 30% of Northern Ireland homes and businesses passed by Virgin Media's cable broadband network.

Figure 9.1 below shows the communications infrastructure availability across the UK⁶³ in 2011, demonstrating Northern Ireland's strength in FTTC. However, the same figure also highlights Northern Ireland's weakness in mobile broadband (3G mobile) availability. The most recent report on the Northern Ireland communications market⁶⁴ by Ofcom highlights that 3G mobile coverage is 54% in Northern Ireland, by far the lowest 3G coverage in the UK.

⁶³ *Ofcom Communications Market Report: Northern Ireland*. Ofcom, 04/08/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

⁶⁴ *Ofcom Communications Market Report: Northern Ireland*. Ofcom, 04/08/2011.

<http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

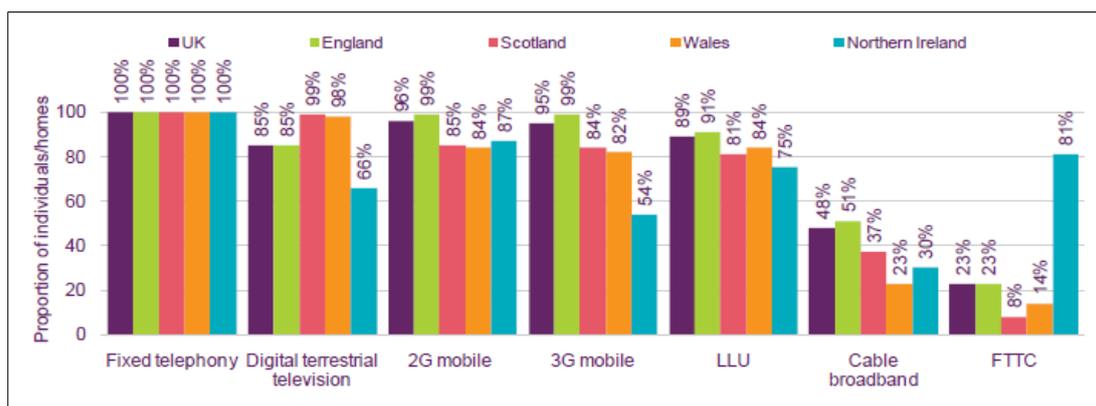


Figure 9.1: Communications Infrastructure Availability across the UK’s Nations [Source: Ofcom]

In Belfast and Derry City, users can choose either FTTC or cable broadband as a fixed line access solution. In the ICBAN region, where there is only FTTC or DSL (both provided by BT), the other main potential competitive platform is mobile broadband. Unfortunately the poor 3G broadband coverage reduces the level of broadband competition in rural areas.

A very high profile example of the limitations of 3G coverage in the ICBAN region was provided courtesy of the 2012 Olympic Torch Relay⁶⁵ in early June. On Tuesday June 5th 2012, as the Torch Relay progressed from Derry/Londonderry to Newry, there were considerable coverage difficulties. The video signals from a dedicated mobile camera vehicle could not be relayed back to the BBC, due to poor 3G network coverage along a considerable part of the route. Transmission outages were experienced first near Irvinestown, and then along the main road through Clogher, Augher, Aughnacloy and Caledon.

In ‘not-spots’, i.e. areas where there is no availability of fixed line broadband due to the distance of subscribers from their nearest cabinet or exchange, the lack of quality 3G broadband coverage means that these subscribers are often deprived of both fixed and mobile broadband access. Satellite broadband or Fixed Wireless Access (FWA) are the only possible broadband access alternatives for these users.

9.2.1 Broadband Not-spots

There remain ‘not-spot’ areas in Northern Ireland where potential subscribers cannot readily avail of a broadband service. They are too far away from the relevant cabinet or local exchange to avail of either an FTTC or DSL service and they are also adversely impacted by the poor mobile broadband coverage in Northern Ireland. Users in these areas are therefore presented with a ‘double whammy’, either no or poor quality fixed line broadband services combined with either no or poor quality mobile broadband services. This greatly reduces users’ ability to avail of any suitable broadband service, apart from FWA or satellite services.

User workshops undertaken for each council area highlighted the following townlands with inadequate broadband coverage:

- Armagh City and District: Middletown.
- Cookstown District: Sandholes, Dunnamore, Lissan, Killycolpy, Ardboe, Stewartstown, Oaklands, Killymoon, Oldtown, Coagh, Gortalowry, Tullagh, New Buildings, Pomeroy, Loup, Moneymore.

⁶⁵ www.bbc.co.uk/torchrelay

- Dungannon and South Tyrone Borough: Altmore, Auchnacloy/Ballygawley, Brantry, Cappagh, Galbally.
- Fermanagh District: Belcoo, Boho, Fivemiletown, Lisnaskea, Newtownbutler, Roslea.
- Omagh District: Termon (Whitebridge Road, Carrickmore), Dromore (Co. Tyrone), Greencastle (Co. Tyrone), Glenhull, Gortin (Plumbridge Road), Beragh (Roscavey, Garvaghey), Fintona (Tattyreagh), Newtownsaville, Garvaghey, Drumquin.

The user survey results detailed in **Section 8.4** of this report list further areas where respondents report that broadband is unavailable.

9.2.2 Mobile Infrastructure Planning Regime

Ofcom’s most recent report on the Northern Ireland communications market⁶⁶ underlines that 3G mobile coverage is 54% in Northern Ireland, by far the lowest 3G coverage in the UK. Figure 9.2 below compares the 3G mobile phone coverage for the various regions in UK. The figure shows the percentage of population within postcode districts with at least 90% area coverage. It’s worth noting the large gap in coverage between Northern Ireland at 54% and the region with the next lowest coverage - Wales at 82% coverage.

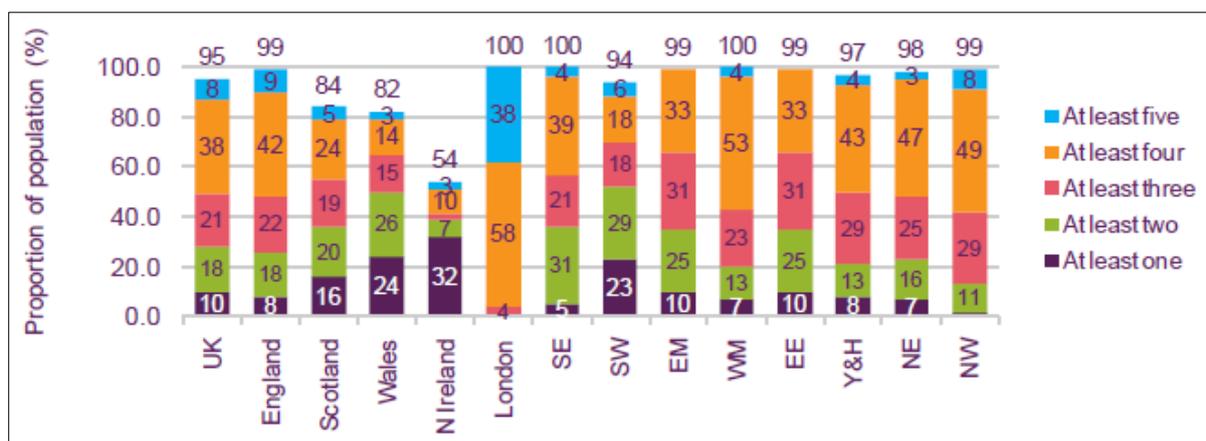


Figure 9.2: 3G Mobile Phone Population Coverage [Source: Ofcom]

There are several factors contributing to the particularly low coverage for Northern Ireland:

- Northern Ireland has a lower population density than the UK as a whole;
- The topography of Northern Ireland, especially in the west is defined by mountains and hills that reduce the effective range of cellular base stations, thereby requiring a greater number of base stations to provide coverage; and
- 3G uses higher frequencies (2.1GHz) than 2G (900MHz and 1.8GHz) and these frequencies do not propagate as far as 2G frequencies, again requiring a greater number of base stations to provide coverage.

However, these factors also apply to large parts of Scotland (84% coverage) and Wales (82% coverage). So what is causing the discrepancy between Northern Ireland and the rest of the Celtic fringe? Why have 3G operators ignored Northern Ireland in particular?

⁶⁶ Ofcom Communications Market Report: Northern Ireland. Ofcom, 04/08/2011. <http://stakeholders.ofcom.org.uk/market-data-research/market-data/communications-market-reports/cmr11/northern-ireland/>

A possible explanation is that the planning regime for mobile infrastructure in Northern Ireland may be too onerous. In 2002 the Northern Ireland Assembly passed legislation that required full planning permission for all mobile masts, initiating a planning regime that was tougher than those for England, Scotland and Wales. This was done to alleviate public concerns regarding the health effects of mobile masts.

However, this may have resulted in mobile operators finding it easier to procure and install sites elsewhere in the UK. At the time the legislation was passed, 3G operators were initialising their network rollouts, the bulk of which took place in the early- to mid-2000s. With licences that mandated coverage of 95% of the UK population, operators could ignore Northern Ireland completely - with only 2.8% of the UK population - and still meet the conditions of their licences. The toughest planning regime in the UK may have acted as a disincentive for the operators, and encouraged them to procure and install sites elsewhere in the UK, in regions that combined higher population densities with easier planning requirements. Operators have concentrated their network investment elsewhere with long-term implications for mobile broadband availability in the ICBAN region.

9.2.3 Broadband Platform Competition

There are five main platforms competing in the broadband market: mixed fibre/copper networks (e.g. FTTC, DSL), cable networks, mobile broadband networks, fixed wireless access (FWA) networks and satellite systems.

Urban areas enjoy a level of competition between different broadband platforms, e.g. between BT Infinity and Virgin Broadband. In contrast, the mainly rural ICBAN region has little real broadband platform competition – it has no cable networks, and suffers from fixed line not-spots and poor 3G mobile coverage. This situation is underlined by survey results detailed in **Section 8.3.2** of this report, highlighting BT's dominance of the broadband market with little to no competition being provided by mobile broadband communications providers.

FWA is a potential competitor platform. However the FWA operators in the Northern Ireland market are small and financially constrained. Unlike larger operators that can make substantial investments with a medium-term financial return, these regional operators can only invest where there is the prospect of a more immediate financial return. Technically competent, they provide limited customer support services and do not advertise their services extensively. There may not be enough market awareness of FWA operators and their service offerings, affecting their ability to provide a competitive platform.

The two main FWA operators in the market (NWE and Net1) have received funding from the Department of Enterprise, Trade and Investment (DETI) under the Northern Ireland Broadband Fund, to further extend their networks. It remains to be seen if this increases the levels of competition in the market.

Satellite, another potential platform, is seen as the platform of last resort due to high latencies, limited download speeds, constrained usage allowances, high install fees and operating fees. The latest satellite technologies promise increased speeds and usage allowances. However potential users either have a negative view of satellite or are not aware of the availability and potential of satellite broadband services. Satellite providers share many of the characteristics of the regional FWA providers, i.e. being small, financially constrained, providing limited customer support and not advertising extensively.

9.3 Findings – Republic of Ireland

The fixed line broadband infrastructure in the main county towns in the ICBAN region meets the national and international connectivity requirements of larger enterprises based in those towns (see **Appendix B**). This has been achieved through a combination of private sector investment, for example by Eircom in its Next Generation Network (NGN) and BT in its National Fibre Network (NFN), and public sector investment, such as that by the Irish Government in the MAN programme and by ESB Telecoms in its fibre network.

There is extensive mobile broadband coverage in the Republic (no coverage breakdown is available for the ICBAN region):

- The mobile operator 3 states that its 3G network covers 96% of the population and that its 2G network covers 99.5% of the population. Its 3G coverage has been augmented by the National Broadband Scheme (NBS) contract with the Irish Government, and it is now the largest mobile broadband operator in the Republic;
- O2 maintains that its broadband (3G) network covers 90.5% of the Republic's population and its voice (2G) network covers 99.6% of the population;
- Vodafone states that its 3G network covers 90% of the population and that its 2G network covers 99% of the population, and
- Eircom Group Mobile claims that its voice (2G) network covers 99% of the population. Eircom Group Mobile includes the Meteor and emobile brands.

Survey results detailed in **Section 8.3.1** of this report outline the market share of communications providers operating on competing fixed and mobile broadband platforms. There is a wide choice of broadband communications providers for respondents in the Republic, with three major players in the market: Eircom, Vodafone and 3, along with a number of smaller providers.

The major infrastructural weakness in the Republic is the fixed line broadband telecommunications infrastructure addressing smaller enterprises (and residential users), especially those businesses based outside the main towns. The main contributory factor is a lack of investment in fibre-based technologies such as Fibre to the Cabinet (FTTC). This adversely impacts the speed of broadband available to subscribers. A final area of concern is the issue of local planning hurdles that demotivate operators from fully investing in the region.

The result is an ever-widening gap between the broadband experience of urban users who can access download speeds up to 100Mbps, and that of rural users who in many instances struggle to access a download speed of 1Mbps.

9.3.1 Quality of Access

Quality of broadband is the main issue for users in the ICBAN region in the Republic. Even though there is widespread access to broadband, too many subscribers experience low speeds and variable performance.

The user survey results detailed in **Section 8.4** of this report list areas where respondents report that broadband is unavailable.

There are multiple means of broadband access in the region. The five main broadband platforms are:

- **Copper Access:** Many areas have upgraded to ADSL2+ technology, offering up to 24Mbps download to users within effective range. However, the region's most pervasive network (in terms of connections) has not been upgraded to mixed fibre/copper technology such as FTTC, unlike its Northern Ireland counterpart. Currently Letterkenny is the only town in the North West that is planned to be upgraded to FTTC.
- **Cable Access:** Sligo is the only town in the ICBAN region in the Republic to have a cable (HFC) network. There are no current plans to rollout cable access elsewhere in the region.
- **Mobile Broadband Access:** The four mobile operators in the Republic provide mobile broadband access within the region. Furthermore under the National Broadband Scheme (NBS), 3 has been contracted by the DCENR to address areas where there were insufficient broadband services.
- **Fixed Wireless Access (FWA):** There are multiple national and regional FWA operators in the region.
- **Satellite Access:** There are several satellite communications providers operating in the region.

However there are significant shortcomings in the broadband infrastructure available. Regarding fixed line technologies, no FTTC has been rolled out yet, Eircom's ADSL+ technology is focussed on the main towns, BT Ireland has no unbundled exchanges in the region, and UPC's cable network is unique to Sligo town. This leaves large swathes of the region still reliant on older ADSL technology (see figure 4.3 in **Section 4.1.1**), with many subscribers receiving less than 2Mbps download speeds due to their remoteness from the local exchange.

All mobile broadband operators concentrate their infrastructure on the main population centres. Consequently the service received by the more rural user is adversely impacted by increased distance from the nearest base station. There are also issues with coverage along main routes. For example, coverage on the N2 in Monaghan is very poor, particularly between Monaghan and Castleblayney.

Extensive mobile broadband coverage is provided by 3 in order to meet its NBS contract commitments. However the service available through the NBS has a minimum download speed of 1.6Mbps.

Regarding FWA infrastructure, users must be within line-of-site of the nearest base station. National FWA operators such as Digiweb and Imagine concentrate primarily on the population centres. Regional operators do target more rural areas, but because of a lack of brand awareness, these operators may not be well-known to potential subscribers outside each operator's home area.

9.3.2 Investment

While all platform types are represented, there is not the same level of competition as in the cities, where investments in the last 4/5 years by UPC in cable broadband and by Vodafone/BT in DSL have shaken up the market.

This competitive situation has not been replicated in rural areas. The main contributing factor is a lack of investment, especially in fixed line access. Most businesses initially approach their fixed line telecoms provider (usually the incumbent Eircom) to provide their broadband access. Subscribers that already pay for line rental (a significant cost in the Republic) usually

prefer to bundle a broadband service with their existing voice service. However Eircom is limited in what it can offer, particularly to businesses outside the main towns.

Unfortunately Eircom will not be in a position to invest extensively in Next Generation Access until it has resolved its current debt difficulties. There are signs that the company's first lien senior lenders are considering a €400m investment plan to fibre-based solution to 100,000 business and 900,000 residential premises in the Republic over the next 4 years. However Eircom is currently in examinership and the timeline for this investment may not become clear for several months.

There is currently little prospect of major investment from UPC, which does not intend to expand its cable network outside Sligo. BT Ireland's current investment plans are limited to the implementation of an unbundled local exchange in Letterkenny.

Even where investment has taken place, i.e. in mobile broadband courtesy of the NBS scheme, the market has not been ignited. The take-up of the NBS service has been lower than expected, even when the original demand projection of 126,000 premises connected by 2014, was reduced to 68,000 premises nationally. In 2011 the Office of the Comptroller and Auditor General reported⁶⁷ on the NBS, examining service delivery, service take-up and service quality. It concludes:

“Because the likely uptake of the service is lower than projected, the value for money delivered by the scheme will be lower than envisaged in the cost benefit analysis. Based on the revised forecast for the uptake, the State's average contribution per subscriber will increase ... There is also a risk that the projected socio-economic benefits of the investment will not be achieved.”

The reasons for this are not clear. The original demand projections by the department were probably too optimistic, and potential subscribers may have a preference for fixed broadband access (initially in any case) before going on to examine wireless alternatives.

The two events with the scale to change this situation significantly are:

- A recapitalisation of Eircom who will have to roll out a national Next Generation Access network if they are to compete with UPC, Vodafone and the rest of the market; and/or
- A government support intervention (e.g. a service procurement like the NBS) that may arise once the Next Generation Broadband Taskforce (NGBT) initiative is concluded.

9.3.3 Planning and Fees

The installation of new telecommunications infrastructure is subject to local government planning regulation. Furthermore many (though not all) local authorities impose development contributions on telecommunications infrastructure. These charges plus the delays, and the additional administrative burden imposed by regulation on a local authority basis, impose costs on operators looking to rollout or extend telecommunications networks.

⁶⁷ *Accounts of the Public Services 2010 Vote Management. Report of the Comptroller and Auditor General Volume 2.* Office of the Comptroller and Auditor General. September 2011.
[http://audgen.gov.ie/viewdoc.asp?fn=/documents/annualreports/2010/2010_Volume_2_EN\(1.04\).pdf](http://audgen.gov.ie/viewdoc.asp?fn=/documents/annualreports/2010/2010_Volume_2_EN(1.04).pdf)

A recent working paper⁶⁸ by the Economic Social Research Institute (ESRI) examined the effects of fees and planning regulations on the deployment of telecommunications infrastructure. Among its findings are:

- “The observed geographical pattern of impact fees” (i.e. development contributions) “is inconsistent with the economic rationale for them”, and
- “A ... model of the number of telecoms masts in each county also suggests that the level of impact fees is negatively associated with mast deployment”.

It could be expected that the disruption (or disamenity) costs associated with masts in particular would be higher in urban densely populated areas, because of the number of people living close to the mast, higher property values, etc. However an examination into the development contribution rates relative to population densities throughout Ireland contradicts this. Figure 9.3 below shows that the highest development contribution rates are levelled by authorities with low population densities, with most of the highest density local authorities not levelling any contribution charges.

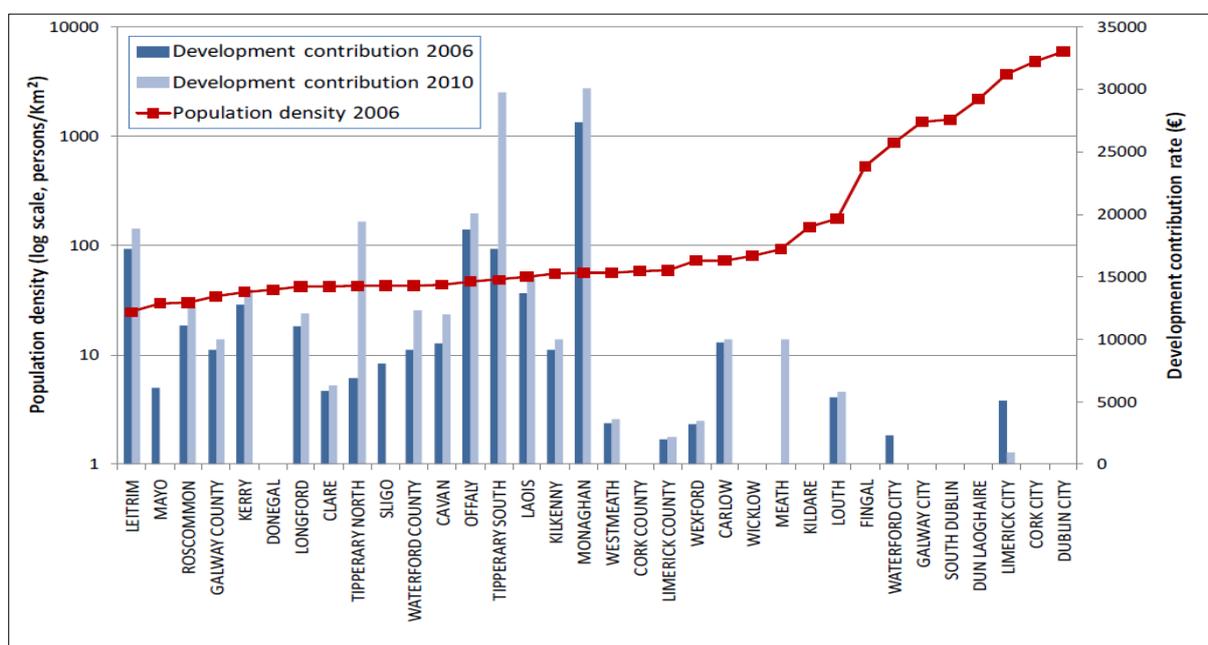


Figure 9.3: Population Density in 2006 and Development Contribution Rates in 2006 and 2010 [Source: ESRI]

These findings align with the experiences of several operators interviewed as part of this study, who confirmed that they avoided installing or extending telecommunications infrastructure in high-cost local authority areas whenever possible.

There is a major contradiction at the heart of many local authorities, between their economic development remit and their planning function. Broadband and mobile telecommunications services greatly reduce the geographic and logistics disadvantages of businesses based in rural areas, particularly at a time when a collapse in local demand is forcing many companies to export more goods and services to survive. It is in the economic interest of

⁶⁸ Working Paper No 401: How impact fees and local planning regulation can influence deployment of telecoms infrastructure. Paul Gorecki, Hugh Hennessy, Seán Lyons, ESRI, August 2011. <http://www.esri.ie/UserFiles/publications/WP401/WP401.pdf>

regions with low population densities (and by extension their local authorities) that businesses are not disadvantaged in terms of telecommunications access.

There is also the inconsistency of central government funding essentially rural telecommunications initiatives such as the National Broadband Scheme (NBS) on the one hand, while on the other hand local authorities add to the costs of these initiatives, through the imposition of irrationally high development contribution rates.

Finally, there is an ever-widening gap between the services available to urban users benefitting from download speeds up to 100Mbps, and those available to rural users who in many instances struggle to get a download of 1Mbps. It is disappointing to see that gap reinforced by the planning policies of local authorities, who should instead be acting to reduce that gap.

9.4 Findings – International Exemplars

The following key findings have been derived from a review of the three international best practice case studies from Austria, Denmark and Cornwall:

1. The importance of localism – working at a local level to prove and stimulate demand, to facilitate network rollout and to identify areas for co-operation and sharing of resources;
2. The need for a strategic Programme Leader, to drive the overall strategy, and local Project Champions to take responsibility to the strategy at local level;
3. The importance of active local authority involvement in the planning process and in demand stimulation;
4. Identify opportunities to take advantage of road and utility network projects for broadband network deployment;
5. The benefits to be gained from including Universities in the project, for technical knowledge and resources, and for research and development;
6. The creation of a suitable ICT platform, where broadband is a key cornerstone, will result in the emergence of business and technology clusters, and an overall improvement in the economic status of rural areas as locations for new and growing enterprises;
7. Value added services delivered over a broadband network will not only increase demand, but will also add to operator revenues and shorten the investor's payback period;
8. Agriculture and education at residential level have emerged as key demand areas for broadband services;
9. Other challenges before and during broadband projects have included:
 - a. Convincing local residents of the merits of the project, and overcoming initial skepticism;
 - b. Managing the expectations of project stakeholders and residents;
 - c. Difficulties in working without the incumbent operator;
 - d. Lack of a nearby backbone connection, and a
 - e. Lack of interconnection between towns in the same area

10 Vision

10.1 EU and National Broadband Targets

The EU's current broadband targets under its Digital Agenda for Europe⁶⁹ flagship initiative are:

- Basic broadband for all by 2013: basic broadband coverage for 100% of EU citizens;
- Fast broadband by 2020: broadband coverage at 30Mbps or more for 100% of EU citizens; and
- Ultra-fast broadband by 2020: 50% of European households should have subscriptions above 100Mbps.

The UK government's commitment⁷⁰ is to provide superfast broadband (i.e. greater than 24Mbps) to at least 90 per cent of premises and provide universal access to standard broadband with a speed of at least 2Mbps by 2015.

Interestingly the Republic of Ireland does not currently have a broadband target, although it is committed⁷¹ to meeting the EU's basic broadband target by 2013. In November 2011 Forfás, Ireland's policy advisory board for enterprise, trade, science, technology and innovation, issued a report⁷² describing its advanced broadband vision for the Republic as:

“Within 5 years (i.e. 2016) Ireland will have an advanced broadband infrastructure comparable with our key competitors in all towns with a population greater than 1,500, delivering download speeds of at least 100Mbps ...”

10.2 ICBAN Telecommunications Infrastructure Vision

The EU-wide and national targets set the context within which the ICBAN vision for telecommunications infrastructure must reside. With this in mind, and taking account of the telecommunications infrastructure currently installed and planned, and using a medium-term five-year timeframe, ICBAN's vision for telecommunications infrastructure should be:

The ICBAN region will have an advanced broadband infrastructure capable of delivering download speeds of at least 100Mbps to 50% of premises, and delivering download speeds of at least 24Mbps to the remaining 50% of premises, by 2017.

This vision is achievable - these speeds are already available in the main cities in the Republic and Northern Ireland. Current infrastructure initiatives have commenced the realisation of this vision in more rural areas:

⁶⁹ http://europa.eu/press_room/pdf/complet_en_barroso_007_-_europe_2020_-_en_version.pdf

⁷⁰ http://www.culture.gov.uk/what_we_do/telecommunications_and_online/7763.aspx

⁷¹ <http://www.dcenr.gov.ie/Press+Releases/2011/Minister+Rabbitte+welcomes+EU+Commission+Telecoms+specialists+to+Dublin.htm>

⁷² *Ireland's Advanced Broadband Performance and Policy Priorities*. Forfás, 07/11/2011. <http://www.forfas.ie/publication/search.jsp?ft=/publications/2011/Title.8528.en.php>

- In Northern Ireland, BT has connected 89% of premises to FTTC technology that will be delivering speeds of up to 80Mbps from April 2012, subject to distance from the cabinet and line quality.
- In the Republic, Eircom's proposed Next Generation Access programme aims to provide an FTTC solution initially delivering speeds of 50Mbps (increasing to 100Mbps over time) to 900,000 homes and 100,000 businesses. There is also a mobile broadband platform (3G), which extends to 96% of the population.
- In both jurisdictions, the rollout of 4G services will increase the download speeds available to mobile broadband users.

10.3 Challenges

In a perfect world, if voice telecommunications did not exist, and broadband networks were being rolled out for the first time by a single operator with no existing competition, then every premises would receive a fibre connection. Users would have access to as much broadband as they could afford, and would not be disadvantaged by distance, topography or regulations.

In reality, operators have already made considerable investments in fixed and wireless infrastructure, and operate in a competitive and regulated environment. The findings described in **Section 9**, detail the strengths and weaknesses of the telecommunications infrastructure in each market. To help achieve the ICBAN vision across competitive platforms, the fixed line broadband infrastructure in Northern Ireland would ideally be replicated in the Republic, and the mobile broadband infrastructure in the Republic would ideally be replicated in Northern Ireland. In addition, the planned rollouts of Fibre to the Home (FTTH) and 4G mobile technologies in both markets should go a long way to addressing the issues of broadband access, broadband quality and competition in the market.

The realisation of the ICBAN vision will necessitate a mix of private and public investment. Communications Providers do not have a sufficiently robust business case to adequately address the broadband requirements of rural areas, with their low population density and low rate of urbanisation. The business case needs government support.

Each Government has already positively demonstrated its commitment to supporting the provision of broadband telecommunications infrastructure, as evidenced by DETI's support of Next Generation Broadband project in Northern Ireland and DCENR's support of the National Broadband Scheme in the Republic. Further support from both Governments will be required to fully address the broadband requirements of the ICBAN region.

10.4 Responsibilities

The ICBAN vision will only be achieved through the combined efforts of communications providers, central government and local government. The communications providers will invest in infrastructure and services, once there is a sufficient return on investment. Central government must support the business case for broadband in rural areas, through public funding and through ensuring the availability of state assets to facilitate the rollout of broadband infrastructure.

Local government has a critically important facilitative role in the areas of planning, asset availability and local engagement. **Section 11** details the recommendations that must be

addressed so that participating councils become the facilitator in the provision of better broadband services in the ICBAN region and achieve the 2017 vision.

All parties have a role in stimulating the demand for broadband services.

11 Recommendations

11.1 Introduction

This section builds on the findings detailed in **Section 9** and the vision outlined in **Section 10**. It identifies and describes the recommended actions to support and promote the case for the upgrading of telecommunications infrastructure across the ICBAN region, proposing timelines and milestones. This section also includes high level indicative costs for the provision of infrastructure.

The recommendations are based on the following five pillars concerning the role of local government in achieving the ICBAN telecommunications infrastructure vision: Planning, Public Assets, Investment, Local Activism and Demand Stimulation. These pillars, each important in its own right, reflect the findings of the evaluation of telecommunications infrastructure and services in Northern Ireland and in the Republic, as well as the conclusions drawn from the study of three international exemplars.

The Regional Telecommunications Action Plan (RTAP) is to be undertaken overall on a collaborative joint cross-border basis. The recommendations and actions are broken down for each jurisdiction, reflecting how each is a separate market operating under its own regulatory and planning regimes.

11.2 Pillar I: Planning

Recommendation I.1:

Determine the changes necessary to current planning regarding mobile infrastructure to encourage better mobile coverage in the ICBAN Region. [Northern Ireland]

Section 9.2.2 highlights the possibility that the current planning regime, based on planning legislation enacted in Northern Ireland in 2002, has adversely impacted the provision of mobile services in the ICBAN region. Considering that Northern Ireland has the lowest 3G coverage in the UK, it is vital that impending mobile infrastructure developments, such as the MIP and 4G services, are not curtailed by planning legislation and practices.

Therefore, planning concerning mobile infrastructure requires further investigation to verify the impact of the current legislation and to evaluate the options (both legislative and non-legislative) to improve the current situation.

The following actions are proposed:

- Assess the mobile infrastructure planning legislation/practice in Northern Ireland compared to that operating in other regions in the UK;
- Consult with mobile operators to identify which planning legislation or practices act as barriers to the rollout of mobile infrastructure in Northern Ireland;
- Engage with the relevant planning authorities to consider the best ways of addressing any barriers in terms of planning practice; and
- Engage with legislators to consider the best ways of addressing any barriers in terms of legislation.

Recommendation I.2:**Align telecommunications infrastructure planning regulation in the ICBAN region.
[Republic of Ireland]**

The installation of new telecommunications infrastructure is subject to local government planning regulation. A consistent aligned approach to the telecommunications planning by each of the councils in the region, in terms of the planning process, required documentation, timelines, etc., would be advantageous. This is not an appeal for a drop in planning standards, but a recommendation that the process is clear and efficient, and if possible common across all the councils in the ICBAN region. If a planning application is to fail, it should fail quickly. This is especially important bearing in mind the forthcoming rollout of 4G mobile networks. Councils should regard operators as they would any other potential investors in the region.

Section 9.3.3 highlights how development contributions levied by some councils and delays in the planning process impose costs on operators looking to rollout or extend telecommunications networks.

The recent report⁷³ by the Next Generation Broadband Taskforce (NGBT) includes a report by the Working Group on Infrastructure Barrier Removal, identifying the following barriers to the rollout of telecommunications infrastructure:

- The planning process for masts and antennas;
- The administrative process associated with the installation of street infrastructure such as cabinets; and
- The administrative process associated with the installation in roads of underground ducting and cable relating to broadband infrastructure.

The report makes multiple recommendations to address these issues, aimed primarily at local authorities but also communications providers.

The following actions are proposed:

- Apply a consistent approach to telecommunications infrastructure planning across the ICBAN councils in relation to planning policy, procedures and charges;
- Agree and implement a transparent and consistent system of (ideally low or no) development contributions for telecommunications infrastructure across the ICBAN councils;
- Engage with communications providers to ensure that any barriers in terms of planning and development contributions are addressed;
- Consult with the Department of Environment, Community and Local Government (DECLG) regarding national planning guidelines, and with the Department of Communications, Energy and Natural Resources (DCENR) regarding national broadband policy and planning. ICBAN can act as a pilot region for new and revised processes relating to masts, street furniture and road works.

⁷³ *Enabling a Connected Society*, DCENR [May 2012]. <http://www.dcenr.gov.ie/NR/rdoonlyres/1AE24C27-40AD-4A73-879F-4536250C87BC/0/FullReport.pdf>

11.3 Pillar II: Public Assets

Recommendation II.1:

Identify council-owned sites that are suitable for hosting mobile or wireless infrastructure. [Northern Ireland]

The Department for Culture, Media and Sport (DCMS) in London is providing £150m to improve mobile coverage in the UK. The Mobile Infrastructure Project (MIP) will invest in new mast infrastructure through a procurement process which is expected to commence in mid-2012, with the project being completed by 2015. See **Section 7.2.2** for more details.

In addition, DETI plans to run a procurement process in Q3 2012, to invest circa £12m to improve access to mobile broadband (3G/4G) services in Northern Ireland.

Councils should examine their site portfolios for sites that could be suitable for these mobile projects and that would meet any planning requirements. These procurement processes will interest mobile operators, network infrastructure providers and operators, network equipment vendors, mobile network planners and backhaul providers, especially in sites that could be used to address known mobile not-spots.

Mobile operators and FWA operators are regularly looking to procure sites for antennae and the impending 4G network rollouts will increase this demand.

The following actions are proposed:

- Undertake an audit of all council properties;
- Engage with operators in the UK to identify gaps in mobile infrastructure and coverage, and to help select properties of interest;
- Agree a common approach by the councils to commercial terms and conditions;
- Operate an open and transparent process in providing access to council assets across the ICBAN region; and
- Encourage operators to share sites.

Recommendation II.2:

Identify council owned sites that are suitable for hosting mobile or wireless infrastructure. [Republic of Ireland]

Councils should examine their site portfolios for sites that could be suitable for wireless infrastructure. Mobile operators and FWA operators are regularly looking to procure sites for antennae and the impending 4G network rollouts will increase this demand. Operators would particularly be interested in sites that could be used to address known mobile or fixed wireless not-spots.

The following actions are proposed:

- Undertake an audit of all council properties;
- Engage with operators in the Republic to identify gaps in mobile infrastructure and coverage, and to help select properties of interest;
- Agree a common approach by the councils to commercial terms and conditions;

- Operate an open and transparent process in providing access to council assets across the ICBAN region; and
- Encourage operators to share sites.

11.4 Pillar III: Investment

Recommendation III.1:

Support DETI in the identification of broadband not-spot areas for the forthcoming fixed and mobile procurement projects. [Northern Ireland]

The government plans to have 90 per cent of homes and businesses in each local authority area (Northern Ireland in this case) having access to superfast broadband and for everyone in the UK to have access to at least 2Mbps by 2015. The latter target of 2Mbps is known as the Universal Service Commitment (USC).

Rural subscribers in effect pay more per megabit, i.e. they are paying the same price as their urban counterparts for a broadband service, but yet experience lower speeds than urban subscribers.

DETI is currently planning to invest approximately £20m in funding to support the provision of a broadband service to fixed broadband not-spots, i.e. areas in which users are currently unable to avail of a broadband service. The fund is planned to be invested through a public procurement process which should commence by Q3 2012. In addition, DETI plans to run a parallel procurement process in the same timeframe, to invest circa £12m to improve access to mobile broadband (3G/4G) services in Northern Ireland. See **Section 7.2.1** for more details.

The department is likely to dimension the broadband not-spots through the use of post-codes and/or specific addresses for the premises affected.

The following actions are proposed:

- Share survey data relating to address and post code information with the department, and
- Support the department in its dimensioning of fixed and mobile not-spots as part of its forthcoming fixed and mobile services procurement processes.

DETI should contractually oblige the selected communications provider(s) to provide a broadband connection to 100% of potential subscribers within a broadband not-spot.

Recommendation III.2:

Lobby for greater investment in telecommunications infrastructure in the ICBAN region. [Northern Ireland]

Mobile operators and FWA operators are regularly looking to procure sites for antennae and the impending 4G network rollouts will increase this demand. Improvements to planning and greater marketing of council-owned sites should be used as a lever to encourage more investment by communications providers.

The EU's Connecting Europe Facility (CEF), has earmarked €9.2 billion to be invested in telecommunications and IT from 2014 to 2020. Of the €9.2 billion, at least €7 billion will be targeted at superfast and ultrafast broadband networks. The aim of the funding is to

complement and catalyse private investment in challenging broadband projects, for example addressing demand for broadband services in rural areas. Projects can be proposed by telecoms operators, utility companies, construction companies or public bodies taking part in public-private partnerships. ICBAN needs to monitor the CEF as it evolves and examine if there's a potential application in the region for this valuable source of funding.

In 2008, the WEST⁷⁴ report recommended extending the reach of the Saturn Ring to Cookstown and Enniskillen. In the context of the Regional Telecommunications Action Plan, this recommendation is now also relevant to Dungannon, which is on the Saturn Ring but where there is currently no POP. In 2010 through the support of Project Kelvin, Hibernia Atlantic installed and commissioned POPs in Armagh and Omagh. Similar POPs should be considered for Cookstown, Dungannon and Enniskillen.

The following actions are proposed:

- Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning the next generation(4G) of mobile networks;
- Lobby DETI to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and
- Evaluate the EU's Connecting Europe Facility (CEF) as it develops from 2014 onwards and determine if there's a potential application for this funding in the ICBAN region.

Recommendation III.3:

Lobby for greater investment in telecommunications infrastructure in the ICBAN region. [Republic of Ireland]

In 2011, the Department of Communications, Energy and Natural Resources (DCENR) set up the Next Generation Broadband Taskforce (NGBT) comprising the CEOs of the main telecoms providers in the republic. The NGBT's main task was to examine the best way of accelerating the delivery of broadband infrastructure in every region to meet the EU's 2020 targets. The NGBT released its report⁷⁵ in May 2012 detailing its analysis and making over fifty recommendations. The recommendations covering infrastructure barrier removal and states assets and entities are of particular relevance to local authorities. A National Broadband Plan is expected to be completed and published in Q3 2012.

The following actions are proposed:

- Monitor the ongoing development of broadband policy, in particular the development by DCENR of a National Broadband Plan due to be finalised and released in July 2012;
- Engage with DCENR to highlight the broadband initiatives being undertaken by ICBAN to remove barriers to infrastructure, and to attract greater investment by operators;

⁷⁴ *Research into Telecommunications Provision within the Western Sub-Region of Northern Ireland*, Western Economic Strategy Team & Analysys Mason [August 2008]. www.omagh.gov.uk/download_files/DEV-FinalReportForWest.pdf

⁷⁵ *Enabling a Connected Society*, DCENR [May 2012]. <http://www.dcenr.gov.ie/NR/rdonlyres/1AE24C27-40AD-4A73-879F-4536250C87BC/0/FullReport.pdf>

- Lobby DCENR to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and
- Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning 4G mobile networks, and Eircom and its Next Generation Access (NGA) programme.

Recommendation III.4:

Monitor investment resulting from ICBAN activities. [Northern Ireland and Republic of Ireland]

The success of the initiatives being proposed in this report will ultimately be proven by the amount of investment that results directly from them. It's important to track this investment to demonstrate the success or otherwise of these initiatives, and provide evidence on which ideas are working or not.

The following action is proposed:

- Monitor the level of infrastructure investment and delivery arising directly from the broadband initiatives being undertaken by ICBAN.

11.5 Pillar IV: Local Activism

Recommendation IV.1:

Support local broadband initiatives. [Northern Ireland and Republic of Ireland]

The review of international projects demonstrates the importance of local community engagement. Firstly, engaging with local users, or potential users in deficient areas, helps to clarify the extent of demand at a local level, and thus build the business case to support a new broadband initiative. ICT projects that have focussed on local communities have discovered that local assets or support may become available. In other projects, these assets and support have come in the form of utility network access, ICT support skills from local businesses, sites being made available for network equipment, and technical R&D skills and knowledge from local universities. Local co-operation, for example with local universities and industrial companies, has led to the successful sharing of resources, information, and skills, often resulting in significant cost savings, and the achievement of the project objectives in a shorter timescale.

A good example of a community-based initiative, relevant to both Northern Ireland and the Republic is Rutland Telecom, a local venture addressing rural broadband deficiencies in the county of Rutland in central England. Rutland Telecom's approach to broadband rollout in rural areas is to partner with local users, who co-invest in the provision of services. For example, in 2010 the company completed a project in Lyddington village that unbundled phone lines to offer a 'non-BT' FTTC service delivering superfast broadband (40Mbps). This was done in partnership with the residents of the village who raised £37,000 for the project.

More recently, in 2011, the company delivered a FTTH service in the village of Hambleton, where residents and local small/home businesses raised £150,000 to fund the project. It is the first village in the county to get a complete fibre service with speeds of up to 100Mbps. Rutland Telecom teamed up with a fibre network builder to provide the service. Prior to the new network, villagers said they were getting a broadband speed of less than 1Mbps.

Rutland Telecom is an example of how a local enterprise can lead a partnership initiative to solve rural broadband not-spot issues, with co-funding from the affected community. Although the county of Rutland is much smaller than the ICBAN region, it demonstrates what can be achieved in a relatively short period of time through local efforts, with demand and commitment from the user community.

The following actions are proposed:

- Engage with communities looking to implement local broadband access solutions, providing support in terms of planning and access to public assets;
- Harness local technology expertise in the form of technical R&D skills from local third level institutions, and ICT support skills from local businesses;
- Track access and quality issues through an annual survey of communications services across the ICBAN region;
- The Regional Telecommunications Action Plan (RTAP) should be led by a **Programme Manager**, responsible for the overall delivery of the action plan. His/her role is to liaise with all stakeholders, to influence the relevant local and national authorities, and to ensure that the actions are delivered according to expectations, and
- There should be a **Programme Champion** within each local council to ensure that each council fully engages with the programme across all the functions under its remit, e.g. planning, building services, economic development, roads, water services, etc. The champion liaises with the relevant functions or departments, with a balanced view of the requirements of the council and the objectives of the programme. In the context of a locally-driven initiative, the champion would act a 'go between', who is responsible for driving the project within the local authority, to ensure that no unreasonable planning or procedural barriers are put in the way of the implementation of the project. In this way, any potential difficulties are identified and addressed early.

11.6 Pillar V: Demand Stimulation

Recommendation V.1:

Increase awareness of broadband. [Northern Ireland and Republic of Ireland]

Increasing broadband penetration improves the business case for the communications provider. Targeting the benefits of broadband at users who are currently 'digitally disengaged', for example increased market access for SMEs or improved access to education for residential users, should over time overcome the inertia of the 'digitally disengaged', increasing the overall level of take-up in the region and making it more attractive for further investment.

Local government itself can also improve the level of broadband take-up, directly by encouraging personnel to work remotely either from home or in the community, or indirectly by placing more of its services online.

The following actions are proposed:

- Support national broadband awareness campaigns aimed at prospective business and residential users.
- Promote increased availability of online government services.

- Encourage eWorking initiatives in local government.
- Track take-up through an annual survey of communications services across the ICBAN region.

11.7 Indicative Costs

Examining the findings detailed in **Section 9** suggests three infrastructure initiatives that would improve the choice, speed and quality of broadband services available to small business and residential users in the ICBAN region:

1. Implement a fibre-based solution throughout the council areas in the Republic;
2. Extend the mobile broadband coverage in the council areas in Northern Ireland; and
3. Eliminate the fixed broadband not-spots in Northern Ireland.

However the latter initiative is already being addressed through DETI's forthcoming USC procurement process with a funding allocation of £20m. Therefore this costing exercise concentrates on the first two initiatives.

11.7.1 Installing a Fibre to the Cabinet Solution in the Five Council Areas in the Republic

Examining the Fibre to the Cabinet (FTTC) rollout in Northern Ireland (outlined in Section 3.1.1), reveals the following data:

- 2,500 cabinets were upgraded to FTTC, of which 1,265 cabinets were part of the NGB project at a cost of £48m Sterling, and
- Around 5,000km of fibre was laid to connect the upgraded cabinets to the local exchanges, i.e. an average of 2km of fibre per upgraded cabinet.

Comparing the population densities between Northern Ireland and the five ICBAN councils in the Republic:

- The population of Northern is 1.8m in an area of 13,843km² with a population density of 122 per sq.km, and
- The population of counties Cavan, Donegal, Leitrim, Monaghan and Sligo have a population of 340,000 in an area of 11,492km² with a population density of 34 per sq.km.

Assuming that the fixed line telecommunications networks in both jurisdictions are dimensioned in a similar manner, then:

- On a population basis, 2,500 upgraded cabinets in Northern Ireland correspond to 550 cabinets in the five ICBAN counties in the Republic, and
- On a population density basis, 5,000km of fibre in the Northern Ireland corresponds to 3,950km⁷⁶ of fibre in the five ICBAN counties in the Republic.

The equipment cost of a cabinet is approximately €8,500, but this does not take into account the costs of civil works and an electricity connection. The proximity of an electricity supply to the new cabinet can have significant bearing on the overall cost and feasibility of

⁷⁶ The assumption is that the length of fibre rollout is inversely proportional to population density, i.e. the higher the population density the lower the amount of fibre rollout required to connect an upgraded cabinet to the local exchange. A fibre run of 2km per cabinet for a population density of 122 per sq.km is equivalent to a fibre run of 7.2km per cabinet for a population density of 34 per sq.km.

implementing an FTTC solution. It is assumed that the cost of installing and commissioning a cabinet is double the equipment cost, i.e. €17,000.

It is further assumed that duct already exists between the local exchange and the cabinet being upgraded, and that the cost of installing a sub-duct and blowing fibre through the sub-duct is €15 per metre.

Figure 11.1 summarises the assumptions used in calculating the costs of implementing an FTTC solution in the ICBAN region in the Republic.

Assumptions	Units	Notes
Number of Cabinets to be Upgraded	550	Based on NI total of 2,500, on a population basis.
Average Fibre Distance per Upgraded Cabinet	7.2km	Based on NI average of 2km per cabinet, on a population density basis.
Overall Cost per Cabinet	€17,000	Cost of cabinet equipment, civil works and electricity connection.
Cost per metre for Sub-duct and Fibre	€15	Duct already exists between upgraded cabinet and local exchange.

Table 11.1: Assumptions used to Calculate Cost of FTTC Solution to ICBAN Region in Republic

The overall estimated cost of implementing a FTTC solution in the five council areas in the Republic is €68.75m.

11.7.2 Extending Mobile Broadband Coverage in the Five Council Areas in Northern Ireland

Examining the mobile-based National Broadband Scheme (NBS) in the Republic (outlined in Section 4.2.1 and Section 7.3.2), reveals the following data:

- The scheme uses 390 sites to provide a mobile broadband service to 234,000 premises in 1,028 out of 3,440 Electoral Divisions;
- The mobile broadband service offered through the NBS has a minimum download speed of 1.6Mbps and a minimum upload speed of 1.2Mbps. These speeds are contracted to increase to a minimum of 2.3Mbps download and 1.4Mbps upload in October 2012, and
- The total cost was €223m, including €79.8m of public funding. This equates to €953 (£794) per premises covered.

In November 2011, Ofcom released maps and data sets⁷⁷ for mobile coverage, based on council areas in the UK. This was accompanied by Ofcom's first communications infrastructure report⁷⁸ for the UK. Table 11.2 below shows the reported 3G coverage for each of the ICBAN council areas in Northern Ireland.

⁷⁷ <http://maps.ofcom.org.uk/mobile/index.html>

⁷⁸ *Ofcom Infrastructure Report: The first Communications Infrastructure Report*. Ofcom, 01/11/2011. <http://stakeholders.ofcom.org.uk/market-data-research/telecoms-research/broadband-speeds/comms-infrastructure-report/>

	No Reliable Signal
Armagh City and District	15%
Cookstown District	11%
Dungannon and South Tyrone Borough	70%
Fermanagh District	12%
Omagh District	46%

Table 11.2: Percentage of Premises Not Covered by 3G for Each Council Area [Source: Ofcom]

Table 11.3 below calculates the number of premises affected for the five council areas, based on the Northern Ireland average of one premises for every two people.

	% of Premises with No Reliable Signal	Population	No. of Premises	No. of Premises with No Reliable Signal
Armagh City and District	15%	59,400	29,700	4,455
Cookstown District	11%	36,700	18,350	2,019
Dungannon and South Tyrone Borough	70%	57,700	28,850	20,195
Fermanagh District	12%	63,100	31,550	3,786
Omagh District	46%	52,900	26,450	12,167
TOTAL				42,622

Table 11.3: Number of Premises Not Covered by 3G in the Five Council Areas

The cost per premises is taken to be broadly in line with that for the NBS (£794), based on the following assumptions:

- The topography and population densities of the areas to be addressed in Northern Ireland are similar to those areas addressed by the NBS in the Republic, and
- The cost of rolling out the latest mobile broadband technology, in terms of site acquisition, access and backhaul, is similar to that incurred implementing the NBS in 2008-2010. Although the more recent technology should provide more bandwidth to users.

Therefore the overall estimated cost of extending a mobile broadband solution in the five council areas in Northern Ireland is £33.5m. It should be noted that DETI plans to run a procurement process this year to invest circa £12m to improve access to mobile broadband (3G/4G) services in Northern Ireland.

11.8 Summary of Recommendations and Actions

Pillars	Recommendations	Actions	Actors
<p>I. PLANNING</p>	<p>I.1: Determine the changes necessary to current planning regarding mobile infrastructure to encourage better mobile coverage in the ICBAN Region. (NI)</p>	<ul style="list-style-type: none"> • Examine planning legislation/practice as it relates to mobile infrastructure in Northern Ireland, compared to that operating in other regions in the UK; • Consult with mobile operators to identify what planning legislation or practices act as barriers to the rollout of mobile infrastructure in Northern Ireland; • Engage with the relevant planning authorities to consider the best ways of addressing any barriers in terms of planning practice; and • Engage with legislators to consider the best ways of addressing any barriers in terms of legislation. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Planning Authorities • Operators • DETI • Legislators
	<p>I.2: Align telecommunications infrastructure planning regulation in the ICBAN region. (ROI)</p>	<ul style="list-style-type: none"> • Apply a consistent approach to telecommunications infrastructure planning across the ICBAN councils in relation to planning policy, procedures and charges; • Agree and implement a transparent and consistent system of (ideally low or no) development contributions for telecommunications infrastructure across the ICBAN councils; • Engage with communications providers to ensure that any barriers in terms of planning and development contributions are addressed; • Consult with the Department of Environment, Community and Local Government (DECLG) regarding national planning guidelines, and with the Department of Communications, Energy and Natural Resources (DCENR) regarding national broadband policy and planning. ICBAN can act as a pilot region for new and revised processes relating to masts, street furniture and road works. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators • DCENR • DECLG

Pillars	Recommendations	Actions	Actors
<p>II. PUBLIC ASSETS</p>	<p>II.1: Identify council owned sites that are suitable for hosting mobile or wireless infrastructure. (NI)</p>	<ul style="list-style-type: none"> • Undertake an audit of all council properties; • Engage with operators in the UK to identify gaps in mobile infrastructure and coverage, and to help select properties of interest; • Agree a common approach by the councils to commercial terms and conditions; • Operate an open and transparent process in providing access to council assets across the ICBAN region, and • Encourage operators to share sites. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators
	<p>II.2: Identify council owned sites that are suitable for hosting mobile or wireless infrastructure. (ROI)</p>	<ul style="list-style-type: none"> • Undertake an audit of all council properties; • Engage with operators in ROI to identify gaps in mobile infrastructure and coverage, and to help select properties of interest; • Agree a common approach by the councils to commercial terms and conditions; • Operate an open and transparent process in providing access to council assets across the ICBAN region, and • Encourage operators to share sites. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Operators
<p>III. INVESTMENT</p>	<p>III.1: Support DETI in the identification of broadband not-spot areas for the forthcoming fixed and mobile procurement project. (NI)</p>	<ul style="list-style-type: none"> • Share survey data relating to address and post code information with the department, and • Support the department in its dimensioning of fixed and mobile not-spots as part of its forthcoming fixed and mobile services procurement processes. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • DETI

Pillars	Recommendations	Actions	Actors
<p>III. INVESTMENT (Continued)</p>	<p>III.2: Lobby for greater investment in telecommunications infrastructure in the ICBAN region. (NI)</p>	<ul style="list-style-type: none"> • Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning 4G mobile networks; • Lobby DETI to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and • Evaluate the EU's Connecting Europe Facility (CEF) as it develops from 2014 onwards and determine if there's a potential application for this funding in the ICBAN region. 	<ul style="list-style-type: none"> • ICBAN • Operators • DETI • EU Commission
	<p>III.3: Lobby for greater investment in telecommunications infrastructure in the ICBAN region. (ROI)</p>	<ul style="list-style-type: none"> • Monitor the ongoing development of broadband policy, in particular the development by DCENR of a National Broadband Plan due to be finalised and released in July 2012; • Engage with DCENR to highlight the broadband initiatives being undertaken by ICBAN to remove barriers to infrastructure, and to attract greater investment by operators; • Lobby DCENR to ensure that government investment in telecommunications is done fairly and equally without disadvantaging the ICBAN region, and • Engage with operators who are embarking on extensive infrastructure rollout programmes, such as mobile operators planning 4G mobile networks, and Eircom and its Next Generation Access (NGA) programme. 	<ul style="list-style-type: none"> • ICBAN • DCENR • Operators
	<p>III.4: Monitor investment resulting from ICBAN activities. (NI & ROI)</p>	<ul style="list-style-type: none"> • Monitor the level of infrastructure investment and delivery arising directly from the broadband initiatives being undertaken by ICBAN and its participant local councils. 	<ul style="list-style-type: none"> • ICBAN • Operators • Local Councils

Pillars	Recommendations	Actions	Actors
<p>IV. LOCAL ACTIVISM</p>	<p>IV.1: Support local broadband initiatives. (NI & ROI)</p>	<ul style="list-style-type: none"> • Engage with communities looking to implement local broadband access solutions, providing support in terms of planning and access to public assets; • Harness local technology expertise in the form of technical R&D skills from local third level institutions, and ICT support skills from local businesses; • Track access and quality issues through an annual survey of communications services across the ICBAN region; • The Regional Telecommunications Action Plan (RTAP) should be led by a Programme Manager, responsible for the overall delivery of the action plan, and • There should be a Programme Champion within each local council to ensure that each council fully engages with the programme across all the functions under its remit. 	<ul style="list-style-type: none"> • ICBAN • Local Councils • Local Communities • Local businesses • Local third level institutions
<p>V. DEMAND STIMULATION</p>	<p>V.1: Increase awareness of broadband. (NI & ROI)</p>	<ul style="list-style-type: none"> • Support national broadband awareness campaigns aimed at prospective business and residential users; • Promote increased availability of online government services; • Encourage eWorking initiatives in local government, and • Track take-up through an annual survey of communications services across the ICBAN region. 	<ul style="list-style-type: none"> • ICBAN • Local Councils

11.9 Timelines

Figures 11.1 and 11.2 below shows the timelines for the implementation of the recommendations and actions outlined above.

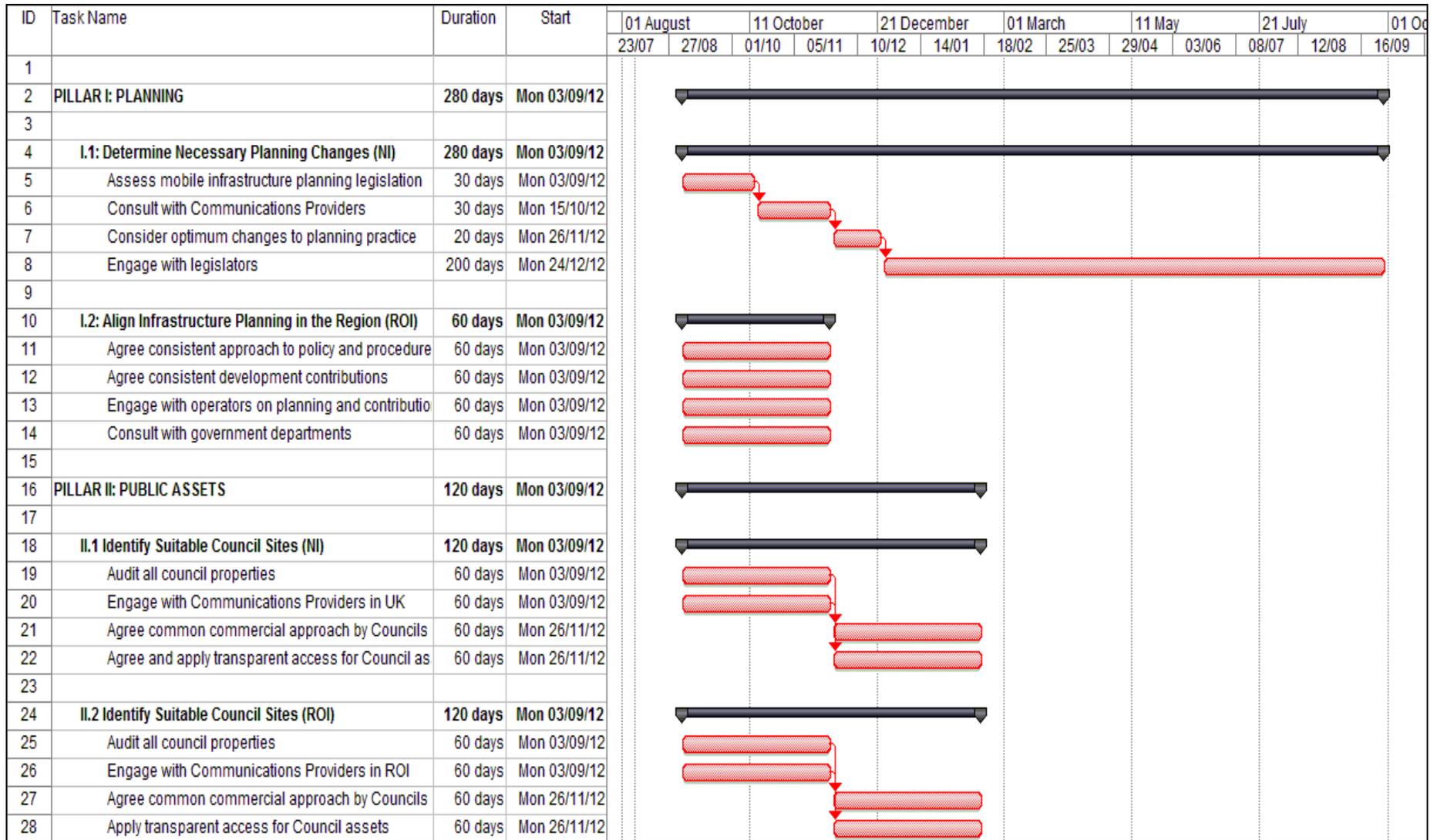


Figure 11.1: Gantt Chart for the Implementation of the Recommendations and Actions for Pillar I and Pillar II

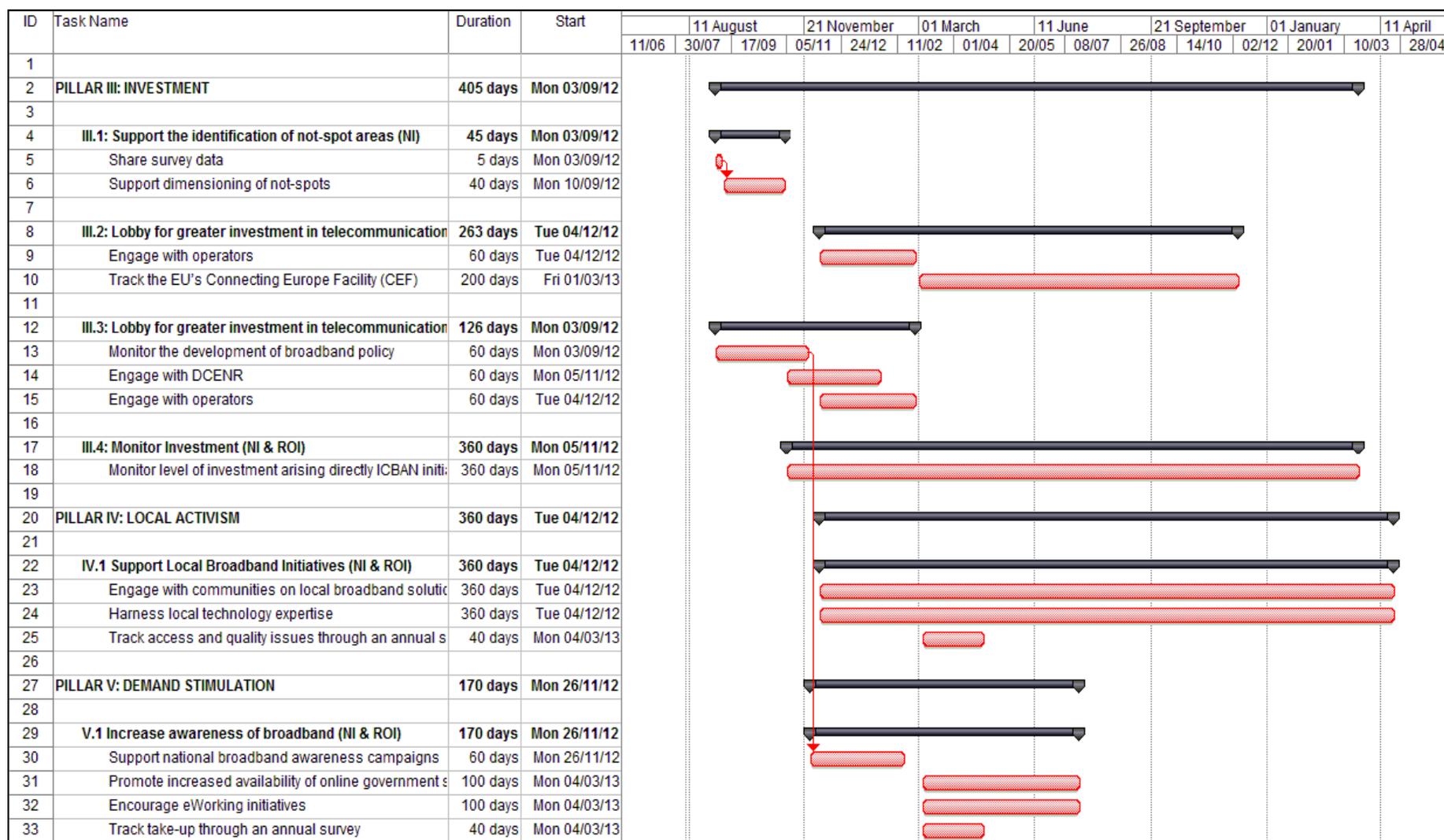


Figure 11.2: Gantt Chart for the Implementation of the Recommendations and Actions for Pillar III, Pillar IV and Pillar V

12 List of Acronyms

ADSL	Asymmetric Digital Subscriber Line
BDUK	Broadband Delivery UK
CP	Communications Provider
DAFF	Department of Agriculture Fisheries and Food in Dublin
DARD	Department of Agriculture and Rural Development in Belfast
DCENR	Department of Communications Energy and Natural Resources in Dublin
DCMS	Department of Culture Media and Sport in London
DECLG	Department of Environment, Community and Local Government in Dublin
DETI	Department of Enterprise Trade and Investment in Belfast
DOCSIS	Data Over Cable Service Interface Specification
DSL	Digital Subscriber Line
ESRI	Economic Social Research Institute in Dublin
FTTC	Fibre to the Cabinet
FTTH	Fibre to the Home
FTTP	Fibre to the Premises
FWA	Fixed Wireless Access
GSM	Groupe Spéciale Mobile
HFC	Hybrid Fibre Coaxial
HSPA	High Speed Packet Access
ICBAN	Irish Central Border Area Network
LLU	Local Loop Unbundled
LTE	Long Term Evolution
MAN	Metropolitan Area Network
MIP	Mobile Infrastructure Project
NBS	National Broadband Scheme
NFN	National Fibre Network

NGA	Next Generation Access
NGB	Next Generation Broadband
NGBT	Next Generation Broadband Taskforce
NGN	Next Generation Network
NI	Northern Ireland
POP	Point of Presence
RBS	Remote Broadband Services (NI), Rural Broadband Scheme (ROI)
ROI	Republic of Ireland
SLU	Sub-Loop Unbundling
SME	Small Medium Enterprise
UMTS	Universal Mobile Telecommunications System
USC	Universal Service Commitment
VDSL	Very high speed Digital Subscriber Line
VOIP	Voice Over Internet Protocol
WiMAX	Worldwide Interoperability for Microwave Access
2G	2 nd Generation Mobile
3G	3 rd Generation Mobile
4G	4 th Generation Mobile

13 Appendix A – International Exemplars

13.1 Arge Glasfaser Waldviertel (AUSTRIA)

Area size	150 sq. km
Scale of Population/Premises	1,500 houses and 150 business premises
Project Budget	€850,000
Technologies	FTTH / FTTP
Project dates	Started in 2005 and completed in 2011

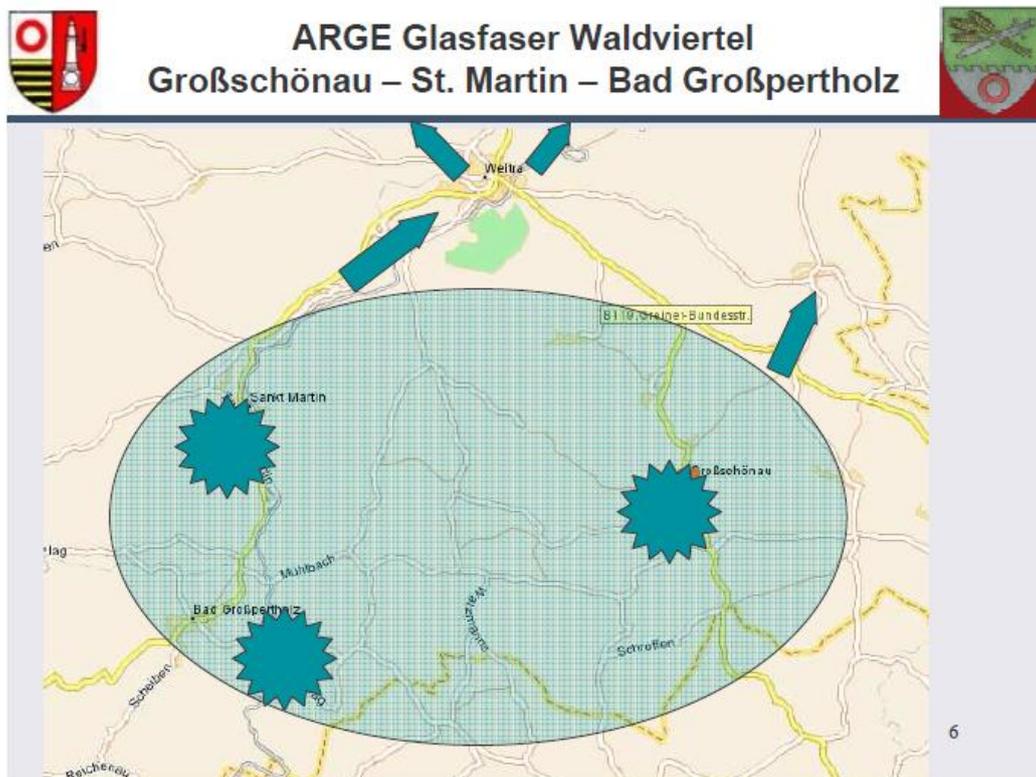


Figure 13.1: The ARGE Glasfaser Waldviertel Region

Three small municipalities (Brobschonau, St. Martin and Bad Grobpertholtz) in this rural area, near to the border with the Czech Republic, came together to build a low-cost 'fibre-to-the-home' (FTTH) network. The three rural economies in northeast Austria, were faced with three problems: high unemployment, declining population, and a need to rejuvenate their local industries.

But without genuine broadband services (only dial-up Internet was available at the time,) the chance of turning this situation around was limited. The mayors of the three municipalities realised the importance of ICT infrastructure in helping families remain in the area and attracting new businesses. The acronym 'ARGE' translates roughly as 'Forest Quarter Fibre Co-operative'.

The project took advantage of some work on the sewage system in 2006 to install ducts for a fibre network capable of delivering broadband to individual properties. In this way, they reduced the potential civil construction costs, which would otherwise have been the most expensive part of the project.

The municipalities have set up the passive infrastructure as far as the homes/premises. Householders then take care of the connection of last few metres on their own property.

By working together, the three municipalities were able to share information and gain economies of scale. Other municipalities are now thinking about joining and this would help to achieve valuable critical mass of demand for value-added services to be delivered over the network(e.g. for IPTV).

The project faced some initial difficulties: Opposition from the incumbent (Austria Telecom), lack of a high-speed backbone infrastructure, and finding ISPs willing to provide services. But these have been overcome.

The network uses point-to-point active Ethernet providing 100 Mbps to customers, and designed with the capacity to offer up to 1 Gbps.

The first customers were connected in 2005, and the backbone between the three municipalities was completed in late 2006. Each village owns their own portion of the network. The municipalities operate the passive network themselves, while a local ISP (WVNET) operates the active infrastructure. The network is open, on a non-discriminating open access basis, to all service providers who are interested in using it. But some challenges remain, including the bottleneck due to lack of a fast 'backbone' to the internet.

The availability of a high quality ICT infrastructure has now given this rural region the chance to:

- Stop migration of young families to big cities – students are now returning home to study;
- Attract people to move to the municipalities;
- Keep the existing SMEs;
- Attract new SMEs into the region;
- Set up a positive dynamic for the region with other new and innovative projects;
- Bridging the broadband gap between this rural area and larger towns and cities.

With the broadband services now in place, the area's low employment, high exodus status has changed. Families and students are now returning to live in the area, and businesses are collaborating, even to the extent of sharing servers. There is a vibrant community network now in place, which enables information exchange, sharing of local photos and videos (through the IPTV system), and special services for the elderly in the communities.

Lessons learned:

- Leadership was essential, and this came from the three mayors;

- The leaders initiated the project themselves, rather than waiting for national political support for the project;
- The municipalities benefited from co-operating and from sharing resources, information, knowledge and skills, and thus achieved economies of scale;
- Installing ducts during the sewage network project dramatically reduced the capital costs of the project;
- They also benefited from the support of a local industrial company (Leoni NBG), which contributed some resources and skills to the project;
- Challenges at the outset included: convincing the local residents; working without the support of the incumbent and the regional electricity company; the lack of a backbone connection; and no interconnection between the municipalities;
- Now that the network is in place, the big service providers that were not interested in supplying services at the beginning suddenly installed competing services. But the local residents remained loyal to their own network;
- The new network now facilitates new municipal services such as remote controlling of street lights and remote energy monitoring.

The ARGE project is a strong example of how taking the initiative at a local level led to this rural and disadvantaged region acquiring a state of the art fibre network. Now, other municipalities in the region are also interested in joining the network.

13.2 Midtsoenderjylland (DENMARK)

Area size	1,008 sq. km
Scale of Population/Premises	19,200 houses and premises
Project Budget	€100m (1% from Public sector partners)
Technologies	FTTH / FTTP
Project dates	2007-2012

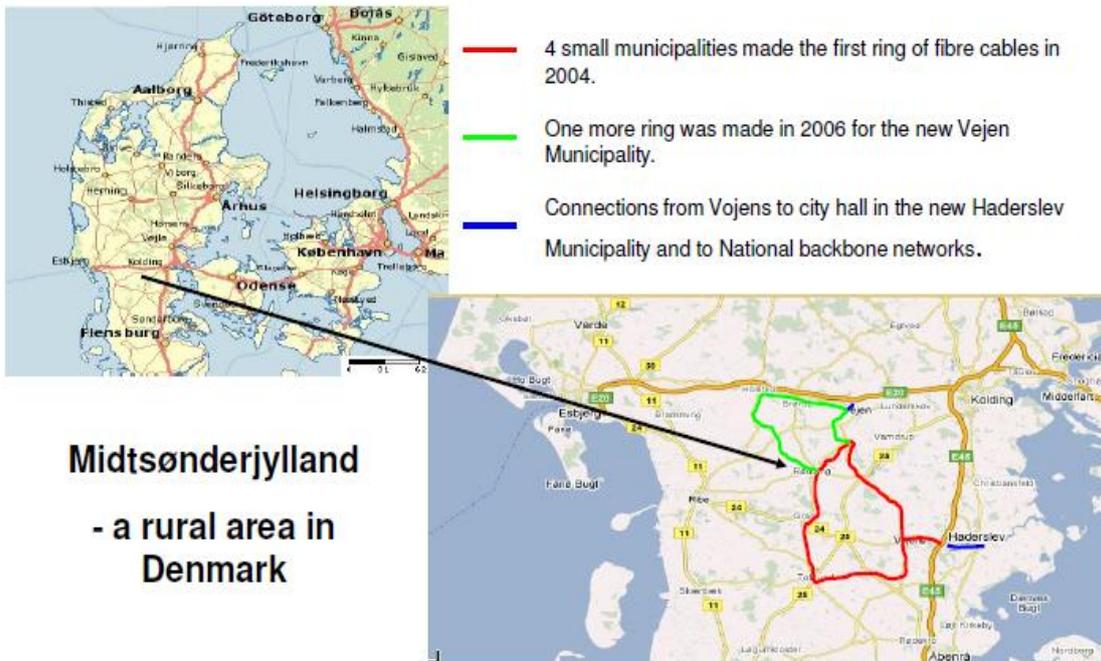


Figure 13.2: The Midtsoenderjylland Project Region (Source of graphic: Rod Mitchell)

An initial broadband study in 2002 showed that Midtsoenderjylland, a small farming region in southern Denmark, was very deficient in broadband infrastructure and services. In addition, the area suffered from typical rural socio-economic problems, including high rates of unemployment, low incomes, and a lack of a higher education institution. The development of a suitable ICT and broadband infrastructure was seen as a key component in a strategy to reverse the region’s problems.

A group of four municipalities came together, initially with the objective of centralising their ICT needs in a single hub, with high speed broadband connections for access. This was to be the initial driver of the network project. After first unsuccessfully attempting to convince the incumbent operator to provide the high speed connections between the local authorities at a reasonable price, the group decided to build the network themselves.

They partnered with two local energy companies, Syd Energi and TRE FOR, under a seven-year programme to build a fibre optic network that would supply FTTP connections between the municipalities, and also to all homes and business premises in the region. Most of the FTTP fibre was deployed in conjunction with the energy company’s own underground cable installation plans.

Construction began in 2004, with an initial public investment of €1.4m. Two fibre rings were constructed initially, enabling FTTP connections to be added to the rings, by leveraging electricity cable deployment programmes. The fibre rings are owned, operated and maintained by the municipalities, for their own use, and for use as backbone for the FTTP networks. The FTTP networks were built by, and are owned and operated by, the two energy company partners in the project: Syd Energi and TRE FOR. Including these energy companies in the project provided significant synergies and economies of scale during the rollout of the FTTP network. All networks are operated on an open access basis, encouraging a range of ISPs to supply services using the network.

The impressive outcome of this project is FTTP access for 100% of the population in the region, although the actual take-up of broadband services varies.

Lessons learned:

- The project has stimulated the emergence and growth of over 50 new technology companies, within special facilities such as Roedding Innovation House. These technology companies, in turn, offer support to the Midtsoenderjylland network and its users.
- Involving a local University had significant technical benefits and synergies. The University of Aalborg, and specifically its Centre for Network Planning, was closely involved in the project, contributing technical resources and knowledge to the design phase of the project, which is widely regarded as a significant factor in the overall success and cost savings of the project.
- As in the case of the ARGE project, the Midtsoenderjylland project also demonstrated how costs and time can be saved by leveraging utility infrastructure projects, by installing telecoms ducts during utility installation projects.
- The new FTTP network has stimulated other businesses in the area, allowing them to grow and remain in the area, as well as connecting them to customers, supplier and other satellite offices.
- The municipalities succeeded in convincing the private partners to invest almost all (99%) of the funds required for the deployment of the network. Much of this was achieved by stimulating demand, by demonstrating the economic benefits, and by offering public support, especially in the planning process. The energy company partners predict a payback period of less than 20 years.
- The farming community has become a prominent user group, with the need to access and upload information on livestock etc. helping to prove the demand for the network services.
- During the project, the stakeholders commissioned an assessment of suitable technologies, and a review of wireless and fibre. The conclusion was that wireless would be a more cost-effective solution, but that a fibre network would reach breakeven within eight years if operators used it to deliver value-added services, such as TV and Video on Demand.

13.3 Superfast Cornwall (formerly ActNow Cornwall) (UK)

Area size	1,008 sq. km
Scale of Population/Premises	19,200 houses and premises
Project Budget	£107m (3% from Public sector partners)
Technologies	FTTC, FTTP, Advanced Copper, Wireless, Satellite
Project dates	2002-2015

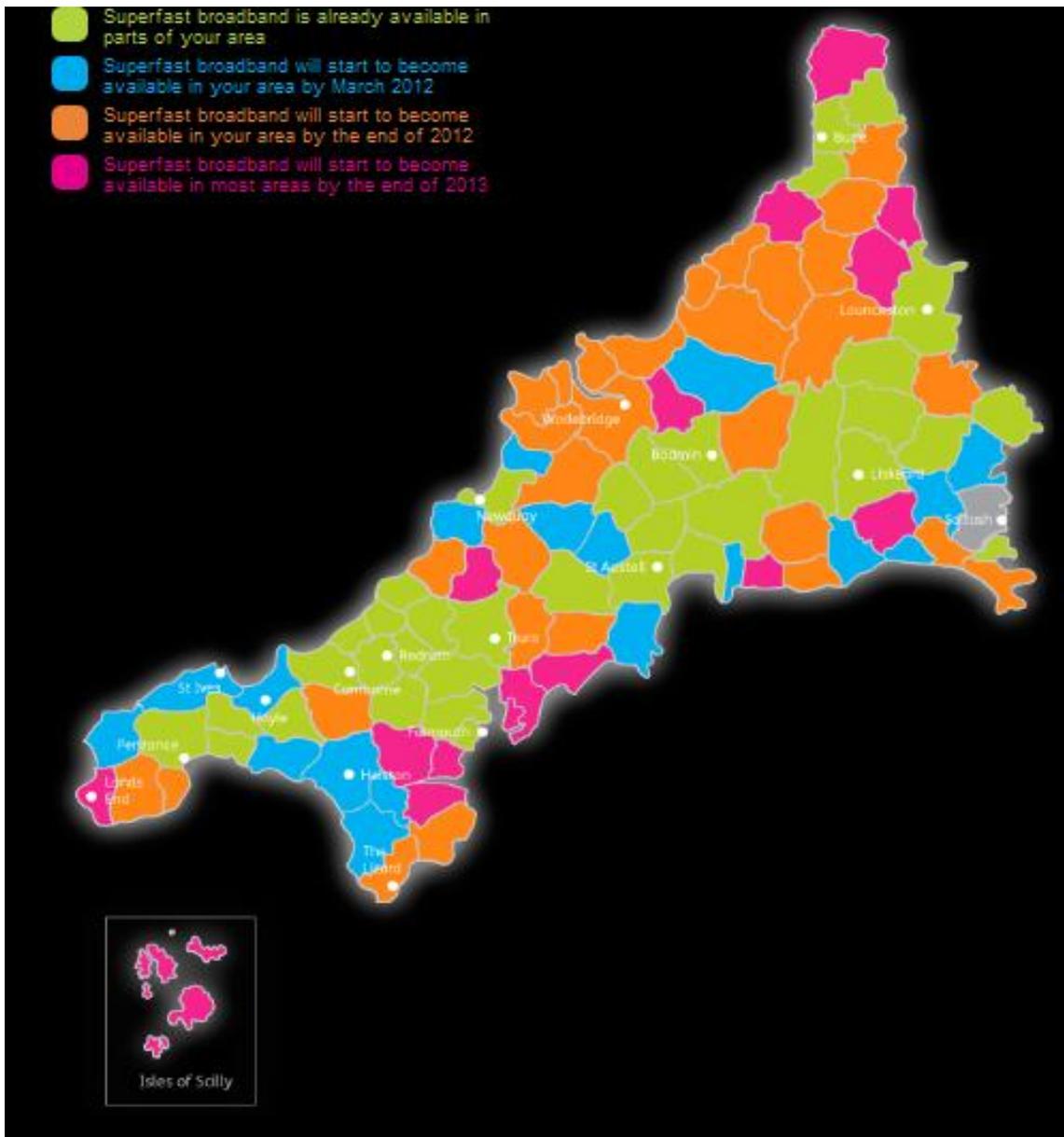


Figure 13.2: Overview of the Rollout of the Superfast Cornwall Network

The Superfast Cornwall project originated from the original ActNow Cornwall initiative of 2002. The success of the original initiative, and its evolution into its current next generation form, makes it a common benchmark case study for other regional broadband initiatives across the world.

ActNow was originally established to give guidance and financial subsidies for getting connected to broadband, along with free impartial ICT business advice, and up to 40% subsidies on IT investment costs for PCs, servers, networks and websites.

The ActNow partnership, led by Cornwall Enterprise, was the first broadband partnership to be set up between the public and private sectors. It had Objective One funding and was comprised of BT, the South West of England Regional Development Agency, Cornwall County Council, Business Link, Cornwall College, DEFRA and Cornwall Broadband Partnership, a consortium of local technology companies.

The project attracted great interest from other regions in the UK and Europe and in February 2004, it hosted 'The Broadband Edge Conference' at the Eden Project to share knowledge and best practice to broadband partnerships across the country.

The success of the ActNow Cornwall initiative, combined with the emergence of superfast broadband services, has resulted in the current Superfast Cornwall initiative. Funded by the EU, BT and Cornwall Council, and managed by Cornwall Development Company, Superfast Cornwall is an ambitious £132m programme bringing superfast broadband to Cornwall and the Isles of Scilly, making it one of the best connected locations in the world. This is the European Union's largest ever single investment in superfast broadband infrastructure. The European Regional Development Fund is investing up to £53.5m through the Convergence programme to help transform the economic competitiveness of Cornwall and the Isles of Scilly. The balance of required funds is being invested by BT (£50m), Cornwall Development Company (£3.5m) and Cornwall Council (£1m).

BT builds, owns and operates the network. All of BT's wholesale service providers also have access to the network, and support the project. This results in a selection of service providers for end users.

To introduce a high speed broadband infrastructure to a rural area on this scale is an immense engineering task. The programme will deploy 130,000km of fibre optic cable throughout the county. Up to 40% of the 266,000 homes and premises in Cornwall and the Isles of Scilly will have access to the fibre network services (all currently have access to basic broadband services, as a minimum). Infill technologies (wireless, satellite and mobile) will be used for the remaining premises. The infill elements of the project will take place towards the end of the project in 2015. CDC has a take-up target of 50% for all areas within 3 years of the network going live in the area.

The scale of the project is evidenced in the size of the full-time project team in place. Cornwall Development Company (CDC) has a full-time team of 10 staff working on the project, and BT has a similar number in its core project team. CDC has a Project Director (Nigel Ashcroft) and Programme Manager (Julian Cowans) assigned to the project. In addition there is a team of staff managing up to 14 project workstreams, including: Business Support; Skills; R&D (in conjunction with local Universities); Digital Inclusion; Marketing; and Environmental assessment.

Lessons learned:

- There have been challenges in managing the expectations of project stakeholders and the user community;

- The rollout of a superfast fibre network is not as 'smooth' as ADSL rollout, due to the cabinet-by-cabinet nature of the fibre deployment;
- The nature of the network rollout, whereby fibre rollout is carried out according in a systematic manner, and infill technologies are being left to the end of the project, will mean that some areas may gain access to the superfast network long before neighbouring areas;
- CDC works closely with the private sector investor, BT, and attributes the success of the project to this close collaborative relationship;
- Contracts with the private sector party must be flexible, to recognise the fact that technologies evolve and a current technology, intended for use in the project, may be surpassed by a future technology. Hence the contract may be characterised by Key Performance Indicators, but should be kept flexible in terms of technologies used;
- The public sector needs to drive demand stimulation. It has a key role to play in engaging the local communities and building up the take-up of the delivered broadband services, and in proving the business case to service providers;
- A sufficiently skilled and resourced team is required, on the public sector side, for complex projects of scale;
- The Cornwall project has not tended to collaborate with utility network companies for combined duct/cable installations. This is partly because a private company, BT, is responsible for the cable deployment. There has been a small amount of co-ordination during road opening and upgrade projects, often co-ordinated by the local authority;
- The local University has been involved in collaborative research into new uses for the fibre network;
- Education at home has become a key driver for broadband demand.

14 Appendix B – Infrastructure in Urban Centres in the ICBAN Region

This section of the document outlines the telecommunications infrastructure available in a main town within each council area. There is a particular focus on the potential communications requirements of multi-national companies (MNCs), to gauge the suitability of the local infrastructure from a Foreign Direct Investment (FDI) perspective.

14.1 Armagh City

Armagh is very well connected nationally and internationally. Within Northern Ireland, the city is connected by the Saturn Ring to Belfast, Derry/Londonderry and Coleraine. There are international connections to North America, Europe via Great Britain, and the Republic.

The following operators have a presence in Armagh:

- BT has unbundled local exchanges and street cabinets upgraded to fibre broadband;
- Hibernia Atlantic has a local Point of Presence (POP) connecting Armagh to North America and Europe via Great Britain;
- Virgin Media has a local POP and international connections to the Republic and to Europe via Great Britain;
- Eircom Northern Ireland has a local POP, a connection to Great Britain and a cross-border connection to the Republic, and
- Altas Communications has a local POP.

14.2 Carrick-on-Shannon

Carrick-on-Shannon is well connected nationally. International connections are available either directly from Eircom or alternatively from other operators using e|net's local MAN infrastructure.

The following operators have a presence in Carrick-on-Shannon:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- e|net manages the local MAN connected nationally through ESB Telecom's fibre network, and
- Digiweb provides an FWA service.

14.3 Cavan Town

Cavan is well connected nationally. International connections are available either directly from Eircom or alternatively from other operators using e|net's Metropolitan Area Network (MAN) infrastructure.

The following operators have a presence in Cavan:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- e|net manages the local MAN connected nationally through ESB Telecom's fibre network;
- Digiweb provides a Fixed Wireless Access (FWA) service, and
- Local FWA operators include Arden Broadband and Ciaracom.

14.4 Cookstown

Cookstown is well connected nationally. International connectivity is available either directly from BT or indirectly from other operators taking a wholesale connection from BT.

The following operators have a presence in Cookstown:

- BT has unbundled local exchanges and street cabinets upgraded to fibre broadband, and
- NWE provides an FWA service.

14.5 Donegal Town

Donegal is well connected nationally. International connections are available either directly from Eircom or alternatively from other operators using e|net's local MAN infrastructure.

The following operators have a presence in Donegal Town:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- e|net manages the local MAN connected nationally through ESB Telecom's fibre network, and
- NWE provides an FWA service.

14.6 Dungannon

Dungannon is well connected nationally. The Saturn Ring passes through Dungannon but does not break out there. International connectivity is available either directly from BT or indirectly from other operators taking a wholesale connection from BT.

The following operators have a presence in Dungannon:

- BT has unbundled local exchanges and street cabinets upgraded to fibre broadband, and
- NWE provides an FWA service.

14.7 Enniskillen

Enniskillen is well connected nationally. International connectivity is available either directly from BT or indirectly from other operators taking a wholesale connection from BT.

The following operators have a presence in Enniskillen:

- BT has unbundled local exchanges and street cabinets upgraded to fibre broadband;
- Net1 provides an FWA service;
- NWE provides an FWA service, and
- Eircom Northern Ireland plans to install a POP.

14.8 Letterkenny

Letterkenny is very well connected nationally and internationally. International connections are available either directly from Eircom, or alternatively from Hibernia Atlantic or other operators using e|net's local MAN infrastructure.

The following operators have a presence in Letterkenny:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- Hibernia Atlantic has a local Point of Presence (POP) connecting Letterkenny to North America and Europe;
- e|net manages the local the Metropolitan Area Network (MAN) connected nationally through ESB Telecom's fibre network and internationally through Hibernia Atlantic's network, and
- BT Ireland plans to install a POP connected to its Northern Ireland Network via Derry/Londonderry.

14.9 Monaghan Town

Monaghan is very well connected nationally and internationally. International connections are available either directly from Eircom, or alternatively from Hibernia Atlantic or other operators using e|net's local MAN infrastructure.

The following operators have a presence in Monaghan:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- Hibernia Atlantic has a local Point of Presence (POP) connecting Monaghan to North America and Europe, and
- e|net manages the local the Metropolitan Area Network (MAN) connected internationally through Hibernia Atlantic's network.

14.10 Omagh

Omagh is very well connected nationally and internationally. Within Northern Ireland, the town is connected by the Saturn Ring to Belfast, Derry/Londonderry and Coleraine. There are international connections to North America, Europe via Great Britain, and the Republic.

The following operators have a presence in Omagh:

- BT has unbundled local exchanges and street cabinets upgraded to fibre broadband;
- Hibernia Atlantic has a local Point of Presence (POP) connecting Omagh to North America and Europe via Great Britain;

- Virgin Media has a local POP and international connections to the Republic and to Europe via Great Britain;
- Eircom Northern Ireland has a local POP, a connection to Great Britain and a cross-border connection to the Republic;
- Altas Communications has a local POP, and
- Local FWA operators include Net1 and NWE

14.11 Sligo Town

Sligo is very well connected nationally and internationally. International connections are available either directly from Eircom, or alternatively from BT and other operators using e|net's local MAN infrastructure.

The following operators have a presence in Sligo:

- Eircom has a Next Generation Network core aggregation node with national and international connectivity via its National Fibre Network;
- BT Ireland has a POP connected to its National Fibre Network;
- UPC has a cable broadband network;
- e|net manages the local the Metropolitan Area Network (MAN) connected nationally through ESB Telecom's fibre network;
- Digiweb provides a Fixed Wireless Access (FWA) service, and
- Local FWA operators include Fastcom Telecom Broadband.

15 Appendix C – Survey Form



ICBAN Telecoms User Survey Questionnaire 2012

Please take a few moments to complete the following questions. Please return the completed Questionnaire to the address at the end of the form. **Thank you for your time!**

Q1 – Profile of Respondent

Name	
Address (Town/Townland & County required, as a minimum)	
Telephone no.	
Contact e-mail address	

Q2 – Broadband Services in Use

Are you currently using a Broadband service? If 'Yes', please state the communications provider.	Yes / No
If 'No', is that because: a Broadband service is not available to you in your area, or do you not require broadband? (Please tick)	<ul style="list-style-type: none"> • A broadband service is not available at your house? • You do not require broadband? • It is too expensive for you?
What type of broadband service technology are you using? (Please tick)	<ul style="list-style-type: none"> • Fixed line (e.g. broadband via your telephone line) • Wireless Broadband • Satellite • Mobile Phone Broadband • Cable Broadband (via your TV service) • Other (please specify):
What bandwidth/broadband speed is offered with your Broadband service, if known? (e.g. 2Mbit/second)	
What is the monthly price of your current broadband service?	
Would you like to change communications provider within the next 12 months, and do you have the option to do so? If you would like to change, what are your reasons?	
What do you, or would you use broadband for?	<ul style="list-style-type: none"> • School homework/projects • Other education purposes • Home business • Other social or personal use • Other (please specify):

Q3 – Broadband Satisfaction levels

How satisfied are you with the following:

<p>The choice of broadband services/broadband communications providers in your area? (Please tick)</p>	<ul style="list-style-type: none"> • Very satisfied • Satisfied • Neither satisfied nor dissatisfied • Dissatisfied • Very dissatisfied
<p>The bandwidth available to you? (Please tick)</p>	<ul style="list-style-type: none"> • Very satisfied • Satisfied • Neither satisfied nor dissatisfied • Dissatisfied • Very dissatisfied
<p>The reliability and Quality of Service. (Please tick)</p>	<ul style="list-style-type: none"> • Very satisfied • Satisfied • Neither satisfied nor dissatisfied • Dissatisfied • Very dissatisfied

Q4 - Mobile Phone Services

<p>Which Mobile Telephone communications provider do you currently use?</p>	
<p>Apart from telephone calls and text messaging, do you use your Mobile service for any other purpose, e.g. Internet/Email access?</p>	
<p>How satisfied are you with Mobile service coverage and reliability in your area? (Please tick)</p>	<ul style="list-style-type: none"> • Very satisfied • Satisfied • Neither satisfied nor dissatisfied • Dissatisfied • Very dissatisfied
<p>Do you suffer from unexpected roaming difficulties? For example, does your phone change networks when near the border region?</p>	

Q5 – Additional comments

<p>Please use this box to give us any other comments that you would like to make regarding Broadband and Mobile Telecoms services in your area.</p>

Please return this questionnaire to