

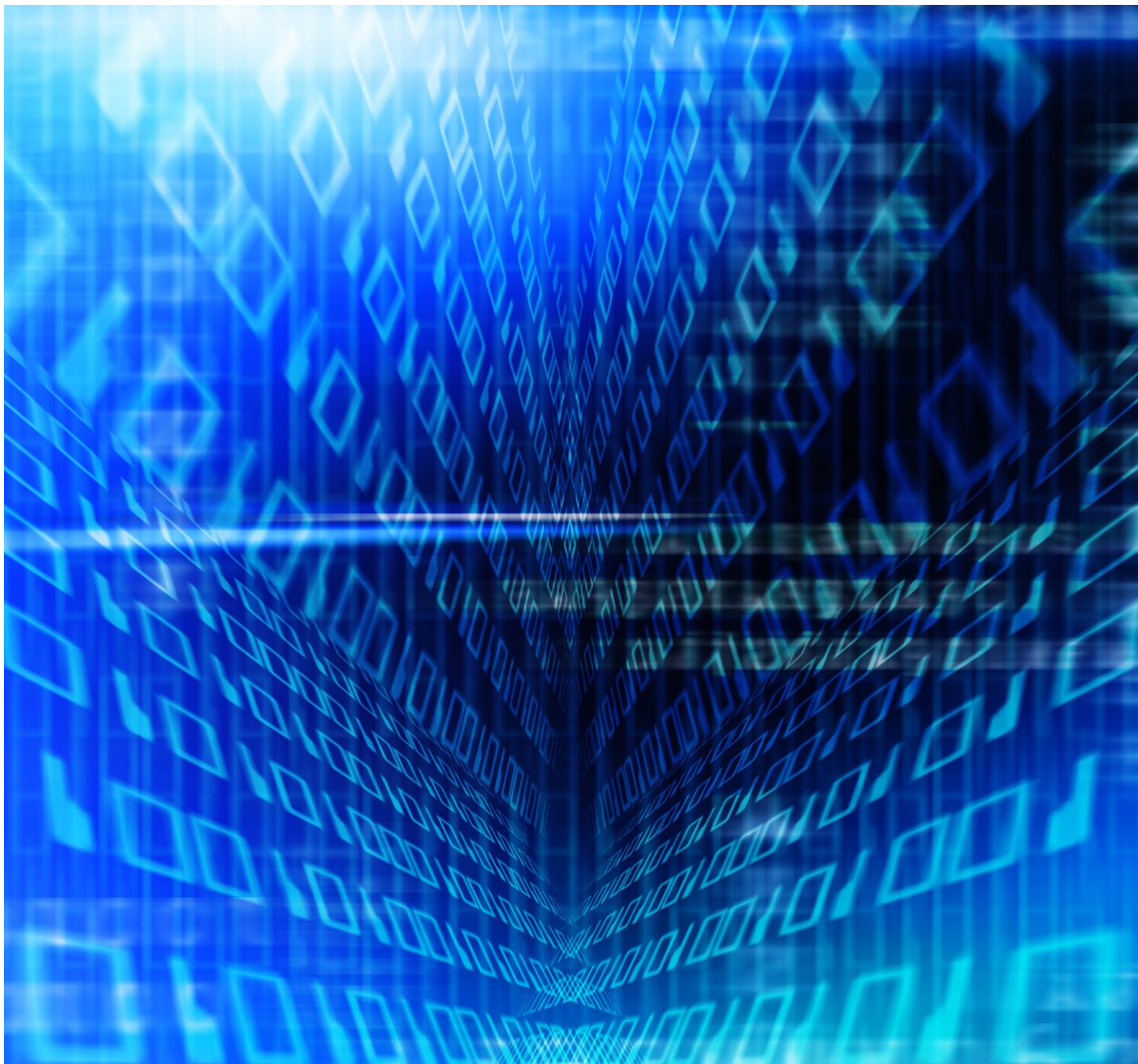


Department of Communications, Energy and Natural Resources
Roinn Cumarsáide, Fuinnimh agus Acmhainní Nádúrtha

2009 Report

Next Generation Broadband

Gateway to a Knowledge Ireland



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Minister's Foreword



There has been significant financial and economic upheaval since the *Consultation Paper on Next Generation Broadband* was published last July. This is creating uncertainty in relation to future investment plans across all sectors. In a liberalised market-driven sector like telecoms, where private sector investment fuels infrastructure growth, such uncertainty could have significant impact.

In 2008 the Telecommunications and Internet Federation (TIF) estimated that €700m was being invested in telecoms infrastructure. While the economic downturn can be expected to impact on this, we need these companies to continue to invest significantly in new infrastructure. The Government has made it clear that the development of higher speed broadband connectivity is central to future economic and social development. The publication last December of the Government's policy paper, *Building the Smart Economy* set out our direction and we are now working on specific actions to support the development of digital-based services to underpin our vision. We must avoid the experience of recent years where a delay in investment in new broadband access technologies hindered our wider economic and social goals.

I am pleased that the consultation on the draft paper of last July largely affirmed the broad policy thrust and the specific policy measures we are taking. International experience has shown that competition between different platform providers is the best way of incentivising investment in networks. At the same time in a country the size of Ireland it makes sense to encourage a collaborative model, allowing access to networks for rival operators. The return on investments in such networks will be greater when they are used for both retail and wholesale business. The country should benefit from the range of new applications that will evolve in a more open access network environment.

The key elements of our strategy are:

- Promotion of private sector investment in Next Generation broadband (NGB);
- An optimal regulatory framework, facilitating collaborative models of engagement among operators;
- An innovative radio spectrum policy;
- Targeted Government actions, where necessary;

We are already implementing specific measures set out for Government in the NGB Consultation paper. The National Broadband Scheme is being rolled out to provide broadband for areas that would otherwise not be covered. The first 75 schools to receive high speed broadband connectivity have been selected and are now the subject of a tendering process. We are also progressing the 'one-stop-shop' to allow fibre access to ducting carried within state infrastructure and we are establishing suitable regulations to manage fibre access for new buildings. The Commission for Communications Regulation (Comreg) has established innovative 'test and trial' spectrum management systems and other innovative uses of our wireless spectrum.

Comreg will publish a framework policy paper on promoting the timely and efficient development of high speed broadband infrastructure and services. Having a stable and supportive regulatory and policy environment will help companies make the necessary investment decisions even in these difficult economic times. The speed of technological change and the increased demand for bandwidth will mean that those companies which fail to invest will quickly fall behind and lose their competitive advantage.

In recent years Ireland has moved up the international league table of broadband providers as speeds have increased, connectivity has improved and the prices for data traffic have come down. The task for us now is to introduce the next generation of broadband access systems so we can benefit from the enhanced opportunities provided by ICT which has the capacity to change the way we live and work.

A handwritten signature in black ink, appearing to read 'Eamon Ryan'.

Eamon Ryan TD

Minister for Communications, Energy and Natural Resources

1. Introduction

The Government's Framework for Sustainable Economic Renewal *Building Ireland's Smart Economy* identifies a range of inter-linked policies covering areas such as sustainability, innovation, competitiveness and productivity that will position Ireland as a leading economy. *Building Ireland's Smart Economy* recognises both the challenging economic circumstances in which we find ourselves and the opportunities that must be grasped to lead the country back to economic recovery. It sets out a framework to address current economic challenges and to build a "Smart Economy" with a thriving enterprise sector, high quality employment, secure energy supplies, an attractive investment environment, first class infrastructure and widespread adoption of modern technology.

Building Ireland's Smart Economy recognises that broadband is a key enabling infrastructure for the knowledge-intensive services and activities on which future prosperity will increasingly depend. It states that future economic growth will depend on re-orientating the economy towards exporting goods and services. The Economic and Social Research Institute (ESRI) estimates that by 2025, a large proportion of our services will be traded over digital networks. Therefore, in terms of critical infrastructure, Next Generation broadband is recognised as a key enabler for the Smart Economy, on which our future prosperity will increasingly depend and which will also drive national and regional competitiveness, especially the development of dynamic city regions.

The innovation and ideas that will drive overall economic development will also power the communications sector. Ubiquitous, open-access networks will allow us to position Ireland as a testing ground for the trialling and development of new digital services and telecommunications technologies. Such a strategy fits with the development of Ireland as a centre for internationally-traded services. It complements our status as a location for international ICT companies and our position as a leading centre for software and digital media industries and high-level research in Information and Communications Technologies (ICT).

Next Generation broadband will provide the infrastructure to help develop our economy, provide imaginative technological solutions for our society and facilitate the sharing of knowledge and greater connection between people throughout Ireland and around the world. This paper is primarily about putting the necessary broadband infrastructure in place to ensure Ireland reaps these benefits.

1.1 Benefits of Next Generation broadband

The availability of Next Generation broadband networks will underpin a transformation in the following areas:

- **Economic development:** ICT is a critical determinant in our transition to a knowledge economy with an increased reliance on services traded over digital networks;
- **Sustainability:** ICT will advance sustainable development by encouraging distance working and the delivery of health and other local services to remote locations electronically;
- **Social inclusion:** Universal access to broadband presents an unprecedented opportunity to foster a more participatory, cohesive society. It gives hitherto geographically dispersed communities and social groups the means of greater interaction and collaboration. The provision of services to disadvantaged and remote communities is vital in this regard to prevent a 'digital divide' between different sections of our society;
- **Education:** The creativity and skills that are a pre-requisite of a knowledge economy can also be fostered through the creation of a world-class e-education system;
- **Public services:** Digital applications will deliver more effective and efficient public services to every region and sector in society. More sophisticated online applications can be used to engage with Government clients such as those that experience difficulty interacting using more traditional methods;
- **R&D:** More collaborative models of engagement across a range of research topics will drive the Internet Economy;
- **Products and Services:** It is envisaged that Next Generation services will include high-quality video streaming. This will enable visual networking for more effective remote working, advanced e-commerce and remote access to powerful computing (cloud computing). It will also facilitate remote healthcare, education and entertainment.

2. Outcome of the Consultation

2.1 Preparation of the paper

This Paper is one of a series of telecommunications and ICT policy papers being published by the Minister for Communications, Energy and Natural Resources. Further papers on Spectrum Policy and the Knowledge Society will issue later this year. The development of Next Generation broadband is an integral part of a Knowledge Society and indeed, ubiquitous access to high speed broadband is one of the key characteristics of the Knowledge Society. One of the key features of the upcoming publication, The Knowledge Society Strategy report - *Enabling Technologies to accelerate the development of the Smart Economy* - will be the development of an exemplar communications network based on advanced optical based technology, an area where Ireland is, already, an acknowledged leader.

Preparation of this Paper involved consideration of a range of issues and interaction with a large number of stakeholders.

An early version of the Paper was critiqued by an International Advisory Forum which offered feedback on the work undertaken. *The Consultation Paper on Next Generation Broadband* was published in July 2008 and initiated an intensive public consultation process.

The Paper was the subject of an online consultation process via the Department's website. In addition, a Forum took place in September 2008. All interested players in the broadband space, such as policy makers, educationalists, companies and media, were represented. A social networking Forum was also established to allow interested participants to debate the issues around Next Generation broadband in an innovative way. The outputs of the consultative processes have contributed to the final content of this Paper.

2.2 Consultation Process

In September 2008, Minister Eamon Ryan hosted a gathering of key stakeholders from many different strands of civic and business society to discuss how best Ireland can reap the benefits of the advent of Next Generation broadband.

This event adopted a innovative, collaborative approach by setting up round-table discussions between people from very different backgrounds and challenging them to reach consensus solutions. The Forum aimed to create a new space to think about technology issues. This "open source" advice on policy formulation was very different from traditional consultation processes.

The Forum was successful and participants indicated that this collaborative approach should be ongoing.

The Forum agreed that Next Generation broadband can deliver major benefits to Ireland in both work and home life.

Examples highlighted included:

- Improving Ireland's "knowledge economy";
- Facilitating new industries;
- Attracting inward investment in Ireland;
- Improved online games and entertainment;
- Facilitating sustainable development through a series of measures including allowing people to do their office work from home;
- Improved ways to keep in touch;
- Better ways to educate our people;

The following is a summary of the main issues to emerge from the consultation, including a brief flavour of some of the main findings from the Forum:

- The role and potential of Next Generation broadband as a key enabler for economic, social and educational growth and development was identified.
- Quality of service and contention rates as well as speed, are considered key metrics of assessing progress in delivering Next Generation broadband technologies.
- Forecasting in the technology sphere is very difficult and rather than predicting an exact speed, the objective should be to aim for the level which will support innovation.
- While most contributors at the Forum believed that universal access to broadband is achievable within the timeframe for the delivery of the National Broadband Scheme, there were doubts expressed about deliverability of comparable speeds especially in rural areas.
- The policy framework needs to ensure a responsive, fit-for-purpose regulatory framework.
- The policy and regulatory framework needs to take an evolutionary approach – recognising the reality of risk and reward, the scarcity of capital and the need to progressively upgrade legacy buildings and follow best practice in new build.
- Some contributors at the Forum considered that State investment actions in the Consultation paper are too focused on fibre and that Government NGB policy should be technology and service neutral.

- The challenges of supplying Next Generation broadband services to rural areas where it may not be profitable for businesses to roll out the infrastructure were recognised. There was general agreement that where there is market failure, there is a need for Government intervention to prevent a digital divide.
- The Forum highlighted specific scenarios where the State might play a useful role, including reduction of duplication and waste across multiple agencies and improving backhaul, demand aggregation, local access and network resilience;
- There was general support for the proposal to introduce building standards/regulations requiring open-access fibre connections to be installed in new premises in Ireland. There was also a suggestion to amend the national Building Regulation for ducting.
- The Forum welcomed the specific policy initiatives for state intervention proposed in the Consultation Paper. It also highlighted the importance of leveraging existing state assets and resources in a collaborative manner to facilitate the roll-out of Next Generation broadband services.

The success of the consultation process confirmed the desirability of the collaborative approach to addressing the challenges of the transition to Next Generation broadband. In order to support collaborative models of engagement, it would be useful to establish a mechanism whereby all interested parties could debate the issues and devise solutions to support the development of NGB.

“NGN is not about rankings, or other markets - it's about what it means to people and their lives and it's about protecting Ireland's future economy.....”

The technical delivery of NGN is not the question - the question is the co-operation and level of honesty provided by all players - operators, regulators, Government and policy makers.”

Comment posted on online Forum

“Just as electricity brought a paradigm shift in patterns of behaviour and lifestyle to the remotest corners of the country then, NGB could engender not just innovative business opportunities but balanced regional development and access to totally new ways of sustainable living.”

Comment posted on online Forum

3. Broadband in Ireland Today

Ireland now has a vibrant telecommunications market. Progress has been significant, especially over the last year. The late start by companies in the roll-out of broadband can be largely attributed to a lack of competition between the main telecom and cable operators. However, that competitive environment has changed in recent years with significant new investment by a number of companies in a variety of new network technologies. Take-up of wireless and 3G broadband services has occurred at a faster pace in Ireland than in other countries. Mobile services are now the fastest growing segment of the broadband market in Ireland. The latest ComReg figures (quarter 1 2009) show that in the twelve months to March 2009 mobile broadband subscriptions increased by 90.6%.

The latest figures from ComReg, also indicate that broadband take-up in Ireland is nearly at 1.3 million subscribers. This is an increase of almost 300,000 since the launch of the Consultation Paper, last July. It is estimated that approximately 60% of households had broadband access as of December 2008.

Broadband is now delivered over multiple networks including fixed line, fibre, cable, fixed wireless, satellite and mobile with over 40 service providers in the market.

A choice of speeds is now available, ranging from 1 Mbps for residential customers up to 100 Mbps for high-end commercial users and Gbit capacity is available to large business users, who require uncontended capacity, through leased lines. ComReg data (Q1 2009) shows that 69% of business subscriptions and 66% of residential subscriptions are in the 2 -9.99 Mbps range. This compares with 67.6% of business subscriptions and 47.5% of residential subscriptions in the same range this time last year. Higher speeds in some cases up to 50 Mbps are also available to residential and SME customers in urban areas.

Despite the current economic climate, investments are being made in upgrading core networks which will benefit all NGB technologies. There have also been recent announcements of investments which will offer speeds of over 100 Mbps, next year.

However, the challenging economic climate will have an ongoing impact on the business case for investment in Next Generation broadband. This will affect the development of the networks necessary to support bandwidth-intense applications and services.

4. International Comparisons

The countries examined as part of this Paper have, in the main, adopted an evolutionary approach to the roll-out of Next Generation Access Networks. It appears that this is largely due to uncertainties about the business models involved and the expense of moving to all fibre networks. There are some examples in East Asia of networks offering very high bandwidths and these networks are beginning to be deployed in Europe and in the United States. Experience indicates that, initially, demand tends to lag supply in high bandwidth networks. However, with the exponential growth in applications requiring high bandwidths this is changing and this trend can be expected to accelerate in the coming years.

A key conclusion from this overview is that in general, governments are not funding the roll-out of high-speed Next Generation broadband to the home. The investment is funded mainly by the telecoms operators. This approach is especially pronounced within the EU, where there are strict regulations controlling the provision of State aid to private telecoms companies. Government policy is to allow regulation to facilitate private investment, and to directly fund only in targeted areas where there are significant economic and social advantages to be gained, e.g. in overcoming the digital divide. Policy is also focused on leveraging State assets to promote investment and on complementary policies in other areas, e.g. residential planning regulations.

The draft EU Regulatory Framework recognises the risk inherent in rolling out high-speed broadband networks. While still promoting the important role of competition, it allows for models of co-operation and co-investment provided that principles such as open access and non-discrimination are adhered to.

Presently, operators particularly mobile operators, are starting to work together on infrastructure roll-out. Examples in Europe include:

- In Ireland, Germany, Spain and the United Kingdom, Vodafone and O2 have entered into infrastructure deals.
- In the United Kingdom, 3 and T Mobile have an extensive infrastructure deal.
- A pan-European collaboration deal has been recently announced between Telefonica and Vodafone.

Similar approaches in relation to investments in fibre networks are beginning to appear in Germany where Deutsche Telekom is adopting co-operative models of investment and providing access to fibre networks.

In addition, the European Commission has recently suggested reforms, which provide service and technology neutrality in order to take advantage of the radio spectrum in ICT. Policy initiatives by Japan and the USA have focused on the promotion of open access, where appropriate, through spectrum policy.

In summary, international experience – especially from Europe – indicates that the best-performing broadband markets are those where competing infrastructures and the competitive environment provide a spur to investment by the fixed-line incumbent, cable operators and alternative operators. In general, the focus of most governments is on facilitating private sector investment by lowering the cost of building infrastructure, or using regulatory policy to improve financial returns. Additionally, the aggregation of public sector demand can be used to build scale in geographical areas.

5. Challenges and Opportunities

5.1 Strengths

Ireland has a number of strengths which are to our advantage:

- Our hosting of many of the world's leading IT companies;
- Significant investment in the ICT sector including through Science Foundation Ireland;
- Vibrant software and digital media industries;
- Proven expertise in financial and other traded services which will increasingly require high-speed global connectivity;
- Intrinsic advantages in the radio spectrum sphere due to our island geography – reflected in the major strides taken in mobile and wireless broadband connectivity.

5.2 Weaknesses

The provision of high bandwidth will not in itself, drive the evolution to a knowledge economy. Our approach must take account of the weaknesses which Ireland faces, with regard to making the transition to Next Generation networks in Ireland;

- Ireland's dispersed and rural population, with less than 10% of people living in apartments and around 40% of people living in rural areas is in sharp contrast with other advanced economies. Only the Scandinavian and Baltic countries have lower population densities. This population structure impacts on the economics of broadband infrastructure.
- The structure of the fixed line also plays a key part in the deployment of Next Generation broadband. The highly dispersed and rural nature of the population of Ireland means that in rural areas there are copper lines of substantial length. This hinders the availability of high speed broadband as DSL technologies can only deliver their maximum speeds over a relatively short distance. In addition, DSL requires that the quality of the line is high, which may not be the case in some parts of Ireland.
- The business models for large-scale infrastructure investments have been affected by the current economic crisis, where access to funds is restricted.

5.3 Opportunities

Ireland is in a position to take advantage of the opportunities arising from:

- The speed of technological change and the convergence of the telecommunications, computing and broadcasting industries;
- New developments in remote data storage, such as cloud computing and in broadcasting, which are leading to a huge increase in user-generated content;
- The move from proprietary standards to open standards and the opening of networks to all devices and services.
- Economic adversity can provide opportunities to be creative. Our current difficult circumstances could provide the impetus to the telecoms sector to adopt a creative approach in order to aid economic recovery.

5.4 Threats

There are a number of threats to Ireland's future prosperity should the transition to Next Generation broadband not be made. These factors further strengthen the case for policy approaches which facilitate the roll-out of Next Generation broadband.

- Delays in investing in telecoms infrastructure slowed the rollout of broadband in Ireland. We cannot afford a similar situation in relation to Next Generation broadband.
- If there is not investment in Next Generation broadband now, Ireland will lag significantly behind other advanced economies in terms of attracting inward investment and remaining economically competitive.
- Without ubiquitous access to high speed bandwidth applications, Ireland will face a digital divide, with citizens and business in the rural areas not able to avail of the many economic, social and educational benefits and opportunities that Next Generation broadband affords their urban counterparts.

"Globalisation of the future is Local and NGB is one of the cornerstones of making localness global."

Comment posted on online Forum

6. Strategy

Accelerating the transition to Next Generation broadband will help achieve the aims of the Smart Economy by delivering technology that will enable enterprise to cut costs and can open new markets for products, services and applications.

The role of the Government's communication policy is to:

1. Promote private sector investment;
2. Ensure optimal regulation;
3. Provide innovative spectrum policy.
4. Provide targeted government action, where necessary;

6.1 Promotion of Private Sector Investment

The provision of Next Generation access networks will be undertaken in the main by the private sector. Next Generation broadband networks, especially access networks, which are critical to making high bandwidths available to both business and residential customers are expensive to build and investors, especially in the current climate, will need to see a return that justifies the risks.

Worldwide operators are facing the investment challenges and criticality of delivering high-speed broadband within a reasonable time frame. They are starting to look at more innovative models of infrastructure roll-out, including collaborative models.

In Ireland, it may be opportune therefore, for industry to examine how collaborative examples in Europe could be applied in the Irish context, in order to address the risk inherent in developing NGA investments in the current difficult economic climate.

While the Government is conscious of the negative impact the general economic deterioration is having on the investment climate, it recognises that the need to invest in Next Generation broadband has not diminished. Indeed, it has assumed greater importance in the light of current Government priorities. On this basis, the Government will support enterprises that are considering investing in Next Generation broadband networks, including models that adopt innovative solutions to handle investment risk using appropriate policy tools such as; optimal regulation, innovative spectrum policy and targeted Government action.

6.2 Optimal Regulation

The EU Regulatory Framework for Communications recognises the importance of competition and efficient investment in market development. The (draft) new EU Framework for the telecoms sector also recognises that Regulators must take account of the risky nature of investment in new networks when they are determining the regulatory obligations of investing entities.

In support of the principles in the draft framework, the EU Commission also proposes to issue a recommendation on NGA which will offer guidance to regulators on facilitating investments on these networks.

The framework which already recognises the importance of competition and investment now needs to address the challenge of making Next Generation access investments and, in regulatory decision making, to ensure that investments in Next Generation access are supported. Four key principles underpin the Government's approach to regulation.

- Regulation should facilitate private sector investment in NGNs, whether wire or wireless.
- Investment may have to be done on a collaborative and risk sharing basis by service operators.
- Non-discriminatory open access to infrastructure.
- The protection of the competitive dynamic market.

In accordance with these principles the Government will ask ComReg to review the operation of the regulatory framework as it applies to Next Generation access networks and report back to Government at an early date with an action plan on using the regulatory framework to improve the investment climate in the communications sector.

6.3 Innovative Spectrum Policy

A policy paper on future spectrum policy was issued for consultation in 2008. The outcome of the consultation process will inform policy development on the management and use of the radio spectrum.

The dispersion of population in rural areas means that delivery of broadband using wireless mechanisms is likely to be particularly effective since contention rates are likely to be low.

ComReg has embraced the opportunities offered by the spectrum with its test and trial licensing regime *Test and Trial Ireland*.

Test and Trial Ireland

Similar to Japan, Ireland has developed a wireless licensing programme, Test and Trial Ireland (www.testandtrial.ie), which has been specifically designed for the needs of the industry and academic institutions wishing to conduct R&D in products and services that use spectrum.

The rapid evolution of wireless technology provides an excellent opportunity to encourage global developers to choose Ireland as a test-bed for new product or service concepts. The ready availability of test-and-trial licences enables developers to gain timely access to appropriate radio spectrum for a limited period, whilst avoiding any adverse effects on existing users. The relative lack of congestion in most frequency bands in Ireland means that a wide range of frequencies can be made available to test products aimed at Irish, European or wider global markets.

The first joint Forum between Japan and Ireland on ubiquitous innovation met on the 27th May 2009. This follows an initiative by the Minister for Communications, Energy and Natural Resources, during a visit to Tokyo in June 2008, and a subsequent visit by the Taoiseach in January 2009. The joint Forum is examining how, at a private and public level, Ireland and Japan can work together to facilitate, encourage and enable development of ubiquitous products and solutions. There is a particular focus on wireless technology and innovation.

The overall message from the Japanese and Irish participants at the joint Forum was one of optimism; that despite the global recession, Ireland and Japan can build on collaboration in the communications area and the links developed at the Forum.

"Government should take a lead to facilitate early development of a world class NGB network – this requires investment"

Comment posted on online Forum

6.4 Targeted Government Action

The framework for the Smart Economy envisages that dynamic city regions will play a central role in moving to an economy built on ideas and innovation. Delivering on this aim will require access to an all-fibre backhaul network.

Important actions in this Paper which aim to promote private sector investment through targeted Government action include:

- The **“one-stop shop”** for State broadband infrastructure is to provide service providers with integrated access to State-owned infrastructure. The proposals for a one stop shop received a largely positive response in the consultation process. The implementation of the one-stop-shop is now underway.
- The requirement for **new premises to install open access fibre connections**, where practicable. It makes economic sense to wire a building for high speed technologies at new build stage rather than having to retro-fit, at great expense, at a later date.
- The **National Broadband Scheme** will provide access to affordable, scalable broadband services by residences and businesses within certain target areas in rural Ireland, many of whom do not have any current broadband services.
- The **Kelvin Interreg IV international connectivity project** has brought a transatlantic submarine telecoms cable ashore in Northern Ireland. The Kelvin project will also improve the resilience of Ireland’s international connectivity, as this transatlantic will be connected by fibre to Dublin.
- **Broadband to Schools initiative** will demonstrate the educational and social benefits of Next Generation broadband and ensure that second-level students throughout the country acquire the skills necessary for participation in the Knowledge economy.

The implementation of these initiatives is underway and a full update on the progress of these actions is provided in the next chapter, Government Commitments.

7. Government Commitments

The policy actions set out in the Consultation Paper on Next Generation broadband received broad support from stakeholders. Government focus will continue to be on supporting private operators through various instruments at the Government's disposal and having a fit-for-purpose regulatory framework which promotes the development of Next Generation broadband.

Review of Government Commitments and Updates on Actions

7.1 Universal Access to Broadband

The Government pledges that there will be universal access to broadband by the end of 2010. Under the National Development Plan, we will target capital investment to address the digital divide and maximise regional competitiveness. Under the National Broadband Scheme (NBS) the Government is contributing €79.8 million towards an overall investment programme of approximately €223 million. The NBS project is also eligible for EU co-funding under the European Regional Development Fund. It is being rolled out on an electoral division (ED) basis and will address electoral divisions without adequate broadband services.

Update on Action

- Following the conclusion of a competitive tendering process, the contract to implement and operate the National Broadband Scheme (NBS) was entered into with Hutchison 3G Ltd (trading as "3") in December 2008.
- 3 will extend its network to provide mobile wireless broadband services to residences and businesses throughout the NBS Coverage Area. In a very limited number of cases 3 will make available a satellite product to premises which are located in areas which are difficult to reach using standard infrastructure.
- A map of the NBS Coverage Area is available on the Department's website.
- Challenging roll-out targets have been agreed with 3 and NBS services have already been launched in a small number of rural areas at the end of April 2009.
- Almost half of the entire NBS Coverage Area is required to be enabled by the end of 2009, while all residential and business premises within the NBS Coverage Area will have broadband connectivity by the end of September 2010. The forthcoming availability of services in individual electoral divisions will be announced progressively prior to their enablement.

7.2 Higher Speeds

By 2012, Ireland's broadband speeds will equal or exceed those in comparator EU regions. In this context, comparator regions are the regions and cities with which Ireland competes economically. We will have a range of broadband speeds capable of meeting the demands of the Smart Economy.

Update on Action

- The Government aims to have greater availability of higher broadband speeds and lower prices. This depends on the mix of available technology and a competitive market.
- Urban centres with higher population density will tend to benefit from a more diverse technology mix and greater competition. Ireland already has a range of broadband speeds available to subscribers.
- In some case up to 50 Mbps are available for residential and SME customers, but the majority are currently in the 2 – 10 Mbps range.

7.3 Optimal Regulation and Innovative Licensing

ComReg will maintain the regulatory framework necessary for telecom operators to compete in a fair and transparent manner across a range of platforms.

ComReg will also work proactively in the allocation of spectrum to encourage the trialling and development of flexible new mobile technologies and digital applications.

Please see 6.2 Optimal Regulation which provides a full update on this Action.

7.4 Broadband to Schools

Connectivity to schools, in particular, will benefit from the Government's investment in broadband infrastructure. We aim to equip second-level schools in Ireland with 100 Mbps of broadband connectivity and Local Area Networks (LAN) on a phased basis. This will enable students to learn and collaborate online.

Update on Action

- A pilot project to roll out 100 Mbps connectivity to up to 75 schools is underway. The demonstration project will be used to guide the wider roll-out of the project to all post-primary schools.
- The schools included in the demonstration project will range from smaller rural schools to larger urban schools.
- The procurement process will be technology neutral to take advantage of the best solutions that the market can offer, and it is expected that a variety of technology platforms will be offered.

7.5 Future State Investment

Further decisions on state investment in broadband, including investment in any further phases of the Metropolitan Area Networks (MANs) Programme will be guided by:

- The priorities set out in this Paper;

- The Value-for-Money and Policy Review of Phase I of the MANs Programme;
- The availability of resources.

Update on Action

The Department of Communications, Energy and Natural Resources is in the final stages of contract negotiations with e|net, the preferred bidder in the procurement process for the engagement of a Managed Services Entity (MSE) for Phase 2 of MANs. Value for money is a key consideration for the Department of Communications, Energy and Natural Resources in the negotiations, which are expected to be concluded in the coming weeks.

7.6 International Connectivity

The Government will ensure Ireland's continued high level of international connectivity. We are building on the success of the Global Crossing project by collaborating with the Department of Enterprise, Trade and Investment in Northern Ireland on The Kelvin Interreg IV international connectivity project to ensure the successful roll-out of further direct international telecoms connectivity. The Government's commitment is a good example of North-South cooperation.

Update on Action

- The Kelvin direct international connectivity project is proceeding according to plan
- The transatlantic telecoms cable has been brought ashore, and the relevant terrestrial broadband fibre links are being constructed to connect the Kelvin international connectivity to towns with a Kelvin point of presence (PoP)
- Some of the Kelvin locations will be connected in 2009 and all the locations will be operational in 2010.

7.7 Optimal Use of State Assets

Backhaul networks provide the connection from local service providers to national and international networks. Extensive ducting already exists along publicly-owned energy, transport and other infrastructure, which could provide backhaul connections. The Government will facilitate network operators' access to these assets on commercial terms, reducing the costs of fibre roll-out.

Major public infrastructure projects will, in future, install ducting at the construction stage to facilitate the extension of existing networks and the roll-out of planned networks.

The Government will establish a one-stop-shop to provide service providers with flexible and open access to existing and future ducting infrastructure.

Update on Action

Dedicated tasks force

- The Department of Communications, Energy and Natural Resources has set up a dedicated task force to expedite the one-stop-shop.
- The implementation of this project has been prioritised by the task force and significant progress has been made with regard to the supply of State

infrastructure, the identification of demand for high bandwidth services and an analysis of which operational model for the one-stop-shop is optimal.

Supply of State infrastructure

This work has identified

- The supply of relevant state infrastructure including road, rail, gas pipeline and electricity infrastructure.
- The gaps in the infrastructure.
- The readiness of the infrastructure. This differs from State agencies who have telecoms businesses, such as the ESB, to those that have no telecoms business, such as the National Roads Authority.
- Existing contractual arrangements concerning the use of the infrastructure.

Identification of Demand

The taskforce has been consulting with key stakeholders, including the IDA, state bodies and industry to identify the priority bottleneck areas of demand. This work has revealed:

- Agreement that demand for much higher speed links to the regions will evolve in the coming years. This is a demand we have to meet.
- The importance of prioritising the National Spatial Strategy Gateway and Hub cities/towns for future investment.
- Confirmation by industry and the IDA of the importance of resilient pathways as a key demand of companies considering investing.
- A range of demand for ducting with some operators requiring small stretches of ducting with others requiring end to end routes

Operational models for a one stop shop

The task force's work on the selection of an operational model is underway:

- The taskforce has identified, analysed and consulted industry and the relevant State agencies on a range of operational models. Examples include an existing state company running the one-stop-shop or a Public Private Partnership approach. A final decision on the operational model will be taken by summer 2009.
- The key operational and safety concerns of the relevant State bodies that may be part of the one-stop-shop have been identified to ensure the one-stop-shop does not interfere with the safe functioning of road, rail, gas networks and other state services.
- Following consultation it has been decided that infrastructure assets of agencies participating in the one-stop-shop will remain under the control of their parent agencies. This is primarily for operational and safety reasons.
- The taskforce has consulted with industry to ensure the one-stop-shop operational model does not displace private investment or disrupt competition.

- Work is underway to shortly bring forward proposals to amend the Communications Regulation Act 2002 to facilitate the participation of the National Roads Authority in the one-stop-shop.

7.8 Fibre Connections to New Premises

New premises in Ireland will be required to install open-access fibre connections, where practicable.

Update on Action

Working group

- A working group with representatives from the Department of Communications, Energy and Natural Resources, the Department of the Environment, Heritage and Local Government and ComReg are over-seeing the implementation.

Work underway by the group

- developing the necessary standards for in-house wiring
- developing standards that will be required to allow open access necessary to enable users to change services provider,
- developing rules for maintenance and repair of installed open access networks
- consulting with industry and State agencies on optimum arrangements for fibre to new build
- identification of appropriate legislative vehicle for regulations.

7.9 Broadband Task Force

The Minister will build on existing collaborative initiatives and form a Task Force, comprising industry, Government and ComReg, aimed at ensuring that the development of broadband in Ireland will meet the demands of Ireland's Smart Economy.

Glossary

Bits / Bytes / Mb / MB

A single character in the binary computer language is known as a bit (lower case b) and is either a 1 or a 0. Data transmission speeds are measured in bits per second (bps), although commonly used figures are in Megabits per second (Mbps), a million bits, or Gigabits per second (Gbps), a thousand Megabits.

A byte (capital B) is typically used when describing memory volume and there are eight bits in a byte. Download caps on broadband services are typically given in Megabytes (MB), a million bytes.

DOCSIS

Data Over Cable Service Interface Specifications is the international standard for transmitting data over Cable TV networks.

D-VBH (Digital Video Broadcasting - Handheld)

One of three prevalent mobile TV formats. It is a technical specification for bringing broadcast services to mobile handsets

Ethernet

Ethernet describes a family of computer network standards that operate at the physical layer, i.e. the layer on which IP runs, under the IEEE 802.3 standard. Ethernet can run at speeds of up to 100 Gbps.

FTTx

A term used to describe fibre deployment in telecoms networks, i.e. Fibre-to-the-x where x can be:

Home (FTTH): Here fibre is deployed to a termination point within the home.

Business (FTTB): Similar to FTTH referring to business premises.

Premises (FTTP): Can refer to either FTTB or FTTH

Curb(Kerb) or Cabinet (FTTC or FTTCab): Here fibre is terminated at a point outside the premises and connected via the copper network to the building.

GDP

Gross Domestic Product. The total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports.

HSPA

High-speed Packet Access (HSPA) is used to describe the standard for delivery of broadband over 3rd Generation (UMTS) mobile networks. Typically offering a headline speed of 3.6 Mbps, the actual speed is usually lower due to signal degradation and contention. There are two variants:

HSDPA – High-speed Downlink Packet Access – Analogous to ADSL, this variant delivers much greater download than upload speeds.

HSUPA – High-speed Uplink Packet Access – Analogous to SDSL, the up and down speeds delivered here are of the same order.

ICT

Short for *Information and Communications Technology*, it is the study or business of developing and using technology to process information and aid communications

Internet Protocol (IP)

This is the basic data transmission standard underlying the internet where the data to be sent is split into packets that are then transmitted through various connections to the recipient.

IP-TV

Internet Protocol based TV broadcasts TV channels over the telecoms network. The quality and number of simultaneous channels is dependant on the speed of the downlink connection.

MMDS

Multi-channel multipoint distribution service is a wireless system for TV broadcast using the cable standards.

OAo

Other Authorised Operators – All licensed operators other than the incumbent or infrastructure owner.

Peer-to-peer

Often abbreviated *P2P*, a type of network in which each workstation has equivalent capabilities and responsibilities. This differs from client/server architectures, in which some computers are dedicated to serving the others. Peer-to-peer networks are generally simpler, but they usually do not offer the same performance under heavy loads.

PoP

Point of Presence – refers to the location of an operator's equipment in the network.

PSTN

Public Service Telephony Network is the traditional standard for voice telephony where a dedicated circuit is first established between two points (phones) for transmission. This is mainly being replaced by IP based transmission.

QoS

Quality-of-Service is the ability to provide different priority to different applications, users, or data flows, or to guarantee a certain level of performance. This means in practice that a high quality video streaming or VoIP service can be guaranteed.

UMTS

Universal Mobile Telephony Service is the technical standard in use for delivery of 3rd Generation mobile telephony services in Ireland.

Video-on-Demand (VoD) VoD allows for real time viewing of high quality video, i.e. movies, through cable or telecoms networks.

VoIP

Voice over Internet Protocol uses the IP standard to transfer voice. The most well known service is Skype™ with many other services on the market replacing traditional PSTN (see below) voice telephony.

WiMAX

Worldwide Interoperability for Microwave Access is the common name for the technical standard IEEE 802.16. There are two main variants 802.16d and 802.16e in use, known as fixed and nomadic WiMAX respectively.

Web 2.0

The second generation of web based services, known as web 2.0, offer more interactivity and user participation. These services make full use of all media and typically require greater available bandwidth.

xDSL

Digital Subscriber Line (DSL) refers to a technology to use traditional copper telephony network to deliver digital broadband signals. There are a number of variants:

SDSL and ADSL refer to Synchronous or Asynchronous DSL. In synchronous the upload and download speeds are the same. Asynchronous services typically have a download speed of 5-10 times greater than the upload speed.

VDSL refers to Very high-speed DSL. A technology that can deliver much faster speeds than standard DSL but only over a shorter distance of less than 1km.