



Bhutan Telecommunications and Broadband Policy 2013

16th January, 2013

Glossary of Terms

As used in this Policy and associated Strategic Plan of Action, the following terms have the meanings shown:

Terms	Definitions
Authority	Bhutan InfoComm and Media Authority
BPC	Bhutan Power Corporation
Broadband	Refers to high speed communications access services
BT	Bhutan Telecom
Government	Refers to the Government of the Kingdom of Bhutan
ICT	Information and Communications Technology
Ministry	Ministry of Information and Communications
RNR	Renewable Natural Resource
ISP	Internet Service Provider
IDD	International Direct Dialling
IT	Information Technology
USF	Universal Service Fund
FDI	Foreign Direct Investments
TV	Television
VOIP	Voice over Internet Protocol
FBO	Facility Based Operator
SBO	Service Based Operator
MVNO	Mobile Virtual Network Operator
QoS	Quality of Service
ITU	International Telecommunication Union

ROW	Right of Way
IPv6	Internet Protocol Version 6
INTELSAT	International Telecommunication Satellite Organization

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1. Introduction

The Royal Government of Bhutan (RGoB) recognises Broadband and Telecommunications as important contributors to the socioeconomic development of the country. They have a vital role to play in enhancing competitiveness, increasing productivity and economic development, and promoting greater social inclusion to mention a few. Telecommunications and Broadband are the foundation on which the ICT vision which is, “An ICT enabled, Knowledge-Based Society as a Foundation for Gross National Happiness”¹ will be built.

Increasing and widespread use of Mobile and Internet services coupled with technological convergence has necessitated the need for a consolidated Telecom and Broadband policy. Bhutan has witnessed impressive progress in ICT in the last decade. The Bhutan ICT Policy and Strategy (BIPS) 2006 which has guided the development of the sector is found insufficient moving forward especially in the areas of Broadband and Telecommunications given the fast changing nature of the sector. Therefore, a policy on Broadband and Telecommunications is required. The Bhutan Telecommunications and Broadband Policy 2013 will guide and shape the development of broadband and telecommunications sector in the country in the coming years. It provides guidelines, principles and rationale on how to go about promoting the sector. The main objectives of the policy are: connectivity for all, strengthening of rules and regulations, creation of a conducive environment for private investments and competition leading towards an efficient market and affordable broadband and telecom services.

The development of broadband infrastructure and broadband services are at the forefront of any telecommunications policy. However, given that broadband must develop on the bedrock of telecommunications and also given that the issues confronting them are intertwined RGoB has issued a converged Telecommunications and Broadband Policy. Therefore this policy includes elements from both, either integrated or differentiated as relevant. From the perspective of RGoB and the stakeholders, the policy must be considered as thus.

¹ Ida International, 21st October, 2012, Bhutan ICT Roadmap

2. Background

Bhutan has come a long way since 1963, when the first works for building a Telecommunications network was initiated as part of the first five year plan for modern economic development of the country. Bhutan Telecom, the first fully state owned Telecom operator came into existence on 1st July 2000 with the corporatisation of the erstwhile Department of Telecommunications which was established in 1970. On June 2nd 1999, Internet and Television services were launched as part of Silver Jubilee Celebration of the reign of His Majesty, King Jigme Singye Wangchuck, the Fourth Druk Gyalpo.

In 2003, Bhutan Telecom launched the first mobile communication service in the country. Since then, Bhutan's development in the sector has been phenomenal. In 2008, Tashi cell, a private Telecom operator started its operation. Today, between the two operators, mobile sector has achieved coverage of up to 97.56% of villages and 100% of gewogs. There are four licensed ISPs (Internet Service Providers) currently serving internet and hosting facilities. Between leased lines, fixed broadband, 3G, GPRS/EDGE and dial up, the country has achieved 100% access of internet to the population with a take up of 18.5 subscribers per 100 inhabitants. The total no. of internet subscribers today has reached 133307 of the population.

Recognizing the importance as well as the capital intensive nature of a contemporary high speed backbone network in the country, the Government took on itself to establish fibre optic infrastructure throughout the country. In partnership with BPC, the MoIC has strung fibres throughout the country on power transmission and distribution infrastructure. So far fibre optic cables have reached 20 districts and 131 gewogs. By October 2013, when the project ends, fibre optic cables will have reached remaining feasible gewogs (74). The fibres have been leased to the telecom operators for free to keep the price of services low. Bhutan Telecom and TashiInfoComm are already providing services using this infrastructure.

In terms of international competitiveness, in 2011 (the date of the most recent index), the ITU ranked Bhutan 118² out of a total of 155 countries in terms of ICT development. From a regional perspective, Bhutan ranks 22 out of 28 countries of the Asia and the Pacific region. These rankings suggest that Bhutan although climbing up from previous rankings has much to do to gain from the benefits of ICT in general, and broadband in particular, compared to other countries regionally and internationally.

² ITU, IDI Ranking, Accessed: 28th January, 2013, [<http://www.itu.int/ITU-D/ict/publications/idi/material/2012/IDI-ranking.pdf>]

3. Telecommunications and Broadband Policy – A Living Document

Telecommunications and Broadband development is occurring in a dynamic social, market and technological context. The opportunities, needs and solutions are changing rapidly. Bhutan Telecommunications and Broadband Policy needs to be flexible and adaptive to reflect the pace of change and ensure that the best outcomes are delivered to the Bhutanese society at any point in time. This policy is a living document, and will be reviewed and revised regularly to ensure its maximum currency and effectiveness.

4. Bhutan Telecommunications and Broadband Policy Principles

The objectives set out in this policy seek to ensure maximum benefit to Bhutan as a whole, supplementing other efforts to promote national welfare. The achievement of the objectives will be guided by a set of clear policy principles. The following principles will guide the development of Telecommunications and Broadband sector:

Market driven: to the maximum extent telecommunications and broadband infrastructure provision and service delivery will be through the operation of market forces, whilst recognizing the critical role of Government in providing backbone capacity and facilitating roll out of service to areas in which telecommunications and broadband is not commercially viable in the short to medium term.

Community involvement and ownership: A community involvement and ownership model shall be adopted while providing broadband and public services on broadband for rural communities so that success and take up of public broadband facilities is ensured.

Universal access: Fixed or mobile and broadband services shall be accessible to all Bhutanese people and communities. Access is a function of availability, affordability and capacity to use. All of these aspects will be addressed in programs designed by the Government to ensure that universal access is achieved. In particular, the Government will address basic telecommunications and broadband access for communities that might not otherwise be served through the operation of market forces.

Affordability: Telecommunications and broadband services shall be made as affordable as possible. At the very least, the Government shall ensure that fixed or mobile and broadband services at entry levels shall be made affordable for all people in Bhutan.

Leadership: Leadership in telecommunications and broadband adoption and usage at all levels of Bhutan's economy and society, and especially by the private sector shall be promoted. The Government will also demonstrate leadership by transforming its own processes and public sector services showcasing the opportunities available through telecommunications and

broadband. The Government's role in terms of lead applications should inspire business and industry to develop applications to more effectively undertake their transactions with the public and with each other.

5. Scope and Practical Focus

This Bhutan Telecommunications and Broadband Policy is a high level plan that provides an over-arching framework for programs in the 11th Five Year Plan and beyond. It contains strategic action plans to be implemented during the 11th Five Year Plan. The Policy is a major component of overall national ICT Policy.

Practical focus, with emphasis on specific targets and measurable deliverables, is provided by the associated Strategic Action Plan under **part D**.

A. Telecommunications

1. Objectives

The objectives of the Telecom Policy are to:

- Ensure the development of Bhutan's Telecommunications Sector in line with international trends and that the people of Bhutan are able to enjoy the same kind of ICT services available anywhere in the world.
- Ensure that the Telecommunications sector provides a strong foundation for Bhutan's ICT enabled Knowledge based Society, and a true engine for the country's social and economic progress.
- Guide and facilitate the evolution of the sector to reach its optimum capacity.
- Ensure that a conducive environment of infrastructure, regulations, private sector participation and government support is promoted for developing the sector.
- Ensure that the sector is able to respond quickly to exploit technological innovations for the benefit for all concerned.

2. Policy Elements

2.1 Universal Access

Fixed line or mobile communications and entry level broadband are basic services, which should be available to all people of Bhutan. The Royal Government of Bhutan will ensure that all villages in the country have access to these services.

While the operators will be encouraged and facilitated to deploy their services nationally, in areas where service provision is not economically viable, the Government will take recourse to the Universal Service Fund and public private partnerships to establish and sustain such services.

2.2 Universal Service Fund (USF)

Universal Service Fund serves a very important role in achieving Universal Access. It has been very effective in spreading basic telephony and mobile services in the remote areas of the country. The Government shall continue with the system of Universal Service Fund. As in the past, the fund will be used to take basic communications and broadband services to rural and uneconomic regions of the country. In addition, it will also be used to provide access to remote schools, and people with disabilities and special needs.

The license fees collected from operators shall be the primary source of USF. In addition the Government shall collect a percentage of annual gross revenue from the operators for the fund. A transparent and fair mechanism for the use of USF shall be established by the government.

2.3 Green Telecom

The development of the Telecommunications sector will be undertaken in sync with RGoB's environment policy. It shall further promote protection of the environment and promote a Green Telecommunications Sector. The Government will take measures to ensure that telecommunication towers and other related infrastructure are not established in a way that degrades the visual amenity or otherwise spoil the aesthetics of the countryside. The number of such structures shall be minimized to the extent possible through infrastructure sharing mechanism.

Telecommunication operators, broadcast companies, public utility companies and corporations, and private entities must share their infrastructure, both passive and active. Such infrastructure shall include, among others, telecom and broadcast towers, transmission and distribution towers, ducts and shelters. BICMA shall continue to develop and implement an efficient and fair

framework for all kinds of infrastructure sharing. Side by side the MoIC shall promote the use of energy efficient equipments while ensuring proper disposal, recycle and reuse of electronic waste.

2.4 Licensing Framework

Recognizing the increasing convergence of technology, devices and services in the sector, the Government shall promote a converged licensing framework. Technological neutrality shall be ensured in the licensing regime. In granting ICT licenses the objective shall be to encourage and facilitate diversity of quality ICT services, with minimal lead time, for the benefit of the people of Bhutan.

- The Government shall promote the two categories of licenses that are already being implemented; an FBO (Facility Based Provider) and an SBO (Service Based Provider).
- Technology-neutral and service-neutral licensing regime in both FBO and SBO category of licenses shall be adopted. This will provide flexibility and innovation at operator level in the choice of technology and providing value added services.
- The Government shall encourage convergence of services (voice, data and video) so that innovation and flexibility of packaging services and competitive prices can be achieved.
- FBOs shall be licensed to setup and operate converged networks capable of delivering voice, video and data in an open and non-discriminatory manner.
- SBOs shall be licensed to deliver services (value added and content delivery) on the converged network in a competitive manner.
- An operator may choose to seek both an FBO and SBO license.

2.5 Competition Framework

The Government shall rely on a vibrant, competitive and market driven sector to provide quality and affordable ICT services to the people of Bhutan. To this end the Government shall create a conducive environment for competition, investments and innovations. In doing so the Government shall, among others:

- Encourage private investment.
- Encourage operators to provide value added services.

- Support and mandate interconnection and peering of local operators.
- Remove any unnecessary regulatory barriers to investment, competition and sector development.
- Mandate and support operators to achieve mobile number portability.
- Regulate anti competitive behaviour.
- Carry out feasibility study of licensing Mobile Virtual Network Operators (MVNO's) and Resellers.
- Require and Facilitate unbundling of local loop infrastructure.

2.6 Mobile Development

Telecommunications and ICT has been recognized by the Government as a key enabler for socio-economic development of the country. Benefits of these extend not just to the urban but also to the rural society. As acceptance of technology increases among society, the benefits to public in terms of increased productivity, competitive advantage as well as increased connectivity with the world outside cannot be denied. One of the major issues that the country faces today is the high cost of international connectivity and the unavailability of such options. To this end, goal of the Government is to provide good quality of such services at an affordable cost to the public. A competitive and innovative sector that will provide these services to the public at affordable prices is a must.

With this view and as the exclusivity of the existing duopoly expires end of 2013, the Government shall license a third mobile operator via a competitive selection process. Priorities shall be given to 100% local bidders.

2.7 Foreign Direct Investment (FDI)

The RGoB has envisioned a competitive and innovative sector, especially as technology convergence is taking place which will eventually drive down the cost of services to the general public and attract investments in IT/ITES as well as other sectors. In keeping with this, the Government shall allow foreign participation to a maximum of 49% in the following:

- Mobile sector
- ISP (Internet Service Provider)
- Any bundled service provider including CATV operators (voice, video, data)

2.8 Quality of Service (QoS)

Quality of Services by operators shall be enforced, so that consumers get what they pay for. The Government shall ensure quality of service in the following ways:

- Operators and service providers should provide a certain quality of service guarantee which is made known to the consumers. This should be combined with terms and conditions with penalties if quality of service is not met. Consumers should be able to view or ascertain the quality of service they get from service providers.
- International standards and best practices for quality of service shall be followed by the operators. BICMA shall strictly monitor and develop a framework for QoS, taking into account indicators such as network latency, bandwidth utilization, network availability, coverage, service activation time and customer service support for all kinds of ICT services.

2.9 Consumer Protection

Consumers of ICT services should get full value of money for services at predetermined levels of quality. Service providers shall be required to provide service level agreements (SLAs) for all their services, which will require of them to forfeit a proportionate amount of charges due to them for failing to provide the required level of quality and availability as specified in the SLA approved by BICMA.

In addition the Government will carry out the following tasks:

- Promote and create awareness on consumer protection among the general populace, informing them of their rights and recourse they have, so that they are able to make informed choices.
- Operators shall be mandated to make consumers aware of the prices of their services by publishing on websites and through other appropriate channels.
- Promote the establishment of a consumer protection organization for the Telecommunications sector.

BICMA shall strictly monitor the service offerings of different operators, gather regular feedback on the services and take appropriate actions on operators defaulting on their license and other regulatory obligations.

2.10 Security

The Government shall ensure that communication and information exchange take place in an environment of security and confidence. The availability, confidentiality and integrity of telecommunication networks and information flow shall be ensured.

The Authority shall provide regulatory and compliance mechanism to ensure appropriate security as follows:

- Telecom operators to provide security in all aspects of their network; devices, elements and components of network, physical infrastructure such as buildings and towers, and to establish structured processes for regular inspection and review of compliance with security requirements.
- Telecom Operators to take all necessary steps to ensure confidentiality and security of communication and traffic flowing through their network.
- Telecom operators to establish and mandate implementation of information security standards and operating procedures for network and communication security.
- Telecom operators do not tap wired and wireless communication in the country for purpose other than Lawful interception authorised by the court.

2.11 Spectrum Management

The Government recognizes that spectrum is a limited and valuable resource. It will ensure prudent and optimal utilization to spread ICT services throughout the country. The Government shall:

- Review national frequency allocation plan on a regular basis following ITU standards and guidelines for effective utilization of the spectrum for nationwide coverage.
- Issue appropriate policy and other directives to BICMA for allocation of spectrum to operators in a transparent and fair manner.

2.12 Next Generation Networks

The government shall promote development of the Next Generation Networks (NGNs) in the country. Towards this end it shall:

- Establish a committee, with members from the industry, government and regulator to spearhead establishment of NGNs in the country. This shall be taken up by a Telecommunications and Broadband committee specified under Roles and Responsibilities, **Part C**.
- Incentivize operators to promote establishment of NGN.

2.13 Telecom infrastructure and Rights of Way

Telecommunications sector requires a very fast, reliable and robust infrastructure throughout the country. Given difficult terrain of the country and also capital intensive nature, the government has taken on itself to establish core fibre backbone covering the entire country till the Gewog level.

The Government will continue to support the sector by investing in a strong core backbone infrastructure for the country. In addition the Government shall:

- Establish a framework to allocate national fibre in a transparent and fair manner with the objective to ensure optimal use of the fibres.
- Promote orderly and efficient growth of telecom infrastructure and reduce unnecessary redundant infrastructure.
- Establish and enforce Infrastructure sharing rules.
- Encourage Private investment in infrastructure.
- Facilitate faster Right of Way (ROW) approval.
- Unless determined not feasible technically or from safety points of view, make available all infrastructure belonging to the Government and its corporations for establishing telecom infrastructure.

2.14 Disaster Management

The Government shall leverage Telecom and ICT infrastructure to prevent, mitigate and manage disasters.

- The MOIC and MOHCA shall work together to establish a robust communication system for disaster management.
- In addition to terrestrial based communication system, with support available from ITU and its partner organizations such as IntelSat, the Government shall establish a satellite based communication system should large scale damage be inflicted on the terrestrial network of the country, for communication during times of calamities.
- The Government shall work towards a single hotline number for all emergency services.
- Telecom operators shall be mandated to follow international standards and best practices for disaster management.

2.15 Migration to IPv6

The Government shall ensure that the total migration to IPv6 is achieved by 2018 by working very closely with the Authority and Service Providers.

2.16 Regulatory Framework

A regulatory framework to enable and guide development of the sector in an efficient and effective manner shall be adopted. Regulations shall promote innovation, competition, customer services and fair play.

2.17 Institutional Setup

Given the criticality of the sector a strong agency to guide and promote the development of the sector is necessary. A Telecom Division shall be established under DITT at the earliest. The division will be upgraded to a department under MOIC in due course.

2.18 Skills and Capacity Development

The Government shall ensure proper skills development across all parts of the sector. It will put in place a continuous skills development plan to have effective and efficient Human Resource for the industry to grow. Collaboration with academic institutions to bridge the gap between academic curriculum and what is required in the field shall be carried out.

B. Broadband

Broadband is the name given to always on, high speed access services that provide connection to the internet and to other information services.³ The importance of broadband is in terms of the applications and services made available. Bandwidth capacity is only important insofar as it enables specific applications and services to be used. For the purposes of this Policy, entry level broadband will mean a minimum download speed of 512 kilobits per second (kbps). The Government in consultation with relevant stakeholders will amend the definition from time to time.

1. Objectives

The specific objectives of the National Broadband Policy are set out below:

- Achieve higher economic growth while ensuring sustainability. This includes contributing to the increased economic welfare of Bhutan and its people, creating sustainable employment opportunities and making Bhutan more visible and attractive for commercial activity, investment and tourism.
- Promote social growth and cohesion in all ways, especially through modern communications, preserve Bhutan's culture and tradition through use of new technologies, promote community ownership and provide Broadband access for all communities, schools, homes and business in Bhutan.
- Enhance Public and Private Sector Efficiency and Performance by reaching Government services through e-Government initiatives; enhance business and community services by

³A range of definitions are possible as discussed in Chapter 2 of the ITU's Broadband Commission report, *Broadband: A Platform for Progress* (May, 2011). However the recommended working definition at page 19 of that report is the approach adopted in this Policy, namely: "The Broadband Commission sought to focus on considering some of the core concepts of broadband as an always-on service (not needing to make a new connection to a server each time a user wants to go online), and high-capacity: able to carry lots of data per second, rather than the particular arrival speed of the data." (http://www.broadbandcommission.org/Reports/Report_2.pdf)

both private and public sectors thereby improving the productivity of all sectors of the economy.

- Facilitate education and training through broadband by delivering broadband-enhanced education in all schools including the development of relevant ICT skills at all levels resulting in curriculum extension, choice and improved quality of education.
- Increase ICT understanding and skills of the entire population, especially to ensure that skills are developed to match future economic needs.
- Improve Health Service Delivery by provisioning of broadband-enhanced health services to all communities through remote diagnostics, enhanced professional assistance to field healthcare providers, coordinated patient databases and access by people and professionals to better medical information online.
- Enhance Global Integration and International Relations by enabling connection of Bhutanese businesses communities with the world, enabling easy and affordable access to markets and counterparts overseas, reducing the cost of doing business and increasing trade opportunities.

2. Short to Medium Term Goals for National Broadband Policy

Specific goals have been developed to meet the policy objectives. It is paramount that the country achieves critical mass of broadband service delivery and uptake during the 11th FYP. The Government will support and do all it can to ensure this including complementing efforts by the private sector through public private partnership and other arrangements.

Specifically, this policy seeks to achieve the following goals:

2.1 To have in place a competitive structure for the provision of broadband in Bhutan – the Government will examine ways to remove legal and regulatory barriers that may be an impediment to competition. This policy will ensure that the market for broadband services operates competitively and will sustainon-going investment, continued growth of broadband and other broadband enabled services.

2.2 To achieve broadband service availability to 80% of all urban and rural communities during the 11th Five Year Plan – 80% of the people of Bhutan shall have the ability to access entry level broadband services or better.

2.3 To ensure that Broadband Services remain affordable for all people in Bhutan – The Government along with relevant stakeholders shall ensure that an entry level broadband service is available to all at an affordable price.

2.4 To support all academic institutions to have access to Broadband– 100% of all primary and secondary schools in Bhutan shall have broadband access by the end of the 11th Five Year Plan.

2.5 Government to lead the broadband evolution by delivering its services online over broadband– A significant programme of e-Government transactions that can be performed online and enhanced by broadband shall be developed and progressively implemented during the course of the 11th Five Year Plan. All licence applications, tax and other payment transactions, notifications and other transactions and functions will be encouraged in online form with incentives where possible for online rather than paper-based or in-person transactions.

2.6 Lead Government applications – In addition to above, Government shall develop a range of lead applications for delivery of new, enhanced or extended services online using broadband in Health, Education, Tourism and primary production specifically:

- All major hospitals shall be connected to broadband for remote diagnostic and supervisory support;
- All field medical centres in communities with broadband availability shall be similarly connected;
- All primary teachers shall receive training in broadband applications and use of broadband-enhanced educational resources in the classroom;
- Specific secondary and tertiary curricula shall be deliverable using multimedia online capabilities to augment the syllabus in schools and to ensure that richer syllabus choices are open to all students, wherever they reside in Bhutan.
- Lead tourism related applications including multimedia shall be developed.
- Lead applications in agriculture shall be developed to assist in efficient production, marketing and logistics associated with these industries.

C. Implementation responsibilities

1. Ministry of Information and Communications

The Ministry of Information and Communications will be responsible for ensuring implementation of the Policy. It shall be responsible for preparing regular reports on at least an annual basis on status of the implementation. It will carry out overall implementation, monitoring and review of the Policy and related Plan, working through the Committee as appropriate.

2. Telecommunications and Broadband Committee

A Telecommunications and Broadband Coordination Committee shall be established to oversee the implementation of the Policy. The Committee will be comprised of the following members:

- The Secretary of the Ministry of Information and Communications (Chair)
- Director of Department of Information Technology and Telecom (Member Secretary)
- Members representing each Ministry or Department forming part of the Strategic Action Plan (details in part D) of this document. A member representing Authority. Such number of members representing the ICT industry in Bhutan as may be determined and appointed by the Minister for Information and Communications from time to time
- Such other members on an ex officio basis as determined by the Committee Chair and approved by the Minister for Information and Communications from time to time
- The role of the Committee is to ensure that the Telecommunications and Broadband Policy and the Strategic Action Plan are implemented and to ensure accountability on the part of the Ministries, Departments and Agencies responsible for each action or program item (see part D).

D. Strategic Action Plan

Item	Goal	Description and target	Responsible	Completion
1	Competition and Investment: Establish a light touch regulatory framework to promote competition in the market	1.1 Examine ways in which availability and affordability of broadband can be enhanced through the removal of any unnecessary regulatory constraints and financial imposts, together with re-design of schemes to encourage investment in broadband delivery. Specifically, and without limiting the generality of this item, examine the prospect of creative removal of regulatory burdens and administration from operators including the detailed approval of retail tariffs for all broadband service options.	Ministry , in conjunction with Authority and other stakeholders	By end of Q4, 2014
		1.3 Facilitate Local Loop unbundling	Ministry in conjunction with Authority	Q4 2015
		1.4 Review existing regulations pertaining to competition	Authority	Q3 2015
		1.5 Establish a system for faster approval of Right of Way	Ministry in conjunction with Authority and relevant stakeholders	Q4 2014
		1.6 Examine and determine the feasibility of improving broadband and other service delivery and take-up in Bhutan through the following additional licensing initiatives: (1) Third mobile network operator licence(domestic); (2) Mobile Virtual Network Operator licence(s); and/or (3) Reseller or other service-based licences. (4) IDD and ISP (If feasible, implement)	Ministry , in conjunction with the Authority and in consultation with industry stakeholders	Feasibility study by end of Q4, 2013, and if feasible, implementation in Q4, 2014

2	Community access	<p>2.1 Review the operation of the Universal Service Scheme to determine whether:</p> <p>(a) It is meeting its objectives;</p> <p>(b) The current objectives need to be amended; and</p> <p>(c) The Community Centre program needs to be augmented by other programs for delivering broadband services to villages and local communities.</p>	<p>Ministry in conjunction with Authority, Local Government, Department, local government representatives and public and industry stakeholders</p>	Commence major review of the Scheme in Q4, 2014
		<p>2.2 Determine the minimum entry level speed for broadband from time to time to meet the changing needs of users – noting that the May 2012 entry level is a download capacity of 512 Kbps</p>	<p>Ministry, in consultation with all stakeholders</p>	Progressively, with annual reviews of the Plan
		<p>2.3 Ensure that broadband service speeds are measured in terms of the speed experienced by the end user. Ensure that end users are informed of actual speeds and that licensed service providers implement plans to ensure that the speed delivered meets the description of the service offered.</p>	<p>Authority</p>	End of Q4 2013
		<p>2.4 Review the arrangements and terms of operation for the Community Centres to ensure that they are achieving the objectives for which they were established and make amendments to the arrangements in conjunction with all stakeholders.</p>	<p>Ministry, in consultation with local government and community representatives and all stakeholders.</p>	Commence review by Q1 2017
3	Individual availability	<p>3.1 Achieve availability of broadband at the minimum entry level or higher speeds to 80% of the people of Bhutan.</p>	<p>Ministry, working with all other relevant stakeholders</p>	Achieve this target during Q4 2017 at latest.
		<p>3.2 Encourage fixed and mobile service providers to include a range of price packages for broadband in their service</p>	<p>Authority in conjunction with all service providers and</p>	Initial review by Q2 2014

		offering schedules, and review the appropriateness and adequacy of the range on an on-going basis.	ministerial stakeholders	
		3.3 Legalise application of Voice over IP (such as Skype to Skype) in Bhutan – subject to necessary consumer protections	Authority	By end of Q3, 2013
4	Affordability	4.1 Undertake a study into the causes of penetration (or lack of it) for broadband services, and examine responses that might assist, including ways of improving affordability.	Authority in conjunction with service providers and all stakeholders	By end of Q3, 2014
		4.2 An entry level broadband service option to be available to all at an affordable price, as a mandated offering in the service schedules of all licensed service providers. Once the regulated price of the mandated broadband service offering has been established for each service provider, remove price controls on other retail broadband offerings.	Authority in conjunction with all service providers and ministerial stakeholders	By end of Q2 2014
		4.3 In order to reduce costs of internet access: (a) examine the feasibility of Bhutanese ISPs peering on a non-paying basis and without having to use other networks; and (b) examine the feasibility of establishing internet termination points in India, either instead of or as well as, the current locations.	Ministry in conjunction with ISPs	Completion of feasibility study by end of Q4, 2013, and, if feasible, complete detailed implementation plan for implementation during, 2014
5	Broadband penetration	5.1 Within the overall availability target of 80% by 2017, determine the penetration target that shall apply within each Gewog for each year of the Plan	Ministry , in consultation with Authority and industry stakeholders	Determine intermediate targets by Q4 2013
		5.2 Monitor service take-up by Gewog, and examine patterns to determine if there are applications or implementation arrangements that, if adopted	Ministry in consultation with Authority and industry stakeholders	Initially by end of Q3, 2014 and then ongoing implementation

		more broadly, will facilitates greater and speedier take-up of services.		tion
		5.3 Examine and implement incentives for broadband service take-up by individuals and households and incentives for service providers to set and achieve challenging targets for penetration, including collaborating with service providers to provide free Wi-Fi spots in public areas.	Ministry , in consultation with Authority and industry stakeholders	By end of Q3, 2014
6	School access and education	6.1 All primary , secondary schools and youth centres to have broadband access	Ministry of Education	Development of a programme by end of Q3, 2013 and for delivery progressively with 90% or more completion by the end of the Plan (2017)
		6.2 Establish Bhutan’s research and education network (DrukREN)	Ministry in conjunction with RUB	By Q4, 2015
		6.3 Primary and secondary school syllabuses to be formatted for complete delivery, as necessary, via broadband means. Promote the use of digital content for learning and teaching in schools, through the development of appropriate enriched content for broadband delivery.	Ministry of Education	Progressively, with completion by end of December 2017
		6.4 Primary, middle and secondary school teachers to be trained in the effective operation of relevant broadband applications and delivery of approved syllabuses by accessing broadband services, as part of the ChigpenRigphel II program.	Ministry of Education	Development of a programme by end of Q1, 2013 and for delivery progressively with 90% or

				more completion by the end 2017
7	Transactions with Government	7.1 Coordinated examination within each Ministry of relevant transaction processes and development of a prioritised e-Government programme for implementation, with initial applications being determined on the basis of their likelihood to encourage broadband service take-up.	Ministry , in conjunction with all ministries	Completion of review by the end of Q3, 2013
		7.2 Digitisation of government records for archive and efficient access and retrieval.	Ministry , in conjunction with all stakeholders	End of Q4 2015
8	Lead applications in Government programs	Addition to above, Government to develop a range of lead applications for delivery of new, enhanced or extended services online using broadband in Health, Education, Tourism, Finance, Foreign Affairs and Agriculture, specifically.	Ministry , in conjunction with all ministries	Develop and monitor a detailed set of milestones by Q3, 2013 for progressive implementation to completion in Q4, 2017
		8.1 100% of hospitals and health units to be connected to broadband for remote diagnostic and supervisory support – covering: (a) Referral Hospitals (b) District Hospitals (c) Basic Health Units	Ministry of Health , in conjunction with MoIC	(a) Q4, 2014 (b) Q4, 2015 (c) Q4, 2016
		8.3 Develop comprehensive patient data bases to enable all Bhutanese to be provided with the best possible care and attention wherever they present with health issues in Bhutan – possibly with specific patient groups with chronic conditions involving high-cost treatment to be covered initially.	Ministry of Health , in conjunction with MoIC	On-going Implementation

		8.4 Tourism planning and information on broadband availability for tourists and tourist organisations, via Tourism Council and tourist operator websites	Tourism Council	End Q3 2013, then on-going
		8.5 Develop detail plan for overall RNRstatistics system for decision making and provision of clearances	Ministry of Agriculture and Forests	End Q3 2013, then on-going
		8.6 Enable online payments: a) Identify enabling policy requirements to be adopted b) Develop online payment gateway in relation to payment to be made to Government for fines, permits, taxes, passports and other services.	Ministry of Finance, in conjunction with RMA and financial institutions	End of Q4 2013for development of a detailed plan showing milestones for implementation thereafter
9	Recognition of ICT Champions	9.1 Design and implement a scheme for the identification and public recognition of outstanding leadership and entrepreneurship in the application of broadband to advance Bhutan's society and/or economy.	Ministry, in conjunction with relevant other ministries and public stakeholders	By end of Q3, 2013, and implement as an annual event
10	Data collection to measure broadband progress	10.1 Review existing arrangements, and, if necessary, design and implement enhanced data collection and reporting arrangements to enable baseline and progress to be understood and for achievement of the Policy and Plan goals to be measured and communicated.	Ministry, in conjunction with relevant other ministries and public stakeholders	Design by end of Q3, 2013, for quarterly collection and analysis thereafter.
11	Universal Access	11.1 Implement the sustainability of universal services through USF and PPP mechanism	Ministry in conjunction with Authority	On-going implementation
		11.2 Mandate operators to contribute a percentage of their annual gross revenue towards the USF	Authority	Implement by Q4 2013
12	Consumer Protection	12.1 Establish a consumer protection framework to be adopted by the telecom operators based on consumer protection Act 2012	Ministry in conjunction with Authority	Establish framework by Q4, 2014 and

				on-going implementation
		12.2 Conduct consumer awareness campaign	Ministry in conjunction with Authority	Implement by Q1 2015 and on-going annually
13	Security and QoS	13.1 Develop minimum QoS framework to be adopted by the operators	Authority in conjunction with MOIC	Q4, 2015
14	NGN and IPv6	14.1 Establish Telecommunications and Broadband committee to specifically look after NGN development in the country and the overall implementation of the policy.	MOIC in conjunction with Authority telecom operators and other stakeholders	Q4, 2013
		14.2 Develop IPv6 migration plan	MOIC in conjunction with the NGN committee	Q4, 2014
15	Green Telecom	15.1 Enforce infrastructure sharing rules	Authority	On-going Implementation
		15.2 Minimize use of fossil fuels for telecom equipment	Ministry in conjunction with Authority and the Telecom Operators	On-going Implementation
		15.3 Encourage use of energy efficient devices	Ministry in conjunction with Authority	On-going Implementation
16	Disaster communication	16.1 Establish single hotline number	Ministry in conjunction with relevant stakeholders	Q3, 2015
17	Skills Development	17.1 Develop a comprehensive skill development plan to meet HR requirements in new technologies	Ministry	Framework by Q4, 2013 and implementation on-going
18	Telecom Division	18.1 Establish a Telecom Division within the Department of Information Technology and Telecom	Ministry	Q3, 2013

Appendix 1:Benefits of Broadband

The availability of high quality and affordable broadband services in Bhutan is essential to facilitate innovation, economic growth and development, and to reinforce social inclusion and cultural norms. The benefits of broadband continue to grow. They include:

- Economic transformation at sector and firm level, and the necessary adaptation of public and private sectors to meet the challenges and imperatives of operating on the global economy
- Productive efficiency as business and government processes are made more effective
- Dynamic efficiency as new processes and innovations are encouraged, with innovation leading to further innovation and improvement
- Social inclusion as people build and reinforce communities online, and support the reach and interactions of individuals and groups
- Reinforcement and preservation of culture and cultural norms
- Development of new products, services, and applications to enrich the cultural, social and business life of Bhutan
- Improved public administration and service delivery through the development of e-Government online transactions to improve quality save cost and increase access and convenience.

Appendix 2: Statistical Base

The latest available measures for the sub-sector overall are set out in Table 1 below, together with the trend on each measure for the past five years. Table 2 sets out other relevant information on ICT-readiness in Bhutan.

Table 1: ICT and Broadband Measures for Bhutan

Measure	2006	2007	2008	2009	2010
Fixed telephone lines	31,526	29,857	27,475	26,348	26,292
Fixed telephone lines per 100 inhabitants	4.67	4.34	3.92	3.69	3.62
Fixed internet subscription	5,820	6,000	6,000	6,656	9,827
Fixed internet subscription per 100 inhabitants	0.86	0.87	0.86	0.93	1.35
Fixed broadband internet subscriptions			2,060	3,100	8,675
Fixed broadband internet subscriptions per 100 inhabitants			0.29	0.43	1.20
Mobile cellular subscriptions	82,078	149,439	253,429	338,938	394,316
Mobile cellular subscriptions per 100 inhabitants	12	22	36	47	54
Percentage of individuals using the internet	4.52	5.92	6.55	7.17	13.6

Source: ITU – statistics collected from member countries.

Note: Figures are at 31 December for each year.

Table 2: Fixed internet access services in Bhutan

Measure	2008	2010	Unit
International internet bandwidth	980	3,343	Bit/s per internet user
Households with computer	5	6	% of households
Households with internet	3	5	% of households
Individuals using the internet	6.60	13.60	% of individuals
Gross enrolment ratio (secondary)	56	62	% enrolled
Gross enrolment ratio (tertiary)	7	8	% enrolled
Adult literacy rate	52.80	52.80	% literate

Source– ITU - statistics collected from member countries