Draft

National Broadband Policy, 2071

Ministry of Information and Communication, Government of Nepal, Singhadurbar, Kathmandu, Nepal

TABLE OF CONTENTS

List of Acronyms and Abbreviations

RTDF	Rural Telecommunications Development Fund
FTTH	Fiber-to-the-Home
ICTs	Information and Communications Technologies
NDLI	National Digital Literacy Initiative
ADSL	Asymmetric Digital Subscriber Line
IXP	Internet Exchange Points
GNI	Gross National Income
QoS	Quality of service

1. Background

Recent advances in telecommunications/ ICTs offer strong potential for generating far reaching development outcomes in a country like Nepal. Among others, these technologies offer compelling prospects for bringing about desired transformation in service delivery, making government more inclusive and transparent and creating conditions for enhanced economic growth.

Telecommunication infrastructure capable of carrying not only voice but also data and enabling multiple channels of service and information delivery continues to be at the core of this process of transformation.

Growing consumer and enterprise demand on Internet for significantly enhanced user experience has prompted the development of technologies that offer marked improvement over traditional, dial-up internet connectivity underscored the role of broadband infrastructure as a key enabler of meaningful internet diffusion.

Given that the economic and social benefits of broadband connectivity have become increasingly evident across the developed and the developing world in recent years, the gross inadequacy if not complete absence of broadband infrastructure here in Nepal has posed serious challenges towards effectively and meaningfully harnessing ICTs to generate far reaching policy outcomes. This policy framework is formulated with a view to creating an environment for sustained development of broadband ecosystem in Nepal.

1.1 Past Policy endeavours

National Communication Policy formulated in 1992 in essence paved the way for the liberalization of the telecommunication sector in Nepal followed by the enactment of The Telecommunications Act and Regulations in 1997. This marked an important milestone in the form of a cogent legal and institutional framework for the regulation of the sector.

Building upon these initiatives, a new telecommunications policy announced in 2004 laid the crucial groundwork for further intensification of the process of liberalization of the sector through the introduction of technology neutrality and open licensing regime, among others. Based upon these policy and regulatory frameworks, a number of service providers currently provide telecommunication services in Nepal - offering consumers with choices and ensuring the growth of the sector under a competitive environment.

One of the major outcomes of a liberalized and open telecommunication sector has been the growing reach and intensified uptake of Internet as a medium capable of lending itself to far reaching innovation encompassing a range of personal, social and developmental uses.

2. Current situation

Telecommunications sector in Nepal has registered impressive growth over the recent years thanks largely to the policy of sector liberalization adopted by the Government. Competitive intensity of the sector has increased and as a result, telecom penetration is significantly on the rise throughout the country. Mobile sector in particular has registered impressive uptake as evidenced by its sustained growth trajectory over the past few years

On a more comparative scale though, there is a great deal of room for improvement, especially in Internet connectivity and broadband space. On the whole, the country continues to face economic and social barriers to effective absorbtion of ICTs in general and broadband in particular on a nationwide scale as well as their utilization for securing overall economic competitiveness and development gains.

This has necessitated the need to take forward looking measures aimed at encouraging investment and minimizing market distortions with the ultimate objective of creating conditions for intensified rollout of broadband infrastructure and lowering barriers to broadband uptake.

In terms of backbone infrastructure, there are two complete east-west fibre optic backbones in Nepal. A third Kathmandu-Hetauda backbone is available through Nepal Electricity Authority which has now commenced hauling optic fibre cable with the roll-out of high power electrical lines infrastructure. There is a need now, among others, to catalyze the development of rural backhaul links feeding into these backbones to expand broadband access to locations at the extremities of commercial broadband coverage.

At the level of access network and technologies, several broadband technologies like cable modem, xDSL, Fiber, 3G and WiFi, Ethernet, and VSAT are commonly in use in Nepal.

Fixed telephony is not growing significantly, but efforts are nonetheless underway to upgrade fixed line network to provide xDSL services. Though copper loop and other wire line infrastructure have the potential to provide a robust medium for ensuring a quality last mile connectivity, they remain severely limited in reach and spread given low installed base of such loops and their slow rate of growth.

It is within these contexts that wireless broadband is fast emerging as the infrastructure of choice for expanding broadband access within the country. Perhaps even more so given geographical imperatives underpinning Nepal's physical landscape characterized by difficult terrain and associated cost implications of rolling out wire-line infrastructure.

As part of a forward looking strategic orientation, the spectrum bands used in most of the countries of the world for IMT and IMT advanced technologies as identified by World Radio Communication Conferences (WRCs) need to be allocated and assigned on a priority basis for the roll out of wireless broadband technologies and services in Nepal, in addition to a host of measures that needs to be taken to create a healthy broadband ecosystem.

3. **Key Issues and challenges**

For one, there is an invariable need to further intensify and consolidate competition across the sector in order to create conditions for large scale rollout of broadband infrastructure and expanding access to broadband services to the majority of the population in Nepal. Steps must be taken to accelerate the process of unlocking the spectrum so as to create an environment for securing wider scale private sector participation in rolling out wireless broadband services all across urban and rural areas of Nepal.

Ensuring timely availability and re-farming of radio spectrum for IMT and IMT Advanced services has been a challenge in Nepal. Among others, an immediate need has been felt to reform general arrangements for spectrum allocation in the country and to ensure most effective and efficient use of the spectrum to deliver IMT services. There is also a pressing need to

enforce licensed transmission parameters and institute interference resolution mechanism among others.

Similarly, access and interconnection regime also needs to be streamlined as an enabling strategy to secure accelerated rollout of broadband infrastructure in the country. Along these lines, efforts need to be mounted to remove any existing regulatory barriers to spectrum access, including simplified license and authorization procedures that could ease restrictions on spectrum use.

Difficult terrain and disruptions in power supply pose yet another set of challenges warranting appropriate policy responses. This underscores the need, among others, to formulate mandated arrangements aimed at encouraging cooperation and sharing of passive infrastructure among the operators to the extent possible. Similarly, policy incentives must be formulated to facilitate and promote the use of green technologies for broadband deployment given a scenario of acute power shortages and the imperative to minimize carbon footprints.

Affordability is also at the core of the factors that have hindered uptake of broadband in Nepal. Steps therefore must be taken to reduce access costs to the end users through innovative policy and regulatory mechanisms. Since international connectivity costs also heavily impact broadband pricing structures, efforts must be made to control such costs by facilitating deployment of national and/or regional internet exchange points (IXPs) in addition to exploring a host of other possible measures. In addition, it is also imperative to undertake periodic review of methodology adopted for utilizing the RTDF fund and benchmarking the same against the best practices followed in other countries so as to ensure effective targeting of RTDF resources to extend the reach of broadband services to under-served areas under Universal Access/Service (UAS) obligations.

Strategies aimed at securing more intensified rollout of broadband will also make it necessary to consider broader regulatory framework that takes account of fast evolving technological trend marked by convergence of electronic communication services including telecommunications, internet and broadcasting services with shared platforms, common transmission facilities, and integrated business models. Among others, there is a need to take cognizance of the fact that this emerging technological trend will affect the key regulatory issues ranging from interconnection, licensing, price regulation, spectrum management, numbering, security issues, and universal service obligations. On a broader sense, as a policy position, it appears imperative now to factor in convergence among telecommunications, broadcast and IT services, networks, platforms and technologies. This underscores the need to formulate forward looking converged policy, legal and regulatory framework aimed at overcoming the existing segregation of licensing, spectrum management and regulatory mechanisms in these areas to enhance reliability, affordability and access.

4. Guiding principles of the proposed policy

This policy formulation is premised around the following guiding principles:

- Information and communication technologies(ICTs) increasingly play a pivotal role in Nepal's growth and development aspirations.

- Broadband infrastructure remains at the core of strategies aimed at securing meaningful diffusion of ICTs and through this means, desired policy outcomes throughout the country

- Nationwide Broadband rollout in a way that is sustainable, affordable and ubiquitous will remain overarching goals of Nepal's broadband initiative

- Effective and meaningful broadband rollout remains contingent upon the creation of healthy broadband growth ecosystem encompassing both supply and demand side fundamentals

5. Need for a Broadband policy

Expansion of broadband services and build-out of an enhanced broadband ecosystem offer compelling prospects for providing new opportunities in many areas of national life, including trade and commerce, health and education and expanded access to a wide range of government services. Information technology and broadband networks can help generate jobs, growth, productivity and, ultimately, long-term economic competitiveness. Broadband access can also serve wide ranging policy goals along the lines, for example, of MDGs, including eradication of extreme poverty, provision of universal education, and improving health and gender equality.

Despite transformative potential of broadband, the fact remains that existing policy and regulatory provisions in telecommunications sector in Nepal fall short of fully taking into account growing potential of broadband and technological dynamism that characterizes the sector.

Government of Nepal believes that broadband is a 'general purpose technology' that will transform economic relations, enhance productivity and create new services.

This policy has been formulated in response to the felt need to create a conducive environment for stimulating growth of broadband infrastructure and services throughout the country.

6. Vision

To achieve affordable, secure, reliable and ubiquitous broadband for socio-economic transformation of Nepal.

7. Mission

- To develop a robust, secure, state-of-the-art broadband infrastructure coverage in the country with special focus on rural and remote areas for bridging digital divide.

- To leverage broadband services for achieving sustainable development outcomes

8. Key objectives and taregts of National Broadband Policy

The National Broadband Policy embraces the following key objectives and will be geared towards achieving the following specific targets:

8.1 To provide secure, meaningful, affordable and reliable broadband services on demand in urban areas and universal access to broadband services in rural, unserved and underserved areas of Nepal

- Key Targets for objective 8.1

8.1.1. Broadband access will be expanded across the country with the goal of achieving a broadband Internet user penetration rate of 30% at a minimum of 512kbps and making available at least 10 Mbps download speed on demand in urban areas by 2018.

8.1.2. By 2018, 45% of households in Nepal will have broadband Internet coverage

8.1.3. Urban broadband users in Nepal will have a choice of at least three broadband suppliers by the end of 2015

8.1.4. All 75 district headquarters will be connected by optical fibre backbone links by 2015.

8.1.5. Broadband connection based on the combination of both OFC/wireline and wireless technologies will be expanded to 70% of the Village Development Committees within the next 3 years.

8.1.6. Community service centres with broadband connections will be established using international best practice models in 600 VDC's by 2018

8.1.7. Villages beyond the reach of commercial broadband services will be identified as the basis for a targeted subsidy program to support service extensions to commence by 2016.

8.1.8. The spectrum bands as identified by World Radio Communication Conferences (WRCs) for IMT and IMT advanced technologies will be allocated and assigned on a priority basis for the roll out of a range of wireless broadband technologies and services by 2018. Along these lines at least 200 MHz of spectrum will made available for IMT services by the year 2017.

8.1.9. Entry level broadband prices will be brought to 3.5% or less of GNI per capita by 2018.

8.2 **To promote broadband take-up by early and influential users including government and business users, socially important users such as the education and health sectors as well as to stimulate demand and content creation and build user capacity.**

- Key targets for Objective 8.2

8.2.1 20% of public secondary schools will have at least 1Mbps broadband connection and use it for educational purposes as well as pedagogical tools by 2018.

8.2.2 All government hospitals and at least 15% of health posts will have a broadband connection by 2018.

8.2.3 All government agencies up to the district level will have a broadband connection, an informative web site, responsive email access and will offer basic citizen facing on-line services by 2018.

9.0 Policy

The following policies will be adopted in support of objectives outlined in 8.1 and 8.2.

9.1 Radio frequency spectrum to expand broadband access by means of both mobile and fixed wireless technologies consistent with international standards and best practices will be released. Along these lines, prevailing spectrum management regime in Nepal will be reformed to provide for more transparent and responsive action on frequency allocation, assignment and pricing. Provisions will also be made to make some unlicensed spectrum available for rollout of wireless broadband services to unserved and underserved areas. Availability of adequate spectrum for IMT and IMT Advanced services will be ensured. Also, arrangements will be made to ensure the availability of sufficient microwave spectrum to meet current and future demand for wireless backhaul especially in prime bands below 12 GHz, in addition to higher spectrum bands.

9.2 Fixed-mobile convergence will be promoted for optimized delivery of services to the consumers irrespective of their devices and locations

9.3 The telecommunications regulatory framework will be modernized and liberalized with simplified, unified and technology-neutral licencing regime to enable the convergence of services on digital platforms and foster the development of open competition with providers able to choose the most appropriate technologies.

9.4 Roadmap for availability of additional spectrum for every 5 years will be prepared beginning the year 2014.

9.5 Infrastructure sharing will be promoted through legal and regulatory instruments and directives so as to minimize the overall cost of service provision and increase choices for users in urban, rural and underserved areas.

9.6 Capacity of the regulator will be strengthened to deal with unfair competition, protect consumer interests and facilitate converged services (including mixed broadcasting and communication business models) with enhanced competition in all the elements of broadband value chain (national and international infrastructure, networks, services and applications).

9.7 Coordination among all relevant ministries and government agencies will be strengthened in order to achieve efficient and effective implementation of seamless broadband services. Along these lines, formulation of special programs to improve the efficiency, effectiveness and reach of government services and specific eGovernment initiatives to enable people to maximise online transactions with all levels of Government will be incentivized encouraged.

9.8 Measures will be taken to secure the unbundling of the local loop under favourable terms and conditions.

9.9 Comprehensive measures will be taken to lower infrastructure rollout costs

9.10 Broadband services will be extended to all the 75 district headquarters of Nepal by 2015 and measures will be taken to ensure competitive roll-out of infrastructure and services into the rural and remote areas.

9.11 Least-cost subsidy program to expand wireless broadband services to areas that are likely to remain unserved by commercial services will be developed and implemented.

9.12 Measures will be taken to incorporate futuristic role of IPV6 and its potential areas of application in various sectors of Nepali economy. Along these lines, the development of an ecosystem for provision of large number of services on IP platform will be encouraged.

9.13 Steps will be taken to ensure inclusion of IT enabled, broadband based service delivery models into annual plans and strategies of sectoral agencies of the government including those in education, health and agriculture sectors, in order to create demand for broadband services and encourage deployment of ICTs to bridge gaps in delivery of public services. Special emphasis will be given to the role of ICT and broadband in improving access to education and educational outcomes.

9.14 Adoption of measures aimed at reducing environmental impact and strategies to incentivise use of green technologies for meeting energy requirements of telecommunications and broadband infrastructure will be encouraged.

9.15 Broadband Accessibility Working Group will be created within the Ministry of Information and Communication to facilitate broadband adoption by people with disabilities

9.16 Specific programs and strategic frameworks will be developed to harness broadband connectivity to promote sustainable development. Along these lines, innovative deployment of ICT based solutions will be encouraged in the areas ranging from food security, managing urbanization, supporting and securing the natural ecosystem and biodiversity, curbing human-induced climate change and transforming governance.

9.17 Telecom including broadband connectivity will be recognized as a basic necessity and efforts will be made towards ensuring Rights to Broadband.

10. Strategies

The following constitutes a broad strategic framework in support of Policy objectives 8.1 and 8.2:

10.1 Enabling regulatory environment

10.1.1 An enabling regulatory environment will be created to encourage competition in the construction of broadband infrastructure, provision of retail services and effective functioning of the wholesale market

10.1.2 Steps will be taken to ensure complete separation of the incumbent from the policy making role of government

10.1.3 Transparent and non-discriminatory spectrum management policies will be adopted to ensure adequate availability of spectrum, provide regulatory certainty and to promote investment. This will include periodic publication of Frequency allocation plans, including frequencies available for wireless broadband access

10.1.4 Release of radio frequency spectrum to expand broadband access by means of both mobile and fixed wireless technologies consistent with international standards will be effected

10.1.5 Telecommunication regulatory framework will be further modernized and liberalized with simplified, unified and technology-neutral licencing regime to accommodate the convergence of services on digital platforms and the development of open competition enabling providers to choose among the most appropriate technologies.

10.1.6 A detailed Human Resource Development plan for enhancing the capacity of the regulator will be formulated in view of fast evolving regulatory challenges brought about by increasing trends towards convergence and its attendant policy and regulatory ramifications

10.1.7 Disclosure requirements for broadband service providers will be developed to ensure consumers have the pricing and performance information they need to choose the best broadband offers in the market. Along these lines, QoS parameters will be prescribed for provisioning broadband services using various access technologies.

10.1.8 Comprehensive review of wholesale competition rules will be undertaken to help ensure competition in fixed and mobile broadband services.

10.1.9 Procedures to allow data roaming will be initiated to determine how best to achieve wide, seamless and competitive coverage

10.1.10 Measures will be taken to improve Rights-of-way management for cost and time savings and use of municipal and local government facilities for broadband will be promoted. Best practices guidelines for rights-of-way policies will be identified and established for broadband infrastructure deployment

10.1.11 Development of guidelines for provision of common service ducts for orderly growth of telecom infrastructure in consultation with all concerned Government agencies and Local bodies will be facilitated

10.1.12 Regulatory instrument for local loop unbundling will be prepared and implemented.

10.2. **Backbone/backhaul and access network infrastructure**

10.2.1 Measures will be taken to drive investments in creating optical fiber backbone infrastructure, predominantly on an open access basis, recognizing the fact that microwave frequencies used for backhaul transport of voice traffic is not sufficient to carry substantial broadband traffic. Open access policies and approaches will be extended to cover existing fiber backbone infrastructure through proper regulatory instrument.

10.2.2 Appropriate institutional framework will be established to coordinate with different government agencies for laying and upkeep of telecom cables, including Optical Fiber cables for rapid expansion of broadband throughout the country

10.2.3 Special measures will be taken to encourage and promote infrastructure sharing and to develop mechanism for securing local government cooperation in infrastructure build-out.

10.2.4 Appropriate legal and regulatory framework will be developed for driving investment in the provision of broadband infrastructure services.

10.2.5 A forum for key business and government interests to promote infrastructure development and sharing will be created

10.2.6 Regulatory support will be provided for backbone construction with adequate protection of property and community interests

10.2.7 Mandated arrangements will be put in place to facilitate sharing of passive infrastructure with particular focus on leveraging this arrangement to expand rural access

10.2.8 Where market forces are unlikely to deliver universal backbone network services, public private partnership models will be encouraged and fostered to drive investment in such services.

10.2.9 Appropriate policy measures will be taken to implement open access and interconnection arrangements for backbones, international capacity and international gateways.

10.2.10 Private sector investment in connectivity like Fibre To The Home (FTTH) by independent Infrastructure Providers will be encouraged through enabling policy and regulatory environment

10.2.11 Measures will be taken to harmonize and reform taxation related provisions, especially as these relate to transactions involving procurement of international communications capacity where the bandwidth is on-sold from one carrier to another, as a means of lowering cost barriers to broadband uptake.

10.2.12 Specific measures will be taken to mitigate environmental impact of intensified roll-out of broadband infrastructure and to incentivize the use of renewable sources of energy

10.2.13 Guidelines will be issued to mandate mapping and submission of information on infrastructure assets on the standard based inter-operable GIS platform by all telecom infrastructure and service providers. Along these lines, Nepal Telecom Authority will be equipped with spatial data analysis capabilities, resources and tools.

10.3. Investment in people, content, applications and innovation

10.3.1 An environment to attract investment will be created not only in the construction of broadband networks but also in skills, software, terminal devices, user capacities and innovation to stimulate demand for broadband services.

10.3.2 Digital literacy and skills especially in schools, community and business centres will be promoted. Along these lines, a National Digital Literacy Initiative (NDLI) will be launched in order to organize and train youth and adults on digital literacy skills.

10.3.3 E-learning will be incorporated in education and professional development

10.3.4 Special programs will be launched to build general awareness on online security and safety

10.3.5 Use of broadband services by government agencies will be promoted by formulation of specific programs both at the central as well as local government levels to make electronic transactions, including eGovernment services accessible to citizens and businesses,

10.3.6 Steps will be taken to promote the take-up of electronic transactions and marketing by small and medium sized businesses.

10.3.7 A host of policy, fiscal, and regulatory measures will taken to make broadband services more affordable.

10.3.8 Measures will be taken to ensure fair compensation for creators of digital content and the protection of their rights.

10.3.9 Excellence in content development, application development, rural communications development, innovative services and broadband readiness will be publicly recognized through a program of national awards that will attract popular interest and attention.

10.3.10 Measures will be taken to ensure that expanded access to broadband is accompanied by sound ethical standards in its use and consumption. Initiatives will also be taken to make broadband roll-out more inclusive across gender and ethnicity lines.

10.3.11 Initiatives will be taken to educate children and other vulnerable groups to ensure their on-line safety and build a culture of security

10.3.12 Specific measures will be taken to promote cloud computing as means of speeding up design and roll out of services and expanding access to a host of online services across platforms

10.4. **Rural services**

10.4.1 The reach of broadband network and services will be expanded to rural and remote areas by including broadband in universal service/access definition through effective mobilization of Rural Telecommunications Development Fund.

10.4.2 Competitive supply of services beyond district headquarters and urban centers will be encouraged through a modicum of fiscal, policy and regulatory incentive schemes. Along these lines, considerations will be made to license a block of spectrum with a condition to offer free or low-cost service in that would create affordable alternatives for consumers, reducing the burden on RTDF related subsidy arrangements

10.4.3 Periodic surveys will be conducted to identify areas that are likely to remain unserved by commercial services for the development of a least cost subsidy program targeted to such areas. Community access centres with distinct on-line services portfolio in remote areas will be established with the support from skilled local people and by drawing upon international best practices

10.4.4 A wireless broadband master plan will be developed as a basis for commercial development and also for application for subsidies from Rural Telecommunication Development Fund.

10.4.5 A mandatory provision for web based disclosure of area coverage by broadband service and infrastructure provider will be made

11.0 International engagement

Landlocked countries like Nepal have special needs to ensure that international communications are reasonably priced and secured. International links provide the opportunity to strengthen connections with the rest of the world through electronic commerce and business as well as enable deployment of IT enabled and Business Process Outsourcing services.

As a policy direction, Nepal will continue to sustain international engagement to explore how Least Developed and Landlocked Countries can grow sustainable business models for adequate returns on broadband investment at minimum income levels with maximum spill-over benefits across multiple sectors of the local society and economy.

Along these lines the government and regulator will continue to sustain their engagement with international agencies such as APT, ITU, Broadband Commission for Digital Development among others, with a view to ensuring policy alignment and mission congruity with best practices and models developed by such agencies.

12.0 Implementation of policy and strategy framework

12.1 Formulation of a Broadband Master plan

The policy and strategy framework will be implemented through a Broadband Master plan endorsed by the Government of Nepal.

12.2 Institutional arrangement

A National Broadband Policy Implementation Steering Committee will be formed at the Ministry of Information and Communication with the following structure.

Hon. Minister, Ministry of Information and Communication	Chairperson
Member, National Planning Commission	Member
Secretary, Ministry of Education	Member
Secretary, Ministry of Health	Member
Secretary, Ministry of Agriculture	Member
Secretary, Ministry of Finance	Member
Secretary, Ministry of Local Development	Member
Secretary, Ministry of Information and Communication	Member
Chairman, Nepal Telecommunications Authority	Member
Joint-Secretary (Policy and Programme), Ministry of Information and Communication	Member-Secretary

The Steering Committee will form an advisory committee comprising of representation from the stakeholder community and domain experts, including the private sector, to provide it with domain specific expert advice and recommendations in relation to the execution of policy provisions.

12.3 Resource Mobilization

The overall goals of broadband policy will be achieved through the mobilization of both public and private sector resources. The proposed policy framework is expected create conditions for private sector investment in the sector complemented by public sector resoure mobilization based, among others, upon universal service obligation commitments.

12.4 Legal and regulatory arrangements

Appropriate Legal and regulatory arrangements will be made for the implementation of this policy and provisions therein if deemed necessary.

12.5 Monitoring and evaluation

A framework will be developed within the fiscal year 2071/72 (2014/15) to serve as a basis for carrying out periodic monitoring and evaluation of the execution of National broadband policy and Broadband master plan. It will be the primary responsibility of National Broadband Policy Implementation Steering Committee to carry out monitoring and evaluation of programs and policy provisions relating to broadband services and infrastructure build-out.

13.0 Asssumptions and Risks

The following consititutes key assumptions and risk perceptions in relation to the proposed Broadband Policy and strategy framework.

Assumptions:

- Broadband as development agenda will enjoy high level of stakeholder support and buy-in the days ahead
- there will be intensified demand for broadband services thereby creating conditions for more private sector investment in the sector
- Necessary regulatory reforms in the area of licensing and spectrum governance will be taken in an urgent basis to promote investment in the sector

Risks:

- Overall investment climate might be compromised on account of delays in much needed regulatory reforms
- The continuing challenges associated chronic power shortages could dampen the overall demand for broadband and create disincentive for investment
- Potential error in judgment in relation to the selection of future proof technology choices in rolling out broadband
- Lack of oversight giving rise to in skewed, purely market driven expansion of broadband resulting in exclusion of the communities outside urban areas