TRAI Corres/1/2010/057
20th July 2010

Mr. S.K Gupta
Advisor (CN)
Telecom Regulatory Authority of India
Mahanagar Door Sanchar Bhawan
Jawahar Lal Nehru Marg, Old Minto Road
New Delhi – 110 002.

Subject: Response to Consultation Paper on "National Broadband Plan"

Dear Sir,

This is in reference to your consultation paper dated 10th June 2010 titled "National Broadband Plan."

At the outset, we appreciate the Authority's far-sightedness for initiating the consultation for a National Broadband Plan. In spite of explosive growth in wireless mobile telephony, Broadband uptake is far from what has been envisaged in the Broadband Policy 2004. We strongly feel that specific and time bound efforts are now needed if our country has to reap the benefits of the Information Highway.

In this regard, we hereby enclose our response to the above-mentioned consultation paper. We hope that TRAI will take into consideration our points while finalizing their recommendations of "National Broadband Plan."

Thanking you and assuring you of our best attention always,

Yours sincerely,

Anand Dalal
Vice President – Corporate Regulatory Affairs
For Tata Teleservices Limited

And

Authorized Signatory,
Tata Teleservices (Maharashtra) Limited

Encl: As above.

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Response to

TRAI Consultation Paper

on

National Broadband Plan

Tata Teleservices Limited (TTL) response to

Consultation Paper for National Broadband Plan (NBP)

Introduction

We appreciate the initiative of the Authority in bringing out this Consultation for the National Broadband Plan (NBP). As we endeavor to enhance the broadband penetration in the country, it is important that we take into account the attempts to address this issue in the past and the learning from the experiences in the telecom scenario of the country.   We tried landline telephony for 60 years after independence and had 2% teledensity, alongside we have until now been putting in concerted efforts for landline Broadband and our broadband penetration density today is less than 1%. There is no doubt that our telecom success story has been on mobile in 2G.   This issue has been extensively debated in the public and government and it is well accepted that India's success/hope is wireless Broadband. Yes, we can provide Broadband to the individual households across the country, but that is expensive and quite, rather totally unfit for rural areas. Each such connection will cost a fortune. We have experience of rural fixed line subsidies - yet most phones did not work. It is well known that the number of landline telephone connections are regularly declining and the success came with rural mobile/shared tower scheme and we have 25% rural teledensity with much less subsidy with very low USO costs. It is our opinion that, taking into account the learning of the past, we must not repeat the same mistakes.

It is pertinent to mention that a number of proposals made by the TRAI in their earlier submission on "Broadband India: Recommendations on Accelerating Growth of Internet and Broadband Penetration" dated 29th April 2004 had been made but these have not been implemented by the Government.   Many of these recommendations are still relevant in the context of this National Broadband Plan and should be seen in conjunction while formulating the new Plan under this consultation.

Utilization of existing infrastructure: The Government should fund broadband proposals that leverage existing underutilized infrastructure in innovative ways to deliver the needed services and significantly improve coverage. The funding must avoid costly 'overbuild' or duplication of the existing network where it is capable of delivering acceptable broadband at a lower cost than fiber based alternatives. We must maximize coverage and get the best "bang for our buck".

The reasons and learning from the time since the Broadband Policy 2004 had been announced should be taken into account for this proposed Plan. It should be based on a rigorous analysis and estimate of existing assets and information available for current state of broadband and those proposed in this Plan. It is necessary that the factors & reasons for non /underutilization of the existing infrastructure (OFC,Copper, rural exchanges , mobile towers)created with huge public investments are fully analyzed. The current paper however, seems to be focusing more on wireline (predominantly OFC) technology and the related infrastructure; thus there is a need to look at the NBP taking into account all aspects of broadband from factors highlighted above.

The proposed Plan needs to have clear targets, timelines and resources allocated for implementing the same to emerge as part of this consultation . *Considering the significant potential of wireless technologies in the speedy provision of broadband and constantly evolving wireless technologies these should be an intrinsic part of the Plan.*

We recommend that the proposed National Broadband Plan should have the following approach:

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a) The plan should be holistic taking into account all the already existing national assets of wireline and wireless.

b) Given the shortfall in meeting the targets of the existing Broadband Policy,2004, it is essential that speed of broadband provision is of essence. The NBP must make broadband available at affordable costs straightaway to rapidly expand broadband in the initial phase, and subsequently build on expansion with installation and commissioning of new broadband infrastructure.

c) Concentrate on current and rapidly evolving wireless technologies which have a continuously increasing potential to deliver higher speeds as is evident from 3G/EVDO/ WiMax/LTE TDD broadband etc.

d) Development of OFC in core and backhaul for effective broadband dissemination to exploit wireless in access. The model for any agency that is set up for executing this project should be adequately researched and shared with the stakeholders prior to implementation. This should not be a source for allocation of public funds to the incumbent to undertake this work.

e) Investment on digitization and digital literacy along with development of local language content for broadband, like content in different languages, e-governance, e-education, e-health, e-banking etc content. Digital Literacy Training for use of online content must be part of the National Skills Development Corporation's objectives for all its skills development programmes.

f) Invest on e-governance, education, health, e-banking etc. projects.

g) Invest on CPE/ handheld devices to make these affordable where these will be used like schools/hospitals/mandi office/panchayat kiosk/ homes.

h) Essential for wireless broadband for the masses the NBP must make spectrum sharing easy and automatic.

i) Allow MVNOs in the Broadband domain.

j) As broadband numbers will grow, so will be the demand for additional spectrum. Focus on making adequate spectrum continuously available in a planned and transparent time frame.

k) Allocation of more spectrum, either from refarming or obtaining more spectrum from defence. Hence, the process of laying of alternate network such a defence " Network for Spectrum" project currently underway must be given top priority for implementation and must be completed expeditiously by BSNL.

l) We should not spend on taking fibre/fixed line to each household. For India, such solution would be elitist. In proportion spend a significantly higher outlay on wireless broadband in earlier phases of the NBP vis a vis landline or OFC.

CHAPTER 2: Broadband – Demand & Supply

It is apparent that the major focus of this Consultation seems to be to get views on the objective of creating nationwide robust optical fiber network for providing connectivity from districts / cities/blocks to villages.

The consultation proposes to seek public response, inter-alia, to provide optical fiber connectivity to 3.74 lakh villages having population of 500 and above, in the first phase. We must also take into account the subsequent Phases to cover all the balance villages. This consultation on the National Plan must include proposals for providing Broadband for the time period upto 2020. Drawing examples from other countries, the National Broadband plan should span around 10 to 15 years as has been done in other countries:

Country	Program Duration
Australia	>15 years
Japan	15 years
South Korea	10-15 years
UK	>15 years

It is therefore recommended that the Indian National Broadband Plan as envisaged in this consultation should cover the period of 10-15 years and this should be sub-divided into three phases. These phases should include the plan and targets in which there is rapid exploitation of available resources in the first phase, lay the groundwork for the infrastructure in the second phase and exploit the infrastructure made in Phase 1&2 and include the villages with <500 population in the Phase 3:-

This may be done as under:-

a) **Phase 1. For the period 2011 – 2012.** Early provision of Broadband services is the aim of this Phase. This phase should exploit the already existing national broadband resources including wireless which are readily available and are underutilized. The need is to connect maximum population with the available resources with additional add on in the form of equipment and services by interested stake holders in the least possible time frame. This would include the assets of private operators, PSUs, considerable landline (including OFC) and wireless network that is presently available in the country. Target 60 million broadband connections, Simultaneously the Government should initiate measures to implement the recommendations on broadband in the DoT Committee on Rural Telecommunications, and promote the laying of OFC core network as envisaged in this Plan.

b) **Phase 2. For the period 2013-2017.** In this Phase provisioning of the 11.46 lakh KM OFC backbone along the road network of the NRRDA and the connected rollout of wireless towers to extend last mile access from this OFC network to the consumers. Dovetail the Phase 2 of the USO Shared Tower Infrastructure Scheme into this Phase

targeted for the 3.74 lakh villages with population > 500.Target - At least 200 million Indian households be provided with affordable access to broadband .

c)   Phase 3. For the period 2017-2020. . Extend the broadband access to all the balance villages (including those with populations < 500). Take into account the learning of the Phase 1 &2 and new technologies that would have evolved. Target 500 million additional connections, thereby covering all households, communities, Government and other enterprise, representatives of the eco system in the country.

Evolving Wireless Technologies. World over, wireless broadband technologies have been identified as the media to overcome the scarcity. In India too, UAS Licensees, have established considerable wireless infrastructure in rural areas. Further, with the recent 3G and BWA auctions, there is a strong case of leveraging this wireless infrastructure for provisioning of national broadband services. Not only will this reduce roll-out time but will also rationalize the CAPEX requirement. **The current technology options have already been deployed successfully in metro cities in India and their rapid scale up for provision of broadband services in rural areas can be expeditiously achieved by adopting a suitable incentive-based approach.**

Wireless is likely to have the most promising role in the provision of high-speed broadband. Over the last 10 years mobile networks have made substantial progress in the cost-effective delivery of data services. In   particular, the advent of 3G and more recently the High Speed Packet Access (HSPA) standard, combined with the declining cost of powerful digital devices, has led to a rapid growth of mobile internet traffic. The speed and bandwidth that mobile networks offer today is similar to the performance of DSL (1st generation fixed network broadband) three to four years ago. Wireless technologies are evolving very rapidly and are expected to continue its progress and to deliver in three to five years speeds that can be materially higher than current access networks. Recent announcements regarding developments in new technologies such as Long Term Evolution (LTE) confirm that trend.

Affordability of CPEs/ Handheld devices. There is an urgent need to reduce the costs of CPEs/ handheld devices, with suitable subsidies and tax incentives to make these affordable and popular. It is clearly evident that most future users for the internet would have their first experience of the internet on handheld mobile devices. Their costs should thereby be reduced in India.

Leveraging Existing Wireless and Satellite Broadband Network Infrastructure. Existing and add on of wireless Infrastructure are not to be ruled out for their obvious advantages of this technology in the backbone, backhaul and in the access and also while providing issue wise comments to this consultation paper. The Government has always been considering technology Neutral eco-system. Hence taking advantage of all existing and proposed technologies by unbundling and sharing of the same becomes very important .

Inter ministerial and State Level Aspects. The pull factor of broadband for the common man will largely depend on the services and applications available. Many of these relate to Government to Citizen Services (G2C). These aspects being inter – ministerial need policy drivers and facilitation. While the industry is very agile in providing these however many issues like timely availability and mandatory provision of G2C services are dependent on the various

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Central and State ministries/departments. It is recommended that these issues be included in this as they will have a direct impact on the national demand for broadband. It is important to make suitable recommendations on these aspects in addition to RoW aspects at State level only, e.g. Rather than imposing any additional fees for e-transactions, it would be useful to rather provide incentives for e-transactions; e.g. for railway's e-tickets one has to pay more than what one pays at the counter whereas the cost is lower for the railways in case of e-tickets!, similarly for online banking transfers thorough NEFT where there is a charge currently.

As soon as the Direct Tax Code and the Goods & Services Tax are being implemented, the only mode of filing and paying taxes under the same must be mandatorily electronic only. This would not only increase the efficiency of collections & disbursals but would also enhance the reconciliations. Acknowledging that several Micro, Small and (even) Medium enterprises may not be having their own broadband and related infrastructure. We recommend that the government invests and promotes public access kiosks (including but not limited to the Common Service Centers under the National e-Governance Plan) both in the public sector as well as in the private sector that specifically assist in such transactions till such time that these units acquire in-house infrastructure and expertise.

Considering that educational institutions, healthcare centres, gram panchayats, railway stations and post offices, banks, micro-financing POPs are the places that only act as physical hubs for human concentrations but also do provide essential services to common people, we strongly urge priority for high speed broadband access to such anchor institutions to accelerate accelerated and affordable (both for the government as a provider & enabler and the people as consumers) broadband access. Suitable training for the staff manning broadband in these institutions and some incentive to the staff will also help in increasing the use of broadband to a majority of population.

Once the basics are set up by the Government as a major driver, the sustenance of the same can be driven by pay per use by the end users of those services which they personally seek : such as Entertainment (individual or community), streaming of desired information location wise, service on demand of many types which can be considered separately. Thus the basic Government responsibilities as a state service or the one for the private but sought individually or by a group of people or applicable enterprises. These may be listed separately so that one compensates for the other for the running cost and the ecosystem becomes self sustaining at certain point of time with planned support from the Government as well. **This requires a mature seed sowing by the Government with futuristic outlook with participation of all stake holders.**

Tata Teleservices response to consultation are given in the paragraphs below:-

5.1 What should be done to increase broadband demand? (Reference Para 2.23)

On global basis, and particularly for India, mobile access to the internet is evidently going to be bigger than the desktop computer's access and connectivity to the internet. Countries all over have realized the immense advantages and potential of wireless broadband (including femtocells, UMA) . The aim being not only to have faster access but also cut OPEX and CAPEX costs.

Broadband penetration in India has been abysmal with less than 1% of the population having access to Broadband connections. The macro economic effects of broadband are well known and hence it is necessary for the Government to make the improvement in the penetration of broadband as its first mandate. We believe that broadband penetration can in positively influenced by following key ways:

a) **Ensure efficient allocation of resources that are within the control of the Government and further incentivized** . This includes spectrum, Right of Way management and infrastructure sharing for broadband. Ensuring service providers can access these resources at fair prices would greatly boost the penetration of Broadband services in the country. Some of the key initiatives in this regard can be:

   i. Allocate a minimum of 200 MHz for Broadband services. In addition, the spectrum per service provider should be at least 40 MHz to give high speed broadband connectivity in the rural areas as well as urban areas.
   ii. Greater use of Digital Dividend band and 450 MHz/ 750 MHz band for increasing rural Broadband penetration.
   iii. Improving right of way management for cost and time savings would greatly facilitate high speed Broadband. For long term requirements, laying of Optical fiber network in urban and rural areas is very important. This requires sharing of OFC network and laying of this network can be encouraged through IP-I entity.

b) **Regulatory Policy Certainty and Continuity.** Agility in bringing timely interventions with reform policies, standards and incentives to encourage the uptake of broadband in sectors like public education, health care, public safety and government operations. This should include a time bound Action Plan intrinsic to the National Broadband Plan with specified targets, committed resources for each phase , and accountability of the individuals implementing this Plan must be clearly built in.

c) **Ensuring Steady Source of Funding**. Provide funding mechanisms to encourage rollout broadband in underserved rural and hard to access areas.
   i. Efficient use of USO Fund for rural broadband
   ii. Evaluating new models for broadband rollout in rural areas as compared to pure subsidy model.
   iii. Enabling new initiatives and mechanisms for operators to roll out Broadband in the hinterland. For example, licensing of block spectrum with a condition to offer free or low cost broadband would provide an alternate incentive to USO funds.

d) **Affordability of the Customer Premise Equipments (CPEs)/ Handheld devices.** The cost of CPE in India is relatively higher as compared to other countries. This acts as one of major hindrance towards increasing broadband penetration. There is a clear need to reduce the costs of CPEs, with suitable subsidies and tax incentives to make these affordable and popular. It is clearly evident that most future users for the internet would have their first experience of the internet on handheld mobile devices. The costs of these should thereby be reduced in India.

    a. Customer end items need to be made more affordable for enhanced penetration. Consolidating a national demand and ordering this from OEMs will provide scales of economy, and standardization in broadband CPE supply to be brought in. The subsidy of up to Rs 4500/- for computing device and Rs 850 for router presently being given for CPEs used in USO scheme for wireline broadband to the BSNL should be extended to wireless broadband as well.

    b. Institutional Demand Stimulation By aggregating demand from government institutions, a twofold objective might be realized, since operators might increase their willingness to deliver service in some underserved areas and government expenditure might be reduced. However, for these benefits to materialize, some important aspects need to be considered:

        i. **Coordination and commitment from various state central and local government sectors**. Coordination between sectors has to be achieved at the highest levels so that rural dependencies can benefit from these approaches. It would be ideal if the health center, police station, and municipality, which are usually located close to each other in a rural municipality, could benefit from the same wireless connection. However, for this to happen they would have to share the costs of the connection; and this decision is hardly ever made at the municipal level.

        ii. **Implementation of relevant applications and content**. The value of access to broadband increases exponentially with relevant applications. Financial management applications and Internet based public health systems, among others, are examples of applications that could benefit government officials and the general public.

        iii. **Relevant training.** Training programs must be put in place in order to take advantage of the benefits that broadband access would bring to rural public entities, especially in those cases were relevant applications are involved. The institutional and implementation arrangements described above are very important for a successful execution of any of the policy options identified in this paper. Besides these specific arrangements, agencies in charge of carrying out the proposed mechanisms should have technical and financial expertise (or at least access to it) and be able to monitor the performance of operators that have received the funds.

e) **Holistic technology neutral approach:** It is important to take a holistic view and include wireless technologies in the broadband definition. By just focusing on wireline it would be difficult to realize broadband objectives as wireline technologies have several limitations like time consuming deployment, relatively expensive CPEs. Wireless

technologies however do not suffer from these challenges and can be an important driver for growth in the access side.

f) **Spectrum:** There is also a need to take some measures on the spectrum end which can have a significant impact on the uptake of broadband. Also, it needs to be kept in view that with increasing uptake of broadband the spectrum requirement will also further increase. Suggestions are:

   i. Refarming of 2.5-2.69 GHz band for broadband. It is important to note that this band has a good ecosystem of broadband. Also, major part of 2.5-2.69 GHz band is currently with ISRO where it is underutilized and is being sublet to private sector companies. The same should be re-farmed from ISRO and should be utilized for broadband services
   ii. Usage of guard band for provisioning of broadband. This is already being done in several countries
   iii. Usage of 450 MHz and 1900 MHz bands by CDMA operators.
   iv. Currently the spectrum allocation in 2.1 GHz band is insufficient. Additional 40MHz of 2.1GHz should be freed up for commercial usage. This would help in increasing the number of players in the sector.

5.2 What, according to you, will improve the perceived utility of broadband among the masses? (Reference Para 2.23)

While the Telecom and IT industry in India has done well, it is unfortunate that there is a very low level of digitisation in the country compared to other developing nations. For instance , while India has only 1.6 PCs or similar devices for every 100 persons, China has more than 6 per 100. Consequently, in India, the major portion of revenues for ICT industry comes from exports, and the domestic market is under exploited. The critical need of the hour is to empower the common man. The requirements of the common man range from online services in government services, health care, education, finding jobs, banking and financial services, travel. There have been many pilots in these areas, but the potential of ICT to comprehensively replicate the same has not been exploited. The pace of scaling up the successful pilots has been missing.

As an example today 50% of the railway reservations happen through e-ticketing and the turnover of Railways from e-ticketing has grown from a mere INR 27 crores to INR 1744 crores. For the common man e-ticketing has meant, more than anything else, a respite from standing in long queues and doing this at a time of his choosing. Despite the widespread nature and impact of the example just cited, the potential for broadband usage has not been adequately promoted. There is actually lack of awareness amongst users, communities and even some state Government stake holders about the advantages the Broadband can deliver though, many other states are working towards higher digital penetration levels but the pace of such efforts needs to be much faster for the perceived utility of broadband to be appreciated. In this regard the following steps are recommended:-

a) Affordability .Subsidization / rationalization of end user devices (CPE).

b) **E-governance -** For any technology to go main stream and find maximum applications and utility, one of the biggest customers is the government. Broadband can be an

important lever in helping government realize its objectives laid out under "National E-governance Plan" With e-governance being the new mantra, it has significant potential to bring about convenience, transparency and efficacy in government functions. The various ministries and government departments must have a clearly specified timeline for providing these services as part of this Plan.

c) G2C services to be rolled out in a time bound manner. Deployment of common G2C services can also catalyze adoption of broadband. The NBP will require the various ministries for integrating the resources for the broadband utilities in the health, education, public utility services , disaster warning services with applications on the PC as well as mobile devices.

d) Government institutions themselves to be the major anchor customers of Broadband Services. Government being the largest employer and provider of services needs to be e the largest user .

e) Development of relevant content in local languages.

f) Awareness Building and Digital Literacy Training. Mass scale sensitization programmes educating the common masses on benefits of broadband. Awareness and training on use of internet/BB and other ICT tools. Making internet education mandatory for all schools, colleges, universities, government establishments and their employees.

g) Adoption of globally accepted metrics for ICT/broadband advancement (this can provide an even measure of how global economies are performing, and allow for competitive comparison and advancement). Periodic tracking and reporting on progress relative to the globally accepted metrics.Creating benchmark and performance metrics for each government department, ministry, states around ICT adoption and e-readiness.

h) **Accessibility to applications like health, education and banking that otherwise are not available to the masses -** Increasing the scope of broadband from just e-mail to more value added applications, effective use of broadband in automation of operations and functions, innovative use of technology in imparting education and increasing literacy is likely to drive the penetration of broadband in India. Internet and broadband needs to go to every household in the country. McKinsey study shows financial services for the unbanked are among the most promising opportunities for mobile-telecom operators (through wireless broadband) hoping to counter slowing subscription growth with auxiliary offerings, such as banking, health care, and education services

5.3 What measures should be taken to enhance the availability of useful applications for broadband? (Reference Para 2.23)

a) Conversion of all existing government documents into digital formats, to make them available. This is also enshrined in the RTI Act Para 4. Which states

Every public authority shall:

Maintain all its records duly catalogued and indexed in a manner and the form which facilitates the right to information under this Act and ensure that all records that are appropriate to be computerised are, within a reasonable time and subject to availability of resources, computerised and connected through a network all over the country on different systems so that access to such records is facilitated;

This is also enshrined in the Action Plan for the implementation of the RTI Act, viz Roadmap for Digitization of files/ records (can be a part of "RTI Readiness Plan". Development of Web-based applications for Public Authorities .

(ref http://rti.gov.in/rticorner/studybypwc/implementation.pdf)

b) **Access and transparent conditions for re-use.** Encouraging broad non-discriminatory competitive access and conditions for re-use of public sector information, eliminating exclusive arrangements, and removing unnecessary restrictions on the ways in which it can be accessed, used, re-used, combined or shared, so that in principle all accessible information would be open to re-use by all. Improving access to information over the Internet and in electronic form. Making available and developing automated on-line licensing systems covering re-use in those cases where licensing is applied.

c) **Information Asset lists.** Strengthening awareness of what public sector information is available for access and re-use. This could take the form of information asset lists and inventories, preferably published on-line, as well as clear presentation of conditions to access and re-use at access points to the information. For eg Government owned multi media content– video, music,film industry content (much of which is in local languages) – already available in its archives should be digitised and made avaiable online.

d) Automate all processes of Public Health Centres (PHC) for digitised patient records. Incorporate a standardised medical informatin security regime, along the lines of the **Health Insurance Portability and Accountability Act** , HIPAA

e) Extending USO funding for wireless Broadband may be proposed. TTSL have already submitted a proposal and a comprehensive business model for the same. Subsidy to be provided on per BTS or geographic coverage basis.

f) Five aspects have been pointed out that are acting as a hindrnace for uptake of broadband applications:

  i.   Relevance / value proposition of broadband.
  ii.   Ease of accessibility, language and literacy barriers.
  iii. Affordability
  iv.   Awareness of Broadband Advantages and correpondingly innovative killer applications.
  v.   Combined and Comrehensive efforts of all the stake holders in the echo system to be driven by the Government

g) Cost of International bandwidth is very high which may be proposed for a review by TRAI.
h) Cost of end device is also prohibitivaly high and government incentives may be looked at for providing / importing cheaper alternatives.
i) Encourage application development in local content and languages by incentivising SMEs involved in this activity, giving tax relief etc.
j) Provide education programs to outline the myriad beneficial applications that broadband can fulfill .
k) Conduct training of government teachers to impart e-education and provide each of the 7 million government school teachers with a Laptop to access good quality content.
l) Provide tax advantages and subsidies, as well as other incentives to promote the new uses of broadband.
m) Broadband sepnding to be made tax dedcutible.
n) Assign more sub 3GHz spectrum in a technology and service neutral manner for broadband wireless access.

5.4 How can broadband be made more consumer friendly especially to those having limited knowledge of English and computer? (Reference Para 2.23)

To ensure an end-to-end local language delivery, Applications (web browsers, messaging etc) as well as Content need to be provisioned in localized language. The content that is available today on the Internet is largely in English and is not customized to local needs. The task is to make this content available in the dialects spoken in India. However, given the diverse socio cultural background in India this is a complicated task. Mere literal translation of the content in local language might not ensure adoption. A context-aware translation, on the other hand, is needed to guarantee widespread acceptance of ICT. Once infrastructure, application and content is available in Indian language a bulk of the population which is not literate in English would be able to relish the benefits of technology.

As seen in various other countries including the USA, computer literacy programmes have been rolled out to promote digital literacy. **Digital literacy** is an evolving concept. Though there is no standard definition, digital literacy generally refers to a variety of skills associated with using ICT to find, evaluate, create and communicate information. It is the sum of the technical skills and cognitive skills people employ to use computers to retrieve information, interpret what they find and judge the quality of that information. It also includes the ability to communicate and collaborate using the Internet—through blogs, self-published documents and presentations and collaborative social networking platforms. Digital literacy has different meanings at different stages of a person's life. Digital literacy is a necessary life skill, much like the ability to read and write. **Government of India may launch a National Digital Literacy Program (under National Skills Development Corporation) that creates a Digital Literacy Corps, increases the capacity of digital literacy partners and creates an Online Digital Literacy Portal.**

a) Browser & search engine must be made available in the local language. It is suggested that voice prompt system in local/national language can be incorporated in the computer
b) Exploit the massive avialbility of TV sets in India to provide internet browsing using TV sets using remote of the TV.
c) Development of front end drop down list selection list to navigate any internet site
d) Awareness and training on use of internet/Broadband and other ICT tools right at the schools level to engage the youth. As often quoted we have 450 million citizens in the age group of 4-14 and these in a decade will be 14-24 making a very powerful work force. It is imperative that they be exposed to the benefits of BB at this stage . The NBP needs to have pertinent recomendations for the dove tailing of the efforts of the Sarva Shikha Abhiyan for this.
e) Carrying out advertisement campaigns on regional and national radio, FM, TV channels and local and national print media print media .
f) Enhanced use of video applications and the spoken web browser capabilities to overcome the need to know English
g) Apart from voice prompt systems suggested above the Templated screen touch functional keys of frequently used interactions in Regional languages or in picture modes (Both Queries and answers) are also a solution tried elsewhere.

5.5 Do you agree with projected broadband growth pattern and futuristic bandwidth requirements? (Reference Para 2.35)

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The proposed projections and targets have taken a limited view and there is a need to expand the scope of broadband growth pattern to include the potential of wireless broadband technologies in addition to OFC. Also it needs to be noted that it would be economically prohibitive for every household to own a PC/Laptop type of device. However, owning a device with form factor of a smartphone which is a fraction of PC's cost) will be much higher. This also becomes relevant from the perspective that smart phones would offer user the ability to interface with the device operating system through icon based touch screen based interfaces which do not require significant computer or English language understanding. It also needs to be noted that mobile handsets have wide software development ecosystem and the business models are mature which make the software management relatively easy and enable the OEMs to offer phones at costs which are significantly lower than that of a PC. It seems that this aspect has not been taken into consideration while estimating the broadband growth pattern projected.

We do not agree with the projected growth mentioned, and feel that this projected pattern needs a better in depth study to come to a more realistic pattern taking into account the locally relevant demand and conditions. **This must factor in the simultaneous availability of power supply for enabling broadband.**

With the current definition of Broadband with speeds of 256 kbps, the targets have not been met and we are way behind targets. The growth pattern projected in the Consultation Paper is not clear whether this is for speeds under the current definition or with a new definition. The proposed growth pattern does not take into account the existing Broadband potential which is underutilized. The consultation mostly focuses on the growth of OFC infrastructure. The projections should be done taking into account all possible technologies wireline, wireless, Broadband over power lines etc. The capacity for the country to implement these numbers is not amply illustrated and taken into account to arrive at the suggested figures.

A simple calculation for only OFC infrastructure projected for consultation, which is based entirely on the requirement of road network as mentioned in the paper indicates the following :-

Total estimated projection for OFC :	11,46,000 km
Months for this proposal 2010(6 months), 2011 to 2014 (4*12=48)	Total Months : 6+48=54
Monthly rollout for this plan	11,46,000/54=21222.22 km /month
Daily rollout or OFC amounts to :	21222.22/30=707 km/day

The Road Transport and Highways Minister Kamal Nath has said " The government is confident of building 20 kilometres road per day"
(http://economictimes.indiatimes.com/news/economy/infrastructure/Indias-infrastructure-sector-needs-90-bn-in-5-years-Kamal-Nath/articleshow/6121376.cms)

It is evident that this estimate of the TRAI is not realistic and needs to be reviewed. The capacity for rollout of this OFC is dependent on the road construction in rural areas. It is good to have this on paper as a plan, however a realistic estimate from the Ministry of Highways & Road Transport and the NRRDA as the concerned department. This is essential to come to a more realistic target for implementation as part of this NBP. We appreciate the dovetailing of this

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project with the NRRDA and the MGREGA. This will be a significant enabler for the implementation of the core OFC network. However, the funding for ROW and acquisition amounting to Rs 34,380 crores should also be considered in this Plan as it is a factor which is intrinsic to the execution for this OFC core network. Non inclusion of this funding requirement may become a hindrance in the NBP. Some international examples of funding for Broadband in Rural Areas is given at Annexure attached.

5.6 Do you agree that existing telecom infrastructure is inadequate to support broadband demand? If so what actions has to be taken to create an infrastructure capable to support futuristic broadband? (Reference Para 2.35)

The Paper does not give an estimate of the currently available broadband capacity (wireline, OFC, wireless & others) that is already available in the country. Comments on this can only be given based on the actual available capacity and its current utilization and then plan for the new capacity to be built in the specified time frame. There is no denying that this infrastructure will continue to be enhanced based on demand. However the is a substantial amount of existing broadband capacity already available, including wireless network, OFC and power lines networks that need to be taken into consideration to realistically evaluate this aspect. Needless to say the NBP will require to prioritize the rollout of the infrastructure of various types with associated timelines. **The fastest means for the provision of Broadband will be through the early expansion of wireless network and unbundling of the Incumbent Infrastructure.**

We agree that the existing infrastructure requires improvement to support the current and future broadband demand, and both wireless and wire line networks play an important role in the overall effort to promote optimum Broadband connectivity. First and foremost, policies and programs must be established to promote a competitive broadband environment.

Wireless is likely to have the most promising role in the provision of high-speed broadband. Over the last 10 years mobile networks have made substantial progress in the cost-effective delivery of data services. In particular, the advent of 3G and more recently the High Speed Packet Access (HSPA) standard, combined with the declining cost of powerful digital devices, has led to a rapid growth of mobile internet traffic. The speed and bandwidth that mobile networks offer today is similar to the performance of DSL (1st generation fixed network broadband) three to four years ago. Wireless technologies are evolving very rapidly and are expected to continue its progress and to deliver in three to five years speeds that can be materially higher than current access networks and, as such, can be regarded as integral part of the broadband infrastructure. Recent announcements regarding developments in new technologies such as Long Term Evolution (LTE) confirm that trend. One of the factors coming in the way of Broadband penetration is that existing infrastructure does not take in to account the what and how of last mile needs . In addition bandwidth needs have not been addressed holistically to make available bandwidth with reasonable costs for broadband services.

Flexible Use of Spectrum

As is well known spectrum is critical to building broadband wireless infrastructure. More spectrum should be released in a technology and service neutral manner, to support new wireless network technologies and services. The amount of spectrum per service provider

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needs to be carefully worked out. 5MHz spectrum in 3G per service provider will not be at all sufficient for providing high speed data access for large customers per BTS and it will not be economical to have very low spacing between any two BTS. These calculations should be done in a techno-economic manner. In a similar way, the amount of BWA spectrum per service provider needs to be specified.

In rural areas, spectrum has become a costly entry barrier for small operators oriented towards low income segments. Many countries have spectrum allocation policies that grant nationwide licenses, not bearing in mind that license holders are usually going to concentrate their operations in urban areas.

Even in those cases where operators granted with nationwide licenses do provide service in rural areas, usage of spectrum in rural areas is certainly different than in urban areas. That is, in urban areas, due to population concentration and intensive use, the value of spectrum as a scarce resource is much higher than in rural areas. So, the opportunity cost of spectrum in rural and low income areas is different, building a case for different approaches when dealing with frequency allocation between rural and urban areas.

Subsidies and tax incentives can be provided, in a competitively neutral manner, to encourage connectivity to the underserved, and deserving segments of the population.

As of now there is no clear spectrum allocation policy in place. TRAI should take a comprehensive review of the spectrum requirement going forward and come up with comprehensive guidelines on how best these frequencies can be allotted to different operators.

For CDMA there is still no clear broadband spectrum roadmap for the availability of 3G spectrum. This reduces the competitiveness of CDMA players in the market. It is recommended that the Authority brings out a clear roadmap for offering high speed data services and undertakes to identify frequency band for LTE, as part of this NBP.

As the demand for broadband increases the requirement of spectrum also increases and frequency bands become more congested, especially in densely populated urban centers, worldwide regulators are following diverse approaches to sharing frequencies: using administrative methods including in band sharing, licensing such as leasing and spectrum trading, and the unlicensed spectrum commons combined with the use of low power radios or advanced radio technologies including ultra-wideband and multi-modal radios. TRAI should look into this aspect of spectrum sharing in view of the explosive telecom growth and increasing need for spectrum for different services.

Digital Dividend bands (Analog TV Bands) should be released and Re-farming of existing spectrum should be allowed by the DOT as well.

National Telecom Infrastructure Policy (NTIP).

The Authority has even earlier made a number of recommendations on streamlining the RoW but this has not be made into a Policy. The ambiguity surrounding the RoW procedures has led to differing interpretations in charges and jurisdiction, leading to a spate of legal cases. It is therefore essential that a NTIP be instituted to enable broadband proliferation as per this NBP.

The DOT had circulated drafted model guidelines in 2005 for RoW which clearly indicated that all State governments should extend the facility of rights of way may be extended for laying

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underground Telecom cables, to all licenses without payment of any compensatory charges / levy /lease rentals / licence fee / free bandwidth / revenue share / cashless equity etc. The only admissible charges are reinstatement charges or charges directly linked to the restoration work. Therefore, the RoW charges may be levied only to ensure proper restoration and compaction of the dug portion of the trenches to the satisfaction of the civic authorities. Imposition of the exorbitant levies would be detrimental to the promotion of IT and Telecom.

The state governments and local municipalities have demanded rental and other recurring RoW charges. There have been even occasions where service providers have been compelled to give free bandwidth in lieu of RoW permission / restoration charges etc. The RoW is also denied at many places for local reasons. Since different state agencies have been imposing costs on RoW it has had the effect of escalating the overall cost of the infrastructure. **Therefore we recommend that the formulation of a National Telecom Infrastructure Policy (NTIP) must be simultaneously instituted as an integral part of this NBP.**

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CHAPTER 3: National Broadband Network

5.7 What network topology do you perceive to support high speed broadband using evolving wireless technologies? (Reference Para 3.22)

Mapping the digital divide presently existing between urban and rural India is a mammoth challenge owing to the setting up of infrastructure in remote or geographically challenged areas. The challenge is similar for densely populated urban areas. Emerging Wireless technologies should be seen as the potent solution to these pertinent issues of the past because of its ease of installation, operation & maintenance, flexibility for the service providers and convenience to the end users. However, we must emphasis on leveraging and harnessing all available technologies i.e. by means of adopting a "Technology Neutral Approach" to achieve the national broadband objectives in the most expeditious and effective manner.

It is recommended that the Network topology should be based on the principle of efficient utilization of various types of available infrastructure. This can be achieved by combining wireless technologies with the fiber based network. Fiber and Microwave can be used for the backhaul whereas wireless technologies can play a vital role in the access side of the network. This type of topology is being recommended keeping in view the success experienced by mobile phones in the country as against wireline phones. This also does not suffer from the long-delays, high costs and complicated RoW procedures involved in provisioning of services to consumers based purely on wireline technology.

5.8 What actions are required to ensure optimal utilization of existing copper network used to provide wireline telephone connections? (Reference Para 3.22)

Going by the country's prior experience, it is to be noted that copper cannot serve as the key medium to realize broadband targets. The emphasis should be on combination of fiber and wireless technologies which have not been given requisite support till now. The service providers should be incentivized to roll out fiber and this can be done from the USOF. Also, further financial support for laying of copper based networks may be withdrawn as it is not helping in proliferation of broadband and the same amount can be diverted towards supporting fiber based networks.

For the available copper, we recommend that:-

a) Customer could be offered broadband over copper with free usage of landline phone like a combo offer with minimal cost .

b) Broadband services providers, need an enabling condition in the building codes to promote the broadband connection in a commercial & apartment / Gated community over Fiber. Such a condition for all new buildings can be done by the JNURRM.

c) Actual Unbundling of copper line by the incumbents and advertise the same on revenue sharing basis

5.9 Do you see prominent role for fibre based technologies in access network in providing high speed broadband in next 5 years? What should be done to encourage such optical fibre to facilitate high speed broadband penetration? (Reference Para 3.22)

While wired broadband technologies in the access network such as Digital Subscriber Loop (DSL) and cable and OFC are well established in developed markets, the limitations of wired technologies impedes the roll-out of broadband in emerging economies. For example, wired technology requires a well-established infrastructure that is often not available in emerging countries, particularly outside urban areas. OFC and DSL lines, in particular, require good-quality OFC and copper lines that are often limited to several kilometers of a telecommunications exchange. Furthermore, with the rise of mobile telephony, many countries simply no longer deploy OFC and fixed copper lines in the access network. We should concentrate on evolving wireless technologies which have a continuously increasing potential to deliver higher speeds as is evident from 3G/EVDO/ WiMax/LTE TDD broadband etc. Maintainability of wireless networks is also much easier in areas that are disaster prone (floods, landslides etc) as well as in adverse law and order districts. This must be taken into account in this NBP.

Fiber based broadband services has the potential to provide maximum high speed Internet over all other available technologies. This technology has no limit as far as upstream and downstream bandwidths are concerned. However, the uptake in India has been low owing to issues relating to Right-of-Way (ROW) and higher capital expenditure commitments required. Fiber optic networks are typically laid down only in big cities with a high density of population and significant revenue-generating potential. Fiber to the Curb (FTTC) and Fiber to the House (FTTH) are being deployed at a limited level in the last mile. The uptake of FTTH in countries like Japan has been significant given the high population density, which makes it possible to connect many users in a small region, as also the widespread fascination for high technology. We feel that wireless technologies will have a more prominent role in the access network rather than OFC. Where ever we have a major core fibre network (specially in the urban areas) FTTH and FTTC is definitely an option. However, very high ROW charges at present are causing a major hindrance for fibre roll out. On the other hand, wireless broadband technologies will be in a better footing in rural areas both from a cost as well as a maintenance perspective.

World over, WIRELESS BROADBAND technologies have been identified to overcome aforementioned hurdles. In India too, UAS Licensees, have established considerable wireless infrastructure in rural areas. There is a strong case of leveraging this infrastructure for provisioning of national broadband services. Not only will this reduce roll-out time but will also rationalize the CAPEX requirement. The provision of broadband services needs incentives to rapidly scale up, since current technology options have already been deployed successfully in metro cities in India.

Needless to say that Potential of Wireless broadband technology along-with robust 2G eco system of voice and data services offered by Telecom Service Providers has not been given much attention in this paper.

Perhaps eventually, but the high cost of this exercise at this time may impede the success, especially in remote areas. A possible better approach is to leverage wireless technologies for

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access where the cost of fiber would be prohibitive. (for example a combination of both fiber and wireless technologies; fiber as a backbone and to anchor institutions first, and access from high speed wireless technologies, eventually the fiber connections can be expanded, where cost effective and desired, to provide higher speed access directly to individuals. The optical and wireless systems should feed and supplement each other along with power lines.

5.10 What changes do you perceive in existing licensing and regulatory framework to encourage Cable TV operators to upgrade their networks to provide broadband? (Reference Para 3.22)

Cable operators normally offer broadband by leasing bandwidth from ISPs or tying up with ISPs in a revenue share arrangement but there is a negative perception of customers who prefer to take broadband connections from TELCOs rather than from cable operators. Cable Operators small distribution franchisees donot deploy quality equipment and the same is unstructured and adhoc. Government should simultaneously regulate and enforce the same.

Digital transmission, offers a number of advantages over analogue broadcasting.. **In order to ensure that the country realizes the wide benefits from digital transmission, It is recommended that TRAI should mandate the digitization plan within next 2 years**. Also, TRAI may go ahead with the recommendations of increasing the FDI cap to 74% for MSOs who are/would digitize their networks. MSOs should combine and cooperate to build tomorrow's digital India. TRAI has sent its recommendations on 'Restructuring of cable TV services to Ministry of Information & Broadcasting.' Acceptance of these recommendations will expedite digitization of cable TV network and hence provision of broadband service.

The cable TV rules are already defined and further changes in the licensing regime are not required. However, there is a need to expedite the digitization plan and this should be done as part of Phase 1 i.e within 2 years.

5.11 Is non-availability of optical fibre from districts/cities to villages one of the bottlenecks for effective backhaul connectivity and impacts roll out of broadband services in rural areas? (Reference Para 3.39)

We support the development of a robust pan-India National Broadband Backbone with OFC in the core network, but would like it to be technology neutral, and the bandwidth offered on it in a neutral and transparent manner at affordable rates. This should also assimilate and consolidate within itself the existing substantial public assets such as the National Internet Backbone (NIB) and the others in the public sector (BSNL, MTNL,PGCIL, RAILTEL & GAIL, etc.). Sharing of the National assets have either to be mandated, counseled and incentivized. Any incremental investment must be made only after careful assessment of the needs and with a commensurate plan to deploy devices and content so as to realize the full potential of existing and rolling out new / upcoming infrastructure. Number of policy and regulatory requirements which did not allow optimally exploit 500,000 km optical fiber network of state owned BSNL was not allowed to TSPs . The optimum utilization of this should be done in this NBP .

The urgent need right now is to catalyze and accelerate the growth of Broadband in rural areas. The benefit of connecting the rural goes well beyond basic telecommunications. In the short term, it is quite evident that wireless connectivity is likely to be much more cost effective to

provide wireless connectivity to villages, than OFC, for example using existing wireless technologies as in the urban areas.

Subsequently the optical fiber based backhaul till taluka level will help to meet the high speed bandwidth requirement. We need to continue to drive our OFC backbone presence in rural areas for high speed broadband applications. Most UASLs can use their last mile RAN network for Wi-Fi based wireless broadband deployment. Incumbent operator can play a vital role in the backbone and the backhaul. It is recommended that the following points be considered in this regard:-

a) An effort should be made for mapping up of existing assets and resultant capacity of meeting the estimated projected demand in rural areas for arriving at a much more pragmatic and scientific approach of actual infrastructure that is required to be deployed.

b) The question is not that of unavailability of OFC. Significant amount of DHQs are connected with OFC, at least by three operators. Therefore the issue of concern is more of accessibility v/s availability. The thrust therefore has to be on ensuring means for making available this national asset of backhaul at least at the DHQ level at reasonable cost.

c) Given the already proven success of wireless in the context of Indian telephony, wireless as an option for deployment of Broadband should be given predominance over the wireline media.

d) The thrust towards use of OFC to act as proliferating Broadband penetration once again seems to be inadequately estimated /researched and we recommend further study. In order to ensure an efficient national deployment of OFC, a body similar to that of NHAI / UIDAI be incorporated, with equal participation from members of the industry.

e) Another learning from the growth trajectory witnessed by the telecommunication sector in India, has been that of the elasticity relationship seen between tariff and subscriber nos. A similar relationship is also apparent vis-à-vis penetration of broadband nos. Reduction in Broadband tariffs will thus be imperative in replicating a growth trajectory similar to that of wireless telephony. Additionally core would also have to be taken for both developing and promoting affordable applications/content which would be available by the Broadband subscribers.

Realizing the above benefits, the Universal Service Obligation Fund Administrator brought out a scheme for subsidizing Wireline Broadband in designated rural areas in January 2009. This scheme envisioned up-gradation of 27,789 rural exchanges of BSNL for provisioning 1,778,496 wireline broadband connections. Even after commencement of such subsidy schemes, India with over 600,000 villages still has to provide enabling schemes to cover adequate broadband coverage in rural areas. Deployment of last mile wireline infrastructure is deemed to be an arduous process where the following factors pose significant challenges to the rural broadband penetration time:

➢ Acquisition of land
➢ Right of Way
➢ Backhaul connectivity
➢ Lack of infrastructure sharing
➢ Power supply

- ➢ Higher operation and maintenance cost
- ➢ Lower Average Revenue Per User (ARPU) & hence reluctance to commit large investment;
- ➢ Affordability of Services
- ➢ Low level of Literacy and Awareness
- ➢ Unavailability of locally relevant applications in local language

World over, Wireless Broadband technologies have been identified to overcome aforementioned hurdles. In India too, UAS Licensees have established considerable wireless infrastructure in rural areas. There is a strong case of leveraging this infrastructure for provisioning of rural broadband. Not only will this reduce roll-out time but will also rationalize the Capex requirement. Since services already exist in urban areas it is only a matter of extending these to rural areas with suitable support for the upgrade of existing rural telecom infrastructure.

Taking the above into consideration it is evident that a combination of existing fiber optic network and emerging wireless technologies would be adequate to handle the challenges in the core, backhaul, access areas of the network (as also CPEs):

a) **Existing infrastructure**: The regulator should encourage all the operators to light up their dark fiber especially in the rural areas. Existing infrastructure is underutilized, thereby overcoming challenges faced so far for ROW, power supply, supply, retail distributor chains etc.
b) **Trials**: Tried and tested deployment in the urban areas in India, which can be rapidly scaled up in rural areas. Thereby being in line with the government's objective of inclusive growth with PURA – Providing Urban amenities in Rural Areas.
c) **Plug and play**: CPEs should be extremely customer friendly, easy to adapt by rural consumers, for individual as well as usage in cottage industry/SME applications
d) **Ease of Use**: Minimal after sales maintenance and support needs.
e) **Flexibility**: Usage as standalone device through USBs, as well as embedded in PC/Laptops, Cell phones.

We recommend that:

- **As part of the NBP, the USOF should devise attractive schemes for rural broadband to enable broadband connectivity in rural areas. The details of the schemes could be worked out by USOF and UAS Licensees.**

- **There is an immense potential for providing broadband over wireless in rural areas using different wireless technologies. While there have been many schemes for wireline, the focus on wireless has been limited. USOF should immediately devise a scheme for subsidizing infrastructure for wireless broadband.**

5.12 If so, is there a need to create national optical fibre network extending upto villages? (Reference Para 3.39)

We recommend the collaborative use of existing infrastructure to support deployment and uptake of rural broadband. Optical Fiber Network to the extent of 7,50,000 kms is available in the country. Approximately, 85% of India's villages are located within a radius of 15-20 kms of a fiber drop point. Therefore, it would be inappropriate to conclude that the non-availability of optical fiber network in the backhaul is resulting into the low proliferation of rural broadband. Many telecom operators and government agencies (Railtel / Power Grid Corporation of India Ltd/GAIL) have already deployed vast network of fiber and appointing an agency would tantamount to duplication of infrastructure. In fact, Pan India Optical Fiber Network should be mapped across all public and private

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operators and the same should be collaboratively used (or shared) with wireless technologies, to increase the broadband penetration in India. BSNL, for example, has more than 5,00,000 km optical fiber network in India. The reasons for its low utilization need to be taken into account while formulating this current proposal.

In addition, the topology should include wireless technologies so that broadband proliferation does not suffer from limitations of complicated RoW procedures, time consuming infrastructure laying process and high costs. Wireless also offers the advantages over wireline in terms of being immune to damages like 'fiber cut' which may be caused by natural disasters / negligence etc.

Thus, we recommend the collaborative use of existing and proposed new infrastructure of public and private operators to support deployment and penetration broadband in the country. We appreciate and support as one of the proposals i.e., to work alongwith the NRRDA, MGREGA to lay OFC alongwith the construction of these roads. While there is no denying that considerable new infrastructure is required to be provided in the fastest possible manner a more realistic estimate of the targets , resources and timelines for execution of this national optical fibre core network layout needs to be done, than that which has been indicated in the Consultation.

This consultation on the National Broadband plan focuses predominantly on issues with creating National Fibre Agency and gives lesser weightage to other effective methods of network deployment and access which could be less capex intensive. One such method of deployment is via wireless broadband.

5.13 In order to create National optical fibre core network extending upto villages, do you think a specialized agency can leverage on various government schemes as discussed in para B? (Reference Para 3.39)

While we consider the establishment of a new Agency that is required to laverage various government schemes, it is important to take into account if we nationally have achieved the objectives of the existing spends undertaken by the Government so far, in order to predict policy outcomes of this Plan with a reasonable degree of certainty. For this it is essential to have a much better understanding and appreciation of the broadband market, than what has been presented in the consultation. The singular thrust in this consultation towards use of OFC to act as the most potent method of proliferating broadband penetration requires more in depth information and statistical analysis and further study.

 In this regard :-

We need to study the market and gather statistics with granularity at the state level atleast for the following:

a) **Penetration.** Which parts of the country is broadband has a higher penetration and where it is not available. The geographies   at the state level require more detailing. (for eg in the mountainous regions and the North East it would be more convenient and cost effective to have Microwave rather than OFC even along the roads due to landslides and weather conditions.). We don't know what are the lessons from the earlier programs in this direction.

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b) **Customer Profiles.** There would be systemic differences in the various states and would require to be addressed by the respective state with suitable policies at their level.

c) **Usage Patterns**. What are the masses interested in, what type of bandwidth these masses need. Allocate a priority for provision of this online usage in the first phase. At the outset most users in rural areas with have their first experience of the internet on mobile handheld devices.

d) **Supply side constraints**. Is broadband infrastructure available in the state at the district level, village level?? A large amount of broadband infrastructure is currently available why has this not been used to its potential.

e) Special consideration to those states and areas which do not have a conducive law and order environment. Use the Home Ministry data for specific planning in these areas to have a dedicated focus in this NBP for such areas.

Without clear deliverables & benchmarks for evaluating the above, any such effort for a new Agency, will lead to inadequate utilization and even potentially result in a waste of scarce public funds. Authority has to undertake some study of the existing efforts of the government on broadband and how and where these have lead to tangible benefits to the public .Only after enhanced research on this the scheme, the proposal for setting up such an Agency as proposed in this Plan may be undertaken .

Taking into account the past experience the private Telecom industry has made extensive telecom infrastructure rollouts in all parts of the country where there was a good market case to do so. The speed of this rollout has been commended and appreciated by all in the world. We believe that the regulator and policy makers should unlock the potential and provide the correct incentives for broadband usage.

Keeping the above in mind, we recommend that it would be beneficial first to do a dedicated study to plan, and then specify the timeline for considering the establishment of an Agency after due consultation.

5.14 Among the various options discussed in Para 3.35 to 3.37, what framework do you suggest for National Fibre Agency for creating optical fibre network extending upto village level and why? (Reference Para 3.39)

Development of a robust pan-India National Broadband Backbone is required but with technology neutral approach as well as assimilate and consolidate within itself the existing substantial private and public assets such as the National Internet Backbone (NIB) and the others in the public sector (BSNL, MTNL, PGCIL, RAILTEL & GAIL, and private telecom operators, etc.). Any incremental investment must be made only after careful assessment of the needs and with a commensurate plan to deploy devices and content so as to realize the full potential of existing and rolling out new / upcoming infrastructure. For example, it may be noted that a number of policy and regulatory requirements/constraints did not allow telecom service providers for optimal utilization / leveraging of the 500,000 km optical fiber network of state owned BSNL. Before undertaking a rapid expansion plan for further OFC deployment, it is pertinent to analyze as to why this extensive OFC is still grossly underutilized. The most cost effective and optimum solution will likely be a mix of technologies and incorporate both wireless and wire line solutions. As previously mentioned, a phased approach should first focus on exploiting existing infrastructure and wireless technologies, with simultaneous extensive fiber layouts in urban areas and to anchor institutions, exploit existing wireless network coverage to

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the villages, and provide training to the remote areas and villages on the benefits of and how to use Broadband and ICT.

The various proposals for such a major network with massive financial outlay needs to be studied and outlined in much more detail than has been done in the Paras 3.35 to 3.37. Out of the three options the proposal for a self supporting national agency to construct, own and lease the OFC network is most favorable. **However, before making a recommendation the Authority must give a detailed proposal for the constitution, terms of reference, funding, manning, functioning and oversight for this agency. Considering the importance of this undertaking we strongly request that this be given a more detailed discussion with participation of all stakeholders prior to making a recommendation.**

In order to ensure an efficient national deployment of OFC, after due consultation a body similar to that of NHAI/ UIDAI may be incorporated, with equal participation from members of the industry.

The agency ownership arrangements should minimise the scope for conflicts of interest between the Government's role as promoter and its role as policy-maker. Further this agency must be independent so that it maintains its independence and there is not unfair discrimination between access seekers.

5.15 What precautions should be taken while planning and executing such optical fibre network extending upto villages so that such networks can be used as national resource in future? What is suitable time frame to rollout such project? (Reference Para 3.39)

The time frame should be for the National Broadband Plan should be atleast the next decade i.e from now till Dec 2020. This should be broken done into phases with specific responsibilities both for government agencies as well as the private industry as stated earlier.

It is recommended that this NBP integrates the aspect of backhaul infrastructure through Microwave in the rural areas. Depending on the geographic and demographic profile of the area, the backhaul and core connectivity it would be better for Authority to undertake a more detailed estimate with a circle level granularity to recommend which technology and medium will be more cost effective , cover larger numbers and can be more viable. The wireless medium is also preferable for quick deployability, particularly in hilly regions.

Therefore we recommend that measures for support for wireless connectivity from nearest SDCC/BHQ to rural BTS/BSC should also be considered as intrinsic to this NBP.

However, in the event that a National Network is setup, the following key considerations are recommended:

a) **National Broadband Network:** The scope of the national program should not be limited to fiber based technologies. Considering the recent auction of 3G/BWA spectrum, wireless broadband technologies would also play an important role in the setup of this national network. Therefore, it would be pertinent to name it as "National Broadband Network".

b) **Set clear, transparent and pragmatic coverage requirements:** Proper forecast of population & subscriber numbers should be carried out to ascertain the capacity or bandwidth requirement in the future. Taking cues from the Australian National Broadband Network Program initiated in 2009, the same was planned (given the heavy capex deployments by government) to provide continuous services to millions of users

over an infrastructure that would last for at least 40 years. Similar vision should be taken into consideration while defining the objective or the project charter.

c) **Realistic target setting:** The consultation paper envisions deployment of 11.46 lakh km OFC core network backbone in next 2-3 years; even if a target of 3 years is set, this would require laying 707 km of fiber daily. This is an unrealistic target and highlights the need to have a more detailed estimate of capabilities to roll out, timelines and funding mechanism to execute with realistic targets to be met.

d) **Commit to build unilaterally, but maintain willingness to share infrastructure: collaboratively:** While, deploying this national broadband network, the regulator/agency should encourage all the public and private operators to provide / share their ducts / dark fibers so as to make the project a success. Passive infrastructure sharing should be encouraged amongst all operators.

e) **Provide support for efficient deployment:** It is essential to have a NTIP with RoW issues to be earnestly resolved to avoid cost overruns. Cost subsidies should be provided and efforts should be made to provide adequate power supply (or alternatives energy sources) for the initiative.

f) **Leverage use of Wireless Solution:** Wireless technologies would come handy to provide the last mile access, as also in the backhaul. Operators should be encouraged to provide broadband services using wireless technologies which would be cost effective and result in faster deployment. However, the operators would be independent to choose their preferred technology to provide the last mile.

g) **Broadband Fund:** A special Broadband Fund may be set up to specifically meet the national broadband objectives of the Government. In this context, it is to suggest that a percentage of the proceeds of say 20-30% from the recent 3G and BWA auctions may be earmarked for the National Broadband Fund. The Government has earned far more from the recent auctions than was originally anticipated and thus it would be both desirable as well as appropriate that at least a part of the funds received from auction of spectrum for broadband are channeled back into the sector for achieving the broadband objectives. This by itself will contribute significantly to the overall development of the economy leading to higher GDP.

CHAPTER 4: Regulatory Challenges and Future Approach

5.16 Is there a need to define fixed and mobile broadband separately? If yes, what should be important considerations for finalizing new definitions? (Reference Para 4.18)

Yes. Fixed and mobile broadband should be defined separately. QoS & SLA are the important parameter for finalizing these new definitions. We recommend that since a massive financial commitment has been made for the wireless spectrum, this commitment is based on the existing QoS parameters / benchmarks, there should be no change to the current " goal post" of QoS in the near future until the deployment period of these is over.

In this perspective, the words "Always on" restricts wireless based high speed internet connections from being classified as Broadband. "Always on" should not be included in any broadband definition. In this age of information technology where growth of the internet is anticipated to be driven mainly by wireless access such as 3G and BWA technologies, the current definition may be highly restrictive.

Internationally too, the definition of broadband is relatively less restrictive. *Several advanced and developing countries have not set a minimum speed for broadband connections thus driving competition and getting players to provide higher speeds to customers. We suggest that India should also follow this concept.* In some countries who have defined speeds, there are separate definitions for wired and wireline connections in order to protect the interests of both technologies.

Technological innovation has changed the parameters of the telecom sector. New developments have given rise to mobile-fixed convergence, eroding what was once an important distinction from the perspective of authorizing services. IP based networks and services have further contributed to convergence in the ICT sector. For example, basic cable television services have entered in to telephony and Internet access over the single median cable.

Next generation Networks (NGN) represents the next phase of development of convergence in the ICT sector. NGN will essentially enable consumers to receive a wide range of services over a single IP-based network. The transition to an IP-based environment requires intensive investments as access providers and network operators must upgrade and build new infrastructure.

From a regulatory perspective, convergence in the ICT sector and the move to NGN raise a couple of important issues. First, traditional market boundaries are increasingly blurred. Moreover, multiple services can now be offered over a single platform. Service specific authorizations can be troublesome in this environment because they hamper service provider's ability to take advantage of efficiencies engendered by technological innovation and to respond to consumer demand. Service specific authorizations also represent an increasing regulatory burden as service providers must hold many authorizations to provide full range of services to their customers.

Second, service providers are looking for regulatory certainty in light of significant investment they must make to upgrade their equipment and build new infrastructure. As changes are made to the regulatory framework in response to new 3G/BWA networks where convergence and NGN are to occur, the TRAI must be sensitive to the concerns to the service providers. Transition to a regulatory framework designed to respond to an IP-based environment must be carefully managed in order to avoid discouraging service providers from investing in NGN.

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Regulators should also take high cost of rolling out IP-based networks in to consideration when setting the terms and conditions for authorizations.

We believe Mobile broadband would play a vital role in ensuring the last mile connectivity in Rural India. For most of the rural customers, mobile has and will continue to be the first tryst with the power of Internet. Lower device cost, wider network connectivity and reach has enabled mobile broadband to generate a sizable base. There lies substantial opportunity for Mobile carriers to play a significant role

The current definition of broadband describes it as a connection with a speed of 256 kbps and more. While this speed would be feasible for wired line broadband, a sub category 'Mobile broadband' needs to be defined within the broadband purview in view of the important role Mobile broadband is likely to play . Further, it is also important for the TRAI to understand that putting a minimum must have speed on wireless would not be feasible.

It is insightful of the TRAI to recognize that broadband definitions are not static, and are required to improve over time. In context, fixed broadband technologies such as fiber can generally provide higher throughput than wireless technologies can today, and it is logical to differentiate between fixed and mobile broadband. In any event, we recommend that India ensure that most citizens are able to get broadband, as per the national BROADBAND Policy, 2004, at high quality and affordable rates, and as expeditiously as possible.

It is pertinent to mention that various definitions in the world prevalent must be taken into account while formulating a new definition. Some of these are given below:-

i. *OECD:*

Defines broadband as minimum 256 Kbps but does not have any criteria as "always on".
Interestingly, OECD also classifies as per different ACCESS TECHNOLOGIES as below:

   *1.   **DSL:***
   a. Includes all DSL lines offering Internet connectivity which are capable of download speeds of at least 256 kbit/s
   b. The DSL line is excluded if it is not used for Internet connectivity (e.g. leased lines)

   *2.   **Cable:***
   a. Includes all cable modem subscribers at download speeds greater than 256 kbit/s

   *3.   **OFC***
   a. Includes all fibre-to-the-premises (e.g. house, apartment) subscribers at download speeds greater than 256 kbit/s
   b. Includes all fibre-to-the-building subscribers (e.g. Apartment LAN) using fibre-to-the-building but Ethernet to end-users. NOTE: This counts only the number of actual subscribers to the provider, not end users.

   *4.   **Other***

   a. Wireless (includes only connections with speeds faster than 256 kbit/s to end users)

      i. Includes fixed wireless technologies
         1. Satellite
         2. LMDS
         3. MMDS
         4. WiMAX (fixed)
         5. Other fixed-wireless transport technologies

ii. Does not include
  1. 3G mobile technologies
  2. Wi-Fi
  3. Exceptions: included in rare case that Wi-Fi/3G is the transport mechanism of a fixed-wireless provider (e.g. in rural UK, CZ, SK)

b. Wired (only connections with speeds faster than 256 kbit/s to end users)

  i. BPL: Includes all broadband over powerline subscribers with download speeds greater than 256 kbit/s
  ii. Leased lines: Includes only circuits with Internet connectivity

ii.   FCC:

A generic definition of broadband by FCC is available at http://www.fcc.gov/broadband/
"The term "broadband" refers to advanced communications systems capable of providing high-speed transmission of services such as data, voice, and video over the Internet and other networks. Transmission is provided by a wide range of technologies, including digital subscriber line and fiber optic cable, coaxial cable, wireless technology, and satellite. Broadband platforms make possible the convergence of voice, video, and data services onto a single network."

FCC also has a technical definition of broadband which puts a minimum bandwidth requirement of 768 kbit/s (0.8 Mbit/s).

iii.   Pakistan:

Pakistan is one of very few countries which have the "always on" criteria. Broadband in Pakistan is defined as "Always on Internet connection with a download speed of at least 128kbps connectivity"

iv.   AUSTRALIA

(http://www.dbcde.gov.au/broadband/australian_broadband_guarantee#about)
The Australian Telecom Authority defined broadband not only on speed but also has a cost of ownership component attached to it.

"Under the Australian Broadband Guarantee, a metro-comparable broadband service is defined as any service that offers a minimum 512kbps download and 128kbps upload data speed, 3GB per month data usage at a total cost of $2500 GST inclusive over three years (including installation and connection fees)."

We recommend that there should be no minimum speed for broadband as it will be defined by the market forces. It is to be noted here that first requirement is to provide broadband access in urban as well as rural areas. As the demand will increase, the industry will itself take care of the customer requirements and will provide network with higher speeds. Even now wherever it is possible the service providers are offering higher speeds for broadband service to their customers.

Also presently, TRAI regulations mandate publishing of contention ratio to be defined in a broadband service. Due to dynamic nature, contention ratio for wireless broadband

technologies cannot be defined. It may be proposed that the said clause should be done away with.

The need of the hour is to first enable the vast majority to experience the internet as the first priority. The focus should be on this aspect, the provision of which will automatically lead and encourage the growth towards higher broadband penetration. We believe that the definition of broadband in any country has not been an impediment for supporting high bandwidth applications. **The definition especially for a county like India, with a low penetration of internet users must be an enabling definition rather than an excluding one, such as to enable the masses to experience the internet, and online utilities to their benefit. Broadband providers have been known to provide much higher speeds where ever the demand has arisen.**

While in its present form, it is a trifle conservative, however, the erstwhile policies and related implementation has not been able to achieve the specified targets of the Broadband Policy 2004. We recommend for an emerging economy like India, depending on local circumstances, we should ensure that most citizens are able to get at least the speeds as per this National Broadband Policy, 2004, initially, at high quality and affordable rates, and as expeditiously as possible. As the infrastructure and the power supply situation improve the broadband penetration will increase.

Minimum defined speed does not deter the delivered speed and as proven internationally, players will offer speeds based on demand requirements and competition. Thus, there is no need to define a minimum speed criterion.

As mentioned earlier there is an urgent need to have the **National Telecom Infrastructure Policy** instituted as a part of this NBP. It is suggested that going forward all the National and state level authorities to be insisted for constructing suitable ducts for telecom cables during any new road constructions; road widening and improvement plans as standard practice and this infrastructure can be leased at reasonable tariffs to the Telecom operators. Such practices already exist in various countries across the globe. Considering the rapid pace of urbanization visualized and planned to be catered for in the JNURRM, the TRAI recommendations on the NBP should recommend that the JNURRM specify that all future infrastructure projects in the real estate sector, roads, and related infrastructure be broadband enabled ab initio.

Enabling a standard process for site clearance, right of way management for fiber deployment across all circles: Currently every state / Town Municipality authority has its own policies for clearance for construction of passive infrastructure for BTS sites and ROW permissions including various tariffs / commercials. This needs to be streamlined and uniform process and concessional commercials to be formulated across all the circles to facilitate speedy and transparent infrastructure roll out.

The requirement for rollout of core and backhaul fibre networks has increased the importance of rights of way (RoW). The delay in issuing ROW approvals increases cost of project. In addition state governments are also imposing very high RoW levies which is increasing cost for laying of fibre network. Since large part of the cost of deploying fibre networks is in form of RoW there is

a need to have appropriate policies in place for ensuring access to right of way at reasonable prices. The Consultation paper must propose the method of funding the RoW clearances which themselves amounts to Rs 34380 crores only for OFC. The NBP must take into account the RoW for wireless access in addition to this cost estimate given for OFC.

The Telecom Operators have been guaranteed the Right of Way (ROW) under Section 10 of the Indian Telegraph Act, 1885 and as per the Act, the charges that can be levied for granting RoW shall be limited to the restoration charges. However, various municipalities and other State agencies have stipulated their own norms across the country for granting permission / access. State governments have started levying exorbitant charges not commensurate with restoration charges of the particular area. Such rates are often arbitrary and range from few Tens of Thousands to Rs 26 lacs per km. There is no rationality/ uniformity in charging as well as there is no uniformity across various states / municipalities and within a state.

In the absence of clear central government guidance, a number of states have begun to regulate the ROW charges as a source of revenue for the state, resulting in additional costs to the providers and, ultimately, to consumers.

We recommend that the NBP should specify a Uniform RoW policy which should be adopted and followed by all state governments. These guidelines should lay down principle for charging for RoW approval, timeline for ROW approvals. These guidelines may also advise the state governments that land conversion requirement should also be dispensed with for laying optical fibre connecting the mobile towers in the forest land.

Uniform Policy for setting up of towers.

Many state governments and municipalities have started imposing stringent guidelines for setting up of towers. These guidelines are mostly based on wrong perception that EMF radiations are health hazards. India has already adopted ICNIRP guidelines and service providers are bound to meet the these EMF limits. World Health Organization (WHO) has concluded that current evidence does not confirm the existence of any health consequences from exposure to electromagnetic fields within ICNIRP limits.

There are other concerns relating to tower safety. The construction of Telecom towers are still unregulated activity throughout India. Department of Telecommunication's engineering bodies can be mandated to work towards standardizing the tower construction.

In addition, broadband network construction often involves multiple jurisdictions. The timing of the process and fee calculations by one local government may not take into account the benefits that constituents in neighboring jurisdictions would receive from increased broadband deployment. The cost and social value of broadband cut across political boundaries; as a result, rights-of-way policies and best practices must reach across those boundaries and be developed with the broader public interest in mind.

In view of the above, the we recommend that this NBP includes the National Telecom Infrastructure Policy (NTIP) which includes the requirements for RoW for both landline and wireless infrastructure. To help develop this consistent rights-of-way NTIP , the TRAI should propose formation of a Inter Ministerial joint task force of state, local and municipal authorities with a mandate to:

a) Investigate and catalog current state and local rights-of-way practices and fee structures, building on data held with the TRAI & DoT.

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b) Identify public rights-of-way and infrastructure policies and fees that are consistent with the national public policy goal of broadband deployment and those that are inconsistent with that goal.

c) Identify and articulate rights-of-way construction and maintenance practices that reduce overall capital and maintenance costs for both government and users and that avoid unnecessary delays, actions, costs and inefficiencies related to the construction and maintenance of broadband facilities along public rights-of-way.

d) Recommend appropriate guidelines for what constitutes "competitively neutral," "nondiscriminatory" and "fair and reasonable" rights-of-way practices and fees.

e) Recommend a process for the DoT to use to resolve to use to resolve disputes under Indian Telegraph Act . Creating a process should expedite resolution of public rights-of-way disputes in areas either unserved or underserved by broadband.

f) The TRAI should recommend that the task force make its recommendations within six months of the task force's creation. These recommendations should then be considered by the TRAI as part of a proceeding that seeks industry-wide comment on these issues.

g) Recommend a "single trenching " legislation applying to all future government funded projects along rights-of-way (including sewers, power transmission facilities, rail, pipelines, bridges, tunnels and roads).

5.19 Does the broadband sector lack competition? If so, how can competition be enhanced in broadband sector? (Reference Para 4.42)

With the imminent rollout of 3G, BWA there will be adequate competition in this segment. The regulator must wait for making any changes till the roll out of 3G and BWA is completed to bring any fresh recommendations on this topic. The operators have committed a substantial amount of finances for this, taking into account the current regulatory and policy framework to make their business case. It would be premature to make changes to this framework without having the benefit of market feedback as it emerges with the rollout of wireless broadband services.

While it is difficult to comment specifically on competition in the Indian broadband market, in order to enhance competition generally, technology and competitive neutral policies, regulatory certainty should be established. More spectrum should be released in a technology and service neutral manner to promote broadband wireless access. Additionally, policies and practices should be established to encourage competition for access to the international cable gateways.

The recommendations of the authority in the NBP must take into account the competition in the market that has already been unleashed courtesy the 3G/BWA auctions. To enable faster roll out, TRAI may consider recommending additional incentives for roll outs completed ahead of schedule. For e.g. If the rollout is completed in target date minus X months , Y months then an added 15%, 10 % respectively of the subsidy from USOF should be given as incentive.

As proved internationally, higher penetration is a result of high competition there should be measures like releasing more spectrum to introduce more players and thereby increase the competition in the sector.

5.20 Do you think high broadband usage charge is hindrance in growth of broadband? If yes, what steps do you suggest to make it more affordable? (Reference Para 4.42)

Yes, the current usage charges are high on account of high backhaul costs. In addition to creating policies and practices to enable a more technology neutral, competitive environment, incentives can be provided, in the form of targeted subsidies and tax incentives for providing lower costs on backhaul bandwidth.

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In the event of modeling the various costing elements contributing to the cost of Broadband services, it is evident that approximately 60-70% of this cost is attributable to backhaul cost. Thus any means to reduce by way of a costing mechanism or by way of providing subsidy should be advocated. The TRAI therefore should intervene and undertake a study to cap the maximum tariff payable for backhaul services.

However, in addition the perceived benefits of the use of broadband need to be highlighted for making it more affordable taking into account a holistic expenditure for including reduced cost of travel and work from home, resulting in increased productivity that can be possible with broadband. For this digital literacy training can be established to explain the benefits of broadband to both urban and rural citizens.The commercial and e-Gov applications should run side by side to support each other and become sustainable..

5.21 Do you think simple and flat monthly broadband tariff plans will enhance broadband acceptability and usage? (Reference Para 4.42)

Another learning from the growth trajectory witnessed by the telecommunication sector in India, has been that of the elasticity relationship seen between tariff and subscriber nos. A similar relationship is also apparent vis-à-vis penetration of broadband nos. Reduction in Broadband tariffs, will thus be imperative in replicating a growth trajectory similar to that of wireless telephony. Additionally costs would also have to be taken for both developing and promoting affordable applications/content which would be available by the Broadband subscribers.

The tariffs should be left to market forces . This has borne fruit in the voice segment and we feel that forbearance should be exercised for the Broadband segment also. With a view to enable utilization in the rural areas, the subsidies should be planned for rural areas and users. In rural areas, perhaps the more viable business model will be opening shared services kiosks akin to cyber cafés to start with and as the demand will pick up the individuals will be taking up connections. The tariffs will be decided by market forces and the type of applications thereof.

End-User Subsidies

Under this mechanism, we recommend that the NBP envisage that a subsidy is given directly to end users, subscribers, and/or consumers. The government must first decide what segment of users (rural areas, low income users, old citizens, handicapped citizens, and so forth) will be targeted. Then, policy makers must decide how the funds will be used by the recipients. For example, recipients may only be allowed to use funds to help pay for all or part of their monthly broadband usage costs. Finally, the TRAI may propose how will funds be effectively allocated to the target recipients. For example, funds may be allocated indirectly through carriers (through vouchers, rebates, or calling cards) or directly to recipients through government vouchers, tax credits, government checks distributed by a social agency, and/or government sponsored calling cards.

5.22 Should broadband tariff be regulated in view of low competition in this sector as present? (Reference Para 4.42)

In view of the imminent rollout of 3G/BWA networks we do not recommend any regulation of broadband tariffs until rollout of 3G/BWA networks.

To further achieve broadband penetration there is need to help service providers in maintaining low tariff costs, the Government can implement some measures to bring down the operator cost through certain investments:

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a) Subsidies may be provided to service providers who apply for provision of wireline broadband connections through Universal Service Obligation Fund (USOF).
b) Financial incentives in the form of lower ROW charges
c) Lower AGR based license fees
d) Government should serve as an anchor customer in driving penetration.

All these measures would lower operational costs and hence lower tariffs.

The TRAI should focus on promoting policies that encourage competition and investment in the broadband marketplace. This will do the most to encourage lower costs. In the event where competition will not exist for some time, for example in areas where it is not cost effective, targeted subsidies and tax incentives can be provided to promote lower costs to consumers.

As an example, incentives out of the USOF could be provided to Service providers, in a technology and competitively neutral manner, for providing low cost broadband to the students and government employees, NGOs, schools, hospitals, other educational institutions.

5.23 What should be the basis for calculation of tariff for broadband, if it is to be regulated? (Reference Para 4.42)

A realistic estimate of cost components of broadband provisioning is essential before making a recommendation on this aspect. As mentioned above the cost of back haul should be affordable to enable growth in broadband. Market and competitive forces should be allowed to drive innovation and prices in the market. Different Broadband plans should be available as per the circle and the Broadband penetration in that circle

Broadband rental calculation should be done base on the competition mapping & prospective subscribers in that circle. Currently there is high CAPEX incurred in case of copper rollout. This can be done by reducing and by taking BSNL & MTNL copper rollout on rental/hire basis. This will help all ISPs to provide DSL / residential broadband internet service with least possible cost & minimum rental.

5.24 How can utilization of International Internet bandwidth be made more efficient in present situation? (Reference Para 4.42)

We recommend that the regulator should encourage domestic hosting/mirroring of sites & domestic routing of traffic by creating an economically viable model through effective data centers and NIXIs.

5.25 How can use of domestic and international internet bandwidth be segregated? Will it have direct impact on broadband affordability? If so, quantify the likely impact. (Reference Para 4.42)

Most of the ISPs and all major ISP are already connected in all 4 major NIXI nodes and exchanging all the domestic traffic domestically. Also these ISPs are also doing Private Peering among themselves. Hence there is no question of routing the domestic traffic through international routes. Since this exchange of traffic is already being done at NIXI and hence this will not have any further affect on reducing the Broadband prices further. Also the major cost for providing the broadband connection to consumers is the cost of rolling out last mile infrastructure.

5.26 What steps should be taken to bring down the cost of international internet bandwidth in India? (Reference Para 4.48)

Price of Internet BW in India have fallen drastically over the past 3-4 years due to intense competition. Also many ISPs and other application providers have now started providing hosting services and content delivery services with in India. Due to this many of the popular content sites are already being hosted/cached/mirrored in India in various ISPs / other application providers network. This has reduced the percentage of international traffic for the past 2-3 years. However even though the prices for internet BW have fallen drastically, there has been increase in Internet Data Centre Costs due to increase in real estate costs and power costs. Govt. may consider to give "Power" subsidies to Internet Data centers to reduce the domestic hosting cost further. The real push for domestic traffic will come due to growth in domestic content and applications like e-governance or other BW hungry applications like video traffic etc. This can be achieved only once we have deep high speed Broadband penetration.

5.27 How can competition be enhanced in the International bandwidth sector? (Reference Para 4.48)

It has been quoted that International Internet Bandwidth constitute major component of broadband tariff. Following are the key points to highlight the current scenario with respect to International bandwidth prices and competition in this sector:

Currently there are approximately 24 ILD license holders in India. Many of them have their own ILD LIM providing them access to the International BW infrastructure not only through India ILDOs but also but also many foreign players. Hence there is already intense competition for International BW in India.

It has been mentioned that majority of STM-1 capacity are available at a recurring charge of USD 15,000/- per month. It is to be noted that the price of USD 15,000/- is only from PoP to PoP and does not include the last mile access and cross-connect charges. Hence we would observe the actual price in the range of ~USD 18,000/- for end to end service.

Additionally the pricing for IPLC capacity in India is competitive considering the number of players in the market who offer IPLC services Hence the multiple providers in the market are causing the prices to be substantially discounted. Further the IPLC tariff has undergone downward revision 5 times in the past 8 years indicating the prices becoming more and more competitive.

Comparison with the global market trends of median STM-1 pricing as per Figure 4.8 clearly indicates that Hong Kong – Tokyo at $18,000 is higher compared to the India touching price trends observed.

Further if we add local loop Prices in Singapore and take STM-1 cost from Singapore to US then it will be more than India IPLC price. Additionally Atlantic prices are below $15,000 per month due to abundant submarine cable capacity available in the European & American continent and hence is not the appropriate example to compare with India.

For the per MB price trend observed in domestic TRAI pricing slabs, the price per MB of a DS-3 is 5 times higher compared to the price per MB of a 10Gb pipe. This is less compared to what is shown as 1/100th price of DS-3 per Mb compared to a 10Gb pipe per mb. Hence again showing that the price per Mb is competitive in India.

It has been stated that Most of the service providers hire bandwidth in terms of STM-1 or in some cases STM-4 only due to lack of fat back bone of 10G and above. However on the contrary today we have network back bones which support multiple 10G requirements. However the ISPs still request for mostly STM-1 capacity. This is a result of less number of broadband customers. Today the problem faced for limited broadband access is the lack of ready availability & deep penetration of last mile access networks. This results in the service providers unable to serve larger number of potential broad band customers. Thus resulting in a lesser requirement for high bandwidth pipes. Hence causing an increase in per MB price due to demand of low bandwidth pipes of STM-1. Thus driving overall costs higher.

This clearly indicates that the availability of last mile access is crucial for deeper penetration of broadband utilization in the country which will result in higher bandwidth consumption and lower per MB bandwidth costs. Further there is URGENT need to reduce or waive the ROW charges for last mile roll out as these have gone substantially high over the past 3-4 years and this is proving detrimental for the growth of broadband (consumer as well as enterprise) in India.
While the process depends on national circumstances, one general method is to ensure fair and equal access to the international bandwidth.

Though there are many players in market who can provide Internet BW or international BW in India but to provide the broadband services in India to consumers only few players have last mile reach ability. So even though there is intense competition in the Internet BW market but due to last mile unavailability there is limited effective competition in Consumer Broadband Market. The competition can be enhanced by providing incentive to ISPs to increase the last mile roll out by these ISPs and hence steps like reduction in RoW charges and easy availablity of local loop will play a major role in broadband penetration.

5.28 QoS of broadband, availability of bandwidth, adherence to given contention ratio, affordability, availability and spread are some intricately linked parameters. In your opinion what should be done to ensure good quality broadband to subscribers? (Reference Para 4.59)

All of them are essential parameters for good quality Broadband services, however contention ratio could not be achieved at lower cost.
Voluntary QOS metrics should be developed in partnership with industry.   Additionally, introduction of more competition into the marketplace will help to promote higher quality connectivity

5.29 Do you think that bad quality of broadband connection is impacting the performance of bandwidth hungry applications and hence crippling the broadband growth? If so, please suggest remedial actions. (Reference Para 4.59)

&

5.30 Is there a need to define new/redefine existing quality of service parameters considering future bandwidth hungry applications, time sensitivity of applications and user expectation? What should be such parameters including their suggestive value and should such parameters be mandated? (Reference Para 4.59)

The current service quality parameters laid down by TRAI are stringent enough. These parameters have been recently defined and there is no need for any changes in this.

Government's focus should be on increasing competition which will automatically ensure that subscribers benefit from improvements in customer service / innovations in tariff / better connectivity etc. The quality of Broadband in India is governed by the current parameters as per the TRAI regulations, which are based on realistic parameters.

Bandwidth on demand feature could be made essential for service provider for easy upgrade of bandwidth for bandwidth hungry applications. This could be left to market forces and user choice and billing need to be supported for commercial measure.

5.31 What measures do you propose to make Customer Premises Equipment affordable for common masses? Elaborate your reply giving various options. (Reference Para 4.64)

It is pertinent to mention that a number of proposals made by the TRAI in their earlier submission on "Broadband India: Recommendations on Accelerating Growth of Internet and Broadband Penetration" dated 29th April 2004 had been made but these have not been implemented by the Government. Many of these recommendations are still relevant in the context of this National Broadband Plan and should be seen in conjunction while formulating the new Plan under this consultation. In addition the NBP must consider :-

a) Establish easy accessibility and affordability to internet devices like PC, laptops, netbooks, mobile internet devices and other BROADBAND enabled devices. This can be enabled by eliminating or minimizing tax on internet access devices, such as computers, net books, mobile internet devices, etc. Reducing the taxes and duties on these devices to 'Zero' will help affordability and hasten the pace of BROADBAND penetration and proliferation.

b) CPE consideration should take into account the potential of mobile devices like smartphones which offer significant advantages over PCs like lower costs (Fraction of PC cost); icon based touch interfaces which can be used by computer / English illiterates; potential for much wider penetration. Keeping this in view there should be subsidies for the broadband mobile devices. 3G/BWA phones will be a major method of broadband access on both handheld as well as fixed devices.

c) Provide targeted subsidies, preferably from general tax revenue, to underserved and underserved populations for internet access devices.

d) Strip down the devices to bare minimum and use cloud computing to make these cheaper. Use SaaS for reducing costs of software and upgrades.

e) Make available the SWAN spare capacities in as a part of the NBP.

f) Provide incentives to MSMEs in the form of tax holiday on PC rentals, 100% depreciation on all IT investments and subsidized broadband for 6 months.

5.32 What measures are required to encourage development of content in Indian vernacular languages? (Reference Para 4.68)

a) Increase Awareness around the benefits, applications, limitless possibilities, knowledge and ease of use of Broadband

b) Involve NGOs (Non Government Organizations) who have reach to the masses in the hinterland

c) Incentives to the local entrepreneurs for making available the local and tailor-made applications to suit local needs of the region

d) Digital infrastructure Creation at the State and Central level

e) The content development will happen as the broadband penetration increases. Further, if some measures are to be considered, they have to be in respect of sharing of revenue between content developer/VAS providers and telecom service providers. In this regard TRAI recommendations on VAS need to be considered by the DOT.

5.33 Do you perceive need for any regulatory or licensing change to boost broadband penetration? (Reference Para 4.71)

An enabling regulatory framework that takes advantage of new technologies and business models will increase penetration and broaden the range of services, without tapping on public monies other than those required to maintain a regulatory agency that will identify market failures in the telecommunications market, address them with the appropriate regulatory measures, and monitor and enforce them.

As the next section shows, the telecommunications industry is one that constantly evolves and changes. It is important that just as universal access policies need to adapt to new innovations and challenges, so regulatory agencies should update regulatory frameworks so that they become enablers rather than bottlenecks for further service expansion.

TRAI must consider and implement Regulation for :-

Authorizations . There is a clear trend from narrowly to broadly defined authorizations for service operators. Some countries have reduced license requirements to a minimum, opening the market to free entry if spectrum or other scarce resources are not required.

Spectrum management. Spectrum management is moving away from traditional administration that involves allocating spectrum to specific uses. The trend is toward allowing a greater role for market forces in assigning spectrum and defining its uses. Open access spectrum regimes are also emerging.

Interconnection and access. The old paradigm of circuit-switched interconnection and switch-based cost allocation mechanisms is being replaced by capacity-based IP interconnection for multi-service networks. Countries are pushing for open access to essential facilities for greater competition.

Institutional Design . The design of regulatory institutions is moving toward increased coordination or integration of previously separate functions, with several models in use. Some of these only involve increased coordination between regulatory agencies; others feature converged agencies.

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One major issue is the lack of adequate spectrum for broadband wireless technologies and applications. New and evolving wireless technologies have great promise to promote broadband growth and competition in the Indian marketplace, provided adequate spectrum is made available. In case of these technologies, abundant spectrum should be made available, allowing the operator to obtain a minimum of 30 MHz or more to allow for a successful, competitive, and robust business model. It is recommended that the NBP integrate:-

a) Design policies to ensure robust competition and, as a result, maximize consumer welfare, innovation and investment.
b) Ensure efficient allocation and management of assets government controls or influences, such as spectrum, towers, and rights-of-way, to encourage network upgrades and competitive entry.
c) Reform current USO mechanisms to support deployment of broadband and telecom in high-cost areas; and ensure that low-income families can afford broadband; and in addition, support efforts to boost adoption and utilization.
d) Reform laws, policies, standards and incentives to maximize the benefits of broadband in sectors government influences significantly, such as public education, health care, banking and government operations, public safety, disaster management.
e) The cable laying process should be made an integral part of the Jawaharlal Nehru Urban Renewal Mission and other road infrastructure / NHAI projects; this would ensure a permanent RoW removing multiple levels of erratic levies, better infrastructure planning and also establish the position of Telecom as an essential public utility service. Bring into effect a " Dig once " policy for ducting along any road construction undertaken from now onwards.

5.34 Are there any specific competition and market related issues that are hindering growth of broadband? (Reference Para 4.71)

Whether wireless broadband, either fixed or mobile, can compete with wireline broadband is an important question in evaluating the status of broadband services competition. The answer depends on how technology, costs and consumer preferences evolve, as well as on the strategic choices of industry that control wireline and wireless assets, including firms that offer both fixed and mobile broadband. Consumers' preferences differ depending on how they use their broadband connections and how much they are willing to pay for such use. Some value download speeds more than any other attribute, some value mobility and new converts from dial-up may still even value the simple wireless broadband connection. A user in India who values little more than e-mail and browsing news sites has, in principle, many choices—nearly any broadband access technology will do. But a user who streams high-definition video and enjoys gaming probably requires high download and upload speeds and low latency. That user will likely have few choices.

Most consumers' preferences are not so extreme—they tend to value some factors more than others. If a sufficiently large segment of consumers are relatively indifferent about the attributes, performance and pricing of mobile and fixed platforms, then mobile and fixed providers are likely to compete for consumers. Today, however, most consumers who do not value mobility when purchasing broadband, or want high download or upload speeds, face limited choices for their fixed broadband service

The issues relating to this are as follows:-

a) In order to ensure that the country realizes the wide benefits from digital transmission, It is recommended that TRAI should mandate the digitalization plan within next 2 years.

b) TRAI should collect data that enable more detailed analyses of the market and red to determine whether broadband service is being denied to potential residential customers based on the income of the residents in a particular geographic area.The data collection should be done in a way that makes possible statistically significant, detailed analyses of at least urban or rural service area levels, thus allowing the TRAI to understand the effect of bundles and isolate the evolution of effective pricing and terms for broadband services.

a) The lack of a large number of wireline, facilities-based providers does not necessarily mean competition among broadband providers is inadequate. While current economic models of competition emphasized the danger of tacit collusion with a small number of rivals, economists today recognize that coordination is possible but not inevitable under such circumstances. Moreover, modern analyses find that markets with a small number of participants can perform competitively. However, those analyses do not tell us what degree of competition to expect in a market with a small number of wireline broadband providers combined with imperfect competition from wireless broadband service providers. Rural areas are less likely to have access to more than one wireline/wireless broadband provider than other areas. It is evident that those low-income areas are on average somewhat less likely to have more than one provider than higher-income areas.

b) In principle, providers can compete on price as well as on service. Unfortunately, the dearth of consistent, comprehensive and detailed price data makes it difficult to evaluate price competition. The price of broadband when not bundled with any other services even though the vast majority of consumers purchase broadband bundled with voice, video or both needs evaluation.

c) While the IT Act empowers security related aspects, however implementation and skills of the implementing agencies viz- police, judiciary etc needs to be enhanced to give confidence to users that they are safe and the laws will be implemented. The NBP should recommend specific steps and indicate additional resources into combating identity theft and fraud and help consumers access and utilize those resources, including bolstering security solutions for building confidence in online usage.

d) The Authority and the DoT should make more spectrum available for existing and new wireless broadband providers in order to foster additional wireless-wireline competition at higher speed tiers. Spectrum availability will ease entry into broadband markets and reduce the costs for current wireless providers to offer higher-speed services that can compete with wireline offers for a larger segment of end-users.

e) Consumer online security efforts should support broader national online security policy, and should be coordinated with the Home Ministry, CERT In, and other security agencies. Government agencies should connect their existing websites to Online to provide clear consumer online security information and direction.

f) The NBP should consider an interagency working group to coordinate child online safety and literacy work, facilitate information sharing, ensure consistent messaging and outreach and evaluate the effectiveness of governmental efforts. The working

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group should consider launching a national education and outreach campaign involving governments, schools and NGOs.

g) Redefinition of broadband: Definition of broadband should keep in view the potential of wireless and should not include clauses which favor wireline over wireless.

5.35 What other fiscal/non-fiscal measures should be considered to boost broadband penetration? (Reference Para 4.71)

The fiscal incentives would be a means of bringing down the cost to provide service and make them affordable to a number of potential users. The same would also encourage various players whose contribution is required in the Broadband Value Chain – Service Providers, Equipment Manufacturers, Content / application developers, other professional or social organizations amongst others. The following fiscal incentives shall make broadband services more affordable:

a) Promote Proliferation of National (with increased focus on Rural) Broadband – Core, Backhaul, Access, Devices and Content development areas
b) Tax incentives for Broadband Proliferation like Service Tax for ISPs, E-Transactions, Entertainment Tax waiver.
c) Incentives for PC and Access Device Penetration like 100% depreciation in first year for CPEs, encourage local manufacturing.

Tax incentives for Broadband Proliferation:

a) ISP's should be exempted from the payment of service tax for the next 5 years or post launch of services (especially in the rural areas). This exemption will reduce immediately the cost of providing such services to the customer.

b) Rather than imposing any additional fees for e-transactions, it would be more useful to provide incentives for e-transactions to encourage take up and adoption . Eg the banks today charge Rs 6/- for a NEFT transfer where as this could be zero to encourage more online transactions.

c) The State Government should waive off the Entertainment Tax for content through internet. Currently approximately 30% is charged as Entertainment tax in certain state viz. levied on broadband subscriptions and entertainment services, if they are provided through a broadband or internet platform. This recommendation should be followed with legislation to ensure execution by the State Governments

d) All corporations, whether public or private, should be allowed to give a minimum per annum allowance to employees for broadband services access at home. This allowance should be removed from taxable income for the corporation. The same facility should be extended to self-employed professionals so that they may also reap the benefits of broadband services. Government should play the role of anchor tenant and adopt broadband for public institutions like police stations, hospitals, schools, community centers etc.

e) Tax status for expenditure on connectivity / usage (similar to policies for other public welfare services such as education allowance, medical allowance etc)

f) Provide seed funding or USOF support to select companies focused on developing rural specific and local language contents and/or applications.

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g) Product Development, Bandwidth Charges and Software License Expenses to be treated as Revenue Expenditure: A separate guideline for 100% deduction on expenses related to product development, bandwidth and software licenses.

h) Incentives for Access Device Penetration:

   i. Capital subsidy on plant and machinery for manufacturing next generation technology enabled (3G/WiMax etc.) handsets (like smart phones) and devices. Refund of central and state taxes for manufacturing in SEZ/Export Oriented Unit /Domestic Tariff Area

   ii. Smart phones and other devices should be given focus. VAT on handsets is levied at IT products rates (4%). However, VAT on accessories and parts of cell phones are levied at residuary rate 12.5% (or higher rate) by some state governments. This has significant impact particularly in smart phones. Parts and accessories which are used along with cell phones should attract same VAT as handset. This will enable better ASC infrastructure and increase usability of handsets particularly smart phones

   iii. Consideration should be given to allow 100% depreciation in first year for PC's and broadband Customer Premise Equipment (CPE) including modems and routers. This would lead to greater uptake by small and medium enterprises

   iv. Consideration should also be given for tax benefits to organizations on the value of PC's, as defined by the Government through a value schedule, that they donate to schools run by the government / local bodies, and charitable organizations.

   v. Duties levied on inputs (parts, components and spares) and finished products used in providing broadband and internet services should be reduced to levels equivalent to that for mobile phones. All this should take into account the GST regime to be applicable in near future

   vi. Additionally, the central excise duty levied on these items should be reduced to the extent the customs duties are proposed to be reduced on a pro-rata basis, and in line with duties on imported finished goods.

   vii. Consideration should be given to encourage local/foreign manufacturers to build small, mobile, energy efficient & economical Laptops/PCs/Mobile devices (like Simputer, Tablet PCs).

Property taxes: Generally Telecom operator leases the rooftop on the land site on leave and license agreement for 10 to 15 years period from a landlord. Different Municipal and Panchayat local bodies impose different rates of property taxes, tower taxes etc which is not uniform across different states, districts, municipalities and Panchayats. We request either waiver or standardization at a reasonable level of these taxes from local bodies.

Service Tax Exemption: Currently infrastructure Providers charge Infrastructure provisioning fee (IP fee) for the providing space and power infrastructure to the Telecom Operator and charge Power & Fuel Charges from different Operators that sharing sites as reimbursement of the actual Power and Fuel expenses. There is a Service Tax that is being levied on Power & Fuel Charges being reimbursed. By nature, Power & Fuel Charges spent in a site are proportioned to all operators sharing the site and are Pass through in nature. We request the Telecom Ministry to take up with finance Ministry to exempt this tax on Pass through Power & Fuel charges Billed.

Reduction in the customs duties for the imported equipment:Currently uniform custom duties are applied for all the imported equipment which is essential for providing the Broadband and Telecommunication services across the Telecom circles and it is recommended that the

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same may be reduced substantially for the equipment proposed for deployment in the broadband infrastructure .

Reduction of various taxes and duties for the infrastructure material:It is recommended that the taxes / duties for the various materials which is essential for construction of the broadband infrastructure such as Steel, shelter material, power plants, batteries and compressors for the air conditioners to be substantially reduced so that the cost of infrastructure build out can be reduced considerably.

Benefits under section 81-1A of the Income Tax Act, 1961:-A new clause for broadband and telecommunication infrastructure companies be introduced under Sec.80IA for extending the benefits to the companies rolling out infrastructure services. This would accelerate broadband network rollouts to rural areas.

5.36 Any Other Points

Availability of Power Supply . As is well appreciated, adequate availability of power supply for the network as well as for the end-user devices is a huge challenge especially in the rural areas and hence, must be developed in parallel and this should form an intrinsic part of the recommendations of the TRAI for this NBP, lest the broadband network languishes and/or remains unutilized for the majority of the time when people need it. The consultation paper has not dwelled on this important aspect.

Availability of uninterrupted power supply is of paramount importance to ensure quality service in broadband services. Availability of power on a reliable basis is very big problem in both urban and rural areas and the same hampers the spread of service to these areas.

Further, it is well recognized that mobile broadband and telecommunications are a public utility service which is very important for the common man in his daily life, for his personal use and business productivity. However, in spite of the same, power supply to broadband and mobile telecommunications is not accorded status for 'priority feeders' by the various electricity supply bodies since there is no policy in this respect. Moreover, power supply to broadband and mobile telecommunications is being charged at a commercial tariff which is very unfair considering that affordability of service has led to the mobile service becoming a service for the masses – public utility. Broadband and Telecom should be treated as a Public Utility services and Power made available at a reduced price, at par with agriculture sector, in order to support broadband infrastructure in rural India.

We strongly recommend that broadband and telecommunications being an extremely important public utility service. Power Connections should be provided to the Service Providers on "Priority Basis", especially in rural & remote areas of the state. For an aggressive roll-out in the rural & remote areas a committed time frame from the date of request for supply of power to new base stations should be set up along with a "single window" clearance system in place.

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Examples of funding for Broadband in Rural Areas

a) Australia :Building Additional Rural Networks (BARN)

BARN promoted by Australian Communications Media Authority (ACMA) through USO funding provided $70 million from 1999 to 2005 to support the development of new networks and new network services and products, with an emphasis on the adoption of innovative solutions and leading edge technologies, the introduction of high speed regional networks and strong participation of new telecommunications carriers and service providers in project implementation.

Project priorities

BARN supported the development and implementation of innovative telecommunications and IT infrastructure and services in regional Australia, including:

- the development of high speed regional networks;
- the delivery of new networks and services by competing universal service providers, leading to greater choice and service standards for consumers
- the development, trial and implementation of new services and products capable of leapfrogging present price and service quality parameters;
- enhancing competition in the supply of such products and services to regional users;
- the development of new market models for delivery of regional communications services;
- providing broad and lasting benefits for rural telecommunications users; and
- Promoting the economic development of regional areas.

Selection criteria

The Networking the Nation (NTN) General Guidelines set out the framework under which BARN operated, including the selection criteria that the NTN Board applied. The Board established guidelines to ensure that projects seeking to develop innovative products and services did not compete unfairly with existing services of a similar nature. Under BARN these same principles were applied with rigorous, transparent processes to ensure that private sector partners in projects were selected on an open basis. Funding in this context was available to both for-profit and not-for-profit bodies.

b) Canada: Broadband for Rural and Northern Development Program (BRAND)

The Broadband for Rural and Northern Development (BRAND) Pilot Program is a federal Industry Canada initiative to connect rural and Northern residents to high-speed Internet.

BRAND funds community-based initiatives to deploy broadband networks under private sector leadership in communities unlikely to be served by market forces alone. It was launched in September 2002 and has received funding to carry out its mandate until March 2005.

BRAND has the following objectives:

- to demonstrate and validate the benefits of broadband in unleashing the full innovative potential of communities across Canada;
- to provide funding to unserved communities;
- to prepare business plans that detail the need for broadband services in their communities;
- to provide funding to unserved communities to help them implement broadband services that will address the needs of these communities in the areas of job creation, education, health, economic development and governance;
- to create opportunities for learning by sharing best practices among communities; and
- to create new business opportunities, domestically and globally, for Canadian information and communication technology (ICT) companies.
- Eligible communities receive a 2 stage financial assistance, according to the following criteria:
- they have to respond to identified community needs;
- the private sector has to play an active role in the development and implementation of business plans;
- business plans have to provide third-party open access to broadband networks and services;
- business plans have to be implemented through a competitive, technologically neutral bidding process; and
- the plan for deploying broadband networks and services has to be sustainable and scalable.

In the first phase, interested communities receive seed funding up to $30,000 or 50 percent of project costs in order to assist "community champions" in the development of a business plan. Community champions are typically not-for-profit organisations that act as sponsors on behalf of eligible communities. In the second phase, community champions submit business plans that serve as the funding application. Successful applicants are eligible for funding up to 50 percent of the project.

$4.2 million has been invested to date for the development of business plans for a total of 154 projects, representing approximately 2,285 communities that received up to $30,000 each. In terms of implementation, 63 projects, representing approximately 900 communities, have been selected for deployment of broadband services to their communities, for a total investment of $80 million.

Canadian policy recognizes that broadband demand aggregation across the public and private sectors in rural communities is necessary to develop the economies of scale that lead to "more viable business cases".

c) New Zealand: Digital Strategy 2.0

New Zealand Government under its Digital Strategy 2.0 has set up two funds for the development of ICT infrastructure and services in its urban and rural areas.

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The one of the two funds is Broadband Investment Fund (BIF) which has a total budget of $ (NZD) 340 million aimed at:

- facilitating high speed broadband to businesses and entities such as municipalities, universities, schools and hospitals in urban centres
- extending the reach of broadband into underserved regions
- improving the resilience of New Zealand's international connections

The second fund known as Community Partnership Fund (CPF) aims to support local, regional and national initiatives, through partnerships, to develop and achieve capability, confidence, relevant content, and connection to realise community aspirations through Information and Communication Technology. The CPF is used for funding the existing and new ICT projects.

- Expansion of existing CPF projects. The CPF seeks projects that:
- link up existing projects, through ICT, to encourage further collaboration and sharing of resources. For example, linking up ICT learning centres
- support past CPF recipients to develop their projects to enable others to use their technologies and/or models. This may include support for past recipients acting as mentors or facilitators for other community organisations wanting to achieve similar outcomes
- replicate or expand into other regions (including national roll-outs) or other user groups,
- apply existing resources for a new use. For example, using existing video conferencing equipment for training.

New projects that support "Digitally disadvantaged New Zealanders". The CPF seeks projects that:
- increase capability and skills to use ICT
- demonstrate a particularly innovative use of ICT
- demonstrate shared utilisation of resources through the use of ICT e.g. multi-use ICT hub, or improve access to ICT and digitised information (these projects must also increase capability and skills to use ICT).

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