

## INFORMATION AND COMMUNICATIONS TECHNOLOGY

9.2.1 We are living in the age of information. The world is moving into a convergence mode because of the tremendous potential of the Information and Communications Technology (ICT) and the impact it has on every other sector. Planned development and use of ICT hold the key to faster growth and give the country a competitive edge in the globalised economy. It is against this backdrop that the Tenth Plan aims at the creation of an efficient and world-class telecom infrastructure in order to meet the requirements of the IT-based sectors and needs of a modern economy on least cost basis. Provision of affordable and effective communication facilities to all citizens on a universal basis and ensuring easy access to these facilities in uncovered areas including rural areas is one of the primary objectives of the Tenth Plan. The other major objectives include efficient spectrum management, strengthening research and development efforts in the country, protecting the defence and security interests of the country and enabling Indian telecom companies to become truly global players.

### PROGRESS IN THE TENTH PLAN

9.2.2. Specific targets were fixed for the sector during the Tenth Plan in order to achieve the above objectives through the joint efforts of public and private sectors. The private sector was expected to play a greater role in the provision of connectivity through mobile and wireless services. Except for rural telephony including Village Public Telephones (VPTs), the progress with respect to all other targets has been satisfactory so far. The present status of achievement in respect of major targets is given in Table 9.2.1

9.2.3 The Tenth Plan had visualised an addition of 650 lakh new connections – 395 lakh by the public sector companies – Bharat Sanchar Nigam Ltd (BSNL) and Mahanagar Telephone Nigam Ltd (MTNL) – and 255 lakh by the private sector. Because of an explosive growth in the cellular segment,

especially in the private sector, almost 49 per cent of the Tenth Plan target has been achieved in the first two years. The rate of expansion has been equally encouraging during the first nine months of 2004-05 whereby another 163.52 lakh new connections were provided. In line with the trend during the first two years, the cellular segment continues to grow at an impressive rate of about 12.50 lakh connections per month. As a result, 479.24 lakh new connections have been provided so far during the Tenth Plan (as on 31.12.2004) thus achieving about 74 per cent of the Tenth Plan target.

9.2.4 The growth has been driven by the private sector, with the public sector contributing only about 25 per cent. The cellular segment contributed about 85 per cent of the net addition so far; private sector accounting for about 78 per cent of the growth in this segment. The share of private sector has increased from 15 per cent in March 31, 2002 to 46 per cent as on 31.12.2004. The number of telephones provided by private sector increased from 68 lakh as on 31.03.2002 to 426.44 lakh as on December 31, 2004. As a result of this impressive growth, the teledensity has already increased to 8.59 in December 2004 as against the Tenth Plan target of 9.91.

9.2.5 In spite of this impressive growth, India lags far behind the countries like Brazil and China where the teledensity is more than 40. Innovative and bolder policy initiatives and greater flow of funds would be needed in the remaining period of Tenth Plan and thereafter to achieve some sort of parity with the leading achievers in the sector. Table 9.2.2 gives the international comparison of teledensity and relative position of population and per capita income.

9.2.6 There seems to be a clear shift in demand in favour of the cellular segment as against fixed line phones, because of the substantial reduction in tariffs and better suitability to the needs of subscribers. The cellular segment is expected to maintain the high growth trend during the remaining period of the Tenth Plan. Keeping in view the growth

**Table 9.2.1**  
**Status of achievement of targets**

S. No	Targets	Present status (As on 31.12.2004)
1	To endeavour to make telephones available, by and large, on demand by the end of 2002-03 and sustain it thereafter.	Almost achieved in urban areas
2	To achieve an overall teledensity of 9.91 by 31 March, 2007	Present tele-density is 8.59. The target would be achieved earlier than 2007 because of phenomenal increase in mobile telephony. Keeping in view the present trend and the plans drawn up by both public and private sector operators for network expansion, the teledensity of 20 is expected to be reached by 2007.
3	Achieve telecom coverage of all villages by December 2002 and provide reliable transmission media in all rural areas.	Out of a total of 6,07,491 villages in the country, 5,24,606 villages have been covered. Out of the total target of replacing 1.8 lakh Multi Access Radio Relay (MARR) based VPTs with WLL during Tenth Plan; about 1,14,000 have been replaced so far.
4	Provide reliable media to all exchanges by the end of March, 2003.	Achieved.
5	Provide high-speed data and multimedia capability using technologies including ISDN to all towns with a population greater than two lakh by the end of March, 2003.	Such capabilities have been provided through technology like Integrated Services Digital Network (ISDN). However, ISDN has had a questionable track record in terms of effective available bandwidth and reliability of its delivery. After the announcement of the Broadband Policy 2004 by the Government, Mahanagar Telephone Nigam Ltd and Bharat Sanchar Nigam Ltd have launched broadband services on 14 January, 2005 which will provide "Always On" 256 Kbps minimum download speed to an individual subscriber. This service would be available in 200 cities by March, 2005. Similar initiatives are also expected from private telecom operators using various technologies.

during the first two years and the present trend, the expansion of the network during the Tenth Plan is expected to be much higher than the initial targets visualised. The progress during the first three years is given in Table 9.2.3.

9.2.7 The performance of BSNL and MTNL during the first two years has been mixed. BSNL provided 82.30 lakh connections during the first two years against the Tenth Plan target of 366.67 lakh and MTNL provided 90,000 connections against the target of 27.56 lakh. However, in case of rural connectivity, BSNL continued to play the key role in the expansion of telecom services in

the rural areas. In fact, the private sector reneged on its commitment for the rollout in the rural India and has opted for liquidated damages. BSNL accepted the challenge and has provided 40 lakh new rural connections (upto February, 2005), which is nearly three times the Company's target of 14.67 lakh rural lines fixed for the Tenth Plan. MTNL provided 3,96,212 gross connections during 2004-05 and 16,70,654 gross connections during the Plan period till 31<sup>st</sup> December 2004. Due to public policy, the public sector was a late entrant in the mobile segment. In spite of this, BSNL has captured a fairly large segment of the mobile market. It is planning to provide cell phone on demand within next

Table 9.2.2  
International comparison of teledensity

(December 2003)

Country	Population (million)	GDP (per capita) (US\$)*	Teledensity
Brazil	175.96	2603	42.38
Canada	31.72	23417	104.58
China	1256.95	963	42.32
Egypt	68.65	1260	21.17
France	59.90	24057	126.19
<b>India</b>	<b>1056.89</b>	<b>494</b>	<b>7.10</b>
Malaysia	25.17	3870	62.36
Pakistan	149.58	428	4.42
Singapore	4.20	20894	125.84
UK	58.12	26369	143.13
USA	292.30	36223	116.43
<b>Asia</b>	<b>3621.14</b>	<b>2313</b>	<b>28.52</b>
<b>Europe</b>	<b>795.13</b>	<b>12822</b>	<b>96.28</b>
<b>World</b>	<b>6129.15</b>	<b>5383</b>	<b>40.32</b>

Source: International Telecom Union (ITU)

\*: Figures pertain to year 2002

six months. MTNL, on the other hand, has provided more mobile connections than the private sector in the last quarter of 2004-05 in the highly competitive markets of Mumbai and Delhi.

9.2.8 However, a large number of fixed line telephones have been surrendered due to migration from fixed line to mobile service. MTNL's entry into mobile services along with a drastic fall in rates from Rs.16 per/minute to Rs.3 per/minute and provision of services by other operators has resulted in an explosive growth of mobile services. MTNL is now deploying additional mobile capacity of 8 lakh lines and another 8 lakh CDMA (Code Division Multiple Access) lines during the Plan period. It has also launched broadband service along with BSNL. It is expected that MTNL will be able to meet the overall Plan target. The details of targets fixed and the likely achievement in respect of the public sector are given in Annexure 9.2.1.

9.2.9 The performance of Indian Telephone Industries Limited (ITI), engaged in the manufacturing of telecom equipment, has been unsatisfactory. The company has incurred a loss of about Rs.1,000 crore during the first two years of the Plan period. However, given the strategic importance of its existence, the government has recently approved a revival package for its rehabilitation which includes foreign collaboration for the latest wireless technologies. However, it has to be recognised that Information Technology (IT) is a field of rapidly changing technology and ITI has failed to update itself technologically. If it is to survive in the competitive environment in the years ahead, it must make radical changes in its systems of management.

9.2.10 An outlay of Rs.86,984.00 crore including a budgetary support of Rs.1,500.00 crore was approved for the public sector units/ organisations in the telecom sector. The

utilisation of expenditure during the first three years is anticipated to be 33.74 per cent of approved outlay at current prices and 31.45 per cent at 2001-02 prices. Only about Rs.374.89 crore out of the budget support of Rs.545.00 crore approved for the regulatory and research and development (R&D) bodies in the public sector is likely to be utilised during the first three years. At constant (2001-02) prices, the likely utilisation of outlay and budgetary support during the first three years works out to 33.71 per cent and 23.25 per cent of the Tenth Plan outlay respectively. The main reasons for low utilisation was lower availability of resources with BSNL coupled with lower reimbursements on account of license fee, spectrum charges and Universal Service Obligations (USO) and lower fund utilisation as against the approved outlay for MTNL. The details of the outlays approved and the likely expenditure are given in Annexures 9.2.2 and 9.2.3.

9.2.11 The Radio Frequency (RF) spectrum is a scarce natural resource. In accordance with international treaties, it has to be shared among a very large number of radio communication services and users – defence, civil, government and private – based on the principles of co-existence and most efficient use. The increasing share of cellular mobile in total number of telephones points to the need for greater focus on the policy of allocating frequency spectrum.

9.2.12 In addition to cellular mobile, which will have a large number of lines by the end of the Tenth Plan, frequency spectrum is required for the Wireless in Local Loop (WLL), used for providing basic as well as broadband services. The advent of new technologies will also pose a significant challenge for the planners of radio spectrum. The increasing adoption of wireless technologies and the need to align with international standards would mean that there will be a need to address the shortage of wireless spectrum and to reconcile competing demands in certain frequency bands. The policy governing spectrum allocation and licensing has to be designed in such a manner that this scarce resource is used optimally and does not become a constraint for growth. Some steps have been taken to this end. These are:

- Notification regarding de-licence of 2.40-2.48 GHz band for low-power use of all technologies which, inter alia, include those based on IEEE 802.11 b and 802.11 g standards has been issued.
- Notification for de-licensing of 5.15–5.35 GHz band for the indoor use of low power Wireless Fidelity (Wi-Fi) systems has been issued.
- An automated spectrum management system has been commissioned in January, 2005.
- In case of receive only Very Small Aperture Terminals (VSATs) – an

Table 9.2.3  
Status of telecom network

(Lakh lines)

Items	Network (31.3.02)	Tenth Plan target	Achievement during Tenth Plan*			Network as on 31.12.2004		
			PSUs	Private	Total	PSUs	Private	Total
Fixed + WLL	385.37	-	32.47	37.09	69.56	411.91	43.02	454.93
Cellular	64.31	-	88.38	321.29	409.67	90.56	383.42	473.98
Total DELs	449.68	650.00	120.86	358.38	479.24	502.48	426.44	928.92
VPTs (Nos)	468016	-	-	-	52626	-	-	524606
Teledensity	4.29	9.91	-	-	-	-	-	8.59@

\*: Achievement up to 31.12.2004

@: Urban Teledensity – 25.90; Rural Teledensity – 1.69

already approved network - and Direct-To-Home (DTH) will receive only internet, no clearance is required from the Standing Advisory Committee on Radio Frequency Allocation (SACFA) / WPC if the total height of installation is less than 5 meters above the roof top of an authorised building.

9.2.13 Policy initiatives in many areas have led to reduction in tariffs, expansion of networks and increase in teledensity. Such policy initiatives are a continuous process. The other items like providing adequate financial support for implementing obligations on account of USO, national plan for optimum use of spectrum and provision of telecom services to the people in the rural areas in an efficient and affordable manner also form a part of the agenda of reforms for the Tenth Plan. These need to be addressed in the rest of the Plan period.

## PENDING ISSUES, POLICY INTERVENTIONS AND NEW INITIATIVES FOR TENTH PLAN

### AVAILABILITY, ALLOCATION & UTILIZATION OF SPECTRUM

9.2.14 Spectrum is the scarcest of resources. Available spectrum has already been utilized in major urban centres with a result that spectrum is tending to be a major constraint in maintaining the high growth rate of cellular mobile services in the urban areas. The spectrum availability for upcoming 3G services etc. is also very soon expected to become a bottleneck in the growth of cellular mobile services which so far in the Tenth Plan has been the base of growth in the telecom sector. The spectrum availability needs to be adequately increased by both more efficient utilization by the existing operators and services and by release of spare spectrum by modernization and upgradation of equipment.

9.2.15 Some new frequency bands need to be made available in line with the international radio frequency spectrum allocations to provide for newer services such as broadband mobile services. The spectrum currently occupied by

Defence and some other agencies may have to be released for this purpose. This may necessitate changing the old equipment deployed by defence and other agencies so that the required spectrum can be released for civilian use. The investment required would first need to be estimated and then made available for this purpose. An action plan needs to be drawn up and implemented in a time bound manner for getting more spectrum vacated from defence and other agencies/users. The task of getting more spectrum vacated has been going on through inter-ministerial discussions for the last several years. However, we have reached such a stage that these efforts have to be translated into a formalized institutional arrangement for vacation of spectrum in the form of a very high level group (Group of Ministers) to have the action plan implemented. The basic requirement from this group will have to be to make necessary funds available to the Ministry of Defence in particular for replacement of analogue / old equipments with more spectrally efficient equipment. Besides, to ensure that the time taken for procurement of Defence equipment is curtailed drastically and the entire project is completed in a time bound manner i.e. by March, 2007. Similarly emerging technologies like Wi-Max in sub 1 GHz are coming up. The 750 MHz band is presently being used for analogue broadcasting by the public broadcaster in India. Efficient digital terrestrial broadcasting should be considered for introduction for public broadcaster so that the terrestrial transmission in digital format is introduced in our country and vacating the frequencies for other uses in tune with other countries. To bring about a smooth transition, in the initial years it will be necessary to have digital and analogue broadcasting in parallel, before analogue broadcasting is totally phased out.

9.2.16 Keeping the national vision of 'Broadband for All' in mind, the spectrum-related issues need to be addressed on priority basis. Alternative spectrum bands, which are not in high usage and could be deployed for broadband services, also need to be explored and identified, taking into account the appropriate technologies.

## BROADBAND CONNECTIVITY

9.2.17 Broadband – “an always-on network capable of providing interactive voice, data and video services on public networks” – is fast becoming a prerequisite for rapid economic growth and social transformation. Broadband-enabled Internet applications promise to fuel productivity growth in virtually every sector. High-speed access to information and web-based communications/transactions has become a competitive differentiator. Internet-based services or connectivity for industries and remote places is crucial for enhanced productivity and, in the near future, even for survival. Effective and affordable broadband services would hold the key to maintaining India’s competitive advantage in the international markets. Without this, Indian firms would not be able to reap the three main benefits of such connectivity: tapping new market opportunities, overcoming barriers and increasing efficiency and cost reduction. DOT has taken up a major initiative for promoting broadband connectivity and for the proliferation of Internet by announcing the Broadband Policy on 14<sup>th</sup> October 2004, the highlights of which are in Annexure 9.2.4.

9.2.18 Countries without a broadband vision and a commitment to implement it, run a serious risk of trailing behind others and have to play a perpetual “catch up” game. After taking the ground realities into account, governments support their broadband visions with policies that encourage private investment in broadband infrastructure and services. Bringing broadband to all citizens by the end of this decade should be the national priority for every modern country and also for India. Broadband connectivity has been identified as one of the major areas for deliberation by the High Level Committee on Infrastructure, headed by the Prime Minister and serviced by the Planning Commission.

9.2.19 Different countries adopted different methods for creating broadband infrastructure. Sweden did it through direct government investment; Canada and the United States through public-private partnership while South Korea and Japan adopted a multifaceted

approach. South Korea deregulated the telecommunication sector and invested approximately US \$1.16 billion in a new high capacity backbone network. The government also provides low cost loans to spur broadband deployment in rural areas and encourages rural communities to form associations with municipal governments, regional education institutions and telecommunications operators to promote IT in their regions and drive the applications that broadband allows. Japan is working towards the goal of linking all homes with high-speed Internet connections by 2005. The Japanese government has targeted US\$ 16.7 billion for the programme, which includes tax incentives, low-interest loans, strong government-facilitated competition and digitising of government and education services.

9.2.20 In order to achieve an 8 per cent growth rate of the economy and to transform India into a vibrant and knowledge-based society, the government needs to be ambitious in terms of broadband connectivity. A Joint study report titled *India’s Broadband Economy: Vision 2010* by the Confederation of Indian Industry (CII) and the DIT (March 2004) and recommendations made by the Telecom Regulatory Authority of India (TRAI) on broadband services (April, 2004) have been deliberated upon by the DoT culminating into the Broadband Policy, 2004. These documents have projected a certain vision for broadband roll-out in the country. The broadband has been defined as an “always on” data connection supporting interactive services including Internet access with minimum download speed of 256 Kbps per subscriber. Specific targets have been laid down in the policy to be achieved by 2007 and 2010. The public sector companies – BSNL and MTNL – plan to provide 1.50 million connections by the end of 2005 covering 200 cities. In quantitative terms, this vision is summarised in Box 9.2.1

9.2.21 According to the initial estimates in the CII-DIT study, the ubiquitous broadband connectivity during 2010 to 2020 is estimated to contribute to direct employment of 1.80 million; indirect employment of 59 million and yield benefits of US\$ 90 billion (estimated at present value). However, these benefits will

come at a price. Translating this vision into reality would require large investments. Providing broadband connectivity to ten million subscribers by 2010 and 35 million by 2020 would require investments of the order of US\$ 2.60 billion by 2006 and approximately US\$ 5.40 billion by 2010. Out of this, an investment to the tune of US\$ 250 million would be required to cover 25 to 30 per cent of the rural networks through broadband connectivity.

9.2.22 To become an engine of growth and change, broadband has to be made easily accessible, affordable and useful to the masses. It also has to be technology neutral. Effective use of broadband is critically dependent on the PC penetration. This is low especially in rural areas. Unless this is adequately addressed, broadband for the masses will not become a reality. Incentives and policy regime needs to be put in place which will make PCs affordable for the masses. These will include fiscal measures to encourage domestic manufacture at affordable prices. Secondly, cost of international bandwidth is another bottleneck that needs to be quickly addressed. Enormous efforts need to be made to reduce the costs of international bandwidth and make it affordable. The prime principles that should guide the envisaged rollout plan for broadband connectivity need to include:

- Ensuring mass market usage of broadband access and services (not just availability but off-take).

- Eliminating digital divide through focused research, design and development to get access to broadband either at home or through public kiosks within walking distance.
- Enabling viable/sustainable business models to promote investments and entrepreneurship and minimise the need for direct investments by the government.
- Providing choice for the user, content/application provider, and service provider in a potentially oligopolistic industry.
- Balance demand and supply through competition and a viable business model at affordable user costs.
- Making available requisite critical infrastructure like electricity, reliable connectivity etc.
- Put in place policy regime aimed at lowering the costs of PC to make it affordable so as to encourage large scale PC penetration in the rural areas.
- Devise a system aimed at substantially reducing the cost of international bandwidth.

## RURAL TELECOM GRID

9.2.23 Many countries have tapped the potential of wireless communication for providing communication and Internet services in rural and remote areas. India lives in its villages and providing connectivity to remote

### Box 9.2.1 Goals for broadband

- Seven million broadband subscribers by 2007.
- 20 million broadband and 40 million Internet subscribers by 2010, which translates into penetration levels of 1.70 per cent and 3.40 per cent respectively.
- Broadband network of 10 million subscribers by 2010 and 35 million subscribers by 2020 in urban India across homes, enterprises and public kiosks.
- Achieve broadband coverage by providing access to at least 50 per cent of the rural population by 2010 and 100 per cent by 2020 through rural broadband kiosks.
- Make appropriate and locally relevant e-education, e-Governance, entertainment and e-commerce services and employment opportunities available through broadband connectivity to all cities, towns and villages in India.

areas without reliable power supply arrangement is a gargantuan task. The advent of cellular (Global System for Mobile or GSM/CDMA) and 802.11 Wireless Fidelity (Wi-Fi) technologies has enabled much greater access to broadband applications and services. Until recently, every wireless access point required expensive wired backhaul connections to provide the wireless user with Internet connectivity. This disadvantage, combined with limited range of 802.11 Wi-Fi medium, confined deployments to relatively small areas. The goal of true ubiquitous connectivity for the wireless user was still a vision and dream.

9.2.24 However, Worldwide Interoperability of Microwave Access (Wi Max) based solutions could extend the range of broadband backhaul and provide fast, reliable, scalable and cost-effective, standards-based wireless broadband connectivity to the villages and facilitate the vision of ‘connected village’ – being connected anywhere and anytime using any device – becoming a reality when the technology becomes established and proven to provide cost effective solution in sparsely populated rural areas. With the DIT announcing a SWAN policy and putting in place network connectivity right up to the block level by

extending the existing National Informatics Centre (NIC) network up to the district, the power of Wi Max (802.16) can be effectively used for creating hot spots around the block headquarters and extending the reach for last mile access, so that any village can gain broadband experience in a level playing field environment.

9.2.25 Apart from technological and cost related issues for providing voice and broadband data services through possible Wi-Max deployment it also faces several challenges related to government permits, licenses and processes, in addition to installation and technical challenges. One way to promote the deployment on a large scale is to have the 3.3-3.4 GHz band spectrum licensed at a lower or subsidised rate. The licence free band of 2.4 GHz can also provide low cost Wi-Max connectivity.

#### RURAL CONNECTIVITY

9.2.26 While the principal immediate focus in rural telephony is voice centric, the telecom infrastructure should have adequate capacity to be also used to carry text, data and video. The country has witnessed a very impressive growth

#### Box 9.2.2

##### Status of rural telecom services (31 December 2004)

- Rural teledensity of 1.67 as compared to the urban teledensity of 25.90 and an overall teledensity of 8.59.
- There are 27,000 BSNL exchanges in the rural areas having optical fibre connectivity. The capacity utilisation is negligible.
- So far 5,24,606 villages in the country have been connected using a Village Public Telephone (VPT). The remaining 66,822 villages excluding the villages with population of less than 100 and villages in insurgency-prone or thick forest areas are yet to be covered. These are envisaged to be covered in a phased manner by 2007.
- BSNL has provided 98 per cent of the VPTs installed in the rural areas. Only about 13,000 VPTs have been provided by the private sector.
- There are 130.37 lakh connections; half of which are estimated to be un-remunerative. These are basically owned and operated by BSNL.
- The annual operational loss of BSNL on rural telephony is estimated to be about Rs.9,000 crore.
- The total collection for USO Fund so far has been Rs.6, 695 crore, though the actual disbursements to USO administration were only Rs.1,814 crore which have been fully utilized.

come at a price. Translating this vision into reality would require large investments. Providing broadband connectivity to ten million subscribers by 2010 and 35 million by 2020 would require investments of the order of US\$ 2.60 billion by 2006 and approximately US\$ 5.40 billion by 2010. Out of this, an investment to the tune of US\$ 250 million would be required to cover 25 to 30 per cent of the rural networks through broadband connectivity.

9.2.22 To become an engine of growth and change, broadband has to be made easily accessible, affordable and useful to the masses. It also has to be technology neutral. Effective use of broadband is critically dependent on the PC penetration. This is low especially in rural areas. Unless this is adequately addressed, broadband for the masses will not become a reality. Incentives and policy regime needs to be put in place which will make PCs affordable for the masses. These will include fiscal measures to encourage domestic manufacture at affordable prices. Secondly, cost of international bandwidth is another bottleneck that needs to be quickly addressed. Enormous efforts need to be made to reduce the costs of international bandwidth and make it affordable. The prime principles that should guide the envisaged rollout plan for broadband connectivity need to include:

- Ensuring mass market usage of broadband access and services (not just availability but off-take).

- Eliminating digital divide through focused research, design and development to get access to broadband either at home or through public kiosks within walking distance.
- Enabling viable/sustainable business models to promote investments and entrepreneurship and minimise the need for direct investments by the government.
- Providing choice for the user, content/application provider, and service provider in a potentially oligopolistic industry.
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- Making available requisite critical infrastructure like electricity, reliable connectivity etc.
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## RURAL TELECOM GRID

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- Achieve broadband coverage by providing access to at least 50 per cent of the rural population by 2010 and 100 per cent by 2020 through rural broadband kiosks.
- Make appropriate and locally relevant e-education, e-Governance, entertainment and e-commerce services and employment opportunities available through broadband connectivity to all cities, towns and villages in India.

This implies that one can reach within 15-20 km of most villages with large bandwidth through lighting up of the dark fibres. This, in turn, would imply that the total investment needed for building the backbone for a country-wide roll-out of broadband in the rural areas would be one-fourth to one-fifth of that needed against a scenario in which the entire optic fibre backbone will have to be built afresh. In order to effect the rollout, the optical fibre needs to be lighted up and development of last mile connectivity ensured. Taking into account the logistics, the time frame for rollout and cost effectiveness, wireless technology seems to be ideally suited. The choice of technology, however, has to be left to the operator of the last mile.

## UNIVERSAL SERVICE OBLIGATION (USO)

9.2.31 A major initiative towards promoting connectivity in the rural and far flung areas has been the setting up of the USO Fund through the Indian Telegraph (Amendment) Act, 2003. India has been able to operationalise the Fund successfully and the rules for administering it have also been notified by the USO Administrator on 26 March, 2004. Besides India, only six other countries have actually operationalised USO administration. India, perhaps, is the only country where reimbursement from the USO is available for shared public access both for data and voice through public teleinfo centers. The basic goals and objectives visualised under the rules and their implementation status based on a transparent competitive process is as follows :

### *Stream-I: Provision of public telecom and information services*

- Operation and maintenance of VPTs in the villages identified as per the 1991 Census. So far financial support is being provided to 5,23,000 VPTs.
- Installation of VPTs in the additional villages as per the 2001 Census. Agreements have been signed to cover 66,822 villages by 2007.
- Upgradation of public telephones in villages with population exceeding 2,000

to High Speed Public Tele Info Centres (HPTICs) in a public place at the block headquarters. A pilot project covering 2000 villages has been taken up which will be extended to other such villages in 2005-06.

- Replacement of Multi Access Radio Relay (MARR)-based VPTs installed before 1<sup>st</sup> April 2002. Already 1,14,000 such VPTs have been replaced and the balance would be replaced by June, 2006.
- Provision of additional rural community phones in villages with population more than 2,000, where no public call office exists, after achieving the target of one VPT in every revenue village. Agreements have already been finalized with two operators for completing this work in 46,253 such villages by 2007.

### *Stream-II: Provision of household telephones in rural and remote areas*

- Paying the difference between the rent actually charged and the rent prescribed by TRAI on all Direct Exchange Lines (DELs) installed before 1<sup>st</sup> April 2002 until such time as the Access Deficit Charges take into account such difference. Support has already been extended on this basis to 90.50 lakh rural lines.
- For household DELs installed after 1st April 2002, capital recovery, operational expenses and revenue are to be taken into account to determine the net cost. Agreements have been signed with four operators to provide rural DELs in all 1685 eligible SDCAs, covering nearly 70 per cent of the country, between the period 01.04.2005 and 31.03.2007. Agreements have also been finalized to provide support to rural DELs already installed between 01.04.2002 and 31.03.2005.

9.2.32 Though the USO Fund has been operationalised, the mechanism for passing on the funds to the USO Administrator continues to be ad hoc in nature. Till now, the USO

administration has received only Rs.1814 crore which has been fully utilized from the Ministry of Finance against the accrual of about Rs.6,695 crore into the Consolidated Fund of India on account of USO levy. For the Annual Plan, (2005-06), an allocation of Rs.1200 crore has been approved whereas the requirement of funds to implement the programmes firmed up in line with the NTP, 1999 objectives is of the order of Rs.5,000 crore. Keeping in view the constraints of the present system, a mechanism needs to be put in place where the funds accrued on account of USO levy (currently 5 per cent of the adjusted gross revenue of the telecom sector) are transferred in full to the USO Fund. Till such time that the required mechanism/legal framework is put in place and operationalized the transfer of resources collected through the USO levy and accruing to Consolidated Fund should be effected through the Plan route on yearly basis. The possibility of providing adequate financial support through USO for creation of shareable infrastructure so as to minimise the impact of higher costs for providing cellular mobile wireless services in the rural areas should be immediately explored for rapid rollout of such services in the rural areas.

## RESEARCH AND DEVELOPMENT

9.2.33 The very impressive growth in the communications sector in the country in the last few years has been characterized by deployment of radically new technologies by service providers as well as competitive provisioning of mobile wireless and broadband services. The indigenous R&D and manufacturing has a complimentary role to play in the fast changing scenario as it has done earlier in the nineties. Though the leading national R&D institutions like Centre for Development of Telematics (C-DOT), Centre for Development of Advanced Computing (C-DAC), IITs etc., have worked considerably in the new areas, yet the pace of development has not been as fast as compared to availability of new technology from outside vendors so as to have a significant national impact. C-DOT has taken up some initiatives to prepare a new roadmap both for short term and long term to meet the needs of the changing market

requirements and to help bridge the digital divide through its redefined programme. The present research efforts in the emerging areas of broadband internet and rural wireless connectivity, efficient use of spectrum, packet switching networks, wireless LANs etc. need to be supported fully. Other long term projects on which work can be initiated includes an all optical networks, optical protocols, wavelength multiplexed links, & inter-connecting nodes, grid computing & access network and new internet protocols like IPv6.

9.2.34 A few institutional and structural changes were envisaged as part of the R & D effort for the communications sector for the Tenth Plan. It included setting up of a Communication Research Council (CRC) as a apex body to prioritize, plan and finance R & D projects in the country; associating the industry with financing and managing the activities of C-DOT; earmarking a percentage of the turnover of the companies in the organized sector for financing the corpus envisaged under the CRC and allowing adequate flexibility to PSUs to decide perks and pay for retaining the talent with them. The necessary follow-up action in this regard needs to be initiated.

## PROMOTION OF INFORMATION TECHNOLOGY (IT) INCLUDING APPLICATIONS

### INTERNET PENETRATION

9.2.35 The present Internet penetration in India is extremely low at 0.40 connections per hundred persons against 2 in China, 11 in Malaysia and 58 in South Korea. This indicates a total disconnect between India's strength in software and its resolve to be an IT superpower and availability of this potent tool of information and empowerment to its citizens. The major reasons for low Internet penetration are:

- Lack of access to this facility in the rural areas
- High cost of accessibility on account of:
  - high price of personal computers (PCs) in relation to the per capita income

- high dial up charges for dial in connections
- high rentals and user charges adversely affecting affordability
- Lack of content and IT applications suitable to local language and local needs
- Shortage of appropriate spectrum at reasonable prices.
- Cost of international bandwidth

9.2.36 BSNL and MTNL have recently reduced the public switching network (PSTN) access charges for dial-up Internet access. TRAI has issued a consultation paper in April 2004 to address the issue of prices of international bandwidth and other factors. DOT has taken up the matter with TRAI so that the tariffs for

international bandwidth are reduced without further delay.

9.2.37 The Broadband Policy enunciates some measures for promoting Internet penetration and services. These need to be implemented quickly. In addition, the following policy initiatives would help in ushering in broadband communication connectivity and help in providing Internet access and services at international standards:

- Delicensing of radio spectrum for use by wireless communications like WiFi and Wi Max technology.
- Adoption of suitable policies including encouraging domestic manufacture of PC components to bring down the prices to affordable level. These may include:

**Table 9.2.5**  
International comparison of ICT penetration

Parameters	Korea	Malaysia	China	India
<i>Access and Infrastructure (per 100 persons)</i>				
PCs	78.60	15.00	2.80	@1.3
Cable TVs	49.00	18.50	16.70	6.00
Fixed Telephones	49.00	18.50	16.70	4.50
Mobile Phones	68.00	39.60	16.10	@4.73
Internet	58.00	11.00	2.00	@0.45
Internet users	59.40	33.00	5.00	@2.25
Broadband Connections	57.50	0.21	1.00	0.02
<i>Financial Parameters (US\$)</i>				
GDP	10000.00	4000.00	965	465.00
PC Cost (US \$)	#500.00	1100.00		600.00
Cost of Cable/DSL Modem	60.00			100.00
Broadband charges (per month)	30.00	29.00	16.00	20.00
Bandwidth charges (100kbps) (in US \$)	0.25	7.61	3.07	*15.63
Import duty on local customer premises made equipment used for broadband	Local made		Local made	38%

#: Numbers are estimates

@: as on December, 2004

\*: Based on present rate for 128 kbps

Source: TRAI, 2003

- Negotiation with software and hardware companies for special country pricing as was done in China, Malaysia and Thailand.
- Adoption of suitable fiscal measures like tax reduction etc. for attaining the psychological benchmark price of Rs.10, 000 per PC.
- Depreciation of 100 per cent on IT products
- Rationalisation of taxes
- Instruments to deal with zero duty regime
- Promotion of content creation in local languages, suited to local needs.
- Promotion of IT in the domestic market on a larger scale including promotion of low cost technology alternatives such as Linux.
- Providing PC loans to citizens under priority sector lending
- Fiscal incentives for expanding rural network
- Leveraging SWANs for rural connectivity
- Take necessary steps to ensure availability of uninterrupted power supply

## INITIATIVES OF THE DEPARTMENT OF INFORMATION TECHNOLOGY

9.2.38 In order to achieve the goal of ICT connectivity for everyone, the Department of Information Technology (DIT) has taken the following key initiatives:

- ICT research and development programme has been taken up for innovating and bringing emerging technologies to the service of the common man. Developmental works leading to products such as *Grampatra*, *Gramchitra*, *Infothela*, *Shruti-Drishti* and *Bhav Poochiye*, to name a few, have been carried out.
- Community Information Centres (CICs) have been set up in all the 487 blocks of the eight north-eastern states

to provide Internet access and computing facilities (Figure 9.2.2). These centres would deliver education, infotainment and e-governance services. The programme is being extended to Jammu and Kashmir.

- The *Vidya Vahini* programme has been implemented in 140 government and government-aided schools on a pilot basis for delivering education and enhancing its quality through computers. These selected schools have been provided connectivity using VSATs for providing educational programmes in an e-learning mode.
- As a part of the envisaged national programme on e-governance, a State Wide Area Network (SWAN) with 2 Mbps connectivity right up to the block level covering all states is envisaged.
- State Data Centres are proposed to be established for data storage and processing, which is necessary for effective provision of services.
- The National Internet Exchange of India (NIXI) has been set up in association with the Internet Service Providers Association of India (ISPAI) as a non-profit company under Section 25 of the Companies Act. Under this, four nodes have been established at Delhi (Noida), Mumbai, Chennai and Kolkata.
- A policy for proliferating and popularising the .IN domain has been launched on 1<sup>st</sup> January 2005.
- Experiments on the next version of Internet protocol (IPv6) and putting in place a network architecture meeting the new protocols have been initiated by the DIT.
- A Center of Excellence in Wireless Technologies has been set up at IIT Madras to undertake research and development in fixed / mobile wireless technologies and leapfrog from the current generation of mobile telephony (2 – 2.5 G) to the fourth generation (4G) technology. This will help to address

the problems in last mile connectivity for cost effective broadband communication services.

- Digital Signature regime has been put in place for encouraging e-commerce.

## **RURAL CONTENT PROVIDERS (RCPS)**

9.2.39 The Department of Information Technology is taking several steps to make PCs affordable for the masses. The Department is also taking steps to popularise local language tools since PC penetration as well as Internet coverage is critically dependent on local language content being made available. The Department has an ambitious plan of setting up of 1,00,000 Common Service Centres (CSCs) spread all over the country for the benefits of e-governance and other services to reach the common man. The importance of creating local/rural content to make PCs and Internet an attractive proposition to a much larger number of people is well recognised. Involving the private sector in this regard would also be essential. Therefore, it is felt that a new entrepreneurial category of Rural Content Providers (RCPs) would give a further boost to and drive the demand both for PCs and Internet access as well as for rural connectivity. It will also help in better utilisation of the cable/wireless network already laid, or being planned in the rural areas by the Bandwidth Providers.

9.2.40 The issue that needs to be examined is how to encourage this new category of Rural Content Provider. The Rural Content Provider would provide content and other facilities, including entertainment, which will be of interest to the rural population. Content creation would be a specialised area requiring thorough understanding of the local requirements and language which can only be done through local entrepreneurs. The business model of such an RCP would vary from region to region and would be driven by the market. The Department of IT and the Department of Telecommunications need to evolve a suitable policy framework which would encourage such RCPs. The existing incumbent access providers should look upon these RCPs as engines to push faster and deeper penetration of the market for their mutual economic benefit.

## **LEVERAGING POSTAL NETWORK FOR BUILDING DELIVERY MECHANISM**

9.2.41 The postal network run by the Department of Posts with more than 1,55,000 post offices / outlets is one of the largest networks in the world. The two unique strengths of this retail network in the country are its nationwide outreach spreading into the remotest areas and reliability backed by Govt. accountability and sovereignty. As a result, access to any citizen for delivery of services is assured. Keeping in line with the Tenth Plan thrust on technology induction and modernization, the Department has undertaken a programme of progressive computerization and networking of the post offices / outlets. The Department has already made a beginning in the delivery of e-services like e-post and e-bill post. The system can be leveraged most advantageously to build front-end delivery mechanisms including kiosks as multi-product multi-service centres. The network can also be used for building the shared infrastructure envisaged by the USO administration. Leveraging the postal network for ICT connectivity and national efforts for e-Governance would ensure optimum returns from the public investments being made in the delivery mechanism.

9.2.42 The Tenth Plan policies and programmes are guided by the basic goal of creating a world-class telecom infrastructure in order to meet the needs of a modernizing economy and provision of basic services on universal basis at affordable prices. Based on a very impressive growth in the cellular segment, the expansion of network so far has been satisfactory and the Tenth Plan targets are expected to be exceeded. As expected, private sector has played a major role in the growth. The rural telecom services, however, have been an area of concern. The rural teledensity is as low as 1.69 against urban teledensity of 25.90 and national teledensity of 8.59. With the private sector not entering rural areas so far and BSNL incurring large operational losses, the present policy of fixed-line voice centric telephony-based rural connectivity may need

to be broadened to take advantage of new wireless technologies.

9.2.43 The recent experience of USO Fund tenders for providing rural telephone lines however reflects a positive change in the attitude of private operators to compete with BSNL, resulting in more operators rolling out in rural areas. This interest of both public and private sector to compete for the rural segment of the telephone sector indicates the growing rural market which has resulted in significant lowering of costs primarily based on wireless technologies like WLL. BSNL can leverage its widespread Optical Fibre network terminating at various points in all blocks of the country.

This coupled with similar network rollout by other operators provide an opportunity for an accelerated countrywide rollout of voice and data services including broadband services at very competitive costs. Keeping in line with the international trends, effective and affordable broadband services provided through a national rollout would hold the key to maintaining India's competitive advantage in international market. The possibility of providing adequate financial support through USO for creation of shareable infrastructure so as to minimize the impact of higher initial costs for providing cellular mobile wireless services in rural areas should be immediately explored for rapid rollout of such services in rural areas.

#### THE WAY FORWARD

- To work out and implement in a time-bound manner an action plan for optimum utilization of spectrum including technology upgradation and allocation of appropriate spectrum for the defense, paramilitary and other organizations so that surplus spectrum is released for civilian use. Necessary funds need to be provided through plan route.
- Put in place policy regime aimed at lowering the costs of PC to make it affordable so as to encourage large scale PC penetration in the rural areas.
- Devise a system aimed at substantially reducing the cost of international bandwidth.
- Adopt a promotional policy for setting up shared access to connectivity (including broadband wherever feasible) for front-end infrastructure for delivery of services as part of multi-product multi-service retail outlets or centres based on PPP model. This may take the shape of public teleinfo centers, kiosks, community information centres etc.
- To initiate necessary legal and other measures to transfer the resources accruing through the USO levy to USO Fund to promote rural telecom services. Pending this, Plan route may be preferred over the non-Plan mode.
- Take necessary steps, including fiscal measures, for encouraging domestic manufacture of PC components to bring the prices to affordable level.
- Promote creation of content in local languages suited to local needs.
- Take necessary steps to ensure availability of uninterrupted power supply.
- Promotion of IT in the domestic market on a larger scale including promotion of low cost technology alternatives such as Linux.
- The Department of IT and the Department of Telecommunications need to evolve a suitable policy framework for encouraging RCPs .
- Leveraging the postal network for building a nationwide delivery mechanism for ICT connectivity and e-Governance efforts.

**MID TERM APPRAISAL OF TENTH PLAN (2002-07)**  
**Physical Performance of Telecom Sector**

Scheme	Units	Ninth Plan Achvnt	Tenth Plan Targets	2002-03 Targets	2002-03 Achievmt	2003-04 Targets	Achievmt	2004-05 Targets	Antcd. Achievmt 3yrs	Antcd. Achievmt (in %)
Tot. DELs	Lakh lines	236.01	650.23	69.83	96.48	64.11	219.23	132.56	448.27	68.94
Fixed	Lakh lines		96.89	25.03	23.32	14.00	-2.47	20.49	41.34	42.67
WLL	Lakh lines		62.93	13.43	10.60	16.61	87.03	25.50	123.13	195.66
GSM	Lakh lines		235.41	31.37	62.56	30.00	134.67	81.57	278.80	118.43
BSNL	Lakh lines	218.86	367.67	64.34	47.70	60.61	34.60	100.00	182.30	49.58
Fixed	Lakh lines		80.90	22.90	22.12	14.00	0.19	4.50	26.81	33.14
WLL	Lakh lines		62.93	11.94	3.19	16.61	4.43	25.50	33.12	52.63
GSM	Lakh lines		223.84	29.50	22.39	30.00	29.98	70.00	122.37	54.67
MTNL	Lakh lines	17.15	27.56	5.49	2.38	3.50	-1.48	5.00	5.90	21.41
Fixed	Lakh lines		15.99	2.13	1.20		-2.66			
WLL	Lakh lines		0.00	1.49	0.27		0.50			
GSM	Lakh lines		11.57	1.87	0.91		0.68			
<b>PRIVATE</b>	<b>Lakh lines</b>		<b>255.00</b>	<b>0.00</b>	<b>46.40</b>	<b>0.00</b>	<b>186.11</b>	<b>27.56</b>	<b>260.07</b>	<b>101.99</b>
Fixed	Lakh lines				0.00			15.99	15.99	
WLL	Lakh lines				7.14		82.10	0.00	89.24	
GSM	Lakh lines				39.26		104.01	11.57	154.84	
<b>TAX</b>	<b>Lakh lines</b>	<b>25.09</b>		<b>11.47</b>	<b>10.61</b>	<b>11.08</b>	<b>11.08</b>	<b>12.66</b>	<b>34.35</b>	
BSNL	Lakh lines	23.05		10.05	10.11	10.58	10.58	10.58	31.27	
MTNL	Lakh lines	2.04		1.42	0.50	0.50	0.50	2.08	3.08	
Microwave	000KMs	87.35		5.00	8.08	2.00	2.00	2.00	12.08	
Optical Fib	000KMs	273.83		125.06	87.55	55.00	55.00	38.00	180.55	
BSNL	-do-			76.06	75.81	35.00	35.00	18.00	128.81	
MTNL	-do-			49.00	11.74	20.00	20.00	20.00	51.74	
VPT	Nos	218860	18000.00	3944.00	3693.00	7130.00	2960.00	8060.00	14713.00	

**MID TERM APPRAISAL OF TENTH PLAN (2002-07)**  
**TELECOM SECTOR**

(Rupee crore at current prices)

Name of Orgn. 1	IXth Plan Outlay 2	IXth Plan Actuals 3	Xth Plan outlay 4	AP 02-03		AP 03-04		AP 04-05		AP 05-06 BE 11	Operational Outlay (5+7+9+11)	Anticipated Expnd.(4yrs) (6+8+10+11)	% of Xth Plan
				BE 5	Actual 6	BE 7	Actual 8	BE 9	RE 10				
<b>BSNL</b>	<b>37995.00</b>	<b>59994.35</b>	<b>66412.00</b>	<b>14076.00</b>	<b>11819.00</b>	<b>12285.00</b>	<b>6535.80</b>	<b>8809.00</b>	<b>6636.00</b>	<b>9696.00</b>	<b>44866.00</b>	<b>34686.80</b>	<b>52.23</b>
IR	30965.00		66407*	7692.00	8937.00	6515.00		7734.00	6381.00	8051.00			
Bonds	7030.00			3502.00	2881.00	1341.00		1074.00	255.00	1645.00			
Others				2881.00	0.00	4428.00		0.00	0.00	0.00			
GBS			5.00	1.00	1.00	1.00		1.00	0.00	0.00			
<b>MTNL</b>	<b>5446.00</b>	<b>4762.91</b>	<b>11955.44</b>	<b>3994.06</b>	<b>1053.91</b>	<b>2284.00</b>	<b>965.91</b>	<b>2557.00</b>	<b>2220.00</b>	<b>1887.00</b>	<b>10722.06</b>	<b>6126.82</b>	<b>51.25</b>
IR	4066.00		9180.44	2744.06	1053.91	2284.00		2557.00	2220.00	1887.00			
Bonds	1380.00		2775.00	1250.00	0.00	0.00		0.00	0.00	0.00			
<b>ITI</b>	<b>175.00</b>	<b>170.99</b>	<b>790.00</b>	<b>73.00</b>	<b>32.00</b>	<b>202.00</b>	<b>10.86</b>	<b>120.00</b>	<b>738.00</b>	<b>0.00</b>	<b>395.00</b>	<b>780.86</b>	<b>98.84</b>
IR	0.00		130.00	-77.00	-328.00	7.00		0.00	0.00	0.00			
Bonds	150.00		660.00	150.00	200.00	195.00		120.00	0.00	0.00			
Others	25.00				160.00			0.00	538.00	0.00			
BS									200.00				
<b>WMO</b>	<b>44.04</b>	<b>17.00</b>	<b>1450*</b>	<b>2.25</b>	<b>2.97</b>	<b>9.36</b>	<b>0.10</b>	<b>14.27</b>	<b>3.27</b>	<b>18.77</b>	<b>44.65</b>	<b>25.11</b>	
<b>WPC</b>		<b>1.33</b>		<b>101.05</b>	<b>15.80</b>	<b>131.17</b>	<b>94.01</b>	<b>73.75</b>	<b>20.00</b>	<b>62.71</b>	<b>368.68</b>	<b>192.52</b>	
<b>TRAI</b>		<b>6.00</b>		<b>1.50</b>	<b>0.92</b>	<b>1.67</b>	<b>1.67</b>	<b>0.00</b>	<b>0.00</b>	<b>3.00</b>	<b>6.17</b>	<b>5.59</b>	
<b>TDSAT</b>		<b>0.00</b>		<b>0.20</b>	<b>0.48</b>	<b>0.87</b>	<b>0.63</b>	<b>0.60</b>	<b>0.70</b>	<b>1.00</b>	<b>2.67</b>	<b>2.81</b>	
<b>TEC</b>		<b>7.16</b>		<b>4.00</b>	<b>1.28</b>	<b>2.27</b>	<b>2.46</b>	<b>4.00</b>	<b>2.98</b>	<b>1.13</b>	<b>11.40</b>	<b>7.85</b>	
<b>C-DOT</b>		<b>292.63</b>		<b>75.00</b>	<b>103.00</b>	<b>38.66</b>	<b>47.66</b>	<b>81.38</b>	<b>68.36</b>	<b>131.40</b>	<b>326.44</b>	<b>350.42</b>	
IR										49.40	49.40	49.40	
GBS									68.36	82.00	82.00	150.36	
Others*	2782.00		<b>6331.56</b>								0.00	0.00	0.00
<b>Total</b>	<b>46442.04</b>	<b>65252.37</b>	<b>86984.00</b>	<b>18327.06</b>	<b>13029.36</b>	<b>14955.00</b>	<b>7659.10</b>	<b>11660.00</b>	<b>9689.31</b>	<b>11801.01</b>	<b>56743.07</b>	<b>42178.78</b>	<b>48.49</b>
IR	35031.00		79152.44	10359.06	9662.91	8806.00		10291.00	8601.00	9987.40			
Bonds	8560.00			4902.00	3241.00	1536.00		1194.00	793.00	1645.00			
Others	2782.00		6331.56	2881.00	0.00	4428.00		0.00	0.00	0.00			
BS	44.04		1500.00	185.00	125.45	185.00	146.53	175.00	295.31	168.61	545.00	735.90	49.06

\* VSNL Rs 2737.00 crore+HTL Rs 45.00 crore

## MID TERM APPRAISAL OF TENTH PLAN (2002-07)

(Rupee crore at 2001-02 prices)

Name of Orgn. 1	IXth Plan Outlay 2	IXth Plan Actuals 3	Xth Plan outlay 4	AP 02-03		AP 03-04		AP 04-05		AP 05-06 BE 11	Operational Outlay (5+7+9+11)	Anticipated Expnd.(4yrs) (6+8+10+11)	% of Xth Plan	
				BE 5	Actual 6	BE 7	Actual 8	BE 9	RE 10					
BSNL	37995.00	59994.35	66412.00	13573.77	11397.30	11483.45	6109.37	7768.08	5851.85	8143.11	40968.41	31501.63	47.43	
IR	30965.00		66407*	7417.55	8618.13	6089.92	0.00	6820.11	5626.98	6761.57				
Bonds	7030.00			3377.05	2778.21	1253.51	0.00	947.09	224.87	1381.54				
Others				2778.21	0.00	4139.09	0.00	0.00	0.00	0.00				
GBS			5.00	0.96	0.96	0.93	0.00	0.88	0.00	0.00				
MTNL	5446.00	4762.91	11955.44	3851.55	1016.31	2134.98	902.89	2254.85	1957.67	1584.78	9826.16	5461.65	45.68	
IR	4066.00		9180.44	2646.15	1016.31	2134.98	0.00	2254.85	1957.67	1584.78				
Bonds	1380.00		2775.00	1205.40	0.00	0.00	0.00	0.00	0.00	0.00				
ITI	175.00	170.99	790.00	70.40	30.86	188.82	10.15	105.82	650.79	0.00	365.04	691.80	87.57	
IR	0.00		130.00	-74.25	-316.30	6.54	0.00	0.00	0.00	0.00				
Bonds	150.00		660.00	144.65	192.86	182.28	0.00	105.82	0.00	0.00				
Others	25.00			0.00	154.29	0.00	0.00	0.00	474.43	0.00				
BS				0.00	0.00	0.00	0.00	0.00	176.37	0.00	0.00			
WMO	44.04	17.00	1450*	2.17	2.86	8.75	0.09	12.58	2.88	15.76	39.27	21.60		
WPC		1.33		97.44	15.24	122.61	87.88	65.04	17.64	52.67	337.76	173.42		
TRAI		6.00		1.45	0.89	1.56	1.56	0.00	0.00	2.52	5.53	4.97		
TDSAT		0.00		0.19	0.46	0.81	0.59	0.53	0.62	0.84	2.38	2.51		
TEC		7.16		3.86	1.23	2.12	2.30	3.53	2.63	0.95	10.46	7.11		
C-DOT		292.63		72.32	99.32	36.14	44.55	71.76	60.28	110.36	290.58	314.51		
IR														
GBS														
Others*	2782.00		6331.56										0.00	
Total	46442.04	65252.37	86984.00	17673.15	12564.47	13979.25	7159.38	10282.19	8544.37	9910.99	51845.57	38179.20	43.89	
IR	35031.00		79152.44	9989.45	9318.14	8231.45	0.00	9074.96	7584.66	8387.84		0.00		
Bonds	8560.00			4727.10	3125.36	1435.78	0.00	1052.91	699.29	1381.54				
Others	2782.00		6331.56	2778.21	0.00	4139.09	0.00	0.00	0.00	0.00				
BS	44.04		1500.00	178.40	120.97	172.93	136.97	154.32	260.41	141.61	647.26	659.96	44.00	

\* VSNL Rs 2737.00 crore+HTL Rs 45.00 crore

## BROADBAND POLICY, 2004 – MAJOR HIGHLIGHTS

- Broadband has been defined as an always-on data connection supporting interactive services including Internet access with minimum download speed of 256 Kbps per subscriber. The new broadband policy aims to target three million broadband subscribers and six million Internet subscribers with a timeframe of December 2005. By the end of year 2010, the policy aims to target 20 million broadband subscribers and 40 million Internet subscribers.
- There are more than 4.5 lakh route km of optical fibre laid by BSNL / MTNL and more than one lakh route km laid by private operators. Spread of optical fibre networks shall be emphasised keeping in view the long-term perspective.
- Last mile copper loop is not a ‘bottleneck facility’ for Broadband service providers. Access providers shall be free to enter into mutually agreed commercial arrangements for utilisation of available copper loop for expansion of broadband services. The owner of local loop shall be free to decide the areas in which investment is to be made to upgrade the infrastructure for Broadband services.
- There are more than 40 million copper loops in the country available with BSNL and MTNL out of which 14 million loops are in rural areas. Due to combination of old and new cables only about 25-30 per cent of the 26 million loops in the urban areas (about 7 million loops) can be leveraged for broadband services by BSNL and MTNL. Due to combination of old and new cables, the owners of copper loop will have to be given high priority because their role is critical as key drivers in the broadband service market using DSL.
- Further, use of brand name being treated, as a part of the value shall be permitted in such commercial arrangements.
- Management of BSNL and MTNL has decided to provide 1.5 million connections by the end of 2005.
- Cable TV network can be used as franchisee network of the service provider for provisioning Broadband services. However, all responsibilities for ensuring compliance of terms & conditions of the licence shall vest with the Licensee. The terms of franchise agreement between Licensee and his franchisee shall be settled mutually by negotiation between the two parties involved.
- Very Small Aperture Terminals (VSAT) and Direct-to-Home (DTH) services would be encouraged for penetration of Broadband and Internet services with the added advantage to serve remote and inaccessible areas.
- VSAT service providers are permitted to transmit data up to 2Mbps instead of earlier limit of 512 kbps in a Closed User Group domestic VSAT network.
- Commercial VSAT service providers having ISP license shall be permitted use of same hub station and remote station to provide Internet service directly to the subscribers. Further, this remote station shall be permitted to be used as a distribution point to provide Internet services to multiple independent subscribers. Necessary amendments in the licence agreement shall be carried out immediately.
- DTH service providers shall be permitted to provide Receive Only Internet Service after obtaining ISP licence from Department of Telecommunications. Further, ISP licensees shall be permitted to allow customers for downloading data through DTH after obtaining necessary permission from the competent authority. DTH Service providers will also be permitted to provide bi-directional Internet services after obtaining VSAT and ISP licence from DoT.

- In order to simplify SACFA clearance, the VSAT operators shall be allowed to start the installation process of VSAT terminals after a period of one month of submitting all relevant documents to WPC for SACFA clearance wherever the total height of such installation is less than 5 meters above the rooftop of an authorised building. In the case of Receive-Only VSAT terminals and DTH with Receive-Only-Internet, no SACFA/WPC clearance will be required wherever the total height of such installation is less than 5 meters above the rooftop of an authorised building.
- Other wireless installations with antenna height less than 5 meters, above the rooftop of an authorised building, will also not require SACFA clearance for such antenna.
- A transparent scheme is being outlined separately for time-bound frequency allocation, siting clearance and wireless licensing.
- With a view to encourage broadband connectivity, both outdoor and indoor usage of low power Wi-Fi and Wi-Max systems in 2.4 GHz-2.4835 GHz band has been delicensed. The use of low power indoor systems in 5.15-5.25 GHz and 5.725-5.875 GHz bands has also been delicensed in January, 2005.
- To accelerate penetration of Broadband and Internet, the 5.15-5.25 GHz shall be de-licensed for the indoor use of low power Wi Fi systems. For outdoor use, the band 5.25-5.35 GHz shall be de-licensed in consultation with DoS and delicensing in the band 5.15-5.25 GHz would be considered after the process of vacation. Alternative spectrum bands, which are not in high usage and could be deployed for Broadband services, shall also be explored and identified.
- As per TRAI Act, 1997, TRAI has to prescribe QoS parameters. Government recognises that QoS parameters are extremely important and have an impact on investment and rollout decisions of operators. TRAI would be requested to prescribe QoS parameters for provisioning of broadband service using various access technologies at an early date.
- National Internet Exchange of India (NIXI) has been set up by DIT, Government of India to ensure that Internet traffic, originating and destined for India, should be routed within India. It is expected that NIXI will take appropriate steps for increasing the utilisation of such infrastructure.