

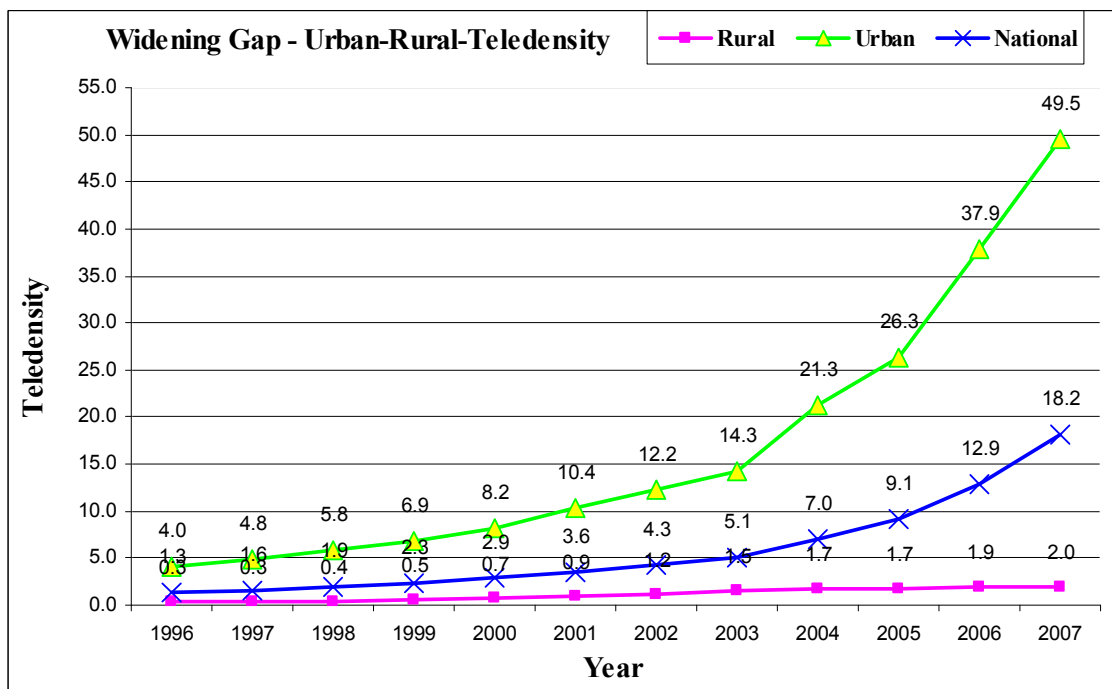
Increasing Rural Tele Density - Search for a Viable Model

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Introduction

There has been an impressive growth in the Indian telecom industry. In the period between March 31, 2002 and March 31, 2007, the number of phones increased from 44.9 million to 205.9 million. The teledensity of 1.3 per cent as of March 31, 1996 rose to 18.2 percent by March 31, 2007 (www.trai.gov.in). The urban teledensity as of March 31, 2007 was 49.5 per cent, whereas, rural tele-density (RTD) was 2.0 per cent. Low RTD leads to lack of quality access to markets, non-optimal production decisions and lack of supply to rural demands in a timely manner. The quality of life is affected due to the inadequate support for (i) emergencies and disasters, or even just safety requirements and (ii) reasonable social and information networks.

In addition, there is a growing disparity between the telecom service penetration in the urban and the rural sectors. The increasing and significant gap is a concern. Figure 1 highlights this gap.



Source: www.trai.gov.in

Due to the low RTD and the growing disparity, it is important to address this issue. However, improving RTD has several challenges. The provision of rural telephones and their maintenance is expensive. Low population densities, small population sizes, geographical

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spread and lower per capita income in relation to urban areas are additional challenges. The demand is low and the ability to pay is limited. Hence, the revenues generated are often abysmally low. These factors discourage the increase in RTD. In the above scenario, commercial incentives to provide rural telecom services may be low. Therefore, there is a need for an effective regulatory and policy environment to bring about improvements in the penetration of rural telecom services and increasing RTD.

Policy Initiatives to Improve RTD (until December 2006)

Recognizing the challenges in rural telecom service provision, the government accepted the provision of public phones as a policy objective in the 1970s. Since then, the Department of Telecommunication (DoT) has adopted a number of schemes. Rural telecom policies may be analyzed along the following dimensions:

- Technology
- Customer
- Funding

Technology

A pioneering effort towards development of indigenous technologies for spread of rural telecommunications was the setting up of C-DOT in 1984 as an autonomous body with the objective of developing digital exchanges for rural areas. C-DOT successfully developed and deployed a number of switching and transmission products such as Rural Automatic Exchanges (RAX) that were developed and deployed both in the rural and urban areas. The availability of low cost, rugged, low maintenance RAX that did not require air conditioning and was suited for easy installation in villages gave a huge boost to rural connectivity. Subsequently, C-DOT had also developed an integrated Time Division Multiple Access Point to Multi Point (TDMA-PMP) equipment for serving up to 256 subscribers sparsely distributed in a radius of 20 km. This allowed for wireless connectivity and was selected by DoT as a suitable solution for rural connectivity.

Indigenously developed Multi Access Radio Receiver (MARR) systems overcame the problem of long wire based solution that was often costly and difficult to maintain. However, since there were both technical and operational problems in the deployment of such systems (IIR 2007), it was decided to use Digital MARR, WLL, satellite based communication and C-DOT's TDMA-PMP for rural connectivity. There was an initiative on using indigenously developed CorDECT technology (<http://dqindia.ciol.com/content/Trends/2004/104031701.asp>) for deployment in rural areas due to its cost effectiveness.

While the initial focus of the government was on providing rural connectivity through fixed and fixed wireless, in recent developments elaborated later, the government has recognized the role of mobile services in increasing both geographical coverage and ownership, leading to increase in RTD.

Customer

The customer related policies may be examined in terms of

- Access
- Affordability

Access: Access policies have been through programs focusing on geographical coverage (Long Distance Telephone Program and Village Public Telephone (VPT) Program) and less developed areas (North Eastern and Tribal areas).

Long Distance Telephone Program (1970s): It had the target for provision of public phone within 5 km of any habitation. However, while this policy addressed the spread of telecom through targets for coverage of geographical area, the program implementation was in terms of covering villages.

Village Public Telephone (1970s): The scheme envisaged provision of public phone in everyone of the nearly 0.6 million villages. However, even as of March 31, 1996, total number of villages covered was 31,497 (Jain and Raghuram, 2005). There were several reasons for the non fulfillment of the targets.

- Wireline VPTs and analog MARR based VPTs had several technical problems. With the introduction of digital MARR, some of these problems were resolved.
- Non availability of long distance calling facility, especially in the early years. Over the time, BSNL provided for conversion of VPT without STD facilities to ones that with this facility.
- Absence of a proper monitoring system and difficulties in managing billing and collection. These led to non payment of bills and consequent disconnections.
- Sometimes, the lack of personnel to deal with rural systems left many phones in non functional state for long periods of time.

North Eastern Regional Program (NERP)/Tribal Sub Plan (TSP) (1989): From the Ninth Five Year Plan onwards, the NE region, being a “sensitive border area,” was treated as a special focus area. TSP was formulated in 1989 for all round and faster deployment of telecom facilities in tribal areas. Its main objectives were:

- To provide telephone facilities practically on demand in tribal and rural areas.
- To provide public telephones in all tribal villages.
- To provide long distance calling facility to all exchanges in tribal areas.

The National Telecom Policy, 1994 (NTP, 1994): It aimed to cover all villages by 1997. During the Eighth Five Year Plan (1992-97), the aim was to provide 0.309 million VPTs (covering half of the total number of villages) by 1997. These targets were revised by NTP 94 to cover all villages with a VPT by March 1997 on the assumption that the private sector would significantly contribute to the effort. However, by March 31, 1997, 0.301 million villages remained uncovered.

The Ninth Five Year Plan (1997-2002): It had the objective of providing universal and easy

accessibility for rural telecommunications. It was envisaged that the remaining 0.301 million villages would be covered jointly by the DoT and the private sector. Of this, DoT was to provide 0.239 million VPTs. Emphasizing the importance of rural connectivity, the plan envisaged that any shortfalls from the private sector would be made up by the government.

By March 1999, only a total of 0.310 million villages were covered. However, the participation by the private sector did not take off in any significant manner and DoT's efforts were limited to the resources it had. Paucity of funds and delay in supply of equipment were cited as reasons for this gap [Ninth Five Year Plan, Vol 2].

The New Telecom Policy, 1999 (NTP, 1999): It set 2002 as the target year for covering all villages with not only voice but also low speed data services. It recognized the importance of coverage as well the reliability of transmission media. Besides providing specific targets for rural service provision, it recommended setting up the Universal Service Obligation Fund (USOF). NTP 99 had envisaged the following:

- Make available telephone on demand by the year 2002 and sustain it thereafter so as to achieve a teledensity of 7 by the year 2005 and 15 by the year 2010 at the national level. This would include increasing RTD from the current level of 0.4 to 4 by the year 2010 and to provide reliable transmission media in all rural areas.
- Encourage development of telecom in rural areas by making it more affordable by suitable tariff structure and making rural communication mandatory for all fixed service providers.
- Encourage the development of telecommunication facilities in remote, hilly and tribal areas of the country.
- Achieve telecom coverage of all villages in the country and provide reliable media to all exchanges by the year 2002.

Despite these policy guidelines, there were gaps in coverage. The existing VPT's had poor maintenance. The reason for the gap was that the remote villages were difficult to reach. Poor maintenance further led to low revenue generation. As of April 30, 2007, 19,075 villages remained uncovered (www.dot.gov.in).

Affordability: Government's tariff policies in rural areas have focused on "affordability" for the rural customer. Rural charges have been traditionally lower than those in urban areas. But this discouraged DoT/BSNL to provide STD connectivity to VPTs as investment in rural areas gave less returns. TRAI continues to regulate rural tariffs, although it has forborne from regulating urban tariffs since 2003.

Funding

With private participation in telecom services, government envisaged funding support from these operators for rural telecom services. The three primary instruments to do this have been:

- Contribution from Private Operators towards Rural Roll Out

- Access Deficit Charges
- Universal Service Levy (USL) and creation of USOF

Contribution from Private Operators towards Rural Roll Out: As government policies had focused on fixed line/wireless as the technology for spread of rural telecom services, private fixed line operators were required to provide 10 per cent of their deployments in rural areas. However, there was very little contribution on the ground from them. Private operators preferred to pay the associated liquidated damages as these were lower than the cost of roll out. With the framework of the Unified Access Service License (UASL), a large number of both fixed and cellular mobile telecom services (CMTS) licensees shifted to UASL. The UASL had no associated rural roll out obligations.

Access Deficit Charge (ADC): In 2002, TRAI came out with a framework for the imposition of ADC to be paid by all operators to fixed service operators so that the fixed service operator could spread services in rural areas. Since BSNL was the dominant fixed line service provider, all operators contributed to BSNL. This was supposed to compensate BSNL for the below cost rentals and call charges in rural areas.

ADC became operational from February 1, 2004. As of March 2004, BSNL was to receive nearly Rs 4,500 crores through the ADC. However, there were a number of operational difficulties (Jain, 2006; www.traigov.in) which led to reviewing the current ADC regime, and a revenue share of 1.5 per cent payable to BSNL was imposed on all private operators.

Universal Service Obligation Fund: The guidelines for USOF policy were issued by DoT in March 2002. Subsequently, the Indian Telegraph (Amendment) Act, 2003 was passed by both Houses of Parliament in December 2003 giving it a statutory status. It came in to effect with retrospective effect from April 1, 2002. It was created as a non lapsable fund. Transfers to the USOF would be through parliamentary approvals. Rules governing the scope and implementation were notified in March, 2004. Until then guidelines governed the implementation.

The resources for implementation of USO were to be raised through a Universal Service Levy (USL) which had been fixed at 5 per cent of the Adjusted Gross Revenue (AGR) of all telecom service providers except the pure value added service providers like Internet, Voice Mail, E-Mail service providers etc. The USOF was to be administered by the Administrator, USOF who was empowered to formulate procedures for implementation of the USO and disbursement of funds.

Credits to the fund would include contribution towards USO by both telecom service providers and any grants and loans by the central government. The USOF framework supported only fixed and fixed wireless systems. Operators could choose any technology for providing fixed/fixed wireless services to be eligible for USOF.

USOF Design: The USOF design had the following elements:

- **Viability Gap Funding:** The USOF provided for viability gap funding on the basis of net cost. Net cost was the difference between the sum of annualized capital and annual operating cost and annual revenue. The annualized capital recovery took into account the aggregate of depreciation, return on equity, and interest on debt.

For calculation and estimating benchmark costs, fully allocated current costs method had been adopted. For operating expense, the costs were calculated on the basis of operations run most efficiently. For existing VPTs, only annual revenue was taken into account for net cost determination. For existing household lines installed prior to April 1, 2002, only tariff differential between the rental prescribed by the TRAI and that charged by the service provider was considered (This support was only for a period from April 1, 2002 to January 31, 2004). Factors that have been taken into account in cost calculation included the geographical location, distance from the nearest exchange, technology deployed, topological factors, tele- density, landline ratio, extent of rural area and availability of power.

- Separation of Public and Private Services: The USOF was designed to be implemented as two streams:
 - Stream-I: Provision of Public Telecom and Information Services: This covered the following:
 - (a) Operation and Maintenance of VPTs in the revenue villages identified as per 1991 census and installation of VPTs in the additional revenue villages as per Census 2001. For installation of VPTs in the revenue villages, identified as per 1991 Census, only the operating expenses and revenue would be taken into account for determining the net cost. For the additional revenue villages identified as per 2001 Census, capital recovery would also be taken into account for determining the net cost.
 - (b) Provision of additional rural community phones (RCP) in areas after achieving the target of one VPT in every revenue village. If in a village, the population was more than 2000 and no public call office existed, a second public phone would be funded.
 - (c) Replacement of MARR Technology VPTS installed before April 1, 2002.
 - (d) Up-gradation of a Public Telephone to Public Tele Information Centers. The data transmission facilities would be provided within 5 kms of a village with a population exceeding 2000, preferably in those villages where post offices were located. The capital recovery would cover provision of customer premises equipment such as computer, uninterrupted power supply, and modem.
 - (e) Installation of High Speed Public Telecom Information Centers in a public place at block headquarters and in villages with a population exceeding 2000 would be made in a phased manner. Capital recovery towards customer premises equipment as in the case of public telecom information centres, and required access would be provided.

- Stream-II – Provision of household telephones in rural and remote areas:
 - (a) For household DEL installed prior to April 1, 2002, the difference in rental actually charged from rural subscribers and rent prescribed by TRAI for such subscribers would be reimbursed until such time the ADC prescribed by it from time to time takes into account such difference.
 - (b) For household DELs installed after April, 2002, capital recovery

SDCA The Short Distance Charging Area was taken as a unit for the purpose of arriving at the net cost for activities for Stream II.

- Selection of Operators: The winning bidders for each of the streams was through a multi-layered bidding process on the least quoted subsidy support basis. Unified Access Service providers, Basic Service Providers, and Cellular Service Providers were eligible for bidding in their service areas. Each service area had a reserve price. Fresh round of bidding was undertaken if no bids are received or the lowest bid was higher than the benchmark.

Implementation Status: Stream I: Out of 66,822 villages not covered by VPTs at the beginning of the scheme, 19,075 remained uncovered until April 30, 2007. The provision of VPTs in some of these villages had been included as one of activities under Bharat Nirman Programme (www.dot.gov.in).

1,86,872 VPTs which were earlier working on MARR technology and installed before April 1, 2002 were to be replaced by BSNL by June 2006 as most of these were non functional. Both capital and operational expenses were being supported for this activity. Until April 30, 2007, 1,75,522 MARR VPTs had been replaced and 11,350 remained (www.dot.gov.in).

Funding was provided for RCPs in 46,253 villages with population exceeding 2,000 and without a PCO facility. Agreements were signed with BSNL and Reliance Infocomm Limited in September 2004 to provide 24,794 and 21,459 RCPs respectively in these villages over a period of three years i.e. by September 2007. The installations were eligible for both capital and operational expenses support. These numbers were later revised to 24,822 and 21,431 respectively for BSNL and RIL respectively. As of April 30, 2007, BSNL and RIL had achieved 21,522 and 15,066 respectively.

Stream-II: Financial support had been provided to nearly 9.1 million rural DELs installed prior to April 1, 2002. The support for these rural DELs were be extended to cover 1685 Short Distance Charging Areas (SDCAs), which were high cost low income areas out of a total of 2647 SDCAs in the country. This covered about 64 per cent of the total geographical area covered by telecommunications. BSNL had emerged as successful bidder in 1267 SDCAs of the total tendered SDCAs while Reliance, Tata Teleservices Ltd. and Tata Teleservices (Maharashtra) had been successful in 203,172, and 43 SDCAs respectively. Support in the form of front loaded subsidy and an equated annual subsidy was given for all the rural DELs installed after April 1, 2005 and up to the plan period i.e. March 31, 2007. The equated annual subsidy where payable, was given up to a maximum period of validity of the agreement (five years) and validity period ended in March, 2010. As per the agreement conditions, the Service Provider was required to provide at least 100 lines per Secondary Switching Area (SSA) within six months. Thereafter, all the wait listed subscribers were to be

provided with a telephone connection on demand.

Support at the same rates was also extended for 1.86 million rural lines installed between April 1, 2002 and March 31, 2005. Financial support was provided to nearly 9.05 million rural household DELs. A total of 25, 64,577 rural DELS had been provided by March 31, 2007.

Review of the USOF Framework: The selected private operators had roll out obligations so as to ensure at least a minimum level of service availability. Delays in service provision could entail recovery from the liquidated damages. Often there were contentions regarding the operational status of USOF roll outs between DoT and operators, leading to complaints of delays in disbursement and contentions about the amounts that service providers claimed they were eligible for and the amounts sanctioned under USOF.

Since provision of rural DEL through USOF was a highly visible, largest single program and involved both public and private operators, there were likely to be issues on the ground that would need to be addressed during the roll out. Therefore, it was essential that a system for early assessment of problems and issues was implemented, preferably by third parties. However, such a system was not implemented.

By limiting the type of technology to fixed and fixed wireless, the **Separation of Network Infrastructure and Service Provision: Separation of Network Infrastructure and Service Provision:** USOF provided for entry of new service providers, although restricting services to existing players

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F precluded spread through mobile services which were becoming more popular. Subsequently, the Indian Telegraph (Amendment) Act 2006 was passed on 29.12. 2006 to enable support for mobile services and broadband connectivity in rural and remote areas of the country.

Policy Initiatives to Improve RTD (from January 2007 to April 2007)

USOF New Objectives (2007)

With the passing of the Act, the USOF objectives were enhanced to additionally include:

- Stream-III: Creation of infrastructure for provision of mobile services in rural and remote areas: A percentage of the capital recovery for the infrastructure for provision of mobile services was to be taken into account to determine the net cost.
- Stream-IV: Provision of broadband connectivity to villages in a phased manner: A percentage of the capital recovery for the infrastructure for broadband connectivity shall be taken into account to determine the net cost.
- Stream-V: Creation of general infrastructure in rural and remote areas (to be

determined by the Central Government from time to time) for development of telecommunication facilities. A percentage of the capital recovery for the development of general infrastructure would be taken into account to determine the net cost.

Note – For streams III, IV and V, revenue district/group of revenue districts were taken as a unit for the purpose of arriving at the net cost.

- Stream-VI: Induction of new technological developments in the telecom sector in rural and remote areas. Pilot projects to establish new technological developments in the telecom sector, for deployment in the rural and remote area, could be supported with the approval of the central government.

Implementation: To operationalize the provision of mobile services through USOF, a scheme was launched to provide support for setting up and managing 7,871 infrastructure sites spread over 500 districts for provision of mobile services including other wireless access services like WLL using fixed/mobile terminals in the specified rural and remote areas of the country. These sites constituted 81 clusters. The objective was to cover those rural and remote areas which had no existing fixed wireless or mobile service.

Overall Framework

The scheme had two parts: Part A and Part B, each of which were of five year duration. Part A envisaged a single infrastructure provider and Part B envisaged three service providers for competitive service provision using the provided infrastructure.

Part A: Support in the form of a percentage of the capital recovery for setting up the infrastructure site by licensed Infrastructure Providers (IPs) comprising of land, tower, power connection, power backup and associated civil and electrical works in order to cater to the requirement of three Universal Service Providers (USPs) was provided. It was envisaged that as the infrastructure was capital intensive, overall expenditure could be kept low through sharing of the infrastructure.

The Infrastructure Providers Category-I (IP-Is) or existing Basic Services Operators (BSO), Cellular Mobile Telephone Service (CMTS) Providers and Unified Access Services Licensees (UASL) were eligible for seeking USOF subsidy. The short listed IP-Is were eligible to bid for all the specified infrastructure sites. The IPs were required to take up installation of telecom towers on the land acquired by them for this purpose in the specified villages, provide electrical connection and engine alternator, construct boundary walls and security cabin etc. as per specifications. They were also responsible for the operation and maintenance of the infrastructure so created.

Part B: Support for the installation of the equipment and provisioning of mobile services for installation of BTS with associated antennas and backhaul was provided. Initially, the infrastructure created was to be used primarily for voice telephony. Later, the same infrastructure could also be used to provide broadband services.

Only the existing BSO, CMTS, and UASL, called Universal Service Providers (USP) were eligible for USOF subsidy. The USPs were required to install BTS along with battery and power plant, associated antennas, backhaul, and provide mobile services as per the terms and conditions of the service license and had spectrum allocated from WPC for the service area

for which the bid was submitted.

The three successful bidders for Part-B of the scheme were to be allocated the space on the tower to provide the antennas at heights of 38.8 m, 36.4 m and 34 m respectively from the ground level, for each cluster.

Design Features

Identification of a Cluster: Clusters were formed out of a group of districts within a service area that had the same benchmark (explained below). Each cluster contained a number of infrastructure sites. Tenders were separately invited for each cluster.

Location of Towers: The location and the number of towers required in each district were identified on the basis of GIS maps showing non-coverage by fixed wireless or mobile services. Areas where there were GSM and CDMA towers as on 31st March 2006 providing fixed wireless or mobile services were considered as already covered. Radius of coverage for existing GSM towers was taken as 5 km and that for existing CDMA towers was taken as 10 km. Population details corresponding to the 2001 Census was taken. Village or a cluster of villages, which remained uncovered and had a total number of households greater than 400 qualified for provision of towers. Wherever a Block Head Quarter came under the uncovered area, a tower was proposed.

Modified [Hata Model](#) (a [radio propagation model](#) that is most widely used model in radio frequency propagation for predicting the behaviour of cellular transmissions in built up areas) was used to identify the location of towers. (www.en.wikipedia.org/wiki/HATA_Model_for_Urban_Areas). The modeling was developed for a wide range of frequencies that included the frequency bands used by service operators in India (800 MHz, 900 MHz, 1800 MHz).

Calculation of Benchmark: Benchmark was calculated based on the technology used for the BTS and the estimated cost of providing the infrastructure. The location of existing towers and existing population base were taken as factors in locating additional towers under this scheme. The benchmark was same for all the infrastructure sites within a cluster.

Rollout Time Frame: IPs had to commission at least 50 per cent of the infrastructure sites in the service area within eight months period and the remaining ones within 12 months of the signing of the agreement. USPs had to provide the mobile services within two months of the commissioning of the infrastructure site by the IP

Agreement between IP and USP: The DoT proposed to enter into agreement with IPs and USPs for provision of mobile services. IPs and USPs were to mutually discuss the suitability of the location of the infrastructure site for installation of the towers and provision of the mobile services. The USPs would exchange relevant information with IPs about the space and power requirements for the equipment proposed to be installed. The USPs would also share their radio frequency plans with the IP for the optimal coverage from the towers. It was expected that all the USPs and IP would adhere to a common tower location keeping in view the overall coverage of the targeted area. It was further expected that the location of the infrastructure sites would be finalized on the basis of the mutual consensus between the IP and USPs. The tower locations for all the infrastructure sites were to be decided within two months of the signing of the agreement.

In case, a consensus was reached between IP and USPs for shifting of the location of the tower from one place to another, the IP would take up the case for change of location with the USOF Administrator. In case, a consensus was reached between IP and USPs for installation of additional tower(s) in the vicinity of the towers to be installed, the IP would take up the case for installation of additional tower(s) with Administrator. In case, IP and USPs did not agree for a common tower location, the IP would report the same to the Administrator USOF within the stipulated timeframe. SLAs would be signed between the IP and USPs to ensure round the clock availability of the mobile services.

On commencement of the work at the infrastructure site, the IP would intimate the same to USPs for initiating parallel action for installation of the necessary equipment required for provision of mobile services.

Tariffs: Service providers were mandated to charge tariffs as per TRAI tariff orders or the prevailing tariffs of the incumbent basic services operator, whichever was lower. The USP was required to publish tariffs, notifications and provision of information as per the provisions of TRAI Act, 1997 as replaced or amended from time to time.

Mechanism for Monitoring Implementation: Liquidated damages were to be paid by IP/USP for delay in the rollout. In case of interruption of mobile services for a period up to seven days in a quarter, there were to be no deductions from the subsidy. However, there would be deduction in subsidy for USP on pro rata basis if there is interruption in services for more than seven days in a quarter. However, if there is interruption in services for 45 days or more in a quarter, no subsidy would be paid for that quarter.

Auction Design: A multi-layered “Informed Descending Auction” was designed to provide subsidy to IP and USP in each cluster. It was a sealed bid auction. The bidders had to submit their financial bid(s) for subsidy for one infrastructure site per cluster. The same bid amount was applicable for all the infrastructure sites within that cluster. A starting benchmark for the bid amount was specified for each cluster for both Part A and Part B of the scheme. The bidders had to quote a subsidy amount less than or equal to the benchmark. The benchmark for any subsequent round was the largest amount bid in the earlier round. The bidders were to furnish an Earnest Money Bank Guarantee (EMBG) issued by any Scheduled Bank for the amount towards earnest money as specified for each state. The amount of EMBG remained the same for all the clusters in a state, irrespective of number of districts in the cluster. The bidders had to submit sealed bids for pre-qualification and separate sealed bids for the first financial bid, for both Part A and Part B.

Rules of Bidding: Sealed Pre-qualification bids of all bidders would be opened for pre-qualification. The first financial bids of those who pre-qualified would be opened.

Rules for Second Round of Bidding: For Part A, out of N pre-qualified bidders for a cluster, lowest $N/2$ bidders qualified for the second round of financial bidding in case N was an even number and lowest $(N+1)/2$ bidders qualified in case N was an odd number. If pre-qualified bidders were five or six, a maximum of four lowest bidders qualified for second round of financial bidding. If bidders were two, three or four, all the bidders qualified for second round of financial bidding. In case of only one bidder, the bidder was declared as successful for the cluster. For Part B, a maximum of four lowest bidders qualified for second round of financial bidding. If there were less than four bidders, then all the bidders were declared as successful.

The least quoted bid amount by a bidder from amongst the bidders who qualified for the second round of bidding was the reserve price for the second round of bidding. The bidders, who qualified for second round of bidding, had to submit a second financial bid for the second round. The bid amount in the second round had to be equal to or lower than the reserve price for each of clusters and the bidder(s) who quoted above the reserve price were disqualified for further round of bidding. All the bidders who quoted less than or equal to the reserve price for each of the clusters in the second round of financial bidding were short listed.

Ranks were determined keeping in mind, the possibility of ties. In case of a tie amongst two or more bidders in any round of the financial bidding, all such bidders qualified for the next round of financial bidding with the same ranking. The remaining higher bidder(s) were dropped. In the event of a tie in the previous round of bidding, the process of bidding continued until a successful bidder emerged. In case of a tie in the conclusive round of bidding, the bidder who quoted lower amount in the previous round for that particular cluster was declared successful. In the event of a tie in the previous round of bidding, the process of bidding continued until a successful bidder emerged.

For Part A, the lowest offer out of the short listed bids for second round of financial bidding for a cluster, become the representative rate or winning bid for an infrastructure site. For Part B, three lowest bidders of the final round of financial bidding for a cluster were declared successful for signing of the agreement. The amount quoted was applicable for all the infrastructure sites within a cluster.

The agreement for Part-A, would be signed with the successful bidder only in case there was at least one successful bidder for Part-B of the Scheme.

Results of Bidding

Part A: Table 1 provides details on the state wise number of clusters and the winners. There were 21 bidders of which only seven won.

BSNL became the largest infrastructure provider, by winning the bid in 63 of the 81 clusters it had bid for. It did not win in Assam, Manipur, Meghalaya, Mizoram and Nagaland. , It won one out of six clusters in Andhra Pradesh, three out of five clusters in Chattisgarh, two out of three clusters each in Himachal Pradesh and Jharkhand, eight out of nine clusters in Maharashtra, three out of four clusters in Orissa and four out of six clusters in Uttar Pradesh. Reliance Communication was a distant second winner, by winning the bid in six clusters out of the 81 it bid for. National Information Technologies Limited won in four out of 51 clusters. Hutchison Essar South Limited and GTL Infrastructure Limited won in three clusters each. Hutchison Essar South Limited had bid in 17 clusters while GTL Infrastructure had bid in 81 clusters. Hutchison Essar Cellular Limited and Quipo Telecom Infrastructure Limited won in one cluster each, having bid in 14 and 24 clusters respectively.

Table 1: Part A Winners for Different Clusters

Sr No	State	Total Number of Clusters	Bharat Sanchar Nigam	Reliance Communications Infrastructure	National Information Technologies	GTL Infrastructure	Hutchison Essar South	Hutchison Essar Cellular	Quipo Telecom Infrastructure
1	Andhra Pradesh	6	1	-	-	3	2	-	-
2	Arunachal Pradesh	1	1	-	-	-	-	-	-
3	Assam	1	-	1	-	-	-	-	-
4	Bihar	5	5	-	-	-	-	-	-
5	Chhattisgarh	5	3	-	2	-	-	-	-
6	Gujrat	1	1	-	-	-	-	-	-
7	Haryana	1	1	-	-	-	-	-	-
8	Himachal Pradesh	3	2	1	-	-	-	-	-
9	Jammu & Kashmir	2	2	-	-	-	-	-	-
10	Jharkhand	3	2	1	-	-	-	-	-
11	Karnataka	4	4	-	-	-	-	-	-
12	Kerala	1	1	-	-	-	-	-	-
13	Madhya Pradesh	10	1-	-	-	-	-	-	-
14	Maharashtra	9	8	-	-	-	-	1	-
15	Manipur	1	-	1	-	-	-	-	-
16	Meghalaya	1	-	-	1	-	-	-	-
17	Mizoram	1	-	-	1	-	-	-	-
18	Nagaland	1	-	1	-	-	-	-	-
19	Orissa	4	3	1	-	-	-	-	-
20	Punjab	1	1	-	-	-	-	-	-
21	Rajasthan	4	4	-	-	-	-	-	-
22	Sikkim	1	1	-	-	-	-	-	-
23	Tamil Nadu	4	4	-	-	-	-	-	-

Sr No	State	Total Number of Clusters	Bharat Sanchar Nigam	Reliance Communications Infrastructure	National Information Technologies	GTL Infrastructure	Hutchison Essar South	Hutchison Essar Cellular	Quipo Telecom Infrastructure
24	Tripura	1	1	-	-	-	-	-	-
25	Uttaranchal	2	2	-	-	-	-	-	-
26	Uttar Pradesh	6	4	-	-	-	1	-	1
27	West Bengal	2	2	-	-	-	-	-	-
Total		81	63	6	4	3	3	1	1
Clusters Bid			81	81	51	81	17	14	24

Source: www.dot.gov.in

The maximum number of bidders in any cluster was 11 and the minimum was four, indicating competition for the bids.

From DoT's perspective, the maximum benchmark was justified for clusters in Manipur and Nagaland of Rs 609,201 per site per year. After the bidding, the subsidy for the clusters states for Manipur was Rs 2,12,185 and Nagaland bringing in a reduction of 65.2 per cent from the benchmark price. The lowest benchmark Rs 368,864 was for cluster in Karnataka, where the winning bid was Rs 98,558.

The maximum subsidy for a winning bidder was Rs 2,74,599 for a cluster in Mizoram from a benchmark price of Rs 5,72,233 bringing in a reduction of 52 per cent. The high subsidy amount could be attributed to the hilly terrain and the difficulty in laying down the infrastructure. Bidders for a cluster in Madhya Pradesh sought the least subsidy of Rs 66,464 against a benchmark of Rs 374,910, bringing in a reduction of 82.3 per cent.

The largest numbers of towers were proposed in Maharashtra (1017). The large number of towers reflected both the size of the state and the level of existing coverage. The lowest numbers of towers were proposed in Sikkim (8).

Since in the case of Assam, the bidders GTL Infrastructure and Reliance Communications Infrastructure had both bid the same amount in the second round, the bidding went on to the third round.

The total amount of subsidy "saved" was Rs 228 crores annually for five years, being the difference in amount between the total benchmark costs and the total bid amounts. The final actual subsidy to be paid by the government was nearly 71 per cent less than the estimated benchmark value. The least difference from the benchmark cost in percentage terms was in Chattisgarh (42.0 per cent) and the highest was in West Bengal (83 per cent). This showed that due to competition, the winning bids were far lower than the benchmarks.

Since bid design allowed only the lowest $N/2$ (if N was odd) or $(N+1)/2$ lowest bidders to go to the second round, it was important for bidders to come up with bids lower than the benchmark in order to continue to participate in the subsequent rounds. This resulted in first round bids to be on an average lower by 54.5% from the benchmark. As only the lowest bidder in the second round was to be selected, bids were further reduced in the next round.

The interesting dynamics of multiple players and multi round bidding is depicted in the case of the cluster in Arunachal Pradesh, where after the first round of bidding, the reserve price was 20 per cent lower than the benchmark. It came down to 60.9 per cent of the benchmark after the second round.

Table 2 gives details of the round wise data of bidders and bid amounts.

Table 2: Part A Round wise Bidding Data

State	Total Sites	Average Number Bidders in the First Round	Average Numbers Bidders in the Second Round	Average Benchmark per Site	Average Reserve Price for Second Round of Bidding	Average Reduction in the Reserve Price with respect to Benchmark	Average Winning Bid	Average Reduction in the Winning Bid with respect to Reserve Price	Total Subsidy 'Saved'
	<i>No</i>	<i>No</i>	<i>No</i>	<i>Rs</i>	<i>Rs</i>	<i>%</i>	<i>Rs</i>	<i>%</i>	<i>Rs Million</i>
Andhra Pradesh	581	7.3	4	397,038	230,782	42	189,685	18	120
Arunachal Pradesh	62	5	4	517,041	413,632	20	202,316	51	20
Assam	90	8	4	441,777	265,066	40	249,000	6	17
Bihar	489	9	5	415,349	166,140	60	78,520	53	165
Chhattisgarh	560	6.6	4	389,085	202,781	48	145,222	30	139
Gujarat	66	6	4	412,320	103,080	75	73,198	29	22
Haryana	14	7	4	404,211	101,052	75	71,738	29	5
Himachal Pradesh	295	5	4	385,606	154,242	60	120,374	22	78
Jammu & Kashmir	178	4	4	436,635	280,831	36	189,733	33	44
Jharkhand	305	8.7	4	401,522	160,608	60	100,737	37	91
Karnataka	427	10	5	373,994	181,366	52	99,943	45	117
Kerala	46	6	4	394,946	98,736	75	98,700	0	14
Madhya Pradesh	985	9.1	5	385,022	154,412	60	68,284	56	312
Maharashtra	1,017	10.4	6	404,895	186,677	54	103,851	45	305
Manipur	95	5	4	609,201	365,520	40	212,185	42	38
Meghalaya	102	7	4	465,314	279,188	40	223,299	20	25
Mizoram	71	7	4	572,233	343,339	40	274,599	20	21

State	Total Sites	Average Number Bidders in the First Round	Average Numbers Bidders in the Second Round	Average Benchmark per Site	Average Reserve Price for Second Round of Bidding	Average Reduction in the Reserve Price with respect to Benchmark	Average Winning Bid	Average Reduction in the Winning Bid with respect to Reserve Price	Total Subsidy 'Saved'
	<i>No</i>	<i>No</i>	<i>No</i>	<i>Rs</i>	<i>Rs</i>	<i>%</i>	<i>Rs</i>	<i>%</i>	<i>Rs Million</i>
Nagaland	56	5	4	609,201	365,520	40	212,185	42	22
Orissa	432	10	5	400,423	160,169	60	96,168	40	131
Punjab	13	7	4	400,140	100,035	75	67,004	33	4
Rajasthan	411	8.5	5	389,136	191,629	51	111,820	41	114
Sikkim	8	6	4	477,413	190,965	60	162,321	15	3
Tamil Nadu	371	9.8	5	424,181	84,836	80	71,065	16	131
Tripura	147	5	4	537,317	322,390	40	255,912	21	41
Uttaranchal	217	5	4	442,277	280,325	37	142,035	49	65
Uttar Pradesh	666	9.2	5	404,557	182,051	55	129,035	29	183
West Bengal	167	9	5	401,105	160,441	60	67,168	58	56
Grand total	7,871					Overall % reduction = 33			2281

Part B

Table 3 provides details on the winners in different clusters. There were 18 bidders of which 12 won.

The top three winners were BSNL (59 out of 81 clusters), Reliance Communications (53 out of 74 clusters), and Reliance Telecom (40 out of 81 clusters). The other winners were Hutchison Essar South (14 out of 17 clusters), Dishnet Wireless (16 out of 22 clusters), Idea Cellular (12 out of 16 clusters), BTA Cellcom (12 out of 15 clusters), Aircell Digilink India (10 out of 13 clusters), Bharti Airtel (10 out of 42 clusters), Hutchison Essar Cellular (10 out of 14 clusters), Bharti Hexacom (3 out of 3 clusters), Idea Mobile Communications (3 out of 5 clusters), and Fascel (1 out of 5 cluster).

BSNL did not win in Jharkhand and Orissa. Reliance Communications did not win in Assam, Arunachal Pradesh, and Tripura. Reliance Telecom did not win in Andhra Pradesh, Gujarat, Haryana, Karnataka, Maharastra, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Jammu and Kashmir, Manipur, Meghaya, Mizoram, Nagaland, Kerala, Rajasthan and Uttaranchal.

Table 3: Part B Winning Bidders

Sr No	States	Number of Winning Bids (Total Number of Clusters)	Bharat Sanchar Nigam	Reliance Communications	Reliance Telecom	Dishnet Wireless	Hutchison Essar South	Idea Cellular	BTA Cellcom	Aircel Digilink India	Bharti Airtel	Hutchison Essar Cellular	Bharti Hexacom	Idea Mobile Communications	Fascel
Clusters in which Winning Bidders Sought Negative Subsidy from the Government															
1	Andhra Pradesh	18(6)	3	6	-	-	5	4	-	-	-	-	-	-	-
2	Assam	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
3	Bihar	15(5)	4	2	5	4	-	-	-	-	-	-	-	-	-
4	Chhattisgarh	15(5)	4	2	5	-	-	-	4	-	-	-	-	-	-
5	Gujarat	3(1)	1	1	-	-	-	-	-	-	-	-	-	-	1
6	Haryana	3(1)	1	1	-	-	-	-	-	1	-	-	-	-	-
7	Jharkhand	9(3)	-	3	3	-	-	-	-	-	3	-	-	-	-
8	Karnataka	12(4)	3	2	-	-	3	-	-	-	4	-	-	-	-
9	Madhya Pradesh	30(10)	10	2	10	-	-	-	8	-	-	-	-	-	-
10	Maharashtra	27(9)	6	7	-	-	-	8	-	-	-	6	-	-	-
11	Orissa	12(4)	-	4	4	3	-	-	-	-	1	-	-	-	-
12	Punjab	3(1)	1	1	-	-	-	-	-	-	1	-	-	-	-
13	Rajasthan	9(4)	2	3	-	-	-	-	-	1	-	-	3	-	-
14	Tamil Nadu	12(4)	3	3	-	-	-	-	-	3	-	3	-	-	-
15	Uttar Pradesh	18(6)	5	5	-	-	1	-	-	4	1	-	-	2	-
16	West Bengal	6(2)	1	1	2	-	2	-	-	-	-	-	-	-	-
	Total	195(66)	45	43	30	8	11	12	12	9	10	9	3	2	1
Clusters in which Winning Bidders Sought Subsidy from the Government															

Sr No	States	Number of Winning Bids (Total Number of Clusters)	Bharat Sanchar Nigam	Reliance Communications	Reliance Telecom	Dishnet Wireless	Hutchison Essar South	Idea Cellular	BTA Cellcom	Aircel Digilink India	Bharti Airtel	Hutchison Essar Cellular	Bharti Hexacom	Idea Mobile Communications	Fascel
1	Arunachal Pradesh	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
2	Jammu & Kashmir	6(2)	2	2	-	2	-	-	-	-	-	-	-	-	-
3	Manipur	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
4	Meghalaya	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
5	Mizoram	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
6	Nagaland	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
	Total	21(7)	7	2	5	7	-	-	-	-	-	-	-	-	-
Clusters in which Winning Bidders Sought Zero Subsidy from the Government															
1	Himachal Pradesh	9(3)	3	3	3	-	-	-	-	-	-	-	-	-	-
2	Kerala	3(1)	-	1	-	-	-	-	-	-	-	1	-	1	-
3	Rajasthan	3(4)	1	1	-	-	-	-	-	1	-	-	-	-	-
4	Sikkim	3(1)	-	1	1	-	1	-	-	-	-	-	-	-	-
5	Tripura	3(1)	1	-	1	1	-	-	-	-	-	-	-	-	-
6	Uttaranchal	6(2)	2	2	-	-	2	-	-	-	-	-	-	-	-
	Total	27(12)	7	8	5	1	3	0	0	1	0	1	0	1	0
	Grand Total	243	59	53	40	16	14	12	12	10	10	10	3	3	1
	Clusters Bid		81	74	81	22	17	16	15	13	42	14	3	5	5

Source: www.dot.gov.in

Table 4 gives the round wise bid data. From DoT's perspective, maximum subsidy was justified for one of the clusters in Himachal Pradesh (Rs 325,532). After the bidding, the subsidy for this cluster was zero bringing in a reduction of 100 per cent from the benchmark price. The lowest benchmark Rs 117,963 was for Punjab, where the winning bid was Rs (-20,996). While the lower benchmark indicated a relatively higher commercial potential, the winning bid amount indicated that with the infrastructure costs provided for, the winning bidder was willing to not take any subsidy and pay the government Rs 20,996 annually per site. A maximum subsidy of Rs 159,758 was sought in Mizoram from a benchmark price of Rs 319,517 bringing in a reduction of 50 per cent. The high subsidy amount could be attributed to the hilly terrain and low revenue potential. Bidders in two clusters in Karnataka and two clusters in Rajasthan sought the least subsidy of Rs (-21,020). These were against a benchmark of Rs 156,432 and Rs 174,252 in Karnataka and Rs 152,856, bringing in a reduction of 112 per cent and 114 per cent and Rs 174,252 in Rajasthan, bringing in a reduction of 113 per cent and 114 per cent respectively.

For 10 of the clusters, the bidding was over in the first round. This was because for these clusters, there were only three bidders in the first round. All three were considered "successful" and the lowest subsidy sought among these bidders became the applicable winning bid price. Nine of these clusters sought subsidy from the government and included all the clusters in Arunachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram and Nagaland. The cluster in Tripura sought zero subsidy.

For 14 of the clusters, the bidding went into the second round. For these clusters, one of the four bidders quoted more than zero and was not selected.

For 57 of the clusters, the bidding went into the third round as more than three bidders quoted zero subsidies. This led to a tie, leading to a final third round, where the highest bidder was eliminated.

Bidders in clusters in 16 states were willing to take negative subsidy. These states were Andhra Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The bidders were ready to take no subsidy in clusters in states in Himachal Pradesh, Kerala, Rajasthan, Tripura, Uttaranchal and Sikkim. Rajasthan, was the only state where in some clusters were willing to seek both negative subsidy and subsidy.

Since only the lowest four bidders were allowed to go to the next round of bidding, it was important for bidders to come up with bids lower than the benchmark in order to continue to participate in the subsequent rounds. This resulted in zero or negative subsidy sought in the first round bids. Since only three bidders were to be selected, a further reduction in subsidy sought took place. For clusters in those states where negative subsidy was sought, the average reduction from the benchmark was 102.7 per cent (indicating the negative subsidy). For clusters in those states where zero subsidy was sought, the average reduction from the benchmark was 57.9 per cent. For clusters in those states where subsidy was sought, the average reduction from the benchmark was 50% per cent. The overall reduction in subsidy sought was 93.2%.

The total amount of subsidy "saved" being the difference in the benchmark and the winning bid over all the cluster was Rs 24 crores. This included the negative subsidy of Rs 2.97 crores.

Table 4: Part B Round wise Bid Data

State	Total Sites	Average Bidders in the First Round	Average Bidders in the Second Round	Average Benchmark per Site	Average Reserve Price for Second Round of Financial Bidding	Average Winning Bid	Total Subsidy 'Saved'
	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>Rs</i>	<i>Rs</i>	<i>Rs</i>	<i>Rs Million</i>
Clusters in which Winning Bidders sought Subsidy from the Government							
Andhra Pradesh	581	6	4	128,421	0	-13	-75
Assam	90	4	4	185,224	-18,288	-18,320	-18
Bihar	489	6	4	181,345	-100	-123	-88
Chhattisgarh	560	4	4	259,516	0	-12	-145
Gujarat	66	5	4	179,589	0	-12	-12
Haryana	14	5	4	131,577	0	-12	-2
Jharkhand	305	6	4	243,022	-17,292	-17,292	-80
Karnataka	427	5	4	180,977	-20,986	-21,016	-86
Madhya Pradesh	985	4	4	212,346	0	-13	-210
Maharashtra	1,017	5	4	184,105	0	-12	-189
Orissa	432	5	4	205,286	-5,146	-5,146	-92
Punjab	13	4	4	117,963	-20,996	-20,996	-2
Rajasthan	294	5	4	148,569	-20,991	-21,018	-50
Tamil Nadu	371	6	4	136,725	-100	-124	-51
Uttar Pradesh	666	5	4	170,581	-6,962	-6,982	-120
West Bengal	167	7	4	182,547	0	-15	-31
Total	6477						-1,250*

State	Total Sites	Average Bidders in the First Round	Average Bidders in the Second Round	Average Benchmark per Site	Average Reserve Price for Second Round of Financial Bidding	Average Winning Bid	Total Subsidy 'Saved'
	<i>No.</i>	<i>No.</i>	<i>No.</i>	<i>Rs</i>	<i>Rs</i>	<i>Rs</i>	<i>Rs Million</i>
Clusters in which Winning Bidders Sought Zero Subsidy from the Government							
Himachal Pradesh	295	3	3	296,656	0	96,560	87
Kerala	46	5	4	104,469	0	0	5
Rajasthan	117	4	4	228,755	0	216,999	27
Sikkim	8	4	4	188,840	0	0	2
Tripura	147	3	3	228,500		0	34
Uttaranchal	217	5	4	182,025	0	168,612	3
Total	830						158*
Clusters in which Winning Bidders sought Subsidy from the Government							
Arunachal Pradesh	62	3	3	291,741		145,870	9
Jammu & Kashmir	178	3	3	215,774		107,887	19
Manipur	95	3	3	304,820		152,410	14
Meghalaya	102	3	3	298,690		149,345	15
Mizoram	71						11
Nagaland	56	3	3	222,631		111,315	6
Total	564						76*
Grand Total	7,871						1,484

Source: www.dot.gov.in and Authors' Analysis

* These numbers have been rounded off.

**indicates, that second round bidding was not required.

USOF Collections and Disbursements Made

Table 5 gives the collections and disbursements from the USOF from 2002 onwards. It can be seen that there is a significant amount which remains to be utilized. There is scope to provide for accelerating the growth of telecom services through innovative schemes and programs.

Table 5: Collections and Budgetary Allocations: USOF

<i>Rs Millions</i>				
Year	Opening Balance	Funds Collected	Funds allocated and Disbursed	Balance at End of Year
2002-03	0	16,536	3,000	13,536
2003-04	13,536	21,432	2,000	32,968
2004-05	32,968	34,577	13,146	54,400
2005-06	54,400	35,333	17,669	72,064
2006-07	72,064	42,111	15,000	99,175
2007-08	99,175	0	101	0
Grand Total	0	149,990	0	0

Source: www.dot.gov.in

Implications for the Future

- Shifting focus of RTD from fixed and fixed wireless to include mobile services and other wireless technologies. This approach takes in to account the potential for widespread usage of wireless technologies, especially mobile services for a rural context. It also provides for connectivity to those who visit rural areas.
- DoT should not only monitor RTD spread but also “coverage” in terms of carpet area, where wireless signals may be received both by geographical area covered and population (Jain and Raghuram, 2005).
- Separation of network infrastructure and service provision: By dividing the provision of mobile service in to network infrastructure and service provisioning, the USOF provided for entry of new service providers. Although service provision in the existing framework is limited only to existing BSO, CMTS and UAS providers, new infrastructure providers got a chance to directly participate in the rural roll outs.

By having a single infrastructure provider, duplication in costs was avoided in case multiple service providers wanted to provide services. By separating infrastructure and service provision, rural service provision became attractive to private players as they bore only the risks associated with operational costs, part of which was paid as subsidy. Thus DoT ensured lower prices for the rural citizens.

- Spillover Effects: Driven by competition and the signaling provided by the winning bid amounts (which in some cases sought negative subsidy), some private companies have announced extensive rural coverage plans. For example,

Vodafone had announced a \$2bn expansion in rural areas (The specific rural areas to be covered was not known). It is also possible, that other companies could announce similar plans, independent of the USOF.

- Due to the significant growth in the revenues of the telecom sector, the USOF has got substantial funds. After allowing for new VPTs, replacement of MARR VPTs, RCPs, rural DELs and the current USOF scheme, there is more than Rs 7,000 crores remaining in the USOF.

As a consequence, and in order to utilize additional DoT plans to subsidize both state-owned and private operators to build optic fibre cable networks across the country. The DoT has already asked state-owned Telecom Consultants India Ltd (TCIL) to conduct a detailed study on the optic fibre cable networks of all operators and suggest the best methodology to augment these networks as 'it would be uneconomical for every service provider to lay their own extensive OFC networks'.

On the basis of the study, operators whose OFC networks are the most amenable to sharing would be identified and the government will support augmentation and extension of the same on the condition that they share their bandwidth with other players. USOF would try and support the company which has the largest OFC network in each district, connectivity between the block HQ and the district, and would also take up work on the missing link and provide it in such a manner as to enable sharing by other service providers.

The large unutilized amounts in the USOF also have implications for the need for continued contribution levels from operators at 5 per cent of their AGR. The additional contribution of 1.5 per cent from private operators towards ADC could be done away with. BSNL could be reimbursed directly through the USOF.

- Extension to Broadband Data: Although the present requirements of bidders are limited to voice but there is a provision to extend it to broadband data.
- Uniqueness of the Indian Model: Although the USOF framework prior to December 2006, limited service providers to only fixed and fixed wireless technologies, subsequent changes have considerably enhanced the scope of service provision by specifically including mobile and other new technologies. The DoT has worked out a mechanism for roll out and disbursements, that is worth emulating by other administrations.
- It is likely that there are operational difficulties in actual service provision due to the dependence of service providers on infrastructure providers. Early resolution of interface issues related to IPs and USPs could provide credibility to the USOF and pave the way for faster roll outs in rural areas.
- The involvement of operators was done in a transparent way through a bidding process: The identification of location of clusters and towers was done in a scientific manner using well established models. The cluster is a bottom up approach, based on actual infrastructure deployed and enables for a critical mass of users. This is convergent with the bidders' interest. The expected rapid growth in telecom revenues

in the future also guarantees that amounts are available in the USOF for future disbursement and sustenance.

- The bidding process showed that market forces can determine which projects really need subsidy and how much. In a competitive environment, small subsidies could give tremendous leverage.

Going Further

The USOF framework has lessons for other infrastructure sector. While there are several elements in the design of the current USOF, such as bidding process, separation of infrastructure and services, identification of areas to be subsidized (cluster) that may be directly relevant, there may be areas where other design choices would need to be made. For example, while in the case of a telecom network, it is “justified” for users of telecom services to provide for connectivity in non commercial areas or customers, as there are positive network externalities when more users are there on the network, it may not be conceptually alright for users to fund non users in other infrastructure sectors (for example, airlines).

The allocation of subsidy on a viability gap funding appears to have worked well. Multiple round auctions with criteria that maintained competition enabled significant reduction from the reserve or benchmark price and allowed for market discovery of prices. An auction design that enabled “clustering of clusters” would have worked even better, as it would enable infrastructure service providers to leverage economies of scale, and allow service providers to consolidate their operations. For example, BSNL won the infrastructure bid in 61 of the 83 clusters. A bid design that allowed bidders to consolidate the clusters could have led to higher bids.

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