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Role of Universal Service Obligation Fund in Rural Telecom Services: Lessons from the Indian Experience

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Abstract

Despite the tremendous growth of mobile services in most developing countries, these have largely remained limited to urban areas. This has further aggravated the existing urban and rural divide. Policy makers and regulators perceive the need for an effective regulatory and policy environment to reduce the gap, as there are several market challenges in this endeavor, including low commercial viability. However, most such interventions have had little success.

This paper outlines India's experience of increasing rural teledensity, including its recent policy initiative to increase penetration through creation of a Universal Service Obligation Fund (USOF) that supported a variety of innovative initiatives. USOF's most ambitious program to date had been the design and deployment of mobile services in rural areas.

This paper analyses the outcomes of various programs, especially those of the mobile service provision component of USOF. Despite the innovative design of the USOF program, it had little impact on increasing rural teledensity. On the other hand, positive policy steps that reduced the costs for service provision (revenue shares, duties, ADC) and competition facilitated greater rural penetration. This raises the issue of role of government vis-à-vis private sector in increasing rural teledensities.

The lack of accountability arising from the relationship between the government owned incumbent and the USOF administrator and proper evaluation of USOF, the non-ring fencing of the fund and poor quality project management contributed to the low impact. Non-involvement of private operators at an early stage, inability to suitably enforce any penalties for violation of contracts, and non-existent review and feedback mechanism have not allowed USOF to leverage the benefits of an early start. In Peru, strict penalties in non implementation of contracts led to more timely schedules (Cannock, 2001).

Since USOF is a highly visible program, it is important to generate high impact outcomes. On the strategic front, USOF needs to be managed by an independent body that is made responsible for outcomes. Third party assessments and greater enforceability of contracts are necessary operational elements of this design. Without this operational framework, the strategic elements of design will not provide the value that was envisaged.

This paper also provides a framework for assessment of USOF and relates it to the experience in other countries. USOF must be treated as one among many instruments for increasing rural teledensities and efforts should be made to facilitate policy outcomes on a variety of dimensions.

Keywords: Rural Telecom, Universal Access, Universal Service, Universal Service Obligation Fund, Viability Gap Funding, Rural Teledensity

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Introduction

The Universal Service Obligation Fund (USOF) of India's most ambitious scheme to date had been the provision of mobile services in 84 clusters covering 500 out of a total of nearly 625 districts through private participation. Under this scheme, mobile infrastructure and services were to be provided separately through two bidding processes. However, a recent review (TRAI 2008) revealed that despite what was considered an innovative design, rural telecom services (RTS) under this scheme had not taken off. In the meantime, rural teledensities (RTD) had increased faster than in previous years. This led to concerns regarding the efficacy of government intervention in deploying USOF. On the other hand, in this context, the role of markets in helping rural telecom penetration needs to be reviewed. This paper examines the current status of USOF and its evolution. Based on this, we develop a framework for evaluation of USOF and suggest a way forward.

It has been recognized that telecom services are drivers of economic growth (Waverman, Meschi & Fuss, 2005). India has seen significant growth in telecom services in the past few years, mostly driven by mobile services. However this growth had been largely limited to urban areas. For example, the urban teledensity as of December 31, 2008 was 81.38 per cent, whereas, rural teledensity was 12.62 per cent (TRAI 2009).Rural teledensity had not been able to keep pace with the spurt in urban teledensity. This trend was similar in many other countries. For example, in Pakistan, as of March 31, 2007, whereas the total teledensity was 35.7%, rural teledensity was less than 2% (Wilson, 2007). In China, the urban fixed line teledensity was 44%, whereas the rural fixed line teledensity was 16% as of 31st December, 2006 and the ratio of mobile teledensity between urban and rural areas has been 7:1 (Fong, 2009).

The rural context as compared to the urban context is characterized by low population densities, large distances between population clusters, and low per capita income. The first two factors lead to a lower potential demand for a given area, due to which the cost of creating and maintaining rural telecom infrastructure is expensive. The third factor results in lower ability to pay. Therefore, the commercial viability of rural telecom services was low. Thus improving RTD was a challenge.

Indian Telecom Sector

The overall policy framework for the Indian telecom sector was provided by the Department of Telecom (DoT), under the Ministry of Communications and Information Technology. Mahanagar Telephone Nigam Limited (MTNL) and Bharat Sanchar Nigam Limited (BSNL) were the two state owned incumbents. MTNL was carved out of DoT in 1986 and BSNL was formed with the corporatization of DoT in 2000. MTNL provided services in the metros of Delhi and Mumbai. BSNL provided them in the rest of the country.

Apart from MTNL and BSNL, there were several private operators in various key technology and service segments: fixed, mobile, satellite and local, national long distance, international etc. The fixed and mobile services were licensed on the basis of service areas called 'circles' that were administrative units of DoT and later those of BSNL. These were usually co terminus with state boundaries. Initially, two mobile private operators per service area had been licensed through auctions. They were required to use the GSM standard. Besides the state owned incumbents, one private operator per circle could also provide fixed services, by participating and winning in the auction. The fixed service license had the requirement that operators must provide 10% of their lines in rural areas. However, private operators claimed they had bid too high and could not provide services in a commercially viable way. The government then came out with a National Telecom Policy, 1999 (NTP 99) that allowed the operators to convert their license fee in to a one time entry fee (which was much lower than the license fee) and an annual revenue share for the duration of the license. As a part of NTP 99, each circle could have potentially any number of operators. It also introduced the state owned operators, BSNL and MTNL as the third mobile operator in each circle. Subsequently, in 2001, the DoT auctioned licenses for the fourth mobile operator, with GSM standard. Some of the operators, after acquiring fixed line licenses (whose entry fee) was much lower, used the CDMA based Wireless in the Local Loop (WLL) services to provide "limited" mobility services. Since the entry fee for fixed services was much lower, operators had a business case for giving "mobile like services" at the much lower regulated tariffs for fixed services. Moreover, fixed service operators could retain all revenues from long distance services, whereas mobile operators were required to pass on 95% of it to DoT/BSNL (they could retain 5% to cover bad debts etc). Mobile services operated under Receiving Party Pays regime, which limited their ability to influence their subscribers to use their services, whereas the WLL with "limited mobility" services operated under the Calling Party Pays regime. In order to streamline the provision of WLL with "limited" mobility and mobile services, the

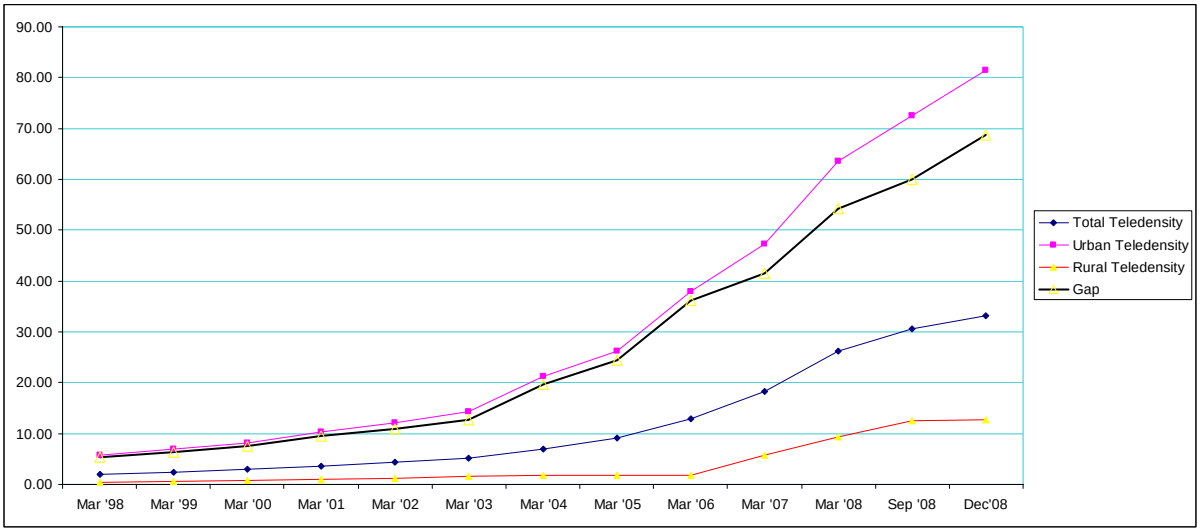
DoT came out with the Unified Access Service License (UASL). By shifting to this regime, fixed service operators could provide full fledged mobile services, after paying the differential in license fee between the fourth cellular and the fixed license fee they had already paid. Since mobile operators had no roll out obligations, the DoT allowed the migration to UASL for all operators without any roll out obligations. Operators got the freedom to choose any standard and Calling Party Pays regime was implemented for all operators.

The Telecom Regulatory Authority of India (TRAI), set up in 1997 was the regulatory authority mandated with tariff regulation, fixing interconnection terms, quality of services etc. The Telecom Dispute Settlement and Appellate Tribunal (TDSAT) was a quasi-judicial body that adjudicated and settled disputes between service providers or licensor and licensee and reviewed appeals against TRAI directions.

Telecom Growth: The Urban/Rural Divide

While the overall growth in teledensity had been impressive, it accentuated the gap between urban and rural teledensity. The total teledensity of 1.3 per cent as of March 31, 1996 rose to 33.23 percent by December 31, 2008 (TRAI 2009). In the period between March 31, 2002 and December 31, 2008, the number of phone subscriptions increased from 44.9 million to 384.79 million. However this has been limited to urban areas. For example, the urban teledensity as of December 31, 2008 was 81.38 per cent, whereas, rural teledensity was 12.62 per cent (TRAI 2008). Despite the relatively rapid increase in urban teledensity the increasing disparity between urban and rural teledensity was of concern as it implied differential economic growth rates. Figure 1 shows the urban, rural and total teledensity, and the growing and significant gap between urban and rural teledensities.

Figure 1: Urban, Rural, and Total Teledensity and the Widening Gap



Source: www.trai.gov.in

The impetus to growth, initially in metros and then urban areas, was provided by mobile services. As was the trend elsewhere, the fast growth of wireless technologies, especially mobile, their reducing cost, increasing consumer demand contributed to their high uptake. Increasing purchasing power due to high economic growth rates further accelerated the adoption of mobiles in India. Policy and regulatory initiatives, such as the introduction of competition (there were 5-7 operators in most service areas), reduction in Access Deficit Charges leading to reduction in tariffs and initiatives of private operators in bringing forth innovative pricing schemes such as lifetime validity, small recharge coupons ($ 0.25) were some factors contributing to this growth. Given the increasing saturation in urban areas, most operators had put in place aggressive plans to penetrate beyond urban areas.

Policy Initiatives to Improve Rural Teledensity

Since the 1970s, there has been policy focus in providing and improving RTS. Over time, these policies and instruments have changed in keeping with the policy and regulatory developments in various other parts of the world and included the following:

a) Programs for Provision of Village Level Connectivity
b) Contribution from Private Operators towards Rural Roll Out
c) Access Deficit Charges
d) Universal Service Levy (USL) and Creation of USOF

a) ***Programs for Provision of Village Level Connectivity***: The initial objective of various policies and programs was to provide a village public telephone (VPT) in each of the 607,491 villages (This number has been revised to 593,485 based on reclassification necessitated by

the changing population profile). Table1 provides data on the status of implementation (VPTs covered from March 31, 1995 -December 31, 2008). It can be seen that until March 31, 2007, the VPTs added over the previous years was a positive number. However, as of March 31, 2008 and December 31, 2008, this is a negative number, indicating that the net number of VPTs has decreased. In fact, the number of villages uncovered has increased to 54,037, larger than in the previous two years. This may indicate an increasing availability of other telecom access means, at least in the larger and better connected villages. This could have let to non-viability of existing VPTs. This situation also raises the issue of whether the USOF should continue to focus on provision, maintenance of VPTs in all villages or should it specifically target specific villages?

Table 1: Year Wise Status of Village Connectivity Program 1995-2008

Status as on March 31 Year	Total VPTs[+]	Percentage of Villages Covered	VPTs Added over Previous Year	Uncovered Village
2008[*]	539,448	91.0	-20,055	54,037
2008	559,503	94.0	-4,572[**]	33,982
2007[*+]	564,075	94.3	15,232	43,416
2006	548,843	90.5	18,227	58,648
2005	530,616	87.0	8,269	76,875
2004	522,347	85.9	8,060	85,228
2003	514,287	84.6	45,425	94,364
2002	468,862	77.1	59,940	
2001	408,922	67.3	68,282	
2000	Data Not Available			
1999	340,640	56.0	37,058	
1998	303,582	49.9	42,855	
1997	260,727	42.9	56,719	
1996	204,008	33.6	31,497	
1995	172,511	28.4		

***** Data as of December 31, 2008

** Shows the VPTs that were closed

*+ The total number of villages changed from 607,491 to 593,485 between June 30, 2007 to December 31, 2007 possibly due to reclassification

+ VPT = Village Public Telephone

Source - http://www.trai.gov.in/

Jain, R. and Raghuram, G. (2005): Report to Department of Telecom on "Accelerated Provision of Rural Telecom Services"

Contribution from Private Operators towards Rural Roll Out: With private operators licensed to provide telecom services, government envisaged funding support for fixed/fixed wireless services from private fixed line operators. They were required to provide 10 per cent of their deployments in rural areas. Mobile operators had no such obligations. This was possibly because the government viewed mobile services as expensive and hence would not be affordable by the poor.

There was very little contribution on the ground from the private operators. They preferred to pay the associated liquidated damages as these were lower than the cost of roll out. With the transition to the Unified Access Service License (UASL), a large number of both fixed service operators (FSO) and mobile telecom services (CMTS) licensees shifted to UASL. The UASL had no associated rural roll out obligations.

Access Deficit Charge (ADC): With increasing participation of the private sector, there was an explicit need to focus on rural areas. Therefore, TRAI came out with a framework for the imposition of ADC to be paid by all operators to fixed service operators (so that they could spread services in rural areas), in 2003. This framework that became operational from February 1, 2004 reflected the government perspective that rural services would be provided using fixed/fixed wireless services. This was supposed to compensate fixed line operators for the regulated, below cost rentals and call charges, especially in rural areas. Since BSNL was the dominant fixed line operator, by far, it became the major recipient of such payments

TRAI initially estimated ADC based on an "affordability" criteria i.e., the difference between the regulated prices, both rentals and call charges (at levels TRAI thought was affordable to rural customers) and BSNL's cost estimation of service provision over its entire network. The ADC thus calculated was nearly 30% of the sector revenue, leading to perceived high additional cost per call. Since initially ADC was applicable only on calls that originated, transited or terminated in a fixed network, the relative cost of mobile to mobile calls became cheaper, resulting in sudden spurt in growth of mobile services. To remove this 'distortion', ADC was subsequently extended to cover all types of calls, resulting in a reduction on reducing the per minute applicable charges as compared to the previous scenario, as the total minutes available over which ADC could be allocated became larger. Given the perceived high charges and complexities of assessing ADC, such as variation by type of call (fixed to mobile, mobile to mobile etc, local, long distance, and international) differences in distance

slabs etc, ADC underwent a series of reviews. Over time the ADC component was reduced to 10% of the sector revenue and attempts were made to simplify the regime.

There were a number of operational difficulties (Jain, 2006) which led to reviewing the then current ADC regime. In 2005, TRAI gave recommendation for implementing a lower priced ADC regime on a per call basis but added a revenue share of 1.5 per cent payable to BSNL by all operators from March 1, 2006. Subsequently TRAI phased out the ADC regime, by removing the per minute call charges and progressively reducing the revenue share towards ADC to zero from April 1, 2008. Further, TRAI recommended that BSNL's rural obligations should be supported through the USOF through a Universal Service Levy (USL).

Universal Service Obligation Fund: USOF came in to effect from April 1, 2002. It was created as a non lapsable fund. Transfers from the USOF required parliamentary approvals. The USOF was to be administered by the Administrator, USOF, DoT. All operators were required to contribute five per cent of the Adjusted Gross Revenue (AGR) towards USL. Table 2 gives the collections and disbursements from the USOF from 2002 onwards and also shows the allocations for fixed/fixed wireless connectivity from 2002-03 to 2008-09.

Table 2: Collection and Disbursement from USOF and Allocations for Fixed/Fixed Wireless Connectivity from 2002-03 to 2008-09

Status of USOF As On 30.09.2008									*(Rs. Million)*
Sr. No.	**Particulars**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**Grand Total**
Aggregate Data									
1	Funds Collected	16,536	21,432	34,577	35,333	42,111	54,055		204,044
2	Funds Allotted	3,000	2,000	13,146	17,669	15,000	12,900	3,521	67,235
3	Total Spent	3,000	2,000	13,146	17,669	15,000	12,900	3,521	67,235
4	Total Funds Remaining								9,599
Break up of Amount Spent by Activity								*(Amount in Rs. Million)*	
1	Amount on O&M of VPTs	2,366	664	651	834	815	1,189	341	6,861
	Percentage of the total spent	*79*	*33*	*5*	*5*	*5*	*0*		
2	Amount on Replacement of VPTs	634	46	721	1,082	1,062	2,569	743	6,857
	Percentage of the total spent	*21*	*2*	*6*	*6*	*7*	*1*		
3	Amount on Rural Community Phone	NA	NA	NA	319	417	197	41	974
	Percentage of the total spent				*2*	*3*	*3*		
4	Amount on VPTs in Uncovered villages	NA	NA	NA	297	554	447	69	1,368
	Percentage of the total spent				*2*	*4*	*4*		
5	Amount on Rural DELs (Prior to 01.04.02)	NA	1,290	10,628	NA	NA	NA	NA	11,918
	Percentage of the total spent		*65*	*81*					
6	Amount on Rural DELs installed from 01.04.02 to 31.03.05	NA	NA	1,146	13,934	3,427	1,221	251	19,980
	Percentage of the total spent			*9*	*79*	*23*	*11*		
7	Amount on Rural DELs installed after 01.04.05	NA	NA	NA	1,201	8,724	7,277	1,052	18,254
	Percentage of the total spent				*7*	*58*	*82*		

Note: "NA" indicates that the agreement for the respective USO activities were not signed during this period
Source – http://www.dot.gov.in/uso/implementationstatus.htm

USOF Framework

USOF was designed to be implemented initially as two streams Stream I and II focusing on fixed and fixed wireless covering both public and private services. Amendments were made to the Indian Telegraph (Amendment) Act in 2006 and the USOF rules that paved the way for inclusion of provision of mobile services (Stream III) (TRAI, 2005). Later, streams IV, V and VI were added to cover provision of broadband connectivity to villages in a phased manner, creation of general infrastructure in rural and remote areas for development of telecommunication facilities and induction of new technological developments in the telecom sector in rural and remote areas respectively.

Design

The USOF framework design comprised of the following elements:

1. *Viability Gap Funding:* The USOF provided for viability gap funding on the basis of net cost, being the difference between the sum of annualized capital and annual operating cost and annual revenue for all its schemes.
2. *Competitive Selection of Operators:* The winning bidders for any program were to be selected through a multi-layered bidding process on the least quoted subsidy support basis. UASL, fixed and cellular service providers were eligible for bidding in their service areas for services and entities registered as infrastructure providers could bid only for infrastructure provision for stream III.
3. *Auction Design*: Multi-layered "Informed Descending Auction" was designed to select bidders (both for infrastructure and service provision) who qualified for subsidy over three rounds of bidding. A starting benchmark or reserve price for the bid amount was specified in the first round. In each of the two remaining subsequent round, the bidders had to quote a subsidy amount less than or equal to the benchmark, which was the smallest amount bid in the earlier round.
4. *Support for Both Public and Private Services:* The USOF provided support for provision of public and private services.

Since very little progress had been made in Streams IV, V and VI, we present the analysis based on data from the first three streams.

Scope

i. Stream-I: This covered villages with a population exceeding 2000 for provision of public telecom and information services. The funding provided for operation and maintenance support of all VPTs in the villages, replacement of non-functional VPTs, installation of additional VPTs (Rural Community Phones) in villages with population of more than 2,000, up-gradation of a public telephone to public tele information centers**,** installation of high speed public telecom information centers in a public place at block headquarters.

ii. Stream-II: In the first phase, that had been operationalized to date, it covered capital and operational support for household telephones in, 1685 or nearly two thirds of the total rural and remote sub districts. The support was to be provided until ADC could cover the differences in rentals prescribed by TRAI and those actually charged for lines that were installed prior to April 1, 2002. After phasing out of ADC, from April 1, 2008, support would be provided for a further period of three years.

iii. Stream III: Provided support for mobile services in those rural and remote areas which had no existing fixed wireless or mobile service. In the first phase, it involved setting up and managing 7,871 infrastructure sites spread over 500 districts. These sites constituted 81 clusters. To date, this was the largest program under this phase.

There were two parts: Part A involved providing the infrastructure. Both telecom service providers and infrastructure providers (including those who did not have a telecom license but were registered as Infrastructure Providers (IP-I)) and Part B envisaged using the provided infrastructure by three competitively selected service providers ("Universal Service Providers" (USPs) who were existing UASL holders). This allowed the costs of the expensive infrastructure to be kept low through sharing. Part B supported for the installation of BTS, batteries and power plants, associated antennas and backhaul and other equipment for provisioning of mobile services. Initially, the infrastructure created was to be used primarily for voice telephony. Later, it could also be used to provide broadband services.

This stream had been designed with the following elements:

a) *Identification of a Cluster*: Bidding was designed on the basis of *clusters* (a group of districts within a service area that had the same benchmark (explained below)). Each cluster would contain a number of infrastructure sites. Benchmark was calculated based on the technology used for the BTS and the estimated cost of providing the infrastructure and was same for all the infrastructure sites within a cluster.

b) *Location of Towers:* The location and the number of towers required in each district were identified based on GIS maps indicating existing towers, population density and availability of fixed wireline/wireless connections.

c) *Rollout Time Frame*: Part A providers 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.

Further details of stream III are provided in Appendix 2.

Outcomes of Streams I and II*:* As of March 31, 2007, the end of the envisaged implementation period, there were gaps in the targets for Stream I (Table 2). For stream II, BSNL was selected in more than 75% of the sub districts for service provisioning with the remaining going to the private sector (www.dot.gov.in/uso//implementationstatus.htl accessed on May 6, 2009). There were no specific targets to be achieved. However, there was a cap of Rs 20,000 that USOF would support from April 1, 2008 for three years for lines installed prior to April 1, 2002.

Outcomes of Stream III

Bidding Process

Part A: 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. The maximum number of bidders in any cluster was 11 and the minimum was four, indicating competition for the bids. Table 3 provides details on the state wise number of clusters and the bidding outcomes.

Table 3: State Wise Number of Cluster and the Bidding Outcomes

Sr. No.	State	Total Number of Clusters	Total Sites	Average Number Bidders in the First Round	Average Benchmark per Site	Average Winning Bid	Total Subsidy 'Saved'	Average Reduction in the Winning Bid with respect to Benchmark
		No	*No*	*No*	*Rs*	*Rs*	*Rs Million*	*%*
1	Andhra Pradesh	6	581	7.3	397,038	189,685	120	52.2
2	Arunachal Pradesh	1	62	5	517,041	202,316	20	60.9
3	Assam	1	90	8	441,777	249 000	17	43.6
4	Bihar	5	489	9	415,349	78,520	165	81.1
5	Chhattisgarh	5	560	6.6	389,085	145,222	139	62.8
6	Gujarat	1	66	6	412,320	73,198	22	82.2
7	Haryana	1	14	7	404,211	71,738	5	82.3
8	Himachal Pradesh	3	295	5	385,606	120,374	78	68.9
9	Jammu & Kashmir	2	178	4	436,635	189,733	44	56.4
10	Jharkhand	3	305	8.7	401,522	100,737	91	74.8
11	Karnataka	4	427	10	373,994	99,943	117	73.3
12	Kerala	1	46	6	394,946	98,700	14	75
13	Madhya Pradesh	10	985	9.1	385,022	68,284	312	82.3
14	Maharashtra	9	1,017	10.4	404,895	103,851	305	74.4
15	Manipur	1	95	5	609,201	212,185	38	65.2
16	Meghalaya	1	102	7	465,314	223,299	25	52
17	Mizoram	1	71	7	572,233	274,599	21	52

Sr. No.	State	Total Number of Clusters	Total Sites	Average Number Bidders in the First Round	Average Benchmark per Site	Average Winning Bid	Total Subsidy 'Saved'	Average Reduction in the Winning Bid with respect to Benchmark
		No	*No*	*No*	*Rs*	*Rs*	*Rs Million*	*%*
18	Nagaland	1	56	5	609,201	212,185	22	65.2
19	Orissa	4	432	10	400,423	96,168	131	76
20	Punjab	1	13	7	400,140	67,004	4	83.3
21	Rajasthan	4	411	8.5	389,136	111,820	114	71.3
22	Sikkim	1	8	6	477,413	162,321	3	66
23	Tamil Nadu	4	371	9.8	424,181	71,065	131	83.2
24	Tripura	1	147	5	537,317	255,912	41	52.4
25	Uttaranchal	2	217	5	442,277	142,035	65	67.7
26	Uttar Pradesh	6	666	9.2	404,557	129,035	183	68.2
27	West Bengal	2	167	9	401,105	67,168	56	83.3
	Overall	**81**	**7,871**		**440,442**	**141,337**	**2,283**	**68.7**

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

The multi round auction process where successive benchmarks were lower ensured that the final actual subsidy to be paid by the government was 68.7 per cent less than the estimated benchmark value. The total amount of subsidy "saved" was Rs 2283 million annually for five years, being the difference in amount between the total benchmark costs and the total bid amounts.

Part B: There were 18 bidders of which 12 won. The bidding was competitive, with an average of eight bidders in the first and five in the second round (Jain and Raghuram, 2008). Table 4 provides state wise data on the bidding outcomes. The total subsidy "saved" was Rs 1,484 million. Only bidders in the six hill states in the North East part of the country sought subsidy from the government. Even here, the reduction from the benchmark was 50.0 per cent, showing a "saving" of Rs 76 million from the benchmark price. Bidders in six states sought zero subsidy from the government. Here, the reduction from the benchmark was 100.0 per cent, showing a saving of Rs 158 million from the benchmark price. Bidders in clusters in 16 states were willing to take negative subsidy. The overall reduction in subsidy sought was 104.0 per cent. The total amount of subsidy "saved" being the difference in the benchmark and the winning bid over all the cluster was Rs 1250 million annually.

Table 4: State Wise Data on Bidding Outcomes

Sr. No.	States	Number of Winning Bids (Total Number of Clusters)	Total Sites	Average Number of Bidders in the First Round	Average Benchmark per Site	Average Winning Bid	Total Subsidy 'Saved'	Average Reduction in the Winning Bid with Respect to Benchmark
		No	*No*	*No*	*Rs*	*Rs*	*Rs Million*	*Percent*
Clusters in which Winning Bidders Sought Negative Subsidy from the Government								
1	Andhra Pradesh	18(6)	581	6	128,421	-13	-75	100
2	Assam	3(1)	90	4	185,224	-18,320	-18	109.9
3	Bihar	15(5)	489	6	181,345	-123	-88	100.1
4	Chhattisgarh	15(5)	560	4	259,516	-12	-145	100
5	Gujarat	3(1)	66	5	179,589	-12	-12	100
6	Haryana	3(1)	14	5	131,577	-12	-2	100
7	Jharkhand	9(3)	305	6	243,022	-17,292	-80	107.1
8	Karnataka	12(4)	427	5	180,977	-21,016	-86	111.6
9	Madhya Pradesh	30(10)	985	4	212,346	-13	-210	100
10	Maharashtra	27(9)	1,017	5	184,105	-12	-189	100
11	Orissa	12(4)	432	5	205,286	-5,146	-92	102.5
12	Punjab	3(1)	13	4	117,963	-20,996	-2	117.8
13	Rajasthan	9(4)	294	5	148,569	-21,018	-50	114.1
14	Tamil Nadu	12(4)	371	6	136,725	-124	-51	100.1

Sr. No.	States	Number of Winning Bids (Total Number of Clusters)	Total Sites	Average Number of Bidders in the First Round	Average Benchmark per Site	Average Winning Bid	Total Subsidy 'Saved'	Average Reduction in the Winning Bid with Respect to Benchmark
15	Uttar Pradesh	18(6)	666	5	170,581	-6,982	-120	104.1
16	West Bengal	6(2)	167	7	182,547	-15	-31	100
	Overall	**195(66)**	**6477**	**5**	**177,987**		**-1,250***	**104**
Clusters in which Winning Bidders Sought Subsidy from the Government								
1	Arunachal Pradesh	3(1)	62	3	291,741	145,870	9	50
2	Jammu & Kashmir	6(2)	178	3	215,774	107,887	19	50
3	Manipur	3(1)	95	3	304,820	152,410	14	50
4	Meghalaya	3(1)	102	3	298,690	149,345	15	50
5	Mizoram	3(1)	71	3	319,517	159,758	11	50
6	Nagaland	3(1)	56	3	222,631	111,315	6	50
	Total	21(7)	**564**	**3**	**275,529**	**137,764**	**76***	**50**
Clusters in which Winning Bidders Sought Zero Subsidy from the Government								
1	Himachal Pradesh	9(3)	295	3	296,656	96,560	87	100
2	Kerala	3(1)	46	5	104,469	0	5	100
3	Rajasthan	3(4)	117	4	228,755	216,999	27	100
4	Sikkim	3(1)	8	4	188,840	0	2	100
5	Tripura	3(1)	147	3	228,500	0	34	100

Sr. No.	States	Number of Winning Bids (Total Number of Clusters)	Total Sites	Average Number of Bidders in the First Round	Average Benchmark per Site	Average Winning Bid	Total Subsidy 'Saved'	Average Reduction in the Winning Bid with Respect to Benchmark
6	Uttaranchal	6(2)	217	5	182,025	168,612	3	
	Total	**27(12)**	**830**	**4**	**204,874**	**80,362**	**158***	**100**
Overall		**243**	**7,871**	**4**	**219,463**	**109,063**	**1,484**	**85**

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

Implementation: However as of September 2008 (Table 5), there were significant gaps in implementation, notably from BSNL, that had fulfilled only nearly 13% of the target infrastructure sites. This resulted in an overall completion percentage of only 25%.

Table 5: Service Provider Wise Breakup of Commissioned Towers

Sr. No.	Awardee Company	Total Towers Awarded	Commissioned Towers	Percentage of Total Awarded Towers	Percentage of Commissioned Towers to Total Awarded
1	GTL	421	390	5.3	0.93
2	QTIL	88	88	1.1	1.00
3	Vodafone	331	262	4.2	0.79
4	Reliance	472	251	6	0.53
5	KEC	384	153	4.9	0.40
6	BSNL	6,175	790	78.5	0.13
	Total	**7,871**	**1,934**	**100**	0.25

Source - http://www.dot.gov.in/uso/implementationstatus.htm

It can be seen that only QTIL that had been awarded 1.1% of all towers had completed commissioning of its awarded towers. BSNL which had been awarded nearly 78.5% of the towers had completed only13.5% of towers. Without substantial roll out of Part A, Part B outcomes were limited.

Implications

Despite this slow progress in the roll out of Phase 1 of USOF, there has been a significant increase in from 1.86% in March 31, 2006 to 9.34% by March 31, 2008 and further to 12.62% by December 2008. Obviously, USOF support had very little contribution on this account.

A large part of the growth was due to competitive and market pressures which operators faced. With an economic boom, operators reached significant penetration levels in urban areas and found it increasingly difficult to get more urban customers and thus focused on penetration in rural areas. Further, a reduction in handset charges to sub $20 level, could have contributed to faster adoption in rural areas, especially

those that were close to urban areas.

A significant role was played by the regulatory changes brought about by a continuous reduction in ADC, leading to reduction in the market efficiency gap (Navas-Sabater et al, 2001; Malik and de Silva, 2005), and a competitive environment, led to operators reducing call charges., facilitating penetration.

The increase in RTD is currently probably concentrated in rural areas around urban centres and highways. The customer, who buys a mobile handset in rural areas, is more likely to be relatively higher earning member, as cost of handset is a major deterrent to acquisition of a phone. Cost of calls and complexity of tariff plans have been cited as other deterrents (Sarin and Jain, 2009).

This shows that the USOF, per se, was not effective in the spread of RTD, but rather the reduction in ADC and competition, coupled with growth in the economy leading to higher disposable incomes including for rural areas, and falling handset prices that has led to increase in RTD.

Further, the delays in rolling out the planned projects, has led to concerns regarding the efficacy of the current organizational mechanisms in dealing with schedule and contract adherence with respect to roll outs. While this could be attributed to gaps in monitoring, we believe this is due to the larger issue regarding the relationship between the USOF and BSNL. BSNL is a wholly government owned entity under the Secretary, DoT and the USOF administrator also reports to Secretary DoT. This lack of independence could lead to a situation where lax oversight could result due to relatedness of the two units.

A Framework for Assessing the Indian Experience

The Indian experience is analyzed following a project life cycle approach covering: Scope, Identification of Universal Access Provider, Mechanism to Fund the USOF, Selection Process, Extent of Involvement of Private Sector, Outcomes, and Review Mechanisms.

Scope: (i) *Type of Services*: The dominant focus had been on voice provision. Initially, the approach was to support this and include Internet access through fixed and fixed wireless

only. Subsequently, the scope was enhanced to include mobile services. While this was in line with developments in other countries where scope of USOF services included mobile services (Uganda, India) (Gasmi, 2005), the delays in incorporation of wireless in the scope of USOF possibly led to delays in increase of RTD. Additionally, the role of broadband and Internet in economic growth has triggered a review of the scope of universal access provision (as for example in Brazil, Mexico, India) (Jayakar and Sawhney, 2004).

After incorporating wireless services, the scope needs to be extended to provision of information services through mobiles. For this, a number of initiatives from the government such as wireless enablement of government websites would need to be undertaken, as people in rural areas are often dependent on government agencies for several services. A number of value added services such as mobile banking could then piggy back on the service infrastructure so created.

On another dimension, while the Indian USOF did envisage Internet access, its focus continued to be on voice as brought out by the little progress made in Streams IV, V and VI and that allotted amounts were almost totally spent on Stream I, II and III that predominantly focus on voice connectivity (Table 2).

(ii) Target Population: The focus of mobile coverage has been rural areas, as nearly 72% of the population is resident there. However, there is a need to focus on urban poor as well. The importance of the urban sector has been growing rapidly and despite the fact that only 28% of India's 1.2 billion people currently live in cities, this proportion is rising. What's more, the urban sector contributes to more than 60% to India's GDP – a far greater than the 29% urban share in 1950-51. The rate at which India has been urbanizing has been increasing and by 2025, 40% of India's population is projected to be urban (National Institute of Urban Affairs, 2000). Furthermore, between 1983 and 2004-05, the total numbers of rural poor declined by more than 12% while the total number of urban poor increased by nearly 14%. USOF in most countries have focused on rural areas. The issue of identifying beneficiaries and ensuring that they are the ones who actually use it is difficult for mobile phones, unlike a fixed line phone that can be made available at a fixed location and thus limits the people who can use it.

(iii) Elements of Services Covered: The USOF provided for viability gap funding for infrastructure and services, but no subsidy was provided for handsets, a major barrier to

mobile ownership, (Sarin and Jain, 2009). Despite the rapid fall in handset prices, its cost continues to be the primary barrier to owning a mobile in the urban slums. There have been few examples of bundling subsidies of network with handsets. Stream III is thus "coverage" based, in the sense, that it provides support for connectivity in rural areas, rather than support to individuals. It is thus not a targeted subsidy.

(iv) Conceptualizing the Scope vis-à-vis Scale of Funding: One of the criticisms against the current model of USOF is the inability of the DoT to develop mechanisms to deploy the funds. It can be seen from Table 2 that there is a significant amount in the USOF which remains to be utilized. A massive roll out plan, rather than limiting to identified clusters, world class management expertise for managing schedule and deliverable adherence, support for backbone infrastructure could have led to more visible outcomes.

If the DoT did not have an adequate plan for utilizing USOF, it could have reduced the revenue share percentage that service providers contribute to it. This could have allowed them to provide lower priced calls, thus facilitating greater penetration. On the other hand, since the USOF is deposited in the Consolidated Fund of India and disbursements are made by prior approval of the parliament, the Ministry of Finance may use its discretion for utilizing the funds for a variety of purposes taking away the independence of USOF.

Given the increase in RTD without any substantial support from USOF, there has been some debate whether there is a need for USOF? Our contention is that while so far, market forces have ensured faster penetration than the USOF, these may not be as effective, when there would be a need to penetrate in the more remote and rural areas. The growth in RTD has largely been in near urban areas and larger villages, where the cost of service provision is lower and ability to pay may be higher, making these services relatively more commercially viable than those in the more remote regions. Also, with the likely introduction of 3G services, operators are likely to focus in urban areas. Thus the USOF is required so as to maintain a sustained focus on rural areas, besides ensuring that specific areas (remote, north east regions) are covered.

To get a perspective on the magnitude of the amounts required to increase RTD, we estimate that it requires nearly $ one billion to increase RTD by one per cent. ((0.01 * 823 million rural population * Rs 5000 cost per line)/Rs 40 (dollar to rupee conversion rate)), whereas the unspent amount in USOF as of September was nearly $3 billion. Given the increasing and

large gap between UTD and RTD, this indicates that there is a need to continue with USOF, even though market forces play a significant role in increasing RTD. However, since the absolute unspent amount appears huge, the public perception could turn against USOF, making it difficult to sustain contributions. Therefore, it is necessary for USOF to come out with high impact, high visibility programs that have quick results.

A possible constraint in conceptualizing high impact, large sized programs could be the lack of autonomy that USOF Administrator has with respect to disbursements from the USOF. The USOF is not ring fenced. It is a part of the Consolidated Fund of India, and requires approvals from the Ministry of Finance for spending. Policy makers must move towards ring fencing it.

Identification of Universal Access Provider: Universal access had traditionally been treated as the obligations of the incumbent. However, with open market entry especially in mobile services in most countries, the issue of who should bear these obligations has increasingly involved private sector (Jain 2004; Jain and Raghuram 2005; Wellenius, 2002). In several countries, incumbent operators continue to be the universal access provider as in Australia and UK

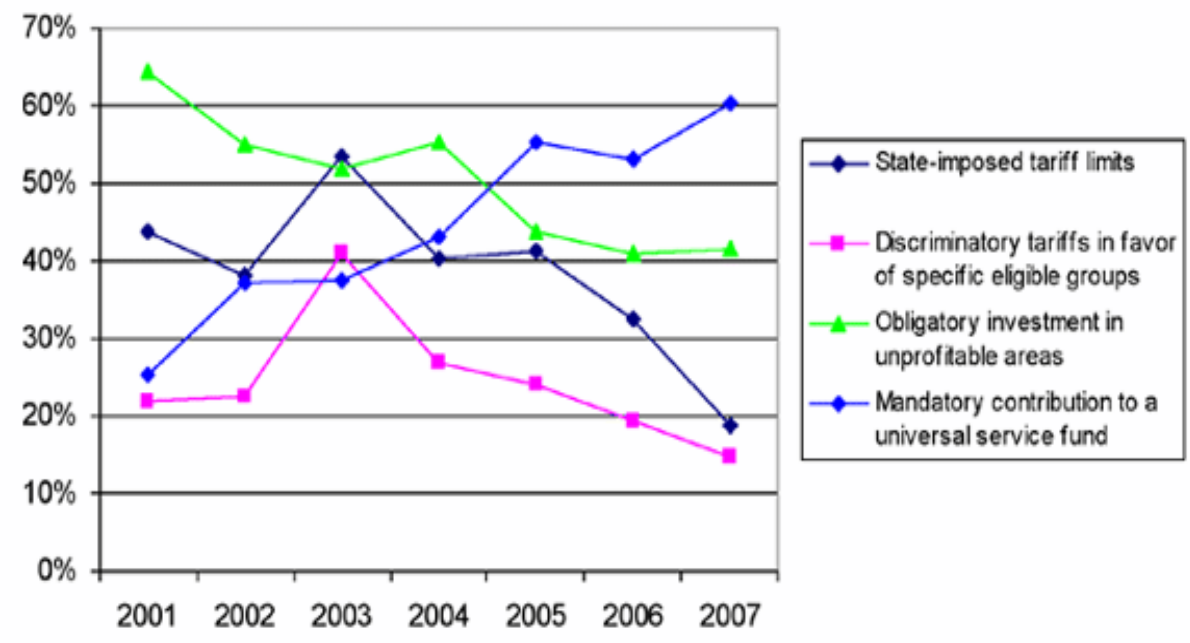
In developing countries, since USOF initiatives gained significance almost in parallel with rapid take-off of mobile services, and since mobile services have generally involved competitive service provision and included private players, there is a rationale for involving them in USO (Chile, India, Uganda (Gasmi, 2005)). Involvement of the private sector was done with a view to bring in reduced costs of service provision, and higher efficiencies.

While ADC usually payable to the incumbent had been traditionally used to improve RTD, there were problems with this approach, in India as it led to the incumbent operator becoming the major recipient of ADC (due to the extensive nature of the existing network). Further, in the absence of accounting separation at the incumbent, and no framework to control the scope/extent of activities, there was no or little review of the rural obligations actually fulfilled by BSNL from the ADC. Besides ADC created ‘perverse’ incentives, in that since it was non-transparent, all operators who contributed to ADC were subsidizing the incumbent. In a competitive situation, this was untenable. An ADC regime and implementing it for two years, it was replaced by USOF. This is a ‘cleaner’ and better targeted instrument with visibility for outcomes (Jain, 2006, Jain and Raghuram, 2005). Over time, ADCs are being

phased out as they create inappropriate disincentives (Jain, 2004; Jain 2006; Malik and de Silva, 2005; Noll and Wallsten, 2006; http://www.ictregulationtoolkit.org/en/index.html accessed on April 24, 2009).

More than 60% of the countries that responded to the ITU survey for the ITU World Regulatory Database had adopted the USO approach by 2007 (Figure 2) having moved from a variety of sources for funding rural obligations . The contributions to this fund come from a variety of sources that vary across different countries.

Figure 2: Prevalence of Different Approaches to Universal Service Funding 2001-2007



Source: ITU World Regulatory Database, Excerpted from ICTregulation toolkit http://icttoolkit.infodev.org/en/Section.3143.html

Another issue that is important to address is the relationship of the USOF Administrator or manager to the players responsible for implementing USOF programs. These need to be independent of each other in order to ensure accountability. The USOF administrator should be made accountable for outcomes. This will ensure that USOF programs are implemented as per schedule and target.

Selection Process: The selection process for service providers (including both public and private service and infrastructure providers) was based on competitive viability gap funding mechanism. This allowed the amount of subsidy to be provided to be substantially brought

down. This method has now been adopted in many countries and reflects the best practices (Cannock, 2001; Wellenius, 2002; Gillwald, 2005)

Extent of Involvement of Private Sector: The role of the private sector was limited to the implementation of the project. In Chile, private operators were allowed to select project sites and the final selection was made on the lowest amount bid (Wellenius, 2002). An example of a context in which greater role for private sector in India is the case of Gujarat where the PPP framework for infrastructure sector provides for a private operator to propose a particular project. The government then invites public bids for the same project. If the proposing bidder has a lower bid or can match the lowest bid, then the proposing entity is awarded the bid, otherwise, it gets a compensation for developing the proposal and the lowest bidder gets the project. The private operator's selection of site leads to commercially more efficient choices. Therefore, within a specified geographic area that is DoT's priority, private operators could be involved in site selection.

Although there had been earlier attempts at involving the private sector in USO provision, they had not been very successful, possibly because of the mismatch between the private sector's assessment of costs and the penalties imposed by the government. Limiting the technologies and service providers to fixed/fixed wireless increased the costs and reduced the incentives for private sector. The use of mobile technologies has increased the incentives for the private sector and competition for service has allowed the government to discover prices. 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.

Outcomes and Review Mechanisms: India has moved very quickly in operationalizing a regulatory framework that could dramatically increase rural coverage. However, a lot would need to be done both by the DoT and the private operators for this to happen. Bundling in handset costs, installation charges etc with service charges could make the rural services more "accessible". Operators have already low cost handsets and sachet size recharge coupons (0.25$) in urban areas, which they could extend to rural areas.

As stated earlier, despite the elaborate framework, the contributions from USOF towards increasing RTD have been very little. Given the growth, in the mobile sector, DoT could have sought a more active role for the private operators, including in conceptualizing the

framework and its implementation. On its side, DoT needed to be able to enforce contracts, develop quick and early feedback and review mechanisms, both of which were missing. Third party assessments of the effectiveness of USOF programs would have facilitated early review and better monitoring of programs.

Conclusions

This paper outlined India's experience of increasing rural telecom services, including its recent policy initiative to increase penetration through creation of a Universal Service Obligation Fund (USOF). An analysis of USOF's largest and most ambitious program for mobile provisioning in rural areas showed that despite the innovative design, it had little impact on increasing rural teledensity. The lack of accountability arising from the relationship between the government owned incumbent and the USOF administrator, and no proper evaluation of USOF, the non-ring fencing of the fund and poor quality project management contributed to the slow progress. Lack of involvement of private operators at an early stage, inability to suitable enforce any penalties for violation of contracts, and non-existent review and feedback mechanism have not allowed USOF to leverage the benefits of an early start. Without this operational framework, the strategic elements of design could not provide the value that was envisaged.

Since USOF is a highly visible program, an important aspect in its management is the ability to conceptualize for large impact programs as poor or limited conceptualization could lead to adverse public opinion against it. The consequence could be a depletion or reduction in the role/scope of USOF.

Positive policy steps that reduced the costs for service provision (revenue shares, duties, ADC) and competition facilitated greater penetration. A judicious combination of USOF support and market mechanism could accelerate mobile services in rural areas.

The Indian USOF model has been analyzed in terms of Scope, Identification of Universal Access Provider, Mechanism to Fund the USOF, Selection Process, Extent of Involvement of Private Sector, and Outcomes and Review Mechanisms. These aspects were compared with the experience of different countries.

By specifically including mobile and other new technologies, the DoT has worked out a mechanism for roll out and disbursals, that is worth emulating by other administrations. It

takes into account the potential for widespread usage of wireless technologies, especially mobile services for a rural context. On the other hand, several other key policy initiatives and operational aspects of various programs need to go hand in hand to increase RTD. USOF must be treated as one among many instruments for increasing RTD and efforts should be made to facilitate policy outcomes on a variety of dimensions.

Appendix 1: Various National Programs for Village Level Connectivity

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 (VPT) (1970s): The scheme envisaged provision of public phone in each one of the nearly 0.6 million village panchayats (administrative units).

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.

The National Telecom Policy, 1994 (NTP, 1994): 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, 0.30 million villages remained uncovered.

The Ninth Five Year Plan (1997-2002): 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. 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): Set 2002 as the target year for covering all villages with not only voice but also low speed data services. It set a target of rural teledensity of 4 percent, from the then current value of 0.4%, and total village connectivity by

2002, coverage of rural, remote and hilly areas as well the reliability of transmission media. It recommended setting up the Universal Service Obligation Fund (USOF).

*Appendix 2: Details of Stream III: 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.

Tariffs: Service providers were mandated to charge tariffs as per TRAI tariff orders or the prevailing tariffs of the incumbent fixed line service operator whichever was lower.

Mechanism for Monitoring Implementation**:** Liquidated damages were to be paid by IP/USP for delay in the rollout based on the days of interruptions.

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