

WDR Dialogue Theme 3<sup>rd</sup> cycle  
Discussion Paper WDR0606

## **Smart Subsidies: Getting the Conditions Right**

***The experience of expanding  
rural telecoms in Nepal***

January 2006

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Final Draft

# Smart Subsidies: Getting the Conditions Right

## *The experience of expanding rural telecoms in Nepal*



Harsha de Silva and Ratna Kaji Tuladhar\*  
January 2006



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## **Executive Summary**

This paper investigates conditions that need to be met in order to make smart subsidies successful in bridging access gaps in rural telecommunication services. Nepal's Eastern Development Region project is the case under study.

The study finds that while it is possible to use the smart subsidies option to provide rural communities with telecommunications services the real question is whether such services are optimal and whether these projects could be sustained in the medium to long term. The findings throughout the paper converge to the point that unless the right regulatory conditions are in place; particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of incumbent's anti-competitive practices, success of rural telecom service providers who are empowered by smart subsidies, would be questionable.

Besides an unfavourable regulatory environment, Nepal is currently undergoing a serious security problem. This has seriously impacted the already weak project threatening its very existence.

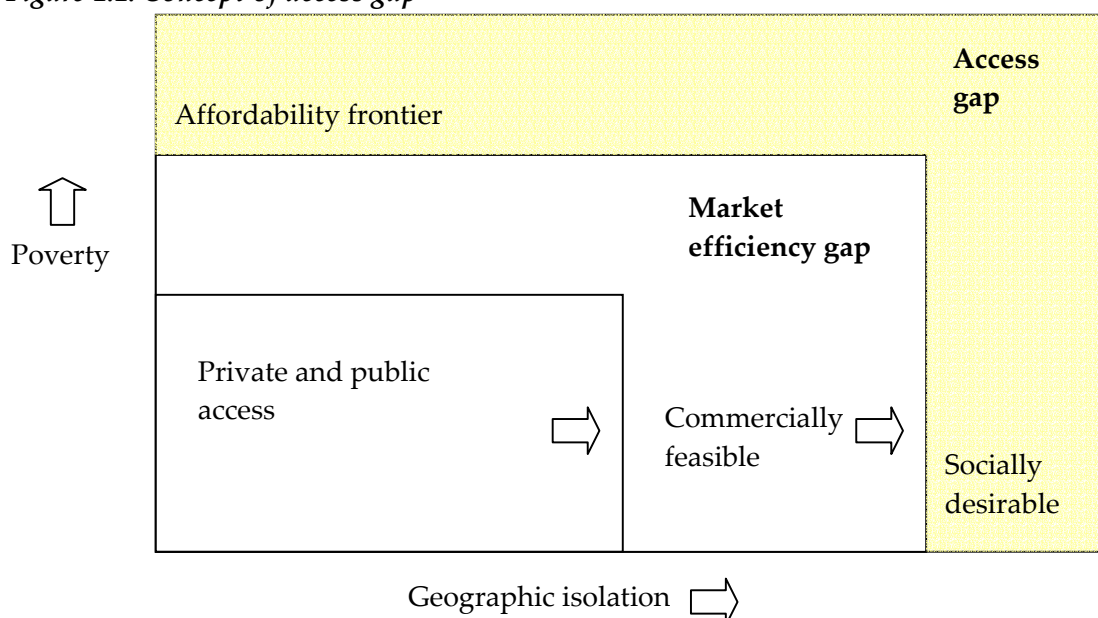
From a policy perspective, the findings of this study leads to probing the wisdom of separating the "access gap" and the "market efficiency gap", particularly in terms of sequencing smart subsidy projects and market liberalization programmes. The findings indicate that perhaps it would be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory-subsidy angle instead of separate solutions for the discrete two-gap problem.



## 1. Background

In most countries, the supply of telephony has traditionally been skewed towards the urban affluent as opposed to the rural poor. The literature dichotomizes this urban rural gap using a “market efficiency gap” and an “access gap” concept.<sup>1</sup> The market efficiency gap is the difference between what markets actually achieve under existing conditions and what they can achieve if market barriers are removed. This gap can be bridged through effective competition, private provision of services, and market oriented policies and regulations that create a level playing field, particularly for new entrants. The access gap on the other hand refers to people and places that remain beyond the limits of the market due to inadequate income levels or its skewed distribution. Bridging this gap needs intervention in the form of subsidies to encourage services providers to enter these areas.

**Figure 1.1: Concept of access gap**



Source: World Bank Discussion Paper 432

Closing the “access gap” through the provision of subsidies is not a straightforward task. A number of policy and regulatory complexities have to be considered. The sequence of implementation is also important. While there is no convergence in the literature as to an ideal sequence of implementation of policy to bridge the two gaps in terms of coverage milestones, experts have argued that it is better to bridge the market

<sup>1</sup> The conceptual framework of the two gap dichotomy is developed in the World Bank Discussion Paper 432, *Telecommunications & Information Services for the Poor: Towards a Strategy for Universal Access*, Juan Navas-Sabater, Andrew Dymond and Nina Juntunen. There are others who refer to the same dichotomy with reference to a “regulatory gap” and an “affordability gap”.



efficiency gap significantly prior to starting on bridging the access gap. Given that it is theoretically true that liberalization and competition within an efficient regulatory regime would successfully bridge the market efficiency gap, how long should policy makers wait before implementing access gap policies? What if very little liberalization has taken place? It must be noted that in the pre-liberalization era where monopoly operators had the opportunity to cross-subsidize less profitable rural service provision with more profitable urban services, some degree of bridging the access gap did take place, particularly with the building of backbone, albeit for its own use during a competitive regime later. However, in every country, the bulk of this gap remained at the time liberalization occurred.

Besides the policy and regulatory complexities are the geographic and socio-economic complexities that need to be considered prior to designing access gap bridging policies. Primarily these are the size and terrain of a country; population densities of the settlements; the income level and its distribution among its population.

Therefore, the bottom line is that, unless these ground realities are factored in when innovative subsidy schemes are designed to bridge the access gap, they will almost certainly fail.

However, once a subsidy policy is designed and developed to bridge the access gap; to strive for either universal service or universal access, it becomes necessary to obtain funds for the purpose. Almost always the required investment comes from special universal service funds which are usually referred to as telecommunication development funds. Normally, these funds are financed by a number of sources: government budgets; development agencies such as The World Bank (typically seed funding); license fees and spectrum auctions; operator revenue contribution and interconnection levies such as access deficit charges.

The final act left is to distribute the funds to bridge the access deficit through a well defined programme; in the case of this paper the programme is referred to as a “smart subsidy” programme. Smart subsidies is the process used to provide the minimum required subsidy to bridge a defined access gap using a competitive bidding process; known as least cost subsidy (LCS) auctions. Here bidders are forced to consider the most cost effective technology and other cost-saving options to bid for the lowest required subsidy; if at all. LCS auctions are very different from the alternate provision of subsidy using a comparative evaluation scheme; known as a “beauty contest” where the award is determined on a merit-based assessment of the applicant’s ability to fulfil a given set of requirements. In countries with poor governance frameworks, it is “safer” to use the smart subsidy approach where only one number is evaluated than one that gives significant degree of discretion to the “tender board” that evaluates the bids.





## 2. Experience with Smart Subsidy Programmes

### *The Latin American story*

Smart subsidies, or more formally Least Cost Subsidies, for bridging access gaps in rural telecommunication services, were introduced in the mid 1990s in the Latin American region. Chile was the first, in 1995-1997, when it granted a LCS of USD 10.2 million to Fondo de Desarrollo de las Telecomunicaciones to roll out telecom services in some 4,500 rural locations. A number of countries in the region followed suit and were able to implement regional telecommunications services (RTS) successfully. India also has a LCS driven universal access programme currently underway.<sup>2</sup> Table 2.1 below provides a summary of the smart subsidy projects thus far implemented in Latin America.

**Table 2.1: Latin American smart subsidy projects**

Country	Name	Source of finance	Period	Localities served	Max subsidy available (USDm)	Subsidy granted (USDm)	Subsidy per locality (USDm)
Chile	Fondo de Desarrollo de las Telecomunicaciones	Gov budget	1995-97	4,504	24.1	10.2	2,256
			1998-99	1,412	14.4	9.8	6,919
			2000	143	1.9	1.8	12,727
Peru	Fondo de Inversion en Telecomunicaciones	1% Operator levy	1998	213	4	1.7	18,800
			1999	1,937	50	11	5,700
			2000 (1)	2,290	59.5	27.8	12,100
Colombia	Fondo de Comunicaciones	Op. levy, gov. bdgt	1999	6,865	70.6	31.8	4,600
Guatemala	Fondo para el Desarrollo de la Telefonía	Spectrum auction	1998	202	n/a	1.5	7,587
			1999 (2)	1,051	n/a	4.5	4,282
Dominican Republic	Fondo de Desarrollo de las Telecomunicaciones	2% Operator levy	2001	500	3.8	3.4	6,800

(1) Implementation delay due to subsidy winner disqualified; second bidder awarded

(2) Network not implemented due to operator failure

Source: Andrew Dymond & Sonja Oestmann, July 2002

<sup>2</sup> See *Diversifying Network Participation: Indian's Universal Service Instruments*, Harsha de Silva and Payal Malik, LIRNEasia, September 2005.



### ***Performance Evaluation: Generally positive***

A number of studies have evaluated the design and implementation issues of the Latin American LCS projects and arrived at similar conclusions.<sup>3</sup> The salient findings in the literature are presented here to ascertain a general view on what the success factors and challenges have been and also to compare and contrast the Nepali case with these findings.

### **Success factors**

#### ***Good regulatory practices***

A sound regulatory framework, it is said, is what actually makes the access subsidies “smart”. In this context, perhaps the most important criteria for the success of the Latin American smart subsidy projects have been the favourable telecommunications regulatory environments prevailing in those countries during the implementation of the RTS projects. Key among good regulation, it is evident, was in pricing and interconnection.

For instance in Chile, the most successful case, tariffs were regulated minimally; as such all tariffs except call charges within the primary calling area (set for 25 years with allowed inflation adjustment) were left for the RT operators to set freely, as long as they were below a ceiling price. This way, the operator was able to set tariffs depending on the various cost and affordability factors within the license territories.

Cost based asymmetric interconnection regimes were crucial in the success of RTS projects. The ability of the regulator to structure and get the operators, particularly the incumbent, to abide by an access charge that reflected the higher cost of operating a network in the rural and sparsely populated license territories was the trick. It has been estimated that on average it cost 18.7 times more to terminate a call on a rural network than on an urban network in Chile.<sup>4</sup> This gave an opportunity for the RTS operators to

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<sup>3</sup> For a comprehensive discussion of the issues, see World Bank Discussion Paper 430, *Closing the Gap in Access to Rural Communication: 1995-2002*, Bjorn Wellenius, February 2002. *Rural Telecommunications Development in a Liberalizing Environment: An Update on Universal Access Funds*, Andrew Dymond and Sonja Oestmann, Intelcon Research & Consultancy, July 2002. World Bank Discussion Paper 432, *Telecommunications & Information Services for the Poor: Towards a Strategy for Universal Access*, Juan Navas-Sabater, Andrew Dymond and Nina Juntunen, April 2003. *Beyond the Market: Public-Private Subsidy Schemes for Telecommunication Services*, Global ICT Department, Presented at WSIS, Geneva, December 2003. *Redefining Universal Service: Policy and Regulatory Actions*, Rohan Samarajiva, LIRNE.NET, 2003.

<sup>4</sup> Samarajiva (2002), *Redefining Universal Service: Policy and Regulatory Actions*. In it he explains the necessity for such a cost based asymmetric interconnection regimes as follows: “Traditionally integrated monopolies that supplied voice telephony charged for the service of call origination



exploit the business case for incoming calls; exemplified by the largest rural operator in Chile which had 60 percent of its revenue generated by the positive interconnection balance with urban operators by 2002.

The large variations in the subsidy per location, for instance between the first Chilean and Peruvian auctions; USD 2,250 vs. USD 18,800 indicate that the Peruvians relied on the subsidy much more than the Chileans. This is further strengthened by the fact that in Chile, each dollar of smart subsidy resulted in six private dollars while it was only two private dollars per subsidy dollar in Peru. The existence of a cost-based asymmetric interconnection regime in Chile, and not in Peru, it is suggested, is the most likely reason for this wide variation.<sup>5</sup> Columbia and Peru are now moving towards such an asymmetric interconnection regime.

Besides the conducive regulatory regime there seem to have been a set of other factors that were helpful in making the programmes in Latin America successful. These are discussed below:

#### *Identification of license areas and multiple licensing*

Greater implementation success has been associated with selecting the “right” areas based on bottom-up approaches. In Chile, for instance local authorities, community organization and telecom companies together submitted lists that were later short listed by regional authorities. Comprehensive market research undertaken by the Regulator to assess the levels of demand in these possible license areas and sharing this information with the bidders seem to have helped them in being realistic about the level of subsidy requirements.

Division of license territories in to smaller regions and providing the opportunity to bid for multiple licenses was another factor. This process allowed bidders to assemble territorial blocks according to their individual (or corporate) interests.

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and offered call termination as a bundled “free” service. Because each “free” call reception was accompanied by a revenue-generating call origination elsewhere on the network, this made sense in an integrated environment. However, the economic viability of connections tended to be measured solely in terms of origination revenues. Those who do not originate many calls (a group that includes most of the poor) appear “uneconomical” though they may be generating income for the overall network through the reception of calls. This perception may be changed through regulatory design that ensures the implementation of cost-oriented interconnection based on measured compensation, as opposed to the simpler sender-keeps-all regime. Because costs are higher in geographical areas where the network is less dense, cost orientation requires that termination rates in low-density parts of the network, such as rural areas, be higher than in high-density, urban areas.

<sup>5</sup> Ibid



### *Competition for market and subsidy*

The Latin American experience is based on competition; both for the market and for the allocation of subsidies. Competition for the market was seen when incumbents, whenever permitted, fought to defend their territories from possible new entrants and new entrants on the other hand fought to gain a foothold in the demarcated license territories. This competition reduced the subsidy structure at the outset. Competition for the subsidy was achieved by using the LCS mechanism which forced all bidders to consider the most cost effective technology solution given the geographic and socio-economic conditions in the license territories.

For instance in Chile, the subsidy given out in some cases was only a sixth of what the Government had to give out (benchmark) previously under the regional telecom development programmes while in other cases it was a third of the previous amount.

### *Attractive licenses*

The licenses were designed in a way that winning bidders were able to provide additional unregulated services to strengthen their business case. In addition to the obligated number of public payphones or call offices, most RTS providers started provision of services to homes and businesses very early on. Some even added on other data communication services. One RTS provider who had obtained a license to provide 1,800 public payphones had expanded the network to over 18,000 lines. A particular attraction was the ability to use the spectrum that was issued upon winning the bid in the license territory.

### *Technology neutrality*

The Latin American success story also hinges upon the decision to offer complete freedom to use any technology of choice as long as the quality and service parameters were met. A salient feature in almost all LCS auctions in Latin America was the association of the winning bidder with suppliers of specialized rural telecommunications technology; particularly VSAT technology. While this was a success from the point of implementation, whether it is possible to sustain high cost VSAT networks is a question which is now being raised, several years down the road.

### *One-stop process and recurrence*

The opportunity provided for the winning bidder to obtain the capital subsidy (or capital and operational subsidy depending on the business plan of the bidder; but irrelevant from the point of evaluation), the operating license and the radio frequency spectrum from one place at the same time was another important reason for the success in implementation.



The recurrence of the LCS auctions over a number of years for a number of locations with no changes in the rules of the game was another factor; where the bidders were able to build in trust and predictability in the programme.

### ***Competence and leadership***

A point that normally does not get highlighted, but is of crucial importance, is the competence, impartiality and leadership of the respective Government officials and consultants who drive the process. This factor has been highlighted by many observers as to something that was crucial in the success of some of the projects; particularly in the case of Chile.

While the above factors have been the most important in the success of the Latin American smart subsidy programmes, there are also a number of issues that have caused the RTS operators to fall behind schedules and not meet service quality obligations and generally face significant sustainability issues.

## **Challenges**

### ***Low bidding***

There is evidence to suggest that in some cases operators had bid lower than actually required amounts just get a foothold in a particular territory. However, when combined with unexpected political and other unrelated issues that impact on the RTS sustainability, the consequences of lower than sustainable bids become apparent. In some cases in Peru such aggressive and unrealistic bidding (20 percent of available subsidy) has been identified as the reason for failure to meet roll-out obligations, leave alone sustainability. It has been noted that this moral hazard issue could best be addressed by including stricter performance guarantee conditions and better due diligence of the bidders prior to subsidy offer.

### ***Sustaining competition***

Either after ensuring a foothold in to a license territory in the case of a new entrant, or after ensuring new entrants is kept away and the incumbent has defended a territory, the incentive to bid low for further RTS licenses becomes difficult. Naturally, bidders tend to bid for higher subsidies. A possible solution to this issue is perhaps to package regions in a license territory in such a way that the number of rural and less attractive areas is maximized by including a number of more commercially attractive regions.



### ***Most marginal locations***

Notwithstanding mixing difficult locations with other areas with strategic interests, a problem across the region has been with the most remote and marginal locations. Some areas are just too far away from any economic activity, are situated in extremely difficult to reach areas that are sparsely inhabited by very poor people and business models, even after heavy subsidies, does not appear profitable. The research indicates that perhaps these areas need to become part of other lucrative territory licenses or even be considered for yet another level of interconnect access charges reflecting the extremely high cost of operating a network.

### ***Operational experience of bidders***

Most LCS auctions in Latin America were won by newly formed operators with links to rural telecommunication technology providers, as opposed to established large international operators or even incumbents. It is clear from the evidence that these new entrants were motivated by creating a new market for their principals' equipment. Without judging if this motivation was positive or negative, the evidence suggests that many of these operators lacked adequate knowledge in the business of supplying telecommunications services and the required marketing and support structure for the same. Their understanding of customer service had been rated low in almost all cases.

Perhaps there should have been a greater focus in creating a balance in the type of bidders that were considered eligible to bid for the LCS auctions; ideally through more stringent pre-qualification processes.

### **The Indian Story: Mixed Results**

Based on the lessons learned from Latin America, India unveiled a smart subsidy programme to disburse funds for universal service through its massive Universal Service Obligation (USO) fund. Between March 2003 and March 2005, the Indians ran five LCS auctions and handed out a total of USD 500m in subsidies.

There has not been much research undertaken to compare and contrast the successes and failures of the Indian programme with that of Latin America. However, some relevant findings from a recent paper by de Silva and Malik (2005), reflecting on the Indian Universal Service Instruments is given below.<sup>6</sup> Table 2.2 below gives a general overview of each of the LCS auctions.

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<sup>6</sup> See *Diversifying Network Participation: Indian's Universal Service Instruments*, Harsha de Silva and Payal Malik, LIRNEasia, September 2005, for a more detailed treatment of the subject.



**Table 2.2: Status of various USO Projects in India**

Project description of LCS auction	Implementation	Comments
Operation and maintenance of Village Public Telephones (VPTs) in 520,000 villages	March, 2003	509,775 VPTs installed by incumbent BSNL and 9,171 VPTs installed by six private basic service operators (BSO). All firms participating in this auction bid exactly the benchmark.
Replacement of 180,000 Multi Access Radio Relay Technology VPTs installed before 1 <sup>st</sup> April 2002.	Sept., 2003	Since the VPTs were mainly BSNL's, the subsidy went to BSNL with a zero cost reduction; bid exactly the benchmark
Provision of additional rural community phones (RCPs) in areas after achieving the target of one VPT; 46,253 RCPs.	Sept., 2004	Out of 300 Secondary Switching Areas (SSAs), incumbent BSNL won 184, Reliance Infocom won 97. Competition between two providers was seen in only 115 SSAs which brought down the cost by 17% from the reserve price.
Provision of public telephone facility in 66,822 villages.	Nov., 2004	Incumbent BSNL won for 12 service areas where six companies participated. Where BSNL had one-to-one competition with Bharti Cellular BSNL bid 15-20% less and won. In the remaining nine areas BSNL was the sole bidder. Hence, BSNL emerged the winner in all service areas.
Provision of rural household direct exchange lines in specified short distance charging areas.	March, 2005	The project covered 274 SSAs. With competitive bidding in 215 SSAs, BSNL emerged the most successful bidder winning in 171 SSAs across 19 States, Reliance Infocomm emerged the winner in 61 SSAs across 15 States while Tata Teleservices won 42 SSAs in 9 States. The competition brought down the cost of the project by 60-75 per cent from the benchmark.

The salient point in the Indian case is that it was the fixed wire-line incumbent operator, BSNL, that won the overwhelming majority of the smart subsidies through the LCS auction. The main reasons for this outcome, which is very different to that of the Latin American case, are given below.

### *Technology restrictions*

Unlike the Latin American case, India did not follow a technology neutral policy until recently; only fixed wire lines and wireless in local loop (fixed WLL) operators were eligible for subsidy support. By restricting the subsidy support only to these technologies meant that the bidding was not open to different and competing technologies and prevented the possible use of integrated technology solutions to provide services. This also meant that the resulting technology solution was not





necessarily the lowest cost technology; in a way making the “least cost subsidy auction” and the “smart subsidies” a misnomer.<sup>7</sup>

### *Scope of service restrictions*

A difficult to explain restriction is the scope of service, where the winning bidder could only provide telephony in the licence area. Since most of the cost is incurred in the access network (the ‘last mile’) it is only logical that the Indian policy had let the licensee use the same last mile at a public place for related e-services applications.

### *Bidders' eligibility restrictions*

Once again, unlike the Latin American case, India restricted participation in the auction to only those service providers who were present in the specified Secondary Switching Areas (SSA) the subsidy was being given. This restriction favoured the ubiquitous incumbent. Furthermore, the policy of shutting out of operators who were not present in the demarcated areas, failed to create competition for the market.

### *Infrastructure sharing restrictions*

The sole responsibility to set up infrastructure for providing rural household connections in the identified service area was left to the bidders. The problem with this approach was that the commercial, legal and regulatory implications of the incumbent having an extensive network in place (massive fibre optic network estimated to be some 670,000 route km.) were not taken into account in designing and implementing the LCS auction. The critical question that should have been addressed is how this capacity could have been shared by all operators, particularly new entrants, in an effective, non-discriminatory and on a cost-based access regime. Because this important issue was ignored, it has become extremely difficult for operators without large subscriber bases in the rural areas to enter those markets in a cost-effective way, notwithstanding the smart subsidy.

### *Regulatory issues*

Taking in to consideration all of the above, it has been observed that the licenses to provide universal service through LCS subsidies in India seem to create a “situation of artificial scarcity, and allow the licensor to enjoy monopoly rents” in its capacity as a provider of the licenses. The India paper notes that the sustainability of the universal service of India rests crucially on removing these regulatory barriers to competition.<sup>8</sup>

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<sup>7</sup> Recently, the Department of Telecommunications announced that it is in the process of amending the Indian Telegraph Act to extend the Universal Service Obligation fund support to cellular mobile services (both GSM and CDMA).

<sup>8</sup> *ibid*





### 3. Rationale' for LCS in Nepal

This paper is written with the intention of shedding some light on the necessary conditions under which smart subsidy programmes to bridge the access gap in rural telephone services could be successfully implemented. While we take Nepal as a case study because it is the first such project in Asia, our intention is to generalize the findings particularly in the background of the various success factors and challenges faced by the Latin American and Indian projects as presented in the previous chapter.<sup>9</sup> Note however that the paper takes in to account all necessary details in the Nepal case in order to sufficiently understand the issues.

#### *Geography: Rough terrain*

Nepal is a Least Developed Asian country measuring 147,181 square kilometres. Within the average length of 885 Km and width of 193 Km, the altitude increases from 150 m in the South to more than 8,800 m in the North. The major part of the country consists of high mountains and rolling hills, which account for 83 percent of the land area. The flat land or Terai occupies the remaining 17 percent.

#### *Population: Rural and poor*

Nepal's population is approximately 25 million. Of this number, 87 percent live in rural areas and contribute to agriculture, which account for some 40 percent of the Gross Domestic Product. Only 57 percent of Nepalese are literate and per capita income is just USD 260 (2004). In terms of access to public utilities, a mere 17 percent have access to electricity while this drops to 5 percent in rural areas.

#### *Administration: Complex and unstable*

Nepal is a multi-party parliamentary democracy within the framework of a constitutional monarchy where the Head of Government is the Prime Minister. However, since 1996 Nepal has been caught up in a disruptive civil war with Maoist rebels fighting for a republic. Administratively the country is divided into five development regions; Eastern, Central, Western, Mid-Western and Far Western. These development regions are further divided into 75 Districts. Each district is then divided into small administrative units called Village Development Committees (VDC) and Municipalities. Altogether, there are 3,914 VDCs and 58 Municipalities. A group of villages, usually nine wards, makes one VDC. For the purpose of the provisioning of telecommunication service, these VDCs can be classified as accessible, remote and extremely remote. Accessible VDCs are mostly in the Terai, hills and some in the mid

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<sup>9</sup> Even though India has completed a number of LCS auctions for operators with existing licenses, it was Nepal that started actually used a LCS auction to provide a license for a new operator to enter the market.



mountains. People who live along the trekking route in these VDCs engage in tourism related businesses. Remote VDCs are those in Terai and hills regions not covered in the accessible VDC grouping. These villages are scattered over a wide area and population in these villages are sparse. Extremely Remote VDCs are mostly in the mid-mountains and in the Himalayas in the northern belt. Population densities in these VDCs are usually very low and scattered over a wide area. People living in these areas are poor and lack even the most basic infrastructure.

## Telecommunication Network Development in Nepal

### *History: Long*

Telecommunications started with the installation of an open wire trunk line between Kathmandu and Raxaul, a border town in India, in 1914. The first manual telephone exchange with one hundred lines was commissioned in 1950 but the sector development started in earnest in 1969.<sup>10</sup>

### *Present Status: Unsatisfactory*

Nepal as a least developed country faces enormous socio-economic problems, which have been exacerbated by the uncertain security situation. The vast majority of people do not have access to minimum public utilities and have enjoyed only marginal benefits from past investments in telecommunication.

Currently Nepal's fixed tele-density is a mere 2.0 telephones per one hundred persons (NTA, April 2005). The waiting list exceeds the number of telephones available. The breakdown of service provision is as follows:

**Table 3.1: Service Providers and Telephone lines (customers) as at October 2005**

Type of Service Providers	Number of License Holders	Total Number of Customers
Fixed using wired Line	1	461,783
Fixed using WLL	2*	36,000
Fixed using VSAT	2	970 (STM 542; NTC 418)
Mobile	2 #	285,714
GMPCS Satellite phone	2	800
Total	0	748,073

\* Nepal Telecom expected to start WLL service from November 2005. Telephone lines shown are the customers belonging to UTL, service provider from private sector.

# Spice Cell, another private operator, was expected to start mobile service in September 2005

<sup>10</sup> USAID provided a USD 1.7 million.



Whatever growth took place since 1969 occurred through the incumbent operator. However, the penetration of telecommunication facilities was not uniform geographically. As at October 2005, more than half of all telephones (269,910 fixed lines or 56.3%) were concentrated in the Kathmandu valley. Many rural areas have little or no access to telephone services of any kind. Rural tele-density is only 0.2 per one hundred persons.

The following table provides an overview of the technology used by the incumbent NTC to serve the rural areas in Nepal as at present. It shows a clear bias for VHF/UHF radio technology.<sup>11</sup>

**Table 3.2: Technology used by NTC in Nepal**

<b>Technology used by NTC to serve VDCs</b>	
Digital C-DOT (wire-line) exchanges	190
MARTS	472
VHF/UHF radio	1087
Digital microwave (JICA project)	3
HF radio	4
VSAT	7
VDCs served with at least one PCO	1711

Source: NTC, Nepal

### ***Competition in the sector***

With a view to accelerate the development of telecommunication services in Nepal, or in other words to bridge the market efficiency gap, His Majesty's Government of Nepal (HMG) made a policy decision to liberalize the sector by introducing private participation via The Telecommunication Act of 1997. One year later in 1998, the Nepal Telecommunications Authority was established.

### ***Nepal Telecommunications Authority***

Nepal Telecommunications Authority (NTA) was established as an autonomous regulatory body for the "development of telecommunication services in the country". In addition, it was charged with assisting the Ministry of Information and Communications (MOIC) in the formulation of telecommunication policy, preparation of legislation and

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<sup>11</sup> Since 1991 and the beginning of the multiparty system, representatives in Parliament from remote areas started demanding telecommunication facilities in their constituencies. It was not possible to install wire line telephone sets in those isolated communities, wireless telephone sets using VHF / UHF technology was the most economical and quick fix to meet the growing demand. From that time until 2001, many VHF/UHF telephone sets were installed. NTC started to use VSAT technology in a big scale only after 2001. (Source: NTA)



formulation of rules and regulations for the execution and implementation of such policy.

The NTA view of a competitive private sector participation is captured in its justification for opening up the sector: *“Keeping in harmony with the currently evolving new technological developments, the emerging craze for globalization and liberalization or market economy concept, it is felt that the resources and efforts of HMG alone cannot fulfill the steadily increasing demand of the telecommunication services in a competitive environment.”* In order to meet the increasing demand for services through private participation, NTA has in its website, identified a number of “aims” that it needs fulfill: *“to make the telecommunications service reliable and easily available to the public; to make necessary arrangement to avail basic telecommunications service and facilities in all rural and urban areas throughout the Kingdom of Nepal; to protect the rights and interests of consumers by ensuring the provision of quality service; to make arrangement for the coordination and healthy competition among the persons providing Telecommunications Service and facilities.”*

Again, according to the NTA website, NTA has been working towards fulfilling its aims by “actively performing” the functions of *“granting licenses to operate the telecommunications service in private sector; involving national and foreign private sector investors in the operation of the Telecommunications Service; prescribing, fixing and approving the standard and quality standard of the plant and equipment relating to the telecommunications and the telecommunications service; approving and regularizing the fees to be collected by the licensee for providing the telecommunications service; regularly inspecting and monitoring the activities carried out by service providers to ensure that the quality of service and quality standard in telecom equipments have been maintained; settling dispute between two service providers or a service provider and its customers; providing suggestions to HMG on the policy, plan and program to be adopted by HMG for the development of the telecommunications service.”* Note however that what is missing in its own assessment of performance is working towards reducing the anti-competitive behavior of the incumbent, the results of which would become clearer throughout the paper.

The data on the growth figures of telecommunication services however does not indicate the successful outcomes of the functions “performed” by the NTA. In order to understand the internal functioning of the NTA, which is of paramount importance to the implementation and sustenance of the Nepal smart subsidy project, it is imperative that its structure, cadre and functioning are examined.

NTA consists of a Board of Directors appointed by HMG for a period of 5 years and eligible for reappointment for a second term. The Board is responsible for general policy and supervision while a management team is responsible for day-today operations. The Board consists of five members including the full time working Chairman who in turn is also the Chief Executive Officer of the Authority. Though the Board has provision for



five members, it never had all members until August 2005.<sup>12</sup> Besides the Chairman, the management cadre consists of a Manager and five Deputy Managers. However, since inception, the Manager post has been lying vacant and out of the five Deputy Managers, three posts still remain unfilled. Interviews with the Chairman and senior officers revealed that NTA severely lacks professional capacity and is ill-equipped for its duties. See organization structure in Annex 1.

### ***NTA Strategy for providing telecommunication in the rural and remote rural areas***

Considering the rapid development in telecommunications technology, the increasing demand of the market and the dynamic changes taking place in the telecom structure, albeit relatively very slowly compared to the region, Nepal's Telecommunication Policy 1999 was revised in January 2004 and a new Policy was announced. The "paramount" objective of the Telecommunication Policy is to *"create a favourable environment in order to make the telecommunication service reliable and accessible to all people at the reasonable cost throughout the Kingdom in collaboration with the private sector in order to support the social and economic development of the country."*

The following objectives have been identified in order to "give support for accomplishment" of the above objective in terms of extension of service to the rural areas: *"In order to bring the access of general public of rural (and urban) areas of the Kingdom to the telecommunication service, arrangement shall be made in a manner that the telecommunication service shall be available within the shouting distance in the inhabited areas" and "arrangement shall be made for getting opportunity to use appropriate information and communication technology for poverty alleviation and development of the rural areas."*

The key features of the strategy adopted to achieve the objectives, as relevant to the study are;

- Universal Access wherein *"The telecommunication service shall be made available to the consumers through the shared telephone. Emphasis shall be given to extend telephone as fixed, mobile, etc. therefore. The satellite system may also be applied for extension of service."*
- Liberalization of the sector, wherein *"The telecommunication sector is kept open for the service providers. However, the number of the service providers may be limited by virtue of radio spectrum."*
- Open licensing regime to be applied, wherein *"Transparent methods shall be applied upon granting such license. Moreover, an environment for healthy competition shall be created."*
- Private sector participation to be encouraged, wherein *"Foreign investment shall be attracted and arrangement shall be made to regularly inform private sector about the*

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<sup>12</sup> The fifth member was finally appointed at the strong insistence of the World Bank. In fact for a very long time, it had only 3 members including the Chairmen.



*particulars of reform taken place in the telecommunication sector and about the opportunity available in this sector also."*

- Commercialization of the NTC, wherein the *"Nepal Telecommunications Corporation shall be converted into a company and the ownership of His Majesty's Government shall be gradually decreased."*
- Institutional development of implementation of policy wherein *"For successful implementation of the Telecommunication Policy, the institutional development shall be gradually made by increasing human resource and economic capacity of the Ministry of Information and Communication and the Nepal Telecommunication Authority."*
- Economic efficiency of the sector, wherein *"Emphasis shall be given to increasing economic efficiency of the sector by creating an environment that promotes healthy competition among service providers."*

### ***Telecommunication status in the VDCs: A long way to go***

Every municipality and almost all commercial centres have at least one digital telephone exchange interconnected with the backbone with either optical fibre or digital microwave. On the other hand, the availability of telephone facilities in VDCs is very different. At the time the LCS was being designed, more than half of the total 3,914 VDCs had no access to any telecommunication service. Even though HMG had attempted to extend service to 2,700 VDCs in its ninth five year plan (1997/98 - 2001/02) and complete the provision of telephone services in all the VDC by the end of the 10th five year plan (2002 – 2007), the outcome at the end of the ninth was only 1,711 VDCs.



**Table 3.3: Number of VDCs covered by NTC before the LCS auction**

Region	VDCs in each Region	VDCs with telephone facilities	Percentage of coverage
Eastern Development Region	893	359*	40%
Central Development Region	1,199	547	46%
Western Development Region	864	417	48%
Mid Western Development Region	575	207	36%
Far Western Development Region	383	181	47%

\*52 VDCs were added by Nepal Telecom in between the first and second subsidy tender

***Access gap: Service providers have not gone to rural areas***

As defined earlier the access gap refers to places and people that lie beyond the market due to inadequate income; more correctly, net income, which is revenue over cost. Notwithstanding monopoly profits and cross subsidies, incumbent NTC had found it difficult to justify extension of their networks to the remote areas of the country. Post-liberalization, even though marginal, the incumbent has found this justification even harder. The majority of Nepalese villages are not only very difficult terrain wise; thus high cost, but also uneconomical from the point of extending telephone services; thus low revenue.

From the supply side of the equation, the main issues are:

- Adverse terrain
  - Technology feasibility is a problem
  - High cost for transportation and installation of whatever equipment
- Non-availability or inadequate supply of electricity
  - High operational and maintenance cost

Besides the supply constraints that increase the cost, the general perception among operators is that people in these areas would not be able to afford the cost of calls and therefore revenue generation would be unsustainably low.<sup>13</sup> The demand side of the equation is thus constrained by

- Sparse, uneven and scattered population distribution
  - Difficult to generate breakeven volumes of business
- Poor economic conditions
  - very low income and therefore low expenditure on telecommunications
  - Most calls are long distance and hence charges are higher than local calls; unaffordable

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<sup>13</sup> See *Telecom use on a shoe string: A study of financially constrained people in South Asia*. Rohan Samarajiva and Ayesha Zainudeen. LIRNEasia, 2005



Aggravating the situation, the present crisis in Nepal due to the Maoist insurgency has either completely destroyed or damaged a number of telecommunication installations in rural areas. In this background, service providers are even more reluctant to extend its network in these areas.

#### ***Rural Telecommunication Development Fund***

Given the background of sector reform being undertaken to liberalize the market and bridge the market efficiency gap, NTA in 200X established a regional telecommunications development fund (RTDF). The rationale' for the RTDF was to fund subsidies to bridge the access gap. Funds were to be collected through a levy of 2 percent of gross annual income from all licensees supplemented by any other allocations by HMG or donor agencies.





## 4. Nepal Smart Subsidy: Design and Implementation Plan

### Introduction

In the context of the failure of incumbent NTC to bridge the access gap in rural areas of Nepal in a reasonable timeframe, and hardly any activity by the private operators in addressing the issue, discussions began between HMG through the NTA and the World Bank (Bank) to consider alternate mechanisms to service these areas. Based on extensive discussions, inter alia taking in to consideration the fact private investments in to Nepal were dismally low due to the unfavourable conditions prevailing in the country, it was decided to carve out one administration region and implement a private sector led regional telecommunications services (RTS) programme through the provision of a possible subsidy, as a pilot.<sup>14</sup>

The Eastern Development Region (EDR) was selected as the licence area in which the eventually successful Licensee would be responsible for rolling out the RTS. Given that the RTDF was not yet in operation, the Bank agreed to provide funds for the implementation of this RTS under a long-term credit to HMG.

Having considered the many options available and lessons learned in Latin America, the NTA and the Bank agreed that it would be more appropriate to call for international competitive bidding, as opposed to a negotiated contract. The mechanism was to use a one-time capital subsidy to be paid to a new licensee selected using a smart subsidy, or more formally a least cost subsidy (LCS) auction process.

### Design and implementation

The salient features of the licence design and implementation plan developed jointly by the NTA, their Consultants and the Bank and contained in the Request for Application are as follows:<sup>15</sup>

#### Design

##### *License area*

The area of coverage was specified as 534 VDCs in the Eastern Development Region (out of a total of 893 VDCs) with a rural population of 4 million. Geographically the coverage area included extremely remote VDCs in the mountainous areas in the northern

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<sup>14</sup> Dividing the country in to three terrain regions of mountains, hills and terai was also considered. The key feature there was the possibility of using different technologies in the three geographically different regions. However, that was abandoned in favor of the administrative regions.

<sup>15</sup> The Consultants to the Bank were Canadian consultancy firm, McCarthy Tetraault Inc.



Himalayas (Mt. Everest is situated in the EDR), remote VDCs in rolling hills in the central country as well as accessible VDCs in the Terai or flat land in the south of Nepal. In terms of income diversity, the region included settlements, which are rich in agriculture as well as remote but rich tourist areas along the Mt Everest trail. It also contained a number of very poor and extremely remote areas.

### *Exclusivity*

The licence was to be issued on a non-exclusive basis to serve the EDR. However, the important point was that, pursuant to the Telecom Act, HMG through NTA agreed not to authorise NTC or grant any new licences to any existing or new operator to provide RT services in the identified VDCs for a period of five years after the licence is issued. The logic for the five year exclusivity seem to lie in the view that the 5 year duration would help the Licensee build its own network and broaden its customer base prior to competition setting in.

The designers nevertheless took adequate precaution to limit the risk in the event the Licensee failed in its obligation. The RFA clearly mentioned that if the Licensee fails to fulfil the rollout requirements identified, the NTA could, at any time, authorise NTC to provide RT services in any of the identified VDCs that remain without service.

### *Technology and network rollout requirements*

The design and implementation plan called for the Licensee to install, activate and operate at least two separate public access lines in each identified VDC. The lines were supposed to be installed in two different Public Call Offices (PCOs) that are located in different wards of each VDC.

In terms of technology to be used, NTA and the Bank were of the view to let the applicants decide on their choice of technology based on the existing infrastructure, geo-demographic and socio-economic conditions in the EDR. The RFA stated “The Licensee may utilise any appropriate wireless or wire-line technologies in the provision of the RTS Services in the Regional Service Area.” This however was qualified to the extent that the applicant’s proposal had to meet the eligibility requirements and service quality criteria identified in the RFA.

The implementation plan also called for 50 percent of the VDCs listed served within 9 months of the effective date of the licence and 100 percent served within 18 months. For the purpose of these rollout requirements, an access line was to be considered to be activated when an independent technical consultant appointed by the NTA certified that incoming and outgoing local, domestic long distance and international service could be obtained from the line; and the pre-specified service quality criteria for call completion were satisfied.



The RFA specified that failure to meet the network roll-out requirements by the Licensee could result in the loss of eligibility for the RTS subsidy, forfeiture of the performance guarantee, termination of the licence, imposition of fines and even the forfeiture of all equipment, land and other assets related to the RT service.

NTA and the Bank when designing the project however took in to consideration the security uncertainty prevailing in Nepal at the time and stated in the RFA that these penalties were not to be applied if the rollout delay resulted solely from an event of *force majeure*. In that event, the RFA stated that NTA would be ready to modify the locations.

### **Scope of Service**

The RFA specified that the eventual licensee would need to provide *basic public telephone service* consisting local, domestic long distance (STD) and international long distance (ISD) as mandatory services. Free access to emergency dialling, directory assistance and a consumer complaint centre were also deemed as mandatory services. Once the above requirements were fulfilled, the Licensee was to be authorized to provide as many additional individual or public telephone access services, whether residential or commercial in any location in the EDR.

In addition to the mandatory services, offering Internet access, e-mail, voice mail, fax, audio conferencing, pre-paid calling card services and data communication services were also authorized in all of the identified 534 VDC at anytime as well as the entire Eastern Development Region, once the roll-out obligations were met.

#### ***STD (Domestic Long Distance Services)***

The design entailed a provision that prior to January 1, 2004 the Licensee may use its own facilities to carry STD traffic within the Regional Service Area or between licensed VDCs in the service area and Kathmandu. For all other STD traffic, the Licensee was restricted to use the domestic long-distance carriage facilities of NTC. However, this restriction was to be relaxed from January 1, 2004 where the Licensee would have the right to obtain a separate non-exclusive licence to provide STD services provided it meets the necessary requirements as specified by NTA for all STD service licences.<sup>16</sup>

#### ***ISD (International Telecommunications Services)***

As in the case of STD, the Licensee was restricted to use the international gateway and other international traffic carriage facilities of NTC until January 1, 2004. However thereafter, upon application, the RFA clearly state that the Licensee would have the right to obtain a national licence to provide ISD services

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<sup>16</sup> NTC's STD licence fee for ten years was NPR 35,000,000 (approximately USD 437,500).



using its own international gateway provided it meets the necessary requirements as specified by NTA for all ISD service licences. The licence fee payable by the Licensee for the ISD services licence would be the same amount and payable on the same conditions as the licence fee payable by NTC.<sup>17</sup>

### *Service quality and availability obligations*

The design included a service quality segment that obligated the eventual licensee to meet standard minimum quality and availability of service; given in Appendix 2.

Besides the quality criteria above, the licensee was also bound by a number of service availability criteria. The key availability criteria was that each PCO need to open and be available to any member of the public to make local, STD and ISD calls during reasonable daytime and afternoon hours (suggested 0900 to 1700 hours), totalling minimum 8 hours, every day of the week. Where a PCO did not have access to the electrical power grid, the RFA called for the licensee to provide an alternate source of power for the PCO. However, this alternate source of power need to be sufficient to provide a minimum of 4 hours total of actual local, STD or ISD calling services within the 8 hours it is open daily.

The licensee was to ensure that the services made available through the installation, activation and operation of 2 separate access lines in 2 PCOs located in 2 different wards separated by at least 2 km, in each identified VDC listed and the provision of basic telecommunications services to the customers through the PCOs need to be continued throughout the period of the licence validity.

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<sup>17</sup> NTC's ISD license fee for ten years was NPR 62,500,000 which is approximately USD 781,250.



## **Regulatory environment**

Regulatory risk has been defined by Spiller and Levy (1994) as “the risk emanating from Government action including but not limited to the actions of the actual sector specific regulatory agency with authority over the industry in question.” It therefore flows that the particular regulatory risk environment within which telecommunications operators and potential new entrants function is the Telecommunications Regulatory Environment (TRE). The obvious logic is that as the TRE becomes more favourable the market efficiency gap would narrow.

LIRNE.NET, WDR and LIRNEasia research on the relationships between TRE and private investments in to telecommunication; both new and reinvestment of internal funds has identified a number of important correlations. Key among them is that a favourable TRE is without a doubt one of the most important factors in the success of attracting private investments and sustaining reinvestments in telecommunications in several developing country economies to bridge the “market efficiency” gap.<sup>18</sup>

In addition, other studies have found that a “bad” regulatory environment would not help subsidies to bridge the access gap either; in fact, the funds could be wasted.

Given that the TRE in Nepal had numerous shortcomings, the NTA themselves and the Bank were deeply concerned that for the RTS to succeed, they needed to ensure that the Nepal TRE would, at the least, not be detrimental to the proposed project. In order to ensure the above, NTA and the Bank undertook a number of precautionary measures.

This paper considers these measures in relation to the five dimensional TRE measurement developed by LIRNE and LIRNEasia.<sup>19</sup> The five dimensions are market access; access to scarce resources; interconnection; tariff regulation and regulation of anti-competitive practices.

### ***Market access***

Market access was guaranteed through a license. One RTS license would be issued for the EDR and depending on the performance of the same further licenses would be issued for other regions.

The initial term of the Licence to provide RT services in 534 VDCs was set at 10 years. However, the licensee would enjoy exclusive service provision in the first 5 years. Thereafter the license would become renewable for 5 year terms for the duration of the

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<sup>18</sup> See Report of the World Dialogue on Regulation, Stimulation Investment in Network Development: Roles for Regulators, 2005

<sup>19</sup> *ibid*



25 year term. NTA was expected to grant the licence renewals automatically provided that there were no material breaches of the licence.

The licence fee was stipulated at a very low level of NPR 100,000 (approximately USD 1,250) for the initial period of 10 years. The successful applicant was expected to pay this licence fee in full at the time of issuance the licence. The renewal fee for each additional 5 year licence term was set at 4 percent of the eventual licensee's gross annual revenues in the fiscal year immediately preceding the start of the relevant renewal period. The eventual licensee was also expected to pay a royalty fee of 4 percent of the licensee's gross annual revenues in each fiscal year to NTA who then passes it to the treasury.

For the first five years the eventual licensee would be exempt from the RTDF levy, but beginning in the sixth year, the RFA specified that the licensee would have to annually contribute 2 percent of its gross annual revenues to the RTDF.

During the first five years after issuance of the licence, prior written consent of the NTA had to be obtained for any change in the ultimate beneficial ownership of any shares of the Licensee or for any change of control of the licensee. Except in extraordinary circumstances, the NTA was not planning to consent to any such change in the first five years of a licensee's operations.

#### *Access to scarce resources*

##### *Frequency*

Given technology neutrality of the design, the RFA allowed for the eventual Licensee to use any wireless technology and/or satellite services in providing the RT services as long as they met the identified technical requirements and service quality criteria.

The MOIC and the NTA were expected to co-ordinate the allocation of radio frequency to the licensee for the selected technology and in accordance with applicable frequency management practices and international obligations. The RFA noted that the eventual licensee was required to pay fees on an annual basis for the spectrum licence calculated on the same basis and payable on the same conditions as the fees charged to NTC pursuant to NTC's spectrum licence. However, the eventual licensee was to be exempted from paying spectrum fees as long as NTC was exempted from paying them.

##### *Right of access*

The RFA noted that the eventual licensee shall have rights of access to public and private lands and also the rights of inspection and entry set out in the Telecoms Act.



### *Interconnection*

The process of interconnection between the eventual licensee's network and other licensed telecommunications networks in Nepal, including that of NTC, was to be governed by the Telecom Act's Guidelines for Interconnection.

The main objective of the Nepali Interconnection Guideline is to ensure that any customer of a particular telecommunications network can communicate with any other customer in another telecommunications network efficiently and without unnecessary impediments. The guideline is expected to insure healthy competition by safeguarding against abuse of market power by the incumbent. The Guideline also provides for licensees concerned to discuss and arrive at an agreement on the use of networks and charges for this use. Licensees are given every opportunity to resolve issues commercially before resorting to regulatory intervention. However, only if the parties are unable to solve the issue and request for the intervention of the NTA, will the NTA attempt to intervene in solving the interconnection issue. If the NTA is unable to bring the two operators into an agreement then it will issue its binding determination.

While the RFA for the RTS in the EDR did not specify a particular interconnection charge between the eventual RTS licensee and the incumbent NTC, the charge was eventually, but prior to actual award of the licence, agreed as 55 percent of NTC's own "VSAT tariff" as the interconnection payment by the licensee to the incumbent.<sup>20</sup>

### *Tariff regulation*

The tariff rates charged by the eventual licensee to its customers for use of the RT services were to be subjected to regulation by the NTA in accordance with the Telecoms Act. Except with the prior approval of the NTA, the eventual licensee was not to be authorized to charge tariffs higher than those set out in the table entitled 'RTS Maximum Tariffs and Default Interconnection Rates' in the RFA. See annexure 3.

This tariff was announced in the RFA as NPR 9.00 per minute for intra RTS calls (originate and terminate on RTS system) as well as outbound calls (originated on RTS and transited to NTC).

This tariff regulation policy seem to have adopted the successful experiences of the Latin American programme where operators were allowed to set cost reflective tariffs in the rural areas.

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<sup>20</sup> NTC's "VSAT" tariff is an internal rate set by itself for its own VSAT network, which constituted just 7 out of the 1,711 VDCs it covered in all of Nepal.





However the design called for the maximum tariffs to be subject to a price cap indexing after 2004 based on a formula to be developed by NTA.<sup>21</sup>

### ***Regulation of anti-competitive practices***

The RFA clearly stated that the NTA will regulate NTC to ensure that it does not unfairly discriminate against the licensee and does not grant anti-competitive preferences or cross-subsidise its own RT service operations. The RFA further elaborated that the RT service operations of NTC will be regulated by the NTA so as to ensure that NTC does not abuse its dominant position as the incumbent telecommunications operator in Nepal. It also undertook to ensure that any authorisation granted to NTC in the RSA of the eventual licensee will contain terms and conditions equivalent to those applicable to the licensee.

This was a very important undertaking as it gave a level of comfort to the possible bidders in terms of the possible anti-competitive behaviour of the incumbent.

### **Eligibility and Qualifications**

It appears that the design of the LCS by the NTA and the Consultants to the Bank intended to maximize the number of potential players that would become eligible to bid at the LSC auction for the RTS licence as the eligibility conditions does not seem to overly restrictive. The key conditions are given below:

- Must become registered as a company in Nepal prior to the Licence being issued.
- Nepalese investors must own minimum of 20 percent equity.
- Must satisfy the NTA of financing capacity to complete rollout of the network in accordance with the terms of the Licence.
- Must provide clear evidence of operating either a telecommunications network with over 250,000 subscribers, or a telecommunications network with over 500 public telephone access lines in rural areas.
- Must demonstrate that the proposed suppliers of the equipment have been in the business of manufacturing the said equipment for at least five years.
- Must furnish a Bid Security of USD 100,000.

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<sup>21</sup> The Telecommunication Policy 1999 states that NTC shall complete the phase-wise rebalancing of the tariff by the end of 2004. It further states that after the completion of the rebalancing, a "Price Cap" policy should be applied. NTC has not so far rebalanced its tariff and the NTA is still studying to introduce Price Cap regime.





## Selection and implementation

The RFA was very clear in indicating how the selection process was to be conducted using a single round LCS auction. It said “The NTA plans to issue the Licence and the RTS Subsidy to the Licensee proposed by the Qualified Applicant that proposes the lowest RTS Subsidy.”<sup>22</sup>

It is important to note that unlike some previous LCS auctions no maximum subsidy amount was announced; taking the position that the “market knows best” and also guarding against all bidders concentrated at the maximum allowable subsidy.

The implementation plan of the RT network and thereby the payment plan of the RTS subsidy determined by the winning bid of the LCS auction was straightforward. The RFA stated that the one-time grant was to be payable in four tranches as follows:<sup>23</sup>

- The first tranche of 40 percent once the IDA receives written confirmation from the NTA that the 534 access lines have been activated and are in operation;
- The second tranche of 40 percent once the IDA receives written confirmation from the NTA that 1,068 access lines have been activated and are in operation;
- The third tranche of 10 percent as soon as possible after the end of the first year after the activation of services in all identified VDCs provided that quality of service standards as described have been maintained; and
- the fourth tranche of 10 percent paid to the Licensee at the end of the second year after the activation of services in all identified VDCs provided that quality of service standards have been maintained.

If NTA provided written confirmation to the Bank that one or more events of force majeure prevented the installation, activation or operation of some of the access lines required to be installed, then the amount of the second, third and fourth tranches of the RTS subsidy were to be reduced by an amount proportionate to the number of access lines that the NTA had confirmed to have been reduced by the events of force majeure.

The obvious question that arises is that of sustainability. For instance what would happen if the eventual RTS Licensee abandons the operation in case the RT operation becomes unprofitable after the subsidy has been received in just 2 years in a 25 year license period? This issue is addressed later in the paper.

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<sup>22</sup> However, the RFA was not clear on how the selection would be made in case there was more than one identical lowest bid.

<sup>23</sup> However, a somewhat revised plan was actually implemented; discussed later.



## 5. Nepal LCA Outcome

Given the design and implementation plan for the Regional Telecommunications Service subsidy using a Least Cost Subsidy Auction as discussed in the earlier chapter, the NTA commenced the bidding process for the RTS license upon intensive dialogue with the World Bank.<sup>24</sup>

In advance of the formal bidding process, NTA and the Bank made the draft Request for Application (RFA) publicly available for review and consultations on NTA's website between June and December 2002. According to the World Bank the transparent public consultation process resulted in NTA improving the quality of the RFA in response to market needs.<sup>25</sup> The revised RFA documents were made available for purchase in February, 2003; a pre-bid conference with six potential bidders was held in April 2003; and applications for the RTS license were received in June, 2003.

During the bidding process, some potential applicants raised additional concerns related to the financial, regulatory and security risks. To mitigate some of the concerns additional changes were made to the proposed RTS license.

One of the major concerns addressed was the need for revising terms for advancing payment prior to project start-up. These resulted in the following adjustments:

1. Subsidy payments to be made at the time of activation of the percentage of VDC lines. For example, the first 20 percent subsidy payments were to be made as soon as the lines were activated in 20 percent of VDCs, even if that occurs before 6 months.
2. If the Licensed service utilizes VSAT technology, 20 percent of the total subsidy was to be paid upon activation of the VSAT network hub station, which had to be based in Nepal. The rest of the payment schedule would be 20 percent of the subsidy upon activation of lines to 20 percent of VDCs; another 50 percent of the subsidy upon activation of 50 percent of the VDCs (for a cumulative total of 70 percent); and a

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<sup>24</sup> This was the second attempt of the LCS auction. The first attempt was in September 2000. At this auction NTA received two bids and the applicant with the lowest subsidy signed a letter of intent to undertake the project. However with the unprecedented incident that left many members of His Majesty's family assassinated and the deteriorating security situation with rising Maoist violence, the party decided to withdraw from Nepal forfeiting its bid bond.

In this background HMG and the World Bank undertook a total review of the programme and weighed the options of suspending the project versus improving the attractiveness of the offer by including conditions that mitigated the country risk and enhancing the financial attractiveness. Finally NTA and the Bank decided to go with the second option.

<sup>25</sup> Aide memoire of supervision mission, January 2003; pre-bid conference, April 2003



further 20 percent (total of 90 percent) upon activation of all lines. The last 10 percent was to be paid at the end of 24 months of awarding the Licence.

3. If the independent consultant were to certify that the RTS licensee was prevented from serving some of the VDCs due to force majeure events, the NTA may approve a list of alternative locations within which PCOs may be installed. The locations on this list shall generally be equally remote to those locations in which the PCOs could not be installed. If PCOs are activated in accordance with the alternative PCO locations, there shall be no reduction in the subsidy payments.

However, even after all the above changes were effected, the LCS auction process attracted only two bids. One was disqualified on technical grounds.<sup>26</sup> Incumbent NTC was not allowed to bid.<sup>27</sup>

Therefore, based on the only bid received, the RTS license was awarded in November 2003 after ensuring compliance with licensing requirements, filing of consortium shareholder agreement and registration with Department of Industry and receipt of the performance guarantee.

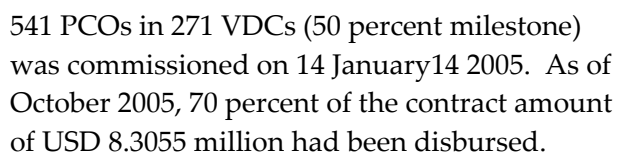
#### **Details of the LCS auction award**

Licensee:	Messer STM Telecom Sanchar Private Limited of Kathmandu Nepal (USA based); Messer Apollo Investment Group is the Nepali shareholder with 20 percent share.
License issue date:	21 November 2003
Roll out completion date as per license:	16 June 2005
License validity:	Ten years extendable by 5 years till 25 years.
Subsidy amount:	USD 11,865,000
Total number of PCO's to be installed under the subsidy amount :	1,068 in 534 identified VDCs of the EDR
Work progress as at 1 October 2005:	Installation of the Katmandu hub station began in early March and was certified on 29 April 2004. The hub station at Biratnagar and installation of 20 percent of locations was commissioned on 26 August 2004.

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<sup>26</sup> TCIL from India

<sup>27</sup> In some of the Latin American projects, the incumbents were allowed to bid, but did not necessarily win the LCS auctions. However, in India the incumbent won the majority of LCS auctions, the reasons for which have been discussed earlier in the paper.



10 out of 16.

197; mostly in the Terai region. 341 locations closed down under orders from HMG.

Planetnetworks Consulting Corporation, Canada

**Rural Telecommunications Services in 16 Districts of the Eastern Development Region**

Legend: **● District Head Quarters**

**XXYY** XX = VDC installed YY = VDC allotted

District	VDC installed	VDC allotted
17/18	0/17	0/37
0/14	0/19	0/25
37/41	0/40	24/27
55/57	0/17	4/10
29/31	15/24	47/77
37/80	0/17	47/77



## 6. Nepal Smart Subsidy: Design and Implementation Issues

Nepal is undergoing a serious security problem where Maoist rebels have been waging an armed campaign against the state since 1996 where some 11,500 Nepalese have been killed. It is not uncommon for hartals that shut down entire cities and villages and explosions that take the lives of many persons at a time. Sometimes main arteries are shut down for days preventing any form of traffic. In certain areas where the Maoists have control, the entire administration is run by them with no reference to Government rules.

The security situation has been non-conducive from the initial stages of the RTS project, which in a sense is something that should have been, and in all likelihood, calculated in the bid submitted by STM. Risk premiums that have to be borne in terms of additional costs would certainly have been included. Even though the Maoists created problems in the initial stages of the roll-out of the RTS network, progress was very much on schedule until mid January 2005 when 542 PCOs in 271 VDCs were completed.

However, the conflict took a different turn when His Majesty assumed direct rule and took over executive powers on 1 February 2005. The king sacked the Prime Minister, dismissed his government and declared a state of emergency. With this state of emergency, HMG ordered STM to shut down all 542 PCO locations.<sup>28</sup> Subsequently HMG permitted STM to reopen 25 out of the 542 locations and by end August 2005 when this study was done, HMG had allowed STM to operate 197 PCO locations in total. In the meantime, STM has been complaining to the authorities that they were unaware of the condition of their equipment in the remaining 345 locations as it had not been possible to even visit these sites due to the numerous restrictions placed on them. However NTA continued to complain that STM were not interested in relocating these PCOs in to other “safe” areas because they had already collected payments (subsidy) for their installation.

In late August 2005, HMG granted permission to STM to restart its implementation programme and provided a list of 177 new locations. However, these new locations had been decided by the Army without any reference (it is alleged) to whether STM could undertake viable operations in those VDCs given that NTC was already present in them. Here it appears that NTA has not been able to convince the defence establishment the logic for selection of VDCs and why certain VDCs should be left out and others brought in.

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<sup>28</sup> Not only STM, all telecommunications facilities were completely interrupted for 7 days. Internet services were also shut down for 7 days. Mobile phone operations were suspended for 3 months and even then only select post-paid connections were reconnected. Pre-paid connections were activated only after 5 months. Even at the time of our research, private FM radio stations were prevented from airing news newspapers were prohibited from publishing news deemed to be anti-state or reporting anything about the Maoist insurgency.



From the point of view of the implementation success of the project, there is no doubt that a more conducive security environment would have helped. However, in reality, the ground situation is such that all stakeholders; NTA, NTC, STM and the Bank needed to have (and continue) factored in the unpredictable nature of the situation in Nepal.

It is in this context, non-security related issues, particularly the action of NTA in ensuring a TRE within which STM could successfully implement and sustain the RTS becomes vitally important.

### **Design and implementation**

An issue that has attracted strong opposing views is the continuation and the subsequent conclusion of the LCS auction given there was only one eligible bidder; STM.

While some quarters, including NTA and the Bank see no reason why the auction process should have been suspended under the above conditions, there are others who argue that going ahead with just one eligible bid was a perhaps a significant error in judgement. This is even more noteworthy in the context that Consultants to the Bank is said to have approached more than 100 potential international entities with the RTS opportunity and reported that there seemed to be “sufficient interest from serious bidders to run an auction”.<sup>29</sup>

Simple economic analysis suggests that for any auction to be successful, be it a single round or multiple round auctions, there must be competition among bidders. The thinking behind the LCS auction is no different to this. Therefore from a purely economics point of view of obtaining the lowest possible bid; albeit agreeing that the decision to go ahead with the auction with one bidder was much more complex, may have been reviewed further.

### ***Licence region and exclusivity***

It was the failure of the incumbent NTC to address the rural areas of Nepal in a reasonable timeframe that led to carving out the EDR as the licence area in 534 VDS which STM was responsible for rolling out its network. In line with this logic, NTA guaranteed exclusivity to STM for the first five years in those 534 VDCs. No new service provider was to be given license to provide service in those VDCs nor was NTC allowed to provide any service in those VDCs. Besides the history of the failure of the incumbent, this decision was rooted in considering the economic activity and hence the traffic in these areas, where introduction of competition prior to STM building its network and consolidating its customer base was not seen as advisable in terms of sustenance of more than one service provider.

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<sup>29</sup> The World Bank





However our research revealed that from the date of selection of STM via the LSC auction and the time our research ended (Oct-Nov 2005), NTC had extended its services in more than 100 of the 534 VDCs exclusively earmarked for the STM. This serious violation was not only against the license conditions, but against the spirit of the entire telecoms policy.

In fact, it was not something neither the NTA nor the World Bank was unaware. The Bank mission that visited Nepal in September 2004 noted in their observations that NTC PCOs existed in 49 of 107 VDCs where STM had been licensed to provide services on an exclusive basis. In this background, the Bank mission had reiterated that the 534 VDCs had been identified jointly by MOIC, NTA and NTC and that it had been agreed that these VDCs would be the exclusive service area of the RTS operator for 5 years. Based on this finding, the Bank and HMG had agreed that such overlap should be avoided in the future and that MOIC and NTC would coordinate with NTA and STM to ensure that NTC does not provide services in the RTS operator's exclusive service area. They had also agreed that given the situation on the ground there was a need for flexibility and that it was necessary to delete or substitute other VDCs in the EDR in agreement with STM with a view to ensuring that the objectives of the RTS project were met. In this regard, HMG had agreed that MOIC would provide NTA with blanket approval to change the VDCs in the list by end October 2004.<sup>30</sup>

The unauthorized entry of NTC in to the exclusive areas earmarked for STM is a clear violation of the license condition. However, even after numerous complaints from STM and reminders from the Bank to stick to the agreed rules of the game, NTA failed to stop this continuing gross abuse. Therefore, from the point of ensuring a favourable TRE in terms of market access and regulation of anti-competitive practices for the smooth implementation of the RT service in Nepal, it is evident that NTA has clearly failed in its duties. This no doubt has created several problems for STM in terms of profitably engaging in its business, particularly when the VDCs in which these violations have taken place are not economically capable to sustain more than one operator.

Adding to the already complex issue is the CDMA license issued to NTC. The incumbent is planning to install 1 million lines in the next five years across Nepal including the EDR. Technical experts are of the view that the CDMA signal will cover almost all VDCs in the Tarai region and many of the Hill region VDCs which would result in telephone services at a much lower tariff than the existing STM tariffs.<sup>31</sup> Be that as it may, the general view is that the CDMA roll-out has been talked about for a

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<sup>30</sup> This blanket approval was granted to NTA by MOIC to ensure their responsiveness.

<sup>31</sup> STM tariff structure is discussed later in the paper.



number of years without any activity on the ground.<sup>32</sup> In any case, if and when the CDMA roll-out takes place the challenge for STM to operate their VSAT PCOs would become much more difficult.

### *Technology and network roll-out requirements*

The RFA was technology-neutral to the extent it let the applicants decide on “any appropriate wireless or wire-line technologies in the provision of the RTS Services”. In terms of network roll-out the RFA gave the freedom of choice to STM to prioritize the VDCs in a manner that was most suitable to them. The RFA simply mentioned that 50 percent of the VDCs were to be covered within 9 months and completed within 18 months. NTA and the Bank did not require any order in which the VDCs or district should be covered.

The outcome of the above two conditions was that STM proposed a VSAT solution, on which it was selected as the lowest subsidy bidder and it started the roll-out with the easiest, or most accessible VDCs in the beginning and left the difficult ones for later.<sup>33</sup> This logic is quite straight forward and falls well within the rules of the game.

It must be noted here that STM is a large VSAT manufacturer based in the US. At the time STM applied for the smart subsidy, it had wide experience in manufacturing and installing VSAT networks. It had supplied and installed equipment in Bolivia, Argentina, Venezuela, Mexico, Brazil and Thailand as well as to the incumbent operator in Nepal.<sup>34</sup>

In the context of implementation and sustainability difficulties encountered by STM, several questions have been raised by the many stakeholders of the project.

One is whether STM selected the best technology solution. Our research revealed that there is more than one answer to this question depending on the respondent. As far as the ease of installation and quick deployment is concerned VSAT technology seem to have been the most suitable technology in the extremely difficult to access mountainous areas of EDR, and perhaps even some of the more difficult to access areas in the hills

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<sup>32</sup> NTC claims it is ready to commence the service. The commissioning of the service and the installation activities were stopped by a court order. Speculation is that the court will be delivered in February 2006.

<sup>33</sup> STM license was granted 21 November 2003, rollout of 50 percent of VDCs completed by 14 January 2005.

<sup>34</sup> STM Telecom Sanchar Inc. is a consortium consisting of (a) STM Communication Services Inc., USA, (b) STM Network Inc., USA, (c) SAMART Communication Service Co. Ltd, Thailand and (d) Apollo Investment Private Limited, Nepal.





where transportation is an immense hurdle. This is borne out in the fact that in just over an year STM completed the installation and commissioned RT services in 542 sites in 271 VDCs. These installations, however, were concentrated in ten out of the sixteen districts in the tarai and hills region while the remaining six remote districts were not touched. STM is of the view that had there been smooth operation of the project they would have completed its obligation of installing and operating all 1,068 PCOs in all the 534 VDCs in due time.

**Table 6.1: Distribution of NTC and STM VDCs in the EDR**

	Nepal Telecom			STM Telecom Sanchar				Per capita income	Total telephones in VDC
	allotted	installed	% of NT share	allotted	% of STM share	installed	% installed		
Mountain	47	54	42.4	70	57.6	0	0	237.7	54
Hills Region	139	173	37.0	256	63.0	162	63.3	195.5	335
Terai Region	173	235	52.8	208	47.2	109	52.4	224.4	344
	359	462	44.1	534	55.9	271		240	733

Source: NTA and other local sources

The problem however is that given the slowing down of the roll out due to a variety of reasons; most of it beyond the control of STM, STM is unable to maintain the network on a profitable basis. In this background the issue is whether using an integrated solution where a less expensive technology in the Tarai or flat lands and a VSAT solution in the more difficult hilly and mountainous districts would have been better.<sup>35</sup>

However, STM is adamant that that prior to proposing a VSAT technology they studied in detail the exiting infrastructure, geo-demographic and socio-economic conditions of the EDR and concluded that a pure VSAT solution was much more economical than an integrated solution. Interviews with STM indicated that they would have needed to submit a subsidy amount as twice as what its actual winning amount was; i.e. a bid of approximately USD 24 million. The logic was that the EDR was not large enough to economically sustain a solution that had more than one technology.

However there are other views. These become relevant in the context of the practical problems STM is facing on the ground. For instance, when 345 locations out of 542 are not in commission, a possible solution to sustain the operation would be to expand service within profitable VDCs by adding more PCOs in those areas. But our research revealed that the VSAT equipment used by STM can only serve an area of four to five Kilometres and thus additional VSAT terminals need to be installed if new locations were beyond this perimeter. Given the average cost of at least USD 11,000 per VSAT terminal (simply dividing USD 11.865m subsidy by 1,068 locations) the expert view is

<sup>35</sup> See Annex 4 for a summary of technology cost guidelines.



that it is uneconomical to use this technology to expand within the VDC without any subsidy. The irony is that while STM is losing money because many of their PCOs have been closed down in “unsafe” areas, they are unable to expand the service within the “safe” areas due to high per line costs.<sup>36</sup> In the alternative had STM used an integrated WLL and VSAT technology it may have had a greater chance of reducing the project cost and had the opportunity to expand within “safe” VDCs.<sup>37</sup>

If the objective of giving absolute freedom in the choice of technology was to motivate the licensee to use either one type of technology or a combination of best possible technologies to make the project the least expensive in capital layout as well as recurrent maintenance and operational costs, then the evidence does not suggest the outcome was optimal.

In terms of coverage, if perhaps some priority areas were indicated; not necessarily in terms of particular VDCs, but even in terms of difficulty of access or districts within the EDR, it may have been possible to achieve a more balanced roll-out.

Another criticism levelled at the design of the RTS and thereby the technological solutions proposed by the bidders is whether sufficient information on EDR along with any demand forecast were provided to potential bidders by NTA. The argument is that

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<sup>36</sup> RTS in the EDR called for installation of 1,068 PCOs in 534 VDCs spread over 28,456 sq. km. Not all VDCs are in the remote inaccessible areas. In fact 416 PCO locations i.e., 39 % of RT service areas are in the flat land or terai region. Just to contrast, NTC’s technology distribution in EDR is follows: wire-line 102; radio and wire-line 108; VHF 245; VSAT 7 for a total of 464 VDCs covered.

<sup>37</sup> Given here is a rough estimate made available to us by local experts and presented here as relevant information. However, the authors do not take responsibility for the accuracy of same. All 416 locations in the Terai region can be easily covered by WLL technology. Even if only 10 percent of the remaining stations, i.e. 65 (1068-416-65) stations are covered by using WLL technology locations with an integrated technology would turn out to as follows. Using the per line cost of USD 11,110 per VSAT terminal from the ongoing project and assuming a cost of USD 600 per line using WLL technology, the project cost could have come down to USD 6,810,170 which is USD 5,054,830 less than the actual subsidy awarded. If exchange cost is included this cost goes up by another USD 250,000.

Cost scenario with integrated WLL-VSAT technology; amounts in USD

Total no. of stations	Stations using WLL	Stations using VSAT	Unit cost per station using WLL	Unit cost per station using VSAT	Total cost with WLL stations	Total cost with WLL stations	Overall cost
1,068	481	587	600	11,110	288,600	6,521,570	6,810,170



if such were available, bidders would be more prudent in proposing appropriate technology. NTA and the Bank however takes the position that the input from their rural economic Consultants (not those who helped design the RTS) upon extensive ground work and the feedback on the draft RFA provided sufficient information for bidders to formulate their plans. Even though the tender did not require a business plan be submitted for evaluation along with the LCS amount, it is obvious that a business plan had to be prepared to arrive at this subsidy amount. The question is whether the assumptions in these plans were accurate in the absence of relevant information.

In this context, it is interesting to note that NTA revealed that no survey was undertaken by them to estimate the potential demand for RTS in the EDR prior to preparing the RFA and bidders may have overestimated revenue and thereby decided on expensive technology.

## **Scope of service**

### ***Mandatory services***

STM was required by license condition to provide basic public telephone service consisting local, domestic long distance (STD) and international long distance (ISD) as mandatory services. Free access to emergency dialling, directory assistance and a consumer complaint centre were also deemed as mandatory services.

For payments to be made to STM for meeting milestones, an independent technical consultant; in this case Canadian based PlanetWorks Consultants (PlanetWorks) had to certify that incoming and outgoing local, STD and ISD calls could be obtained from STM's PCO locations. At the time of authorizing payments these certifications were duly obtained.

However, our research indicates that there are continuing complaints that it is not always possible to complete a call between STM and NTC indicating technical interconnection issues. The Bank mission in October 2004 pointed out in no uncertain terms this issue when it mentioned that the mission was unable to call the STM network from NTC's mobile network. The Bank mission had recommended that NTA take immediate action to address these problems.

Notwithstanding the above PlanetWorks had also identified a number of interconnection problems that STM was facing. Having considered this unsatisfactory state of affairs with the Bank, NTA agreed to take several steps to correct the situation. It agreed to hold regular meetings with STM and NTC to ensure that technical interconnection issues are resolved in a timely manner; and to identify emergency numbers that should be free of charge and allocate these numbers to STM for programming in its facilities to meet its mandatory obligation for free emergency dialling.



More than a year since these agreements were entered into, incumbent NTC has continued to muscle its way through disregarding commitments it made to NTA and the Bank. NTA has been unable to satisfactorily mediate between NTC and STM to solve the said issues. From the point of creating a TRE that is conducive for the success of STM's operations in Nepal, it is clear that NTA has failed in its duties to ensure a favourable interconnection regime at least from a technical standpoint and once again, failed in bringing to an end continuing anti-competitive practices by the incumbent.<sup>38</sup>

### *Additional services*

In many backward VDCs in the list of 534, economic activity is low enough not to venture out to provide more than the mandated 2 PCOs. However there are a good number of VDCs where it is economically feasible to offer much more than two PCO connections and other value added services such as Internet and email access, data communication services and fax services etc. In addition, there is evidence to suggest that there are many VDC that are not in the STM list that could be served with one or many lines.

In a positive move to relax the rather stringent license condition of restricting service provision outside of the identified 534 VDCs, the Bank in October 2004 recommended that NTA, in consultation with STM, amend sections of the license to allow STM to provide optional services to meet new demand outside of the listed VDCs. The Bank clarified that this should be done with the understanding that it would not affect the meeting of roll-out milestones; and that no subsidy would be paid for the provision of extra services.

However, STM does not seem to have shown much interest in providing either more than the two mandatory lines or providing additional services in any significant number of VDCs either in the list or outside. It is possible that partly the reason for this is the VSAT technology they have deployed; where adding terminals is expensive and without the subsidy it is likely that STM is not convinced of sustaining more lines.

On the other hand, given the provision of value-added services within the existing PCOs incur only a nominal marginal cost; with no licence fees, STM should consider re-evaluating its policy of supplying the bare minimum to meet the payment milestones; particularly in the current context.

Evidence from Latin America is clear in that the extension of services beyond the mandated minimum and provision of value-added services contributed positively to the success of those projects.

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<sup>38</sup> A detailed discussion on interconnection pricing is contained later in the paper.



### *ISD license*

Another serious issue is with STM's ISD license. By License condition, STM was restricted to use the international gateway and other international traffic carriage facilities of NTC until January 1, 2004. However thereafter, upon application, STM was to have the right to obtain a national licence to provide ISD services using its own international gateway upon payment of the licence fee payable in the same amount as NTC. According to STM it has not been granted the ISD licence since its application in April 2004, which if granted would have helped them tide over the serious sustainability issues that have emerged due to the unstable security situation within Nepal.

There is enough evidence to show that the Bank on numerous occasions requested NTA to comply with the license condition of providing STM with an ISD license. STM, during its discussions with the authors of this paper complained that their requests have not been entertained while NTA mentioned that it was a matter of STM not making the required fee payments. STM on the other hand was requesting for relief in terms of an extended payment plan for the license fee in light of the deteriorating security situation taking a tremendous toll on its bottom line.

It was the responsibility of the NTA to be more proactive in this situation and make necessary mid-course corrections if it wanted to find an answer to the problem. But it seems that NTA was only interested in sticking to the rules notwithstanding the outcome.

### *Service quality and service availability*

Besides standard quality criteria, STM was bound by a number of service availability criteria. The key availability criteria was that each PCO need to open and available to make local, STD and ISD calls during reasonable daytime and afternoon hours, totalling minimum 8 hours, every day of the week. Where a PCO did not have access to the electrical power grid STM had to provide an alternate source of power for the PCO. However this alternate source of power need only to be sufficient to provide a minimum of 4 hours total of actual calling services within the 8 hours it is open daily.

The monitoring of service quality and service availability is something that our research found to be wanting. The condition is for STM to provide monthly reports and PlanetWorks to submit quarterly reports. However PlanetWorks consultants mentioned of the difficulty of fulfilling the requirements due particularly to the security issues and the remoteness of sites. However, the Bank has certified that even under difficulty these reports have been submitted in time.

Be that as it may, during our field visit to one of the sites at Bhaudaha in the Morang district STM's PCO was closed. We were told that the day being a government holiday the PCO installed in the VDC was closed. Interviews with the local people revealed that the service quality and maintenance was not at all satisfactory. Call charges were much



higher than in the nearby VDC where NTC was operating a PCO. Local people were of the view that the STM PCO should be open from early morning hours because people leave home early to reach their work places which are usually far from their homes. However the PCO opens only from 10:00 to 17:00 hours which does not serve that purpose, nor the License condition that the PCO should open for a minimum period of eight hours a day on all days of the week. In the case of the above example, the PCO is run by the VDC, a semi government office which opens only during the office hours. It would have been much better had the PCO operated from a private house or business where it would have been much easily accessible to the villagers outside of “office hours”.

Discussions with PlanetWorks indicated that there seem to be a number of technical issues that needed to be solved to make the service quality monitoring more efficient. Among the recommendations were that NTA purchase a GIS based system to assist in mapping VDC sites, store data and undertake analysis. This request had also been reiterated by the Bank on more than one occasion.

Another relevant point is whether STM was prudent in selecting its “partners” to operate their PCOs, in terms of the right incentive structure to keep to the service quality and availability criteria. Our research indicates that the selection process of the partner could have been done in a way that would have generated better results. It appears that the normal practise is for a representative of STM to visit a village, shortlists a few potential candidates and thereafter select a person to operate the PCO; all on the same day. It was also revealed that for a person to obtain the right to operate a PCO, STM requires them to deposit NPR 35,000 which would be refunded in three years time (NPR 15,000 forfeited if discontinued in 1 year; NPR 10,000 forfeited if discontinued after 2 years etc.). Once the right to operate a PCO was obtained, these people have to make advance payments (pre-paid cards) of NPR 7,500 through banks, which in some cases are 2 to 3 days walk from the VDC. Discussions revealed that many of these PCO operators were in dire financial difficulty due to the fact that either the PCOs were non-operational or had a very meagre income.

### ***Interconnection and tariffs***

The literature replete with the point that interconnection has a very significant impact on new entry which puts tremendous pressure on the Regulator to establish clear and fair interconnection rules for the success of these new entrants; particularly new rural operators. As described in detail, the existence of substantial externalities due to incoming traffic towards rural networks, as well as of different incremental operating costs between urban and rural networks, well thought out cost-based interconnection are essential. The literature has built a case for asymmetric or skewed interconnection agreements favouring the rural operator in order for operators like STM to succeed.





However, if there is one crucial issue that NTA had failed and thereby created a TRE that is not conducive for the continued implementation of the project let alone its sustainability; that is precisely the related issues of interconnection and tariff regulation. The process of interconnection between the eventual licensee's network and that of NTC, was to be governed by the Telecom Act's Guidelines for Interconnection. However, as described earlier the RFA did not specify an interconnection charge between the eventual RTS Licensee and NTC, but indicated a maximum retail tariff of NPR 9.00 per minute for local calls in the RFA annex on maximum tariffs and default interconnection rates.

An interconnection charge was eventually, but prior to actual award of the licence to STM, agreed between STM and the incumbent NTC, as 55 percent of NTC's own "VSAT tariff". With the NTC "VSAT tariff" set at NPR 9.00 per minute the interconnection rate between STM and NTC was then set at NPR 4.95 per minute for calls originating on the STM network and terminating on the NTC network. STM therefore set its own tariff at the maximum allowable rate of NPR 9.00 per minute. On the other hand, calls originating on NTC's network and terminating on the STM Licensee's network were to entail a NPR 0.30 paid by NTC to the STM.

To facilitate routing and charging these agreed upon rates NTA allocated STM with a separate numbering range with a 99 3 prefix.

The ground reality when STM actually started rolling out was that a local call from its network to that of its own or NTC cost NPR 9.00 per minute. This was in contrast to NPR 1.00 per 2 minutes for NTC to NTC non-VSAT calls, making an STM call 18 times more expensive than a call on NTC (Note that NTC had VSAT phones in only 7 out of 464 VDCs it covered in the EDR). Having realized that it was not at all possible to sustain such high tariffs, STM eventually reduced its local tariff to NPR 3.00 per minute at a loss of NPR 1.95 per minute (still 6 times NTC rates) and reduced STD to NPR 5.00 per minute with an operational profit of just NPR 0.25 per minute.

After numerous rounds of lobbying and directives by NTA upon pressure by the Bank, NTC finally reduced the interconnection rate charged from STM to NPR 2.75 per minute for calls originating on STM and terminating on NTC and continued paying NPR 0.30 per minute for calls originating on NTC and terminating on STM.

The original interconnection charge was, to put it mildly, extremely high. This obviously led to the NPR 9.00 tariff that was not sustainable and had to be brought down to a loss-making tariff as explained earlier. In addition STM reported serious congestion on the lines and this fact has even been reported by a Bank mission who was unable to complete calls from NTC to STM.

Internal communications indicate that the interconnection issue was brewing from the word go. STM had requested NTA to facilitate the interconnection agreement with NTC



to which it had got a positive response. However NTC had insisted that they could interconnect STM along the same lines as UTL (the fixed WLL operator) which meant STM paying for 16 E1 lines even though their requirement was for just a single E1 line. Furthermore NTC had objected to providing interconnection at two locations (Katmandu and Biratnagar) even though the license condition had provided this facility to STM, which was anyway a key criterion for reducing their backhaul costs to make the operation sustainable. In an early letter to the Bank, STM called this issue a “show stopper” and requested the Bank to help sort out this issue.

Besides, the independent certification consultant had identified a number of interconnection problems that STM was facing. Based on discussions among NTA, STM and NTC, the regulator had agreed that NTA would immediately mediate between STM and NTC in order to negotiate a fairer interconnection and revenue sharing agreement; hold regular meetings with STM and NTC to ensure that technical interconnection issues are resolved in a timely manner. It was further agreed that services of a Consultant be used to assist NTA develop an interconnection, pricing and tariff regime to solve the problems faced by STM and NTC. But, things dragged on.

A decision that warrants some attention is why the NTA and the Consultants to the Bank agree to the maximum rates proposed in the RFA (NPR 9.00 per minute) as “reasonable”.<sup>39</sup> The Consultants had mentioned that since neither they nor the NTA had NTC's actual costs and interconnection rates, the proposed tariffs had been “benchmarked adequately and should provide some comfort to potential applicants”. However they had noted that the problem was going to arise with NTC's reaction to interconnection. In order to deal with this impending issue, they had suggested that NTA be provided with “convincing arguments to support the proposed tariff levels”.

From a TRE point of view, it is clear that NTA had been unable or unwilling to stop NTC from imposing unfair and potentially detrimental interconnection charges on STM. This resulted in negligible volume of calls being originated on the STM network and a minimal termination of “local” calls to the network. Even after the reduction in call rates (but still 6 times that of NTC) it was reported by STM that during July-August 2005, the average use per day among its 174 operational sites was only 0.36 minutes per day.

Given the problems faced by STM multiplying due to the deteriorating security situation and the viability of the entire project hanging in the balance, NTA must take a fair share of responsibility for dragging on the interconnection and tariff issue for such a length of time without finding a reasonable solution.

After the research for this paper was completed, NTA reported that on 18 October 2005, it had given a directive to operators on the new interconnection rates. This new regime

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<sup>39</sup> The World Bank





has a number of very positive features towards reducing the burden on STM. The salient features of the new guidelines are that all local calls will be on a “sender keeps all” basis instead of the unacceptable interconnection charge previously imposed on STM by the incumbent; calls within the EDR will attract identical interconnection charges between NPR 0.60 and NPR 3.15 per minute depending on whether the call is handed over at the “near end” or “distant end” and also whether the distance is less or more than 50km; and calls between the EDR and other regions of Nepal will attract a much higher interconnection charge on STM than on NTC.<sup>40</sup> This interconnection regime is further explained in Annex 5.

While this change in the one-sided interconnection regime that was detrimental to STM is welcome, the real question is how well this ruling will be implemented.

### ***Why not an asymmetric interconnection agreement?***

The real question that begs an answer is why did the NTA and the Bank not pursue a cost-based asymmetric interconnection agreement favouring the RTS operator? This issue is not addressed even in the revised rules just published.

The Latin American evidence is clear that it is only through such an interconnection agreement that a significantly high incoming revenue structure for rural networks has been made possible thereby making them sustainable. The key is that the rural operator must be adequately compensated for the high operating costs and low the revenue yield through such innovative mechanisms.

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<sup>40</sup> The gist of the new interconnection rules are:

1. Sender keeps all for all local calls. This is a dramatic change from what used to be, with STM having to pay NTC NPR 2.75 per minute. Under the new regime neither STM, nor NTC need to pay anything to the other party for terminating calls on the same charging zone; district.
2. Identical interconnection charges for calls between districts but within the EDR and “distant-end hand over”. Here STM gets NPR 1.0 per minute from NTC for terminating a call if STM customer is not in the same district as the NTC customer but within 50 km. The amount increases to NPR 3.15 if the distance is over 50 km. However if the termination is on a “near-end handover” basis the amount drops to NPR 0.60 to both parties.
3. However for calls between the EDR and other regions of Nepal, the structure is different and not much help to STM. In this case, if a NTC call from any other region besides EDR is terminated on STMs network in EDR, STM gets NPR 0.60 per minute, but if it is the other way around, that is a STM call is terminated on the NTC network outside the EDR, STM has to pay either NPR 1.00 or NPR 3.15 per minute depending on the 50 km rule.



## **Telecommunications Regulatory Environment: NTA**

The foregoing discussion clearly indicates that while certain improvements in the design and a more conducive security environment would have helped STM keep to the implementation plan, the primary reason for the current complexities which threaten the completion of implementation and sustenance of the programme is the weak TRE in which incumbent NTC is violating numerous agreements with impunity.

The weaknesses in NTA were not unknown. All stakeholders were aware of the capacity issues NTA was facing prior to going ahead with the RTS. In this context, the Bank had, in 2004, held extensive discussions on the performance of NTA in a multi-operator environment and recommended that NTA institute processes to improve its regulatory functions. In this regard, NTA had agreed that a performance audit would be undertaken in order to assess its performance and identify key bottlenecks that hamper its performance. The audit was to provide important recommendations, whose implementation would help the institutional strengthening and functioning of NTA. The Bank proposed a specialized training and capacity building programme for the NTA staff to address the “enormous need to build capacity within NTA”. In the interim, the discussions also highlighted the need for NTA to hire individual consultants to serve as short term regulatory advisors to address immediate and important issues.

However even in mid-late 2005 the situation at NTA remained essentially the same, with serious lack of capacity and as discussed earlier, interviews with its Chairman and senior officers revealed that NTA is severely understaffed and ill-equipped for its proper functioning. The regulator’s capacity to take decisions free from the influence of MOIC;<sup>41</sup> revise staff remuneration to attract the right kind of people for the unenviable job of dealing with the powerful incumbent and even the relatively easy task of filling the senior and middle management positions that remain vacant have not happened. Even the fifth member of NTA board without whom obtaining a quorum for meetings was difficult, that lead to delays in the decision making process, was only appointed in August 2005.

In this background it is not surprising that the TRE in Nepal with respect to the five dimensions of market access; access to scarce resources; interconnection; tariff regulation and regulation of anti-competitive practices continues to be weak. Without a doubt this situation is clearly jeopardizing the entire RTS project in the EDR.

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<sup>41</sup> Chairman of NTC is the Secretary to the MOIC. This is a clear conflict of interest.



## 7. Sustainability

With the incentives offered to the licensee in terms of the subsidy; low license, renewal and frequency fee; exemption of RTDF fee for five years; along with the authority to operate domestic long distance and international long distance services, the operation of the RTS project in the Eastern Development Region of Nepal should be theoretically sustainable.

However, as described thus far, it is quite clear that unless significant changes are undertaken in the implementation of the project, its sustainability might be threatened.

The overall sustainability of the project is dependent upon a number of factors; but the bottom line is that the operation has to be viable in at least the medium term. While it is true that some of the problems that are threatening the sustainability of the RTS are extraneous to the project per se, and also unexpected at the time the project was conceived and implemented, there are others that could have been done differently. However, there are a number of steps that the NTA and STM could possibly take even now to make a difference in the direction the project is headed.

### *Politico-security climate*

As discussed at length in earlier sections, the combined politico-security environment within which the RTN operator has to operate is overwhelmingly difficult. All PCOs were shut down for a number of months since early 2005, and even towards the end of the year, a majority were still not permitted to be put back in to operation. A large number of PCOs may have to be relocated and or new locations would be allocated for the remaining obligations. However it is not clear when these new sites would be made available for installation, and moreover, whether these sites would in fact be reasonable alternatives to the original list on which the licensee bid for the LCS and the RTS license. A disturbing trend is that these alternate PCO locations are being unilaterally ordered to be established within ½ km of military camps, most of which already have NTC service coverage rendering the higher cost per call STM service useless.

In this background, STM seem to be more interested in installing the equipment it has already imported (lying in customs office attracting demurrage) and collecting the subsidy rather than considering steps to ensure sustainability of the project.<sup>42</sup> However, it is only natural that STM behaves in this manner when their business plan has perhaps become meaningless with such drastic and unexpected changes even before it was able to consolidate in the region.

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<sup>42</sup> In the latest discussions with the NTA and the Bank late 2005, STM has been given the authority to install a minimum of 2 to a maximum of 8 PCOs in the new list of VDCs. Whether 8 VDCs can be sustained in a VDC is a serious question.



While the deteriorating security situation in Nepal which is not in the control of either HMG, NTA or STM and does not augur well for the sustainability or even the full implementation of the RTS project, the only silver lining is that STM is optimistic that once the security situation returns to normal and the licensee starts ISD services and hopefully a more conducive TE, they would still be able to bounce back in to a comfortable position.<sup>43</sup>

### ***Regulatory regime***

Previous research on similar projects elsewhere in the world have converged in its unambiguous finding that a favourable telecommunications regulatory regime is crucial to the successful implementation and sustainability of smart subsidy programmes such as the one under discussion here. However, if the politico-security climate is bad in Nepal, then the regulatory regime seem to be even worse.

This is the real challenge for the NTA and the Bank; to make quick and comprehensive changes in the TRE so that the project's downward direction could be turned around.

The paper discussed at length in the previous sections numerous regulatory issues that are not favourable in terms of creating viability for the project. Key among these is the interconnection regime where the RTS operator has to pay extremely high interconnection rates to the incumbent to terminate on to the incumbents network. In this context the new interconnection ruling is very positive.

However, the more important issue is the absence of a cost-based asymmetric interconnection regime. The literature is clear in identifying an asymmetric interconnection regime where the rural operator (STM in this case) is offered a much higher amount than urban operators to reflect the higher cost of operating the service and the lower level of income generated by outgoing calls. The objective is to provide a revenue stream from incoming calls to the RTN.

Therefore, unless this interconnection problem is solved in a more meaningful manner with added incentives to STM in terms of cost-reflective asymmetry, it is highly unlikely that STM would be able to sustain the operation over the longer term. This is borne out by the meagre revenue figures that STM is reporting for its network, particularly under the trying security climate where a majority of its PCO locations have been forced to shut down.

Another issue is the granting of the ISD license to STM, which has been pending for a long period of time. Given that carrying ISD calls on its own gateway seem to be the *only short term revenue generator* for STM under the present tight situation, NTA delaying

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<sup>43</sup> Discussions with General Manager STM.



this action, notwithstanding the many requests by the Bank to expedite the matter is a blow to the project's sustainability.<sup>44</sup>

STM was granted a 5 year exclusivity to operate its network in the identified 542 VDCs in the EDR. However, NTC has continued to violate this exclusivity condition and moved in to areas identified for STM and provide lower cost calls using cheaper technology and more favourable internal interconnection mechanisms. Unless NTA immediately brings an end this violation, sustainability of STM's RTN would be seriously challenged.

The license condition calls for STM's PCO locations to be open for 8 hours a day and provide services at a pre-specified level of quality, however, it is reported that a number of locations do not provide the specified service timings nor the specified quality. While the independent technical consultant provides a quarterly report to the NTA and Bank on the service quality, the consultants own view is that it is increasingly difficult to continue the monitoring under the deteriorating security climate, thus making it difficult to obtain a clear picture of the exact position on the ground.

Yet another looming issue is the ongoing plan of NTC in expanding its network with CDMA technology. Legally NTC can not penetrate in the VDCs where STM has its PCOs, but it will be practically very difficult to stop NTC's CDMA customers from using the service; both technically and politically. This would obviously weigh heavily in the sustainability of the RTN.

While these are among the major issues NTA would need to address on an urgent basis, there are a number of other issues that also need to be solved to ensure sustainability of the RTN project.

### ***Business plan***

NTA and the Bank did not require a specific business plan from bidders for evaluation since the selection process was a LCS auction where only the requested subsidy amount was the deciding factor as opposed to a "beauty contest" where the evaluation panel would have had to consider the various business plans. Whoever requested the lowest bid was to get the subsidy and the license.

However it is implied that when STM bid USD 11.87 million as the required subsidy for the EDR license they would have calculated the discounted stream of cash flows over the 25 year licence period and arrived at a positive net present value. In preparing the business plan and in arriving at the net present value calculation, STM would have

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<sup>44</sup> The Bank has confirmed that NTA finally issued an IDD license to STM in November 2005 for a payment (terms not available) of USD 750,000; similar to NTC and UTL.



made a number of assumptions. The question then is how accurate these assumptions were at the time of making them, and how accurate they are at the present. One of the success factors for the Latin American projects had been accurate demand analysis based on comprehensive market research; which was made available to the bidders. In the case of Nepal, such detailed research and analysis does not seem to have been performed.<sup>45</sup>

Therefore, it is possible that STM's demand analysis that is obviously at the core of its business plan might be inaccurate. If that is in fact the case, it will almost be impossible to meet the projections that would be necessary to meet the cash flows expected in the business plan without which sustaining the project would become questionable. The operator data indicated that the average use per PCO during August 2005 was less than one minute per day.

However, the view of the NTA and the Bank is that according to the STM business plan there were aware that STM would be posing losses for the first two years, but these losses would turn to profits thereafter.<sup>46</sup>

### *Technology bias*

Another salient features in Nepal as well as in some of the other Latin American countries is the possible conflict arising out of the direct relationship between the operator and rural telecommunications technology suppliers. There is ample evidence to show that had the technology been cheaper to implement than the VSAT only solution on ground, it would have possible to expand the services inside the non-conflict areas in the EDR. But, in preparing the business plan, it is likely that creating the biggest possible market for VSAT equipment would have played a considerably significant role and thus, a more optimal solution overlooked.

Nevertheless, it must be noted that the expert opinion is that VSAT technology is the only alternative in the high mountains in the Northern border and sustaining those locations would not be difficult with the significant tourist traffic in those areas.<sup>47</sup>

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<sup>45</sup> However Bank had engaged its own Consultants to do undertake background work in the area.

<sup>46</sup> This is in contrast to the VSAT operations of NTC. According to discussions with Head of the Rural Telecommunication Directorate of NTC, they have installed 378 locations using 160 VSAT terminals with an average revenue per station per month (based on the study of 9 months in 2005) of NPR 21,000, many time higher than that of STM and that of NTC's national average (FY 2003/04) of NPR 1,000. It must be noted that some of these VSAT terminals have been installed to substitute for city exchanges that have been damaged by the Maoist insurgents.



Even now, it is possible to consider enhancing the technology with an integrated VSAT/WLL solution to serve the new locations being provided to the licensee. The logic is that the new locations may not necessarily be as remote as the ones originally envisaged and the possibility to connect a greater number of locations (homes, businesses) would be possible with such an integrated technology.<sup>48</sup>

### *Management issues*

The literature refers to the ability of the licensee having a proper marketing structure to effectively expand the number of connections beyond the obligated PCOs as well as to market additional services, including Internet and other data communications services.

While it does appear that STM has a marketing savvy management team it is not so clear if their model of selecting “franchisees” or PCO operators is the most optimal and also whether the incentive structure offered to them; paying NPR 35,000 deposit and having to make advance payments of NPR 7,500 creates sufficient motivation for them to sustain the operation under severe constraints.

This issue is further complicated due to the fact that STM’s experience in actually operating telecommunications services is very limited.

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<sup>47</sup> However, STM’s VSAT operates on the Ku band and the quality of the signal during the rainy season in these areas (due to the technical difficulties of operating Ku band in the rain) is yet to be evaluated.

<sup>48</sup> See Annex 4 for details on technology





## 8. Concluding comments

The question postulated at the beginning of the paper was what conditions had to be met in order to make smart subsidies work to bridge the access gap in telecommunication services in rural areas. Nepal's Eastern Development Region project was the case under study.

The paper started with an introduction to smart subsidies and why such programmes were useful in bridging the access gap. Thereafter a summary of the literature with respect to success factors and challenges to such projects were presented. The paper then described the design of the Nepali project along with the expectations from each of the significant components. The outcome of the LCS auction and the implementation was the next topic of discussion. Finally, issues relating to the project's sustainability were highlighted.

While it is true that the smart subsidy project has been able to provide some rural communities with telecommunications services they had never experienced prior to the project, the real question is whether the solution is optimal and whether the project could be sustained in the medium to long term. The answer is not straight forward.

The findings throughout the paper converge to the point that unless the right regulatory conditions are in place; particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of incumbent's anti-competitive practices, success of RTS providers who are empowered by smart subsidies, would not succeed. In other words, the findings suggest that the smart subsidy project in Eastern Development Region of Nepal may fail unless the prevailing regulatory framework of the Nepal Telecommunications Authority is made more conducive for STM Telecom Sanchar; the RTS operator.

This conclusion leads to revisiting the wisdom of separating the "access gap" and the "market efficiency gap" in the literature, particularly in terms of sequencing smart subsidy projects and market liberalization programmes. The findings indicate that perhaps it would be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory-subsidy angle instead of separate solutions for the discrete two-gap problem.

Besides the crucial conclusion that smart subsidy projects could fail without a favourable telecommunications regulatory environment, another important conclusion is that such projects should have built-in mechanisms for dynamic mid-course corrections.



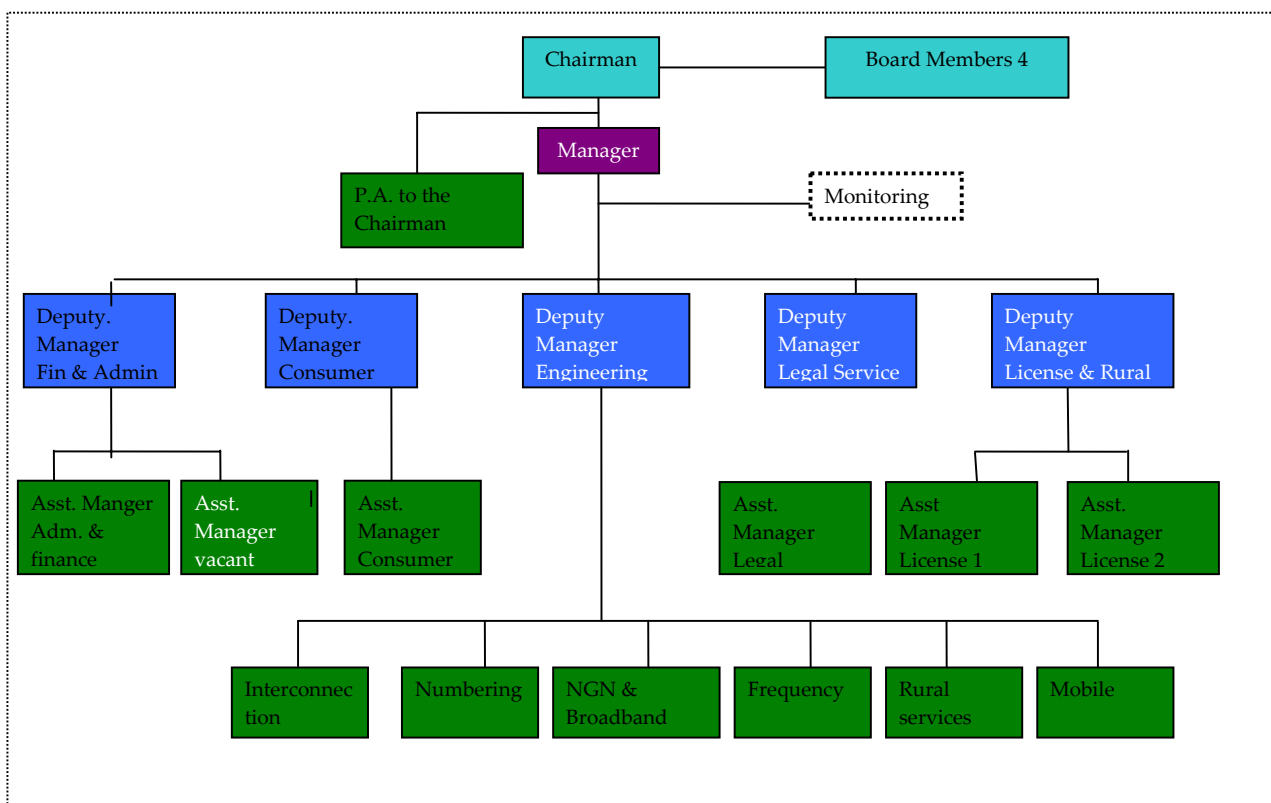


The case of Nepal highlights this point very well where an unexpected security problem has caused havoc in the implementation and sustainability in the already weak project threatening the very existence of the smart subsidy project.

Recent action by NTA, at the strong insistence of the Bank, particularly with the new interconnection ruling and the awarding of the ISD licence are perhaps the most positive steps taken to change the downward direction of the project thus far. It is hoped that such action be commended and the NTA encouraged continuing its good work towards creating a more favourable TRE which would ultimately decide the fate of this USD 11.87 million project to provide telecommunication services to the rural population of the Eastern Development Region of Nepal.



## Annex 1: Organizational Chart of Nepal Telecommunications Authority



*Officer-level posts only. Vacant posts are shown in white letters.*



## Annex 2: Minimum Service Quality Criteria

Description of Criteria	On Date of Activation	During the Term of Licence
Call Completion Rates		
Local (on Licensee's network only)	92.0%	95.0%
Local (also using NTC or other network)	96.0%	97.5%
Long-distance (on Licensee's network only)	85.0%	90.0%
Long-distance (also using NTC or other network)	92.5%	95.0%
Fault Rate per RTS line per annum		50
Fault Clearance Rates		
Less than 48 hours		60%
Less than 5 calendar days		85%
Less than 30 calendar days		99%

Source: RFA



### Annex 3: RTS Maximum Tariffs and Default Interconnection Rates

<b>Rural Telecoms Service (RTS):</b>	<b>Intra RTS Call</b> originated & terminated on RTS system	<b>Outbound STD Call</b> originated on RTS and terminated on NTC <sup>(2)</sup>	<b>Outbound ISD Call</b> originated on RTS and transited by NTC <sup>(2)</sup>	<b>Inbound STD or ISD Call</b> originated on NTC or other network, terminated on RTS	<b>ISD</b> originated on RTS system after Jan. 1, 2004 – and not inter-connected with NTC
<b>Basic RTS Consumer Tariff</b> <sup>(1) (4)</sup>	<b>9.0 NRs</b> (USD <b>0.117</b> )	<b>9.0 NRs</b> (USD <b>0.117</b> )	Prevailing NTC ISD Rates, including surcharge rates (e.g. 30/60 NRs per minute) as per the NTC Tariff (see Annex 13 to RFA for RTS)	0 (zero)	Maximum prevailing NTC ISD tariff
<b>Supplementary RTS Consumer Tariff</b> <sup>(4)</sup>	0 (zero)	Equal to the corresponding NTC STD termination charge as per G.I. <sup>(5)</sup>		0 (zero)	Maximum NTC surcharge rates
<b>Interconnection (termination) Charge payable by RTS to NTC</b> <sup>(2)</sup>	N/A	The corresponding NTC STD termination charge as per G.I. <sup>(5)</sup>	NTC's prevailing ISD tariff minus 25% of the collection rate as per Cl. 9.4.3(a) of the G.I. <sup>(6)</sup>	N/A	N/A
<b>Interconnection (termination) Charge Payable to RTS</b> <sup>(3)</sup>	N/A	N/A	N/A	Same as interconnection (termination) charges payable to NTC (under GI or future rules).	N/A
<b>Notes:</b> <sup>(1)</sup> All tariffs are in rates per minute, unless otherwise indicated. <sup>(2)</sup> Paid to NTC or other operator, unless different rate is mutually agreed. <sup>(3)</sup> Payable by NTC or other operator, unless different rate mutually agreed. <sup>(4)</sup> Tariffs to be subject to price cap indexing after 2004 in accordance with Tariff Guidelines. <sup>(5)</sup> Termination charges prescribed in Guidelines on Interconnection (G.I.). N/A means 'Not Applicable'					

Source: Annex 17 to RFA for RTS



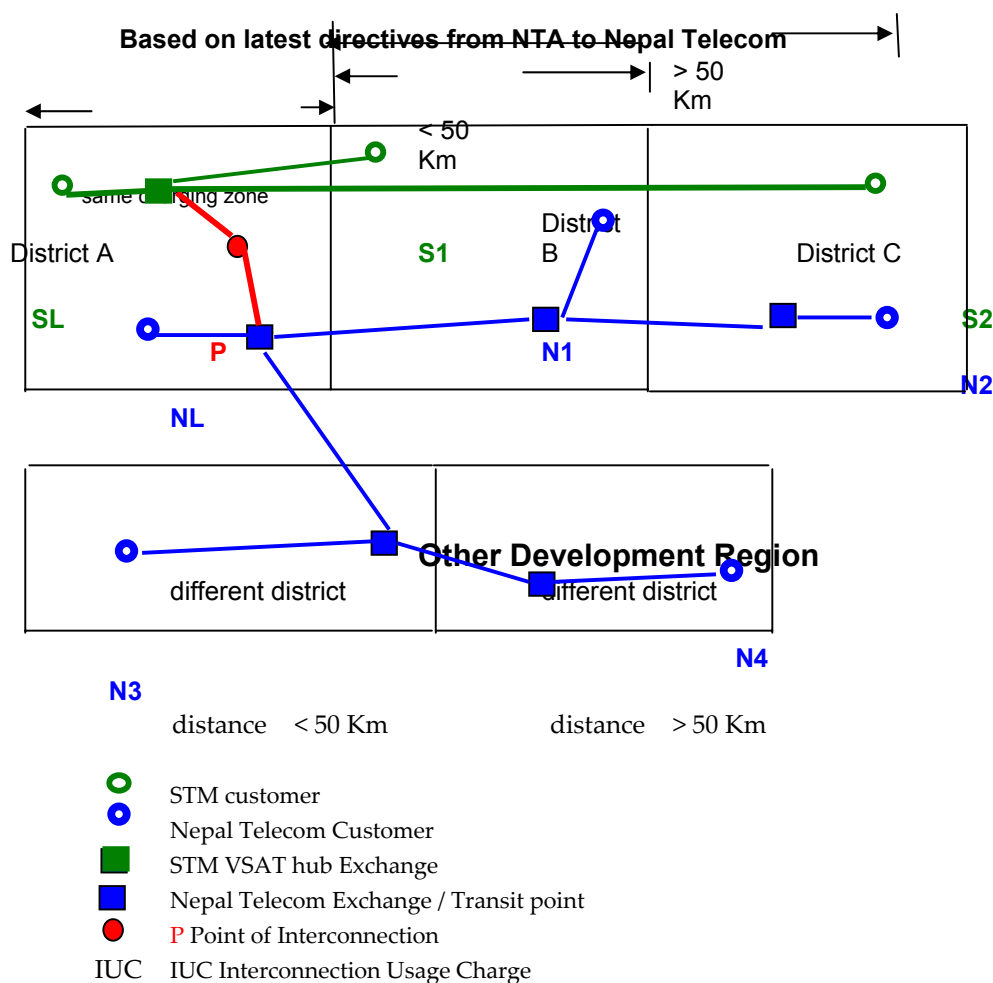
#### Annex 4: Technology Cost Guidelines

Technology	Density/ Application	Geography/ Distance from telephone exchange	Cost range per line including accessories
<i>Cable</i> direct from urban switch	High and clustered (suburban communities)	Max 5 to 10 km radius	\$250 - \$1,000
<i>Rural exchange</i> or concentrator with wire network	Low/medium and clustered (small town or large village with good affordability)	As above, may serve clusters (e.g., 100 subscribers) located more than 10km from nearest exchange	\$1,000 - \$2,000 including trunk system and building
<i>Fixed cellular and wireless</i>	Medium/high not clustered	Medium area (<30 km radius per cell)	\$500 - \$1,500 heavily dependent on users per cell
<i>Multi-access radio</i>	Low but clustered (e.g., more than 5 users per location)	Wide area (radius of several hundred km)	\$1,000 - \$5,000 varies widely with terrain and clustering
<i>VHF/UHF single links</i>	Low, no clustering and no satellite alternative	Medium-long distance (> 25km)	\$10,000+
<i>Satellite VSAT (stand alone)</i>	Low, but most economic with some clustering (e.g., justifying 2-3 lines)	Very large area, long distance (> 200 km)	\$3,000 - \$8,000 plus \$0.05 – 0.10/min 'space segment'
<i>Integrated VSAT/WLL</i>	Low, but serving larger distant communities or clusters (typically 10 to 50 lines in vicinity)	Larger area, but economic at shorter distances (e.g., 100 km)	\$1,500 - \$3,000 plus \$0.05 – 0.10/min 'space segment'
<i>Mobile satellite (MSAT and LEOs)</i>	Low, with no clustering	Very large area and long distances	\$1,000 - \$3,000 plus \$0.50/min 'space segment')

Source: The World Bank Discussion Paper, No. 432.

## Annex 5: Details of New Interconnection Guidelines

### Interconnection Illustration (Eastern Development Region)



- Case 1.** Call from NL to SL and vice versa - Local call " \*Sender Keep all" - Symmetric IUC charge  
Neither Telecom nor STM need to pay the other party  
Same is the case when N1 calls to S1, or N2 calls to S2, or S1 calls to N1, or S2 calls to N2  
(because the calls are within the same district)
- Case 2** Call from NL to S1 "Distant End Handover" - Nepal Telecom pays NPR 1.0 to STM  
Call from NL to S2 " \*Distant End Handover" - Nepal Telecom pays NPR 3.15 to STM  
  
Call from SL to N1 " \*Distant End Handover" - STM pays NPR 1.0 to Nepal Telecom  
Call from SL to N2 " \*Distant End Handover" - STM pays NPR 3.15 to Nepal Telecom
- Case 3** Call from S1 to NL " \*Near End Handover" -STM pays NPR 0.60 to Nepal Telecom  
Call from S2 to NL " \*Near End Handover" - STM pays NPR 0.60 to Nepal Telecom  
  
Call from N1 to SL " \*Near End Handover" - Nepal Telecom pays NPR 0.60 to STM  
Call from N2 to SL " \*Near End Handover" - Nepal Telecom pays NPR 0.60 to STM



- Case 4** BUT in case of call to and from other Development Regions
- Call from **SL** to **N4** " \*Distant End Handover" - STM pays NPR 3.15 to Nepal Telecom (distance is > 50 Km)
  - a 1
  - Call from **SL** to **N3** " \*Distant End Handover" - STM pays NPR 1.0 to Nepal Telecom (distance is <50 Km)
  - a 2
  - Call from **N3** or **N4** to **SL** " \*Near End Handover" - Nepal Telecom pays NPR 0.60 to STM (because the call is handed over near the STM Point of interconnection)
  - b



## **Annex 6: List of persons met**

### ***Nepal Telecommunications Authority***

1. Mr. Suresh Kumar Pudasaini, Chairman
2. Mr. Kumar Prasad Sharma, Deputy Manager, Customer Services
3. Mr. Ambar Sthapit, Asst. Manager, Technical
4. Mr. Kailash Nath Neupane, Asst. Manager, Legal
5. Mr. Surendra Lal Hada, Asst. Manager, Rural Services
6. Mr. Raghubar Lal Shrestha, Consultant, Planetnetworks Consulting Corporation (for The World Bank)

### ***Nepal Telecom Corporation***

1. Mr. Sugat Ratna Kansakar, Managing Director
2. Mr. Rupak Haldar, Deputy Managing Director, Planning and Business
3. Mrs. Laxmi Kanta Shrestha, Director, Rural Services Directorate
4. Mr. Surendra Prasad Thike, Manager Business

### ***STM Telecom Sanchar Pvt. Ltd.***

1. Mr. Vijai Vir Singh, General Manager
2. Mr. Sisir Pradhan, Manager
3. Mr. Sunil Jakibanja, Controller
4. Mr. Shiva Prasad Adhikari Manager Commercial & Warehouse, Biratnagar
5. Mr. Sudarshan Raj Ghimire, Associate Manager, Technical, Biratnagar





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