

# Smart Subsidies – Getting the Conditions Right: The experience of expanding rural telecoms in Nepal

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## 1. Introduction

This chapter investigates conditions that make smart subsidies successful in bridging access gaps in rural telecom services using Nepal's Eastern Development Region project as a case study. The study finds that while smart subsidies can be used to initiate the provision of services to rural communities, the real question is whether such services can be sustained in the medium to long term. The findings converge upon the point that unless certain regulatory conditions are in place, particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of incumbent's anti-competitive practices, the success of rural telecom service providers who are empowered by smart subsidies will be questionable.

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

From a policy perspective, the findings of this study lead to probing the wisdom of separating the market efficiency gap and the access gap in terms of sequencing market liberalisation programs and smart subsidy projects. The findings indicate that it might be more useful to consider addressing rural connectivity issues from an integrated and continuous regulatory subsidy angle instead of separate solutions for the distinct gap problems.

## 2. Background

In most countries, supply of telephony has traditionally been skewed towards the urban affluent as opposed to the rural poor. The literature dichotomises this urban/rural gap using a market efficiency gap and access gap concept.<sup>1</sup> The market efficiency gap is the difference between what markets actually achieve under existing conditions and what they could achieve if market barriers were removed. This gap can be bridged via 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 requires intervention in the form of subsidies to encourage services providers to enter these areas.

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 efficiency gap significantly prior to starting on bridging the access gap. Given that it is theoretically true that liberalisation and competition within an efficient regulatory regime would successfully bridge the market efficiency gap, how long should policymakers wait before implementing access gap policies? What if very little liberalisation has taken place? It must be noted that in the pre-liberalisation era, during which time monopoly operators had the opportunity to cross-subsidise less profitable rural service provision with more profitable

urban services, some degree of bridging access gaps did take place, particularly with the building of backbone, albeit for their own use during a later competitive regime. However, in every country, the bulk of this gap remained at the time liberalisation occurred.

In addition to policy and regulatory complexities, there are 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 density of the settlements; income levels and distribution among the population.

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

Once a subsidy policy is designed and developed to bridge the access gap, in pursuit of 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); licence fees and spectrum auctions; operator revenue contribution and interconnection levies, such as access deficit charges.

The final act is to distribute the funds to bridge the access deficit through a well-defined program. In the case of this chapter, the program is referred to as a smart subsidy program. Smart subsidies refer to 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 compar-

ative 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 rather than giving a significant degree of discretion to the tender board evaluating the bids.

### 3. Rationale for least cost subsidy (LCS) auctions in Nepal

This section intends to shed some light on the conditions under which smart subsidy programs to bridge the access gap in rural telephone services could be successfully implemented. We take Nepal as a case study because it is the first such project in Asia.<sup>2</sup>

#### 3.1 Geography: Rough terrain

Nepal is a least developed Asian country measuring 147,181 square kilometres. The major part of the country consists of high mountains and rolling hills, which account for 83% of the land area. The flat land, or Terai, occupies the remaining 17%.

#### 3.2 Population: Rural and poor

Nepal’s population is approximately 25 million. Of this number, 87% live in rural areas. Only 57% of Nepalese are literate and per capita income is just USD 260 (2004). In terms of access to public utilities, a mere 17% have access to electricity and this drops to 5% in rural areas.

#### 3.3 Administration: Complex and unstable

Nepal is a multiparty parliamentary democracy within the framework of a constitutional monarchy for which 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, Nepal has 3,914 VDCs and 58 Municipalities.

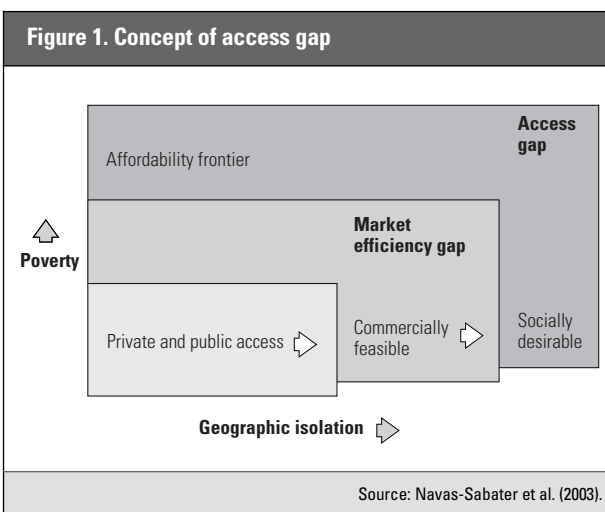
#### 3.4 Telecom network development in Nepal

##### 3.4.1 History: Long

Telecoms 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 100 lines was commissioned in 1950 but sector development started in earnest in 1969.<sup>3</sup>

##### 3.4.2 Present status: Unsatisfactory

Nepal, a least developed country, faces enormous socio-economic problems that 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 telecom.

Nepal's fixed teledensity is a mere two telephones per 100 persons (NTA 2005). The waiting list exceeds the number of telephones available. The breakdown of service provision is shown in Table 1.

Whatever growth took place since 1969 occurred through the incumbent operator. However, the penetration of telecom facilities was not geographically uniform. 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 teledensity is only 0.2 per 100 persons.

Table 2 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>4</sup>

### 3.4.3 Competition in the sector

With a view to accelerate development of telecom 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 liberalise the sector by introducing private participation via the Telecommunication Act of 1997. One year later, in 1998, the Nepal Telecommunications Authority was established.

### 3.4.4 Nepal Telecommunications Authority (NTA)

Nepal Telecommunications Authority (NTA) is an autonomous regulatory body created for the "development of telecommunication services in the country." In addition, it is charged with assisting the Ministry of Information and Communications (MOIC) in the formulation of telecommunication policy, preparation of legislation and formulation of rules and regulations for the execution and implementation of such policy. In

order to meet the increasing demand for services through private participation, NTA has identified a number of aims:

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.<sup>5</sup>

Data for growth figures of telecom services, however, do not indicate the successful outcomes of the functions performed by NTA. To understand the internal functioning of NTA, which is most important for implementation and sustainability of the Nepal smart subsidy project, it is imperative to examine its structure, cadre and functioning.

NTA consists of a Board of Directors appointed by HMG for a period of five years and eligible for reappointment for a second term. The Board is responsible for general policy and supervision; and a management team is responsible for day-to-day 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. Although the Board has provision for five members, it only achieved this number in August 2005.<sup>6</sup> Besides the Chairman, the management cadre consists of a Manager and five Deputy Managers. However, since inception, the Manager post has been vacant and of the five Deputy Managers, three posts remain unfilled. Interviews with the Chairman and senior officers revealed that NTA severely lacks professional capacity and is ill-equipped for its duties. See organisation structure in Annex 1.

### 3.4.5 NTA strategy for providing telecom in rural and remote rural areas

In light of rapid development in telecom technology, increasing market demand and dynamic changes taking place in the telecom structure, albeit relatively slowly compared to the region, Nepal's Telecommunication Policy 1999 was revised in January 2004 and a new policy was announced. The para-

**Table 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.

**Table 2. Technology used by NTC to serve VDCs in Nepal**

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 2004/2005.	

mount 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 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, arrangements shall be made in a manner that the telecommunication service shall be available within the shouting distance in the inhabited areas” and “arrangements shall be made for having 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.”
- Liberalisation 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 particulars of reform taken place in the telecommunication sector and about the opportunity available in this sector also.”
- Commercialisation of 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.”

### 3.4.6 Telecom 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 telecom 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 VDCs by the end of the tenth five-year plan (2002-2007), the outcome at the end of the ninth was only 1,711 VDCs.

### 3.4.7 Access gap: Service providers have not gone to rural areas

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

In addition to supply constraints increasing costs, the general perception among operators is that people in these areas would not be able to afford the cost of calls and therefore rev-

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 between the first and second subsidy tender.

enue generation would be unsustainably low.<sup>7</sup> The demand side of the equation is thus constrained by:

- Sparse, uneven and scattered population distribution
  - difficulty in generating break-even 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, hence unaffordable

Further aggravating the situation is the present crisis in Nepal due to the Maoist insurgency that has either completely destroyed or damaged a number of telecom installations in rural areas. Given this background, service providers are even more reluctant to extend the network into these areas.

### 3.4.8 Rural Telecommunications Development Fund

Given the background of sector reform being undertaken to liberalise the market and bridge the market efficiency gap, NTA 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% 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

In context of the failure of the incumbent, NTC, to bridge the access gap in rural areas of Nepal within a reasonable time-frame, and hardly any activity by the private operators in addressing the issue, discussions began between HMG through the NTA and the World Bank to consider alternate mechanisms to service these areas. Based on extensive discussions, *inter alia* taking into consideration that private investments in Nepal were dismally low due to the unfavourable conditions prevailing in the country, it was decided to select one administrative region and implement a private sector led regional telecom services (RTS) program through the provision of a possible subsidy, as a pilot.<sup>8</sup>

The Eastern Development Region (EDR) was selected as the licence area where the eventually successful licensee would be responsible for rolling-out the RTS. Given that the RTDF was not yet in operation, the World Bank agreed to provide funds for implementing 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 World 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 auction process.

## 4.1 Design and implementation

The salient features of the licence design and implementation plan developed jointly by NTA, their consultants and the World Bank and contained in the Request for Application (RFA) are as follows.<sup>9</sup>

### 4.2 Design

#### 4.2.1 Licence area

The coverage area was specified as 534 VDCs in the Eastern Development Region (out of a total of 893 VDCs) with a rural population of four million. Geographically, the coverage area included extremely remote VDCs in the mountainous areas in the northern Himalayas (Mount Everest is situated in the EDR), remote VDCs in rolling hills in central Nepal, 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 rich in agriculture as well as the remote but rich tourist areas along the Mount Everest trail. It also contained a number of very poor and extremely remote areas.

#### 4.2.2 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 RTS in the identified VDCs for a period of five years after the licence was issued. The logic for the five-year exclusivity seem to lie in the view that the five-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 noted that if the licensee failed to fulfil the identified roll-out requirements, the NTA could, at any time, authorise NTC to provide RTS in any of the identified VDCs that remained without service.

#### 4.2.3 Technology and network roll-out 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) located in different wards of each VDC.

In terms of technology to be used, NTA and the World 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 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% of the VDCs listed being served within nine months of the effective date of the licence and 100% served within 18 months. For the pur-

pose of these roll-out 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 the licensee's failure to meet the network roll-out requirements 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.

In designing the project, however, NTA and the World Bank took into 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 roll-out delay resulted solely from an event of *force majeure*. In that event, the RFA stated that NTA would be prepared to modify the locations.

#### 4.2.4 Scope of service

The RFA specified that the eventual licensee would need to provide *basic public telephone service* consisting of 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 authorised to provide additional individual or public telephone access services, whether residential or commercial, in any location in the EDR.

In addition to mandatory services, Internet access, email, voice mail, fax, audio conferencing, prepaid calling card services and data communication services were also authorised in all of the identified 534 VDCs at any time, as well as the entire Eastern Development Region, once roll-out obligations were met.

#### 4.2.5 Domestic long distance services (STD)

The design entailed a provision that prior to 1 January 2004, the licensee could 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 the domestic long distance carriage facilities of NTC. However, this restriction was to be relaxed from 1 January 2004 when the licensee would have the right to obtain a separate non-exclusive licence to provide STD services provided it met the necessary requirements as specified by NTA for all STD service licences.<sup>10</sup>

#### 4.2.6 International telecoms services (ISD)

As in the case of STD, the licensee was restricted to use of the international gateway and other international traffic carriage facilities of NTC until 1 January 2004. Thereafter, upon application, the RFA clearly states that the licensee has the right to obtain a national licence to provide ISD services 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 under the same conditions as the NTC licence fee.<sup>11</sup>

#### 4.2.7 Service quality and availability obligations

The design included a service quality segment obligating the eventual licensee to meet standard minimum quality and availability of service (see Appendix 2).

In addition to quality criteria, the licensee was also bound by a number of service availability criteria. The key availability criteria stipulated that each PCO be open and 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 a minimum of eight 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, sufficient to provide a minimum of four hours total of actual local, STD or ISD calling services within the eight hours it is open daily.

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

### 4.3 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 telecom operators and potential new entrants function is the telecom regulatory environment (TRE). The obvious logic is that as the TRE becomes more favourable, the market efficiency gap will narrow.

The World Dialogue on Regulation for Network Economies (WDR) and LIRNEasia research on the relationship between TRE and private investments in telecom (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 for attracting private investment and sustaining reinvestment in telecom in several developing country economies to bridge the market efficiency gap (see Samarajiva and Dokeniya 2005). 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 and the World 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 World Bank undertook a number of precautionary measures.

The following sections consider these measures in relation to the TRE methodology developed by LIRNEasia (documented in Samarajiva and Dokeniya 2005). The five dimensions of this methodology are market access, access to scarce resources, interconnection, tariff regulation, and regulation of anti-competitive practices. The following assessment is not a comprehensive TRE analysis but merely the use of the five TRE dimensions to provide clarity of discussion.

#### 4.3.1 Market access

Market access was guaranteed through a licence. One RTS licence 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 RTS in 534 VDCs was set at ten years. However, the licensee would enjoy exclusive service provision in the first five years. Thereafter the license would become renewable for five-year terms for the duration of a 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 ten years. The successful applicant was expected to pay this licence fee in full at the time of issuing the licence. The renewal fee for each additional five-year licence term was set at 4% of the eventual licensee's gross annual revenues for 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% of gross annual revenues for each fiscal year to NTA who would then pass it on 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% 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 did not foresee consenting to any such change during the first five years of a licensee's operations.

### 4.4 Access to scarce resources

#### 4.4.1 Frequency

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

MOIC and NTA were expected to coordinate radio frequency allocation to the licensee for the selected technology and in accordance with applicable frequency management practices and international obligations. The RFA noted that the eventu-

al 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.

#### 4.4.2 Right of access

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

#### 4.4.3 Interconnection

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

The main objective of the Nepali Interconnection Guideline is to ensure that any customer of a particular telecom network can communicate with any other customer in another telecom network efficiently and without unnecessary impediments. The guideline is expected to ensure healthy competition by safeguarding against abuse of market power by the incumbent. The guideline also provides for the 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. Only if the parties are unable to resolve the issue and request the NTA's intervention, will the NTA intervene to resolve the interconnection issue. If the NTA is unable to bring the two operators to 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% of NTC's own VSAT tariff as the interconnection payment by the licensee to the incumbent.<sup>12</sup>

#### 4.4.4 Tariff regulation

The tariff rates charged by the eventual licensee to its customers for use of the regional telecom services were to be subjected to regulation by the NTA in accordance with the Telecom Act. Except with prior approval from NTA, the eventual licensee was not authorised to charge tariffs higher than those set out in the table entitled RTS Maximum Tariffs and Default Interconnection Rates in the RFA (see Annex 3).

This tariff was announced in the RFA as NPR 9.00 per minute for intra RTS calls (originating and terminating on the RTS system) as well as outbound calls (originating on RTS and transiting via NTC).

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

However, the design called for the maximum tariffs to be subject to price cap indexing after 2004, based on a formula to be developed by NTA.<sup>13</sup>

#### 4.4.5 Regulation of anti-competitive practices

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

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

#### 4.5 Eligibility and qualifications

It appears that the design of the LCS auction by the NTA and consultants to the World Bank intended to maximise the number of potential players that would become eligible to bid in the auction for the RTS licence as the eligibility conditions did not appear 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% equity;
- Must satisfy the NTA with regards to financing capacity for completing roll-out of the network in accordance with the terms of the Licence;
- Must provide clear evidence of operating either a telecom network with over 250,000 subscribers, or a telecom 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; and
- Must furnish a Bid Security of USD 100,000.

#### 4.6 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 stated, “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>14</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 bidders concentrating on 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>15</sup>

- the first tranche of 40% once the International Development Association (IDA) receives written confirmation from the NTA that 534 access lines have been activated and are in operation;
- the second tranche of 40% once IDA receives written confirmation from NTA that 1,068 access lines have been activated and are in operation;
- the third tranche of 10% 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% 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 World 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 the *force majeure*.

The obvious question that arises is that of sustainability. What would happen if the eventual RTS licensee abandoned the operation in the event that the RT operation became unprofitable after the subsidy had been received for just two years of a 25-year licence period? This issue is addressed later in the chapter.

## 5. Nepal LCS auction outcome

Given the design and implementation plan for the RTS subsidy using a least cost subsidy auction, as discussed earlier, NTA commenced the bidding process for the RTS license following intensive dialogue with the World Bank.

This was the second attempt of the LCS auction. The first attempt was in September 2000, for which 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. Against this backdrop, HMG and the World Bank undertook a total review of the program and weighed the options of suspending the project versus improving the attractiveness of the offer by including conditions to mitigate the country risk and enhance financial attractiveness. Finally, NTA and the World Bank decided to go with the second option.

Prior to the formal bidding process, NTA and the World Bank made the draft RFA publicly available for review and consultation 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>16</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% subsidy payments were to be made as soon as the lines were activated in 20% of VDCs, even if that occurred before six months.
2. If the licensed service utilised VSAT technology, 20% of the total subsidy was to be paid upon activating the VSAT network hub station, which had to be based in Nepal. The rest of the payment schedule would be 20% of the subsidy upon activation of lines to 20% of VDCs; another 50% of the subsidy upon activation of 50% of the VDCs (for a cumulative total of 70%); and a further 20% (total of 90%) upon activation of all lines. The last 10% was to be paid at the end of 24 months after 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 could approve a list of alternative locations within which PCOs could be installed.

The locations on this list would generally be equally remote to those locations where the PCOs could not be installed. If PCOs were activated in accordance with the alternative PCO locations, there would 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>17</sup> Incumbent NTC was not allowed to bid.<sup>18</sup>

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

### 5.1 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% share.
Licence issue date:	21 November 2003
Roll-out completion date as per licence:	16 June 2005
Licence validity:	Ten years extendable by five years up to 25 years.
Subsidy amount:	USD 11,865,000
Total number of PCOs 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 Kathmandu hub station began in early March and was certified on 29 April 2004. The hub station at Biratnagar and installation of 20% of locations was commissioned on 26 August 2004. 541 PCOs in 271 VDCs (50% milestone) was commissioned on 14 January 2005. As of October 2005, 70% of the contract amount had been disbursed.
Districts covered:	10 out of 16.
Number of PCOs currently in operation:	197; mostly in the Terai region. 341 locations closed down under orders from HMG.
Installation monitoring, evaluation and certification by:	Planetworks Consulting Corporation, Canada

### 6. Nepal Smart Subsidy: Design and implementation issues

Nepal is undergoing a serious security problem with Maoist rebels having been waging an armed campaign against the state since 1996, during which time some 11,500 Nepalese have been killed. It is not uncommon for hartals to shut down entire cities and villages, and explosions 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 was, calculated in the bid submitted by STM. Risk premiums that have to be borne in terms of additional costs would certainly have been included. Although the Maoists created problems during the initial stages of roll-out of the RTS network, progress was very much on schedule until mid-January 2005, when 542 PCOs in 271 VDCs were completed.

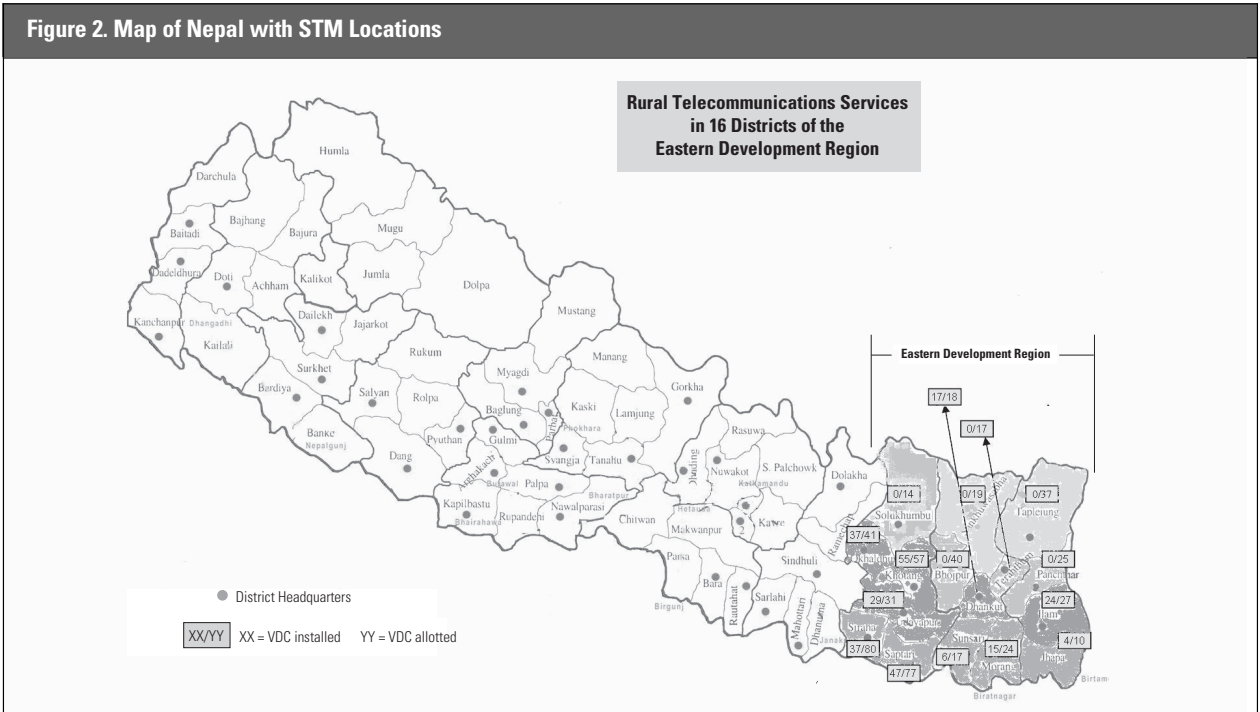
However, the conflict took a different turn when His Majesty assumed direct rule and took over executive powers on 1 February 2005. The king sacked the Prime Minister, dismissed his government and declared a state of emergency. With this state of emergency, HMG ordered STM to shut down all 542 PCO locations.<sup>19</sup> Subsequently, HMG permitted STM to reopen 25 out of the 542 locations and by end of August 2005, 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 was not interested in relocating these PCOs 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 program and provided a list of 177 new locations. However, these new locations had been determined by the army without 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 of the logic for selection of VDCs and why certain VDCs should be left out and others brought in.

From the perspective of successful implementation 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 World Bank – needed to have factored in the unpredictable nature of the situation in Nepal.

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



## 6.1 Design and implementation

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

While some quarters, including NTA and the World 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 given that consultants to the World Bank are said to have approached more than 100 potential international entities with the RTS opportunity and reported that there appeared to be “sufficient interest from serious bidders to run an auction.”<sup>20</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. Thus from a purely economic 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, this might have been reviewed further.

### 6.1.1 Licence region and exclusivity

It was the failure of the incumbent, NTC, to address the rural areas of Nepal within a reasonable timeframe that led to carving out the EDR as the licence area with 534 VDCs within which STM was responsible for rolling out its network. In line with this logic, NTA guaranteed exclusivity to STM for the first five years – no new service provider was to be given a licence to provide service, nor was NTC allowed to provide any service in these 534 VDCs. Besides the incumbent’s history of failure, 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 sustaining more than one service provider.

However, our research revealed that from the date of selection of STM via the LCS auction until the time our research ended (November 2005), NTC had extended its services to more than 100 of the 534 VDCs exclusively earmarked for the STM. This serious violation was not only against the licence conditions, but also against the spirit of the entire telecom policy.

In fact, neither NTA nor the World Bank were initially unaware of this. The World 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. The World Bank mission 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 five years. Based on this finding, the World Bank and HMG 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 did not provide services in the RTS operator’s

exclusive service area. They 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 agreed that MOIC would provide NTA with blanket approval to change the VDCs on the list by end October 2004.<sup>21</sup>

The unauthorised entry of NTC into the exclusive areas earmarked for STM was a clear violation of the licence condition. However, even after numerous complaints from STM and reminders from the World Bank to stick to the agreed rules of the game, NTA failed to stop this continuing gross abuse. Therefore, from the perspective of ensuring a favourable TRE in terms of market access and regulation of anti-competitive practices for the smooth implementation of the RTS 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, especially since the VDCs where these violations have taken place are not economically capable of sustaining more than one operator.

Adding to already complex issues is the matter of the CDMA license issued to NTC. The incumbent is planning to install one million lines over 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 hills region VDCs which would result in telephone services at a much lower tariff than the existing STM tariffs.<sup>22</sup> Be that as it may, the general view is that the CDMA roll-out has been talked about for a number of years without any activity on the ground.<sup>23</sup> If and when the CDMA roll-out takes place the challenge for STM to operate their VSAT PCOs will become much more difficult.

### 6.1.2 Technology and network roll-out requirements

The RFA was technology-neutral to the extent that it allowed applicants to choose “any appropriate wireless or wire-line technologies in the provision of the RTS Services.” In terms of network roll-out, the RFA gave STM freedom to prioritise the VDCs in a manner that was most suitable to them. The RFA simply mentioned that 50% of the VDCs were to be covered within nine months and completed within 18 months. NTA and the World Bank did not require any order in which the VDCs or districts should be covered.

The outcome of the above two conditions was that STM proposed a VSAT solution, upon which it was selected as the lowest subsidy bidder and began roll-out with the easiest, or most accessible VDCs at the beginning, leaving the difficult ones for later.<sup>24</sup> This logic is quite straightforward 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>25</sup>

In terms 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 ease of installation and quick deployment is concerned, VSAT technology appears to have been the most suitable technology in the extremely difficult to access mountainous areas of EDR, and perhaps even for some of the more difficult to access areas in the hills where transportation is an immense hurdle. This is borne out in the fact that in just over a year STM completed the installation and commissioned RTS in 542 sites in 271 VDCs. These installations, however, were concentrated in ten out of the 16 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 their obligation of installing and operating all 1,068 PCOs in all the 534 VDCs in due time.

The problem, however, is that given the slowing down of the roll-out due to a variety of reasons, most of them beyond the control of STM, STM is unable to maintain the network on a profitable basis. In this circumstance, the issue is whether using an integrated solution, with 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>26</sup>

STM is adamant that prior to proposing VSAT technology they studied in detail the existing 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 of twice of 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 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 operations 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 with additional VSAT terminals needed for new locations beyond this perimeter. Given the average cost of at least USD 11,000 per VSAT terminal (obtained by simply dividing the USD 11.87 million subsidy by 1,068 locations) the expert view is 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 the unsafe areas, they are unable to expand the service within the safe areas due to high per line costs.<sup>27</sup> Had STM used an integrated WLL and VSAT technology it might have had a greater chance of reducing the project cost and opportunity to expand within safe VDCs.<sup>28</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, perhaps if some priority areas had been indicated, not necessarily in terms of particular VDCs, but in terms of difficulty of access or districts within the EDR, it might have been possible to achieve a more balanced roll-out.

Another criticism levelled at the design of the RTS and thus the technological solutions proposed by the bidders is whether sufficient information on EDR along with any demand forecasts were provided to potential bidders by NTA. The argument is that if such were available, bidders would be more prudent in proposing appropriate technology. NTA and the World Bank take the position that the input from their rural economic consultants (not those who helped design the RTS) based upon extensive groundwork 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 to 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.

	Nepal Telecom			STM Telecom Sanchar				Per capita income (USD)	Total phones in VDC
	Allotted	Installed	% of NT share	Allotted	% of STM share	Installed	% Installed		
Mountains	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		240.0	733

Source: NTA and other local sources.

It is interesting to note that NTA revealed that they did not undertake any survey to estimate potential demand for RTS in the EDR prior to preparing the RFA and bidders may have over estimated revenue, thereby influencing the decision for more expensive technology.

## 6.2 Scope of service

### 6.2.1 Mandatory services

STM was required by licence conditions to provide basic public telephone service consisting of local, domestic long distance (STD) and international long distance (ISD). 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, Canadian based PlanetWorks Consultants, had to certify that incoming and outgoing local, STD and ISD calls could be obtained from STM's PCO locations. At the time of authorising payments these certifications were duly obtained.

However, our research indicates that there are ongoing complaints about it not always being possible to complete a call between STM and NTC, indicating technical interconnection issues. The World Bank mission in October 2004 underlined this issue in noting that the mission was unable to call the STM network from NTC's mobile network. The mission recommended that NTA take immediate action to address these problems.

PlanetWorks also identified a number of interconnection problems that STM was facing. Having deliberated this unsatisfactory state of affairs with the World Bank, NTA agreed to take several steps to correct the situation. It agreed to hold regular meetings with STM and NTC to ensure resolution of technical interconnection issues in a timely manner, and to identify free-of-charge emergency numbers to be allocated to STM for programming into its facilities to meet its mandatory obligation for free emergency dialling.

More than a year since these agreements were entered into, the incumbent NTC has continued to muscle its way through disregarding commitments made to NTA and the World Bank. NTA has been unable to satisfactorily mediate between NTC and STM to solve these issues. From the perspective 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 to end continuing anti-competitive practices by the incumbent.<sup>29</sup>

### 6.2.2 Additional services

In many backward VDCs on the list of 534, economic activity is sufficiently low to not venture beyond providing more than the mandated two PCOs. However, there are a number of VDCs where it is economically feasible to offer many more than two PCO connections and other value-added services such as Internet and email access, data communication and fax services, etc. In addition, evidence suggests that there are many

VDCs that are not on the STM list that could be served with one or many lines.

In a positive move to relax the rather stringent licence condition of restricting service provision outside of the identified 534 VDCs, the World Bank in October 2004 recommended that NTA, in consultation with STM, amend sections of the licence to allow STM to provide optional services to meet new demand outside of the listed VDCs. The World 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 appears to have not shown much interest in providing either more than the two mandatory lines or additional services in any significant number of VDCs either on the list or beyond. It is possible that part of the reason for this is the VSAT technology they deployed, for which adding terminals is expensive and without subsidies it is unlikely that STM is convinced of sustaining more lines.

On the other hand, given that provision of value-added services within the existing PCOs incurs 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.

### 6.2.3 ISD licence

Another serious issue concerns STM's ISD licence. By licence condition, STM was restricted to using the NTC international gateway and other NTC international traffic carriage facilities until 1 January 2004. 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 World Bank on numerous occasions requested that NTA comply with the licence condition of providing STM with an ISD licence. STM, during discussions with the authors of this chapter, 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 relief in terms of an extended payment plan for the licence 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 appears that NTA was only interested in sticking to the rules, notwithstanding the outcome.

#### 6.2.4 Service quality and service availability

Besides standard quality criteria, STM was also bound by a number of service availability criteria. The key availability criteria was that each PCO be open and available for local, STD and ISD calls during reasonable daytime and afternoon hours, totalling a minimum of eight 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 be sufficient to provide a minimum of four hours total of actual calling services within the eight hours of daily operation.

The monitoring of service quality and service availability is something that our research found to be wanting. STM is required to provide monthly reports and PlanetWorks quarterly reports. PlanetWorks consultants noted the difficulty of fulfilling the requirements due particularly to security issues and the remoteness of sites. The World Bank has underlined that even under difficulty, these reports are required to be submitted on time.

During our field visit to one of the sites at Bhaudaha in the Morang district, STM's PCO was closed. We were informed that this was because it was a government holiday. Interviews with the local people revealed that the service quality and maintenance were 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 that is when people set out 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 neither serves their purpose, nor the licence condition that the PCO be open for a minimum period of eight hours per 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 office hours. It would have been much better had the PCO operated from a private house or business where it would have been much more easily accessible to the villagers outside of office hours.

Discussions with PlanetWorks indicated a number of technical issues that needed to be resolved to make service quality monitoring more efficient. Amongst 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 World Bank on more than one occasion.

Another relevant point is whether STM was prudent in the selection of 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 partner selection process could have been done in a way that would have generated better results. It appears that the normal practice is for a representative of STM to visit a village, shortlist a few potential candidates and subsequently 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 required them to deposit NPR 35,000, which would be refunded in three

years (with a forfeit of NPR 15,000 if discontinued in one year, NPR 10,000 forfeited if discontinued after two years, etc.). Once the right to operate a PCO was obtained, the applicants had to make advance payments (prepaid cards) of NPR 7,500 through banks, which in some cases are two or three days' walk from the VDC. Discussions revealed that many of these PCO operators were in dire financial difficulty due to the fact that the PCOs were either non-operational or provided a very meagre income.

#### 6.2.5 Interconnection and tariffs

The literature is 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 new entrants, particularly new rural operators. Because of significant externalities generated from incoming traffic towards rural networks, as well as different incremental operating costs between urban and rural networks, well thoughtout cost-based interconnection is 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, NTA has failed on crucial issues related to interconnection and tariff regulation and thereby created a TRE that is uncondusive to the continued implementation of the project, let alone its sustainability.

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 above, 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, prior to actual award of the licence to STM, was eventually agreed upon between STM and NTC as 55% 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. Calls originating on NTC's network and terminating on the STM licensee's network were to receive NPR 0.30 paid by NTC to STM.

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

When STM actually started rolling out, the reality was that a local call originating and terminating on its own network or terminating on NTC cost NPR 9.00 per minute. This was in contrast to NPR 1.00 for two 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 seven of the 464 VDCs it covered in the EDR). Having realised 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 six times NTC rates) and reduced STD to NPR 5.00 per minute with an operational profit of only NPR 0.25 per minute.

After numerous rounds of lobbying and directives by NTA under pressure from the World Bank, NTC finally reduced the interconnection rate charged to 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 noted above. In addition, STM reported serious congestion on the lines and this fact has even been reported by a World Bank mission 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 – and received a positive reply on this. NTC insisted that they could interconnect STM along the same lines as UTL (the fixed WLL operator), which meant STM paying for 16 E1 lines despite the requirement being for a single E1 line. Furthermore, NTC had objected to providing interconnection at two locations (Kathmandu and Biratnagar) even though the licence 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 World Bank, STM identified this issue as a show-stopper and requested the World Bank to help sort out this issue.

The independent certification consultant had identified a number of interconnection problems that STM was facing. Based on discussions between NTA, STM and NTC, the regulator had agreed that NTA would immediately mediate between STM and NTC to negotiate a fairer interconnection and revenue sharing agreement, and hold regular meetings with STM and NTC to ensure resolution of technical interconnection issues 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 resolve problems faced by STM and NTC. But, things dragged on.

A decision that warrants some attention is why NTA and the consultants to the World Bank agreed to the maximum rates proposed in the RFA (NPR 9.00 per minute) as reasonable.<sup>30</sup> The consultants had noted that since neither they nor 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 observed that the problem was going to arise with NTC's reaction to interconnection. To deal with this impending issue, they 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 a 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 six times that of NTC) it was reported by STM that during July-August 2005, the average daily use across the 174 operational sites was only 0.36 minutes per day.

Given that problems faced by STM were multiplying due to the deteriorating security situation and with 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.

Subsequent to research for this chapter being completed, NTA reported that on 18 October 2005, it issued a directive to operators on the new interconnection rates. This new regime has a number of very positive features for 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 50 kilometres; and calls between the EDR and other regions of Nepal will attract a much higher interconnection charge on STM than on NTC.

The gist of the new interconnection rules are:

1. Sender keeps all for all local calls. This is a dramatic change from the previous arrangement of STM paying 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 or district.
2. Identical interconnection charges for calls between districts but within the EDR and 'distant-end handover'. Here STM gets NPR 1.0 per minute from NTC for terminating a call if the STM customer is not in the same district as the NTC customer but within 50 kilometres. The amount increases to NPR 3.15 if the distance is over 50 kilometres. However, if the termination is on a 'near-end handover' basis the amount drops to NPR 0.60 for both parties.

For calls between the EDR and other regions of Nepal, the structure is different and not much help to STM. In this case, if an NTC call from any other region besides EDR is terminated on STM's network in EDR, STM gets NPR 0.60 per minute, but if it is the other way around, that is, an 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 kilometre rule. 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.

### 6.2.6 Why not an asymmetric interconnection agreement?

The real question is why did the NTA and the World 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 revenue yield through such innovative mechanisms.

### 6.3 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 current complexities threatening completion of implementation and sustenance of the program is the weak TRE in which the 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 World 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 hampering its performance. The audit was to provide important recommendations, and their implementation would help the institutional strengthening and functioning of NTA. The World Bank proposed a specialised training and capacity building program for NTA staff to address the “enormous need to build capacity within NTA.” In the interim, 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 by late 2005 the situation at NTA remained essentially the same, with a serious lack of capacity. Interviews with the chairman and senior officers revealed that NTA was severely understaffed and ill equipped for proper functioning. The regulator’s capacity to make decisions free from the influence of MOIC,<sup>31</sup> revise staff remuneration to attract suitable 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 remaining vacant have not happened. Even the fifth member of the NTA board was only appointed in August 2005 – without whom obtaining a quorum for meetings was difficult, leading to delays in the decision-making process.

With 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 jeopardising the entire RTS project in the EDR.

## 7. Sustainability

With the incentives offered to the licensee in terms of the subsidy, low licence renewal and frequency fees, and exemption from RTDF fees 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. 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 threatening sustainability of the RTS are extraneous to the project per se, and were also unexpected at the time the project was conceived and implemented, there are others that could have been handled differently. There are a number of steps that NTA and STM could take even now to alter the current direction of the project.

### 7.1 Politico-security climate

As discussed at length in earlier sections, the combined politico-security environment within which the rural telecom network (RTN) operator has to operate is overwhelmingly difficult. All PCOs were shut down for a number of months beginning in early 2005, and even towards the end of the year, a majority were still not permitted to enter back into operation. A large number of PCOs may have to be relocated and/or new locations allocated for the remaining obligations. A disturbing trend is that these alternate PCO locations are being unilaterally ordered to be established within a half kilometre of military camps, most of which already have NTC service coverage rendering the higher cost per call of STM service useless.

STM appears to be more interested in installing the equipment it has already imported (lying in customs offices attracting demurrage) and collecting the subsidy rather than considering steps to ensure sustainability of the project.<sup>32</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.

While the deteriorating security situation in Nepal, which is beyond the control of HMG, NTA and STM, 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 in hopefully a more conducive environment, they would still be able to bounce back to a comfortable position.<sup>33</sup>

### 7.2 Regulatory regime

Previous research on similar projects elsewhere in the world have converged in their unambiguous findings that a

favourable telecom regulatory regime is crucial to the successful implementation and sustainability of a smart subsidy program such as the one under discussion here. However, if the politico-security climate is bad in Nepal, then the regulatory regime appears to be even worse.

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

This chapter has discussed at length in the previous sections numerous regulatory issues that are not favourable for ensuring viability for the project. Key among these is the interconnection regime for which the RTS operator has to pay extremely high interconnection rates to the incumbent to terminate on the incumbent's 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 in which 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.

Unless this interconnection problem is resolved in a more meaningful manner with added incentives for STM in terms of cost-reflective asymmetry, it is highly unlikely that STM will 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 appears to be the only short-term revenue generator for STM in the current situation, NTA delaying this action, despite the many requests by the World Bank to expedite the matter, is a blow to the project's sustainability.<sup>34</sup>

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

The licence condition calls for STM's PCO locations to be open daily for eight hours and to provide services at a pre-specified level of quality. However, it is reported that a number of locations provide neither the specified service hours nor the specified quality. While the independent technical consultant provides a quarterly report to the NTA and World Bank on the service quality, the consultant's own view is that it is increasingly difficult to continue the monitoring under the deteriorat-

ing security climate, thus making it difficult to obtain a clear picture of the exact position on the ground.

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

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

### 7.3 Business plan

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

However, when STM bid USD 11.87 million as the required subsidy for the EDR licence it was implicit that 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 arriving at the net present value calculation, STM would have made a number of assumptions. The question then is how accurate these assumptions were at the time of their making, and how accurate they are in the present. One of the success factors for similar projects elsewhere had been accurate demand analysis based on comprehensive market research made available to the bidders. In the case of Nepal, such detailed research and analysis does not seem to have been performed.<sup>35</sup>

It is possible that STM's demand analysis, obviously at the core of its business plan, may be inaccurate. If that is in fact the case, it will be almost impossible to meet the projections 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.

The view of NTA and the World Bank is that according to the STM business plan they were aware that STM would be posing losses for the first two years, but these losses would turn to profits thereafter.<sup>36</sup>

### 7.4 Technology bias

Another salient feature in Nepal, as well as in some countries where such LCS auctions have been held previously, is the possible conflict arising out of the direct relationship between the operator and rural telecom technology suppliers. There is ample evidence to show that had the technology been cheaper to implement than the VSAT-only solution, it would have been possible to expand the services inside the non-conflict areas in the EDR. In preparing the business plan it is likely that creating

the biggest possible market for VSAT equipment would have played a significant role and thus more optimal solutions were overlooked.

The expert opinion, however, was that VSAT technology was the only alternative for the high mountains of the northern border and sustaining those locations would not be difficult with the significant tourist traffic in those areas.<sup>37</sup>

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>38</sup>

### 7.5 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 appears that STM has a marketing savvy management team, it is not so clear whether their model of selecting franchisees or PCO operators is the most optimal and also whether the incentive structure offered to them – payment of a NPR 35,000 deposit and 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 telecom services is very limited.

## 8. Concluding comments

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

While it is true that the smart subsidy project has been able to provide some rural communities with telecom services they did not have access to 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 straightforward.

The findings throughout the chapter converge on the point that unless the right regulatory conditions are in place, particularly with respect to cost-based asymmetric interconnection agreements and effective regulation of the incumbent's anti-competitive practices, the success of RTS providers who are empowered by smart subsidies, will be threatened. In other words, the findings suggest that the smart subsidy project in the Eastern Development Region of Nepal may fail unless the prevailing regulatory framework of the Nepal Telecommunica-

tions 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 liberalisation programs. 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 telecom 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, with unexpected security problems having caused havoc in the implementation and sustainability of the already weak project, threatening the very existence of the smart subsidy initiative.

Recent action by NTA, at the strong insistence of the World 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 will be commended and the NTA encouraged to continue 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.

## Notes

<sup>1</sup> The conceptual framework of the two-gap dichotomy is developed in Navas-Sabater et al. (2003). There are others who refer to the same dichotomy in terms of a ‘regulatory gap’ and an ‘affordability gap’.

<sup>2</sup> Although India has completed a number of LCS auctions for operators with existing licences, it was Nepal that first actually used an LCS auction to provide a licence for a new operator to enter the market.

<sup>3</sup> USAID provided USD 1.7 million.

<sup>4</sup> Since 1991, and the beginning of the multiparty system, representatives in Parliament from remote areas began demanding telecom facilities in their constituencies. Since it was not possible to install fixed 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 on a large scale only after 2001 (Source: NTA).

<sup>5</sup> See: <<http://www.nta.gov.np/index.html>>.

<sup>6</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 three members including the Chairman.

<sup>7</sup> See Samarajiva and Zainudeen (2005).

<sup>8</sup> Dividing the country into three regions based on terrain – mountains, hills and terai – was also considered. The key advantage would have been the possibility to use different technologies in the three geographically different regions. However, that was abandoned in favor of the administrative regions.

<sup>9</sup> The consultants to the World Bank were from the Canadian consultancy firm, McCarthy Tetrault Inc.

<sup>10</sup> NTC’s STD licence fee for ten years was NPR 35,000,000 (approximately USD 437,500).

<sup>11</sup> NTC’s ISD licence fee for ten years was NPR 62,500,000 (approximately USD 781,250).

<sup>12</sup> NTC’s VSAT tariff is an internal rate set by itself for its own VSAT network, which constituted just seven of the 1,711 VDCs it covered in all of Nepal.

<sup>13</sup> The Telecommunication Policy 1999 states that NTC shall complete the phased 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, thus far, has not rebalanced its tariff and the NTA is still studying the introduction of a price cap regime.

<sup>14</sup> The RFA was not clear on how the selection would be made in the event of there being more than one identical lowest bid.

<sup>15</sup> A somewhat revised plan was actually implemented, discussed further in the chapter.

<sup>16</sup> Aide memoire of supervision mission, January 2003; pre-bid conference, April 2003.

<sup>17</sup> TCIL from India.

<sup>18</sup> In some of the Latin American projects, 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 chapter.

<sup>19</sup> Not only STM, but rather all telecom facilities were completely interrupted for seven days. Internet services were also shut down for seven days. Mobile phone operations were suspended for three months and even then only select post-paid connections were reconnected. Prepaid connections were activated only after five months. At the time of our research, private FM radio stations were prevented from airing news and newspapers were prohibited from publishing news deemed to be anti-state or reporting anything about the Maoist insurgency.

<sup>20</sup> Internal World Bank documents.

<sup>21</sup> This blanket approval was granted to NTA by MOIC to ensure their responsiveness.

<sup>22</sup> STM tariff structure is discussed later in the paper.

<sup>23</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 ruling will be delivered in February 2006.

<sup>24</sup> The STM license was granted 21 November 2003, roll-out of 50% of VDCs completed by 14 January 2005.

<sup>25</sup> STM Telecom Sanchar Inc. is a consortium consisting of (a) STM Communication Services Inc., US, (b) STM Network Inc., US, (c) SAMART Communication Service Co. Ltd., Thailand, and (d) Apollo Investment Private Limited, Nepal.

<sup>26</sup> See Annex 4 for a summary of technology cost guidelines.

<sup>27</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 remote and inaccessible areas. In fact 416 PCO locations i.e., 39% of RTS areas are in the flat land or Terai region. By way of 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>28</sup> This 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% of the remaining stations, i.e. 65 stations, are covered using WLL technology, locations with an integrated technology would result 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	11,11	288,6	6,521,570	6,810,170

<sup>29</sup> A detailed discussion on interconnection pricing is covered further below.

<sup>30</sup> Internal World Bank documents.

<sup>31</sup> The NTC Chairman is also the Secretary to the MOIC. This is a clear conflict of interest.

<sup>32</sup> In the latest discussions with the NTA and the World Bank in late 2005, STM has been given the authority to install a minimum of two to a maxi-

mum of eight PCOs in the new list of VDCs. Whether eight PCOs can be sustained in a VDC is a serious question.

<sup>33</sup> Discussions with the General Manager of STM.

<sup>34</sup> The World Bank has confirmed that NTA finally issued an IDD licence to STM in November 2005 for a payment (terms not available) of USD 750,000, similar to NTC and UTL.

<sup>35</sup> However, the World Bank had engaged its own consultants to undertake background work in the area.

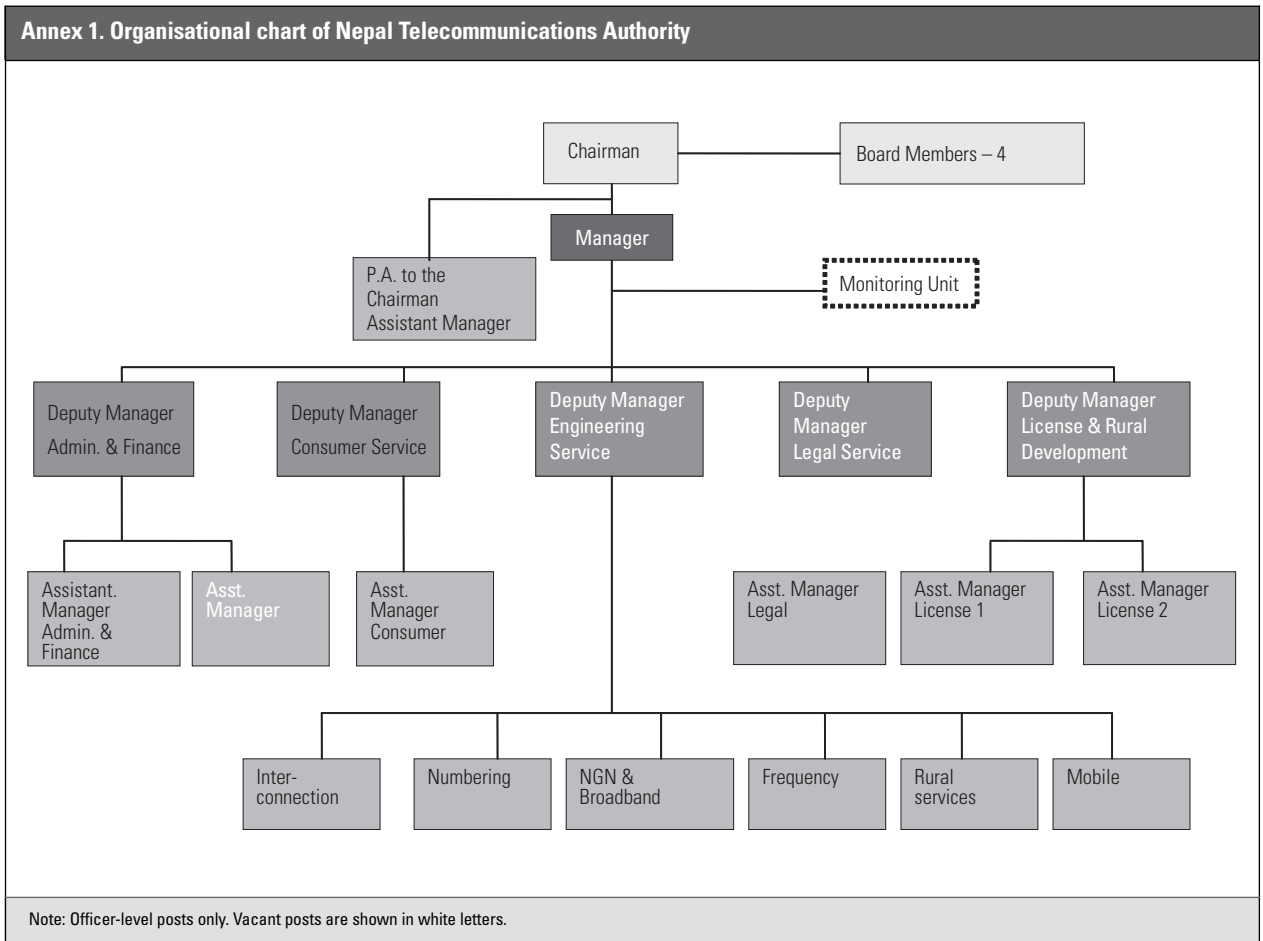
<sup>36</sup> This is in contrast to the VSAT operations of NTC. According to discussions with the head of the Rural Telecommunication Directorate of NTC, they have installed 378 locations using 160 VSAT terminals with an average revenue per station per month (based on the study of nine months in 2005) of NPR 21,000, many times higher than that of STM and that of NTC's national average (Financial Year 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.

<sup>37</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>38</sup> See Annex 4 for details on technology.

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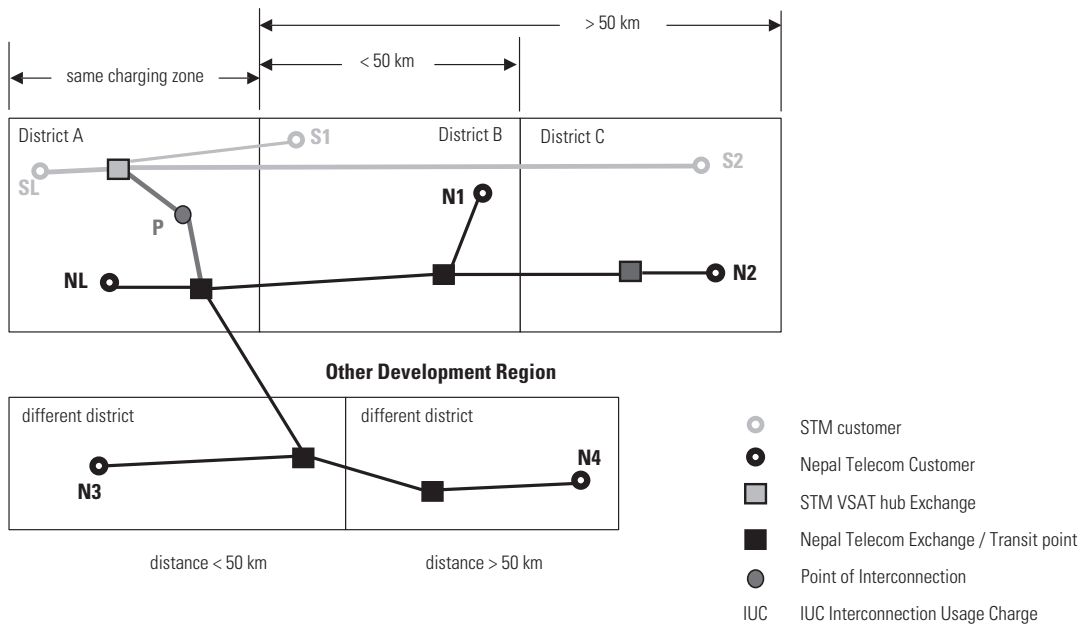
**Annex 2. Minimum service quality criteria**

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%

Annex 3. RTS maximum tariffs and default interconnection rates					
Rural Telecoms Service (RTS)	Intra RTS Call originated & terminated on RTS system	Outbound STD Call originated on RTS and terminated on NTC <sup>2</sup>	Outbound ISD Call originated on RTS and transited by NTC <sup>2</sup>	Inbound STD or ISD Call originated on NTC or other network, terminated on RTS	ISD originated on RTS system after Jan. 1, 2004 – and not inter-connected with NTC
<b>Basic RTS Consumer Tariff</b> <sup>1,4</sup>	9.0 NPR (USD 0.117)	9.0 NPR (USD 0.117)	Prevailing NTC ISD Rates including surcharge rates (e.g. 30/60 NPR 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.	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
Notes: <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 is 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. N/A means 'Not Applicable'			Source: Annex 17 to Request for Applications for RTS.		

Annex 4. Technology cost guidelines			
Technology	Density/ Application	Geography/ Distance from telephone exchange	Cost range per line including accessories in USD
<b>Cable</b> direct from urban switch	High and clustered (suburban communities)	Max 5 to 10 km radius	250 - 1,000
<b>Rural exchange</b> 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 10 km from nearest exchange	1,000 - 2,000 including trunk system and building
<b>Fixed cellular and wireless</b>	Medium/high not clustered	Medium area (<30 km radius per cell)	500 - 1,500 heavily dependent on users per cell
<b>Multi-access radio</b>	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
<b>VHF/UHF single links</b>	Low, no clustering and no satellite alternative	Medium-long distance (> 25km)	10,000+
<b>Satellite VSAT (stand alone)</b>	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'
<b>Integrated VSAT/WLL</b>	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'
<b>Mobile satellite (MSAT and LEOs)</b>	Low, with no clustering	Very large area and long distances	\$1,000 - \$3,000 plus \$0.50/min 'space segment'
Source: Navas-Sabater et al. (2003).			

**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 needs to pay the other party  
Same as for 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
  - a1 Call from **SL** to **N4** "Distant End Handover" - STM pays NPR 3.15 to Nepal Telecom (distance is > 50 km)
  - a2 Call from **SL** to **N3** "Distant End Handover" - STM pays NPR 1.0 to Nepal Telecom (distance is <50 km)
  - b 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)

**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 Halder, 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