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MODEL UNIVERSAL SERVICE/ACCESS

POLICIES, REGULATIONS AND PROCEDURES

PART II: MINIMUM SUBSIDY COMPETITIVE AUCTION MECHANISMS FOR FUNDING PUBLIC TELECOMMUNICATIONS ACCESS IN RURAL AREAS AND TARIFF/INTERCONNECTION REGULATION FOR THE PROMOTION OF UNIVERSAL SERVICE/ACCESS

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Table of Contents

1. Introduction

Part II of the model describes a set of processes and procedures for applying Universal Service Fund (USF) financing to construct and operate new public access telecommunications facilities in rural areas in developing and least developed countries, based on a minimum subsidy competitive auction. While Part II of the model specifically discusses the deployment of public payphones in rural areas, other types of infrastructure, service delivery modalities and services, including, public call offices, franchise public phones, telecentres providing basic and advanced services (including Internet) may also be constructed and operated based on USF financing through minimum subsidy competitive auctions. This document also analyses and provides recommendations regarding applicable consumer tariff and interconnection regimes.

This document seeks to bring together apparent "Best Practices" (or "promising practices") for each of the various processes and procedures based primarily on experiences in a number of Latin American countries including Chile, Colombia and Peru. These countries have enjoyed considerable success in employing minimum subsidy competitive auctions to fund deployment of public payphones and advanced telecommunications in rural areas. This document is based on extensive research into and experience with a range of such processes and procedures in developing and least developed countries around the world. Appendix 1 of this document provides a summary of the applicable processes and results for some of the first developing countries to hold these types of minimum subsidy auctions.

Section 2 describes how an USF Administrator would design, develop and implement a multi-year Programme to finance the construction and operation of public access telecommunications facilities in designated rural areas. The USF Administrator should also define a set of designated mandatory services, which the selected operator will be required to provide as a condition of receiving the subsidy. The subsidy is provided by the USF.

Section 3 describes the processes and procedures of how the USF Administrator solicits bids, selects the operator and provides the applicable subsidy from the USF based on a competitive international bidding process. This process is based on and is initiated by the request for proposal document issued by the USF Administrator. Appendix 2 provides the indicative contents of a sample request for proposal. The request for proposal will include, *inter alia*, a specification of the actual projects that are being auctioned, the maximum subsidy amount available and other required information.

Section 4 analyses and provides recommendations related to consumer tariffs and interconnection charges that are applicable to the provision of the designated mandatory services. This analysis includes a discussion of the economics of rural telecommunications networks and a review of whether the applicable consumer tariffs and interconnection charges should be regulated. Appendix 3 includes a detailed discussion of illustrative benchmark consumer tariffs and interconnection charges, including in a table format.

2. Development of Projects

This section reviews and discusses the principal steps that the USF Administrator will have to undertake to design, develop and implement the actual public access telecommunications projects that will be financed by the USF. This includes the determination of the geographical scope of the projects, the mandatory and optional services to be provided by the projects and the calculation of the maximum subsidy available for each project.

Part I of this model discusses the procedures for determining funding allocations from the USF and identifies four categories of project definition: basic telephone services, advanced telecommunications and information services, economic development and small business support and public service institution information and communication support. The annual or biannual Operating Plan established by the USF Administrator sets out the approximate allocations from the USF to each of the main four categories of projects. Part II covers the first category of projects – the construction and operation of new public access telecommunications facilities in rural areas to provide basic telecommunications services. The remaining categories of projects are addressed in Parts I and III of this model.

The USF Administrator should establish its annual or biannual Operating Plan based on a longer term, multi-year programme for each of the main four categories of projects. The rest of this Section describes the principal steps that the USF Administrator will have to undertake to design, develop and implement its multi-year programme for projects to provide public access to basic telecommunications services in rural areas. For this document we designate this as the Public Access to Basic Telecommunications In Rural Areas Programme or "Programme".

2.1 Programme Design

The design and implementation of the Programme is a complex undertaking that requires considerable planning and analytical capacity. A number of policy, regulatory, social, financial and economic variables have to be taken into account in the design of the Programme. Nevertheless, the USF Administrator has to design a Programme in order to implement its projects in a co-ordinated, effective and efficient manner.

Clearly, the Programme has to be designed taking into account the government's universal service and universal a access policy. Depending on the specificity and the level of detail of that policy, the USF Administrator may have no, some or considerable discretion in the definition of the key "macro-level" parameters of the Programme.

Before the USF Administrator is able to begin to design the Programme, it must first carry out a diagnostic of the current and likely future state of universal service and universal access. This diagnostic must include data gathering, research, estimates and analysis of the following:

- Supply-Side Factors

    - **Actual Network Coverage.** This analysis should be comprehensive and should include all networks and technologies that may be used to provide the mandatory services. This aspect has a number of dimensions. For instance, in terms of fixed or mobile networks, geographic coverage may be quite different than population coverage. All dimensions should be taken into account. The analysis of this aspect, together with data of actual population distributions, will allow the USF Administrator to determine which currently-populated areas or localities currently are not covered by the network.

    - **Actual Access or Subscribership to the Network.** To communicate, people need actual access to the network, rather than merely network coverage. Hence, the USF Administrator has to have data on the subscribership to the fixed or mobile network. For instance, there is very little empirical data regarding the percentage of all wireless subscribers that do not also have fixed access (either at home or at work). This data would be useful to determine the extent to which mobile networks are actually expanding the number of households that have some access, rather than providing

additional access opportunities to households that already have it. The analysis of this aspect, together with population data of actual localities, will allow the USF Administrator to identify which localities currently do not have access to any type of telecommunications service.

- **Future Coverage and Subscribership.** Any Programme has to take into account expected future network coverage and corresponding subscribership. Clearly, if it can be reasonably expected that in the short-term a significant portion of the currently unserved population will receive service the Programme may be scaled down or even deemed unnecessary. Future increases in coverage and subscribership may be due to the normal expected growth of the sector and the different segments (a detailed forecast may therefore be required) or due to rollout and other obligations (these are discussed in detail in sub-Section 2.6.)

- Demand-Side Factors

  - **Affordability assessment.** The most critical demand side factor is affordability. The USF Administrator should research or collect data on individual or household expenditures on telecommunications and other services. Combined with income data (preferably by region and sub-region), this information will allow the USF Administrator have a good idea of the current and expected affordability of telecommunications services by each region. This will allow the USF Administrator to better determine the required geographic/population coverage discussed above. The affordability assessment should also take into account any potential change in consumer tariffs, for instance as a result of a consumer tariff rebalancing plan.

A final critical factor in Programme design that the USF Administrator must take into account is the approximate allocations from the USF that the Programme will receive over its duration in order to design a Programme that can realistically be financed by the USF.

2.2 Key Programme Parameters

Some of the key parameters that the USF Administrator has to define in order to design and implement the Programme are summarized below. One of the aspects of Programme design is that, given limited USF financial resources, there are very significant trade-offs to some of the key parameters discussed below. The USF Administrator will be called upon to make some careful decisions in defining the specific parameters of the Programme, including geographic and population coverage, services coverage and selection and sequencing of localities:

- **Geographic/Population Coverage.** This is one of the most important parameters of the Programme. The geographic parameter has a number of dimensions. Section 3.3 of Part I of the Report provides a general discussion of some of the criteria to be taken into account in defining the geographic component of target locations for all categories of USF projects. The Government's Universal Access/Service Policy may require that "all rural areas have reasonable access to a public telephone". To implement this policy objective, the USF Administrator has to determine what constitutes a "rural area" and other geographical groupings. Most USF Administrators have focussed on the identification of specific rural "localities" (e.g. towns, villages, municipalities, etc.) over a certain population that currently do not have the designated mandatory services. Annex A of the Report includes a detailed numerical example of the determination of target localities for this Programme. The greater the coverage of the Programme, the more costly it will be to finance.

- **Services Coverage.** One of the most important parameters that must be determined by the USF Administrator relates to the types of services to be included in the Programme. A very clear distinction must be made between the services that are required to be provided under the Programme (designated as mandatory services) and those that the selected operator may be allowed to provide (designated as optional services). The discussion in Part II of this model focuses on the provision of basic services via payphones[1]. This specific objective may be elaborated in the universal service policy. Unless, however, the policy is very specific, it will be necessary for the USF Administrator to define the specific mandatory services in a very detailed manner. Most typically, USF Administrators have included voice-grade fixed access to the telecommunications network in order to make and receive local, national long distance (NLD) and international long distance (ILD) calls. Depending on whether, these are part of the general regulatory framework, some USF Administrators also include access to free operator, directory and emergency services. The greater the mandatory services coverage of the Programme, the more costly it will be to finance.

- **Technology Neutrality.** The Programme should be based on the principle of technological neutrality. The focus of the USF Administrator should be to carry out a process that results in the mandatory services being provided by the least cost method. It is the responsibility of the potential operators to develop a technical and business plan that makes economic sense. This will include the specific technology or technologies that will be used to deliver the mandatory services. The USF Administrator should not define or unduly restrict the technology to be used, other than to insist, for instance, that it be "field-proven" and not "experimental". Note that in the countries reviewed in Appendix 1 the mandatory services were defined in such a manner that many different types of technologies could have been used. In fact, satellite, radio, cellular and wireline technologies, sometimes in combination, have been employed successfully to provide mandatory services.

- **Time Duration.** The Programme should have a specific planning horizon in terms of time duration. Most USF Administrators have adopted a planning horizon of between 5 to 6 years. The time period should be long enough to incorporate sufficient projects that will make a significant process in terms of the Government's Policy, but not so long as to make it inoperative, or ineffective due to changing sector conditions.

- **Selection and Sequencing of localities.** Once the USF Administrator has an approximation of the geographic/population and services coverage and the time duration of the Programme, the USF Administrator may start to select and sequence the actual localities that are to receive service. As noted above, the most common approach is to finance projects in specific currently unserved rural "localities" that surpass a certain population threshold. Another approach is to select localities and/or projects based on a net present value ("NPV") analysis calculation. This analytical tool is summarised in sub-Section 2.5. NPV analysis may also be used to select the order (sequencing") of projects to be financed. See also Section 3.3 of Part I of the Report for a general discussion (for all types of projects, including for the ones covered in this document)

1 The inclusion of enhanced or value-added services in the mandatory services does not significantly change the process and procedures discussed in this Report. There are two principal means to incorporate enhanced or value-added services. One approach is to include the provision of enhanced or value-added services in the same project that already includes basic services. The other approach is to have two stand-alone projects, one including only basic access and the other only enhanced or value-added services. Payphones are only one of a number of mechanisms that allow the public to access telecommunications services. Other similar mechanisms include Public Call Offices (PCOs), franchise public phones, etc. The processes and procedures described in this document are general and flexible enough to incorporate payphones and other mechanisms that allow public access. For greater clarity, therefore, when in this document we refer to payphones, we are not necessarily excluding other mechanisms that allow public access.

of some of the criteria to be taken into account in defining the geographic component of target locations. These criteria could also be used for the sequencing of projects.

- **Size of Projects.** This is a critical factor in the success of the Programme. This refers to the number of localities that are aggregated into one stand-alone project that will be subject to the minimum subsidy auction. The optimal size of the project will depend on a number of factors. One will be the administrative costs of the USF Administrator. Regardless of the size of projects the administrative costs of implementing more than one project will be larger than those associated with only one project. This factor suggests that projects should be relatively large (that is, include a large number of localities). Another factor will be the costs borne by potential operators. To participate in any minimum subsidy auction process, potential operators will have to incur significant costs on a per project basis. Most potential international operators would therefore prefer to have larger projects so as to spread out the associated costs. These costs may include due diligence associated with calculation of their subsidy amount, any legal or commercial costs associated with incorporation or registration, the hiring of local legal and other advisers, etc. Most projects to date have generally been relatively large. As discussed in Appendix 1, the projects in Peru and Colombia generally awarded maximum subsidies of above USD10 million and require the installation of between 500 to 1000 public payphones in different localities. The one mitigating variable which may suggest that smaller and more numerous projects may be appropriate is if the Government has a specific preference for a multiplicity of operators implementing the projects.

2.3 Determining the Subsidy

There are generally two approaches to determine the maximum subsidy required. These approaches are complementary, and both should generally be used. The first is to estimate the amount of the maximum subsidy using a financial cost model as discussed below. The second approach is to let the market determine the final amount of the required subsidy, through a competitive bidding process.

It is recommended that the competitive bidding approach should always be used. However, the financial cost model should be used for determining the "benchmark" maximum subsidy amount available for each project. Generally, USF Administrators have announced the maximum subsidy available before the bidding process is concluded. The maximum subsidy is generally announced in the corresponding request for proposal. By announcing the maximum subsidy amount, the USF Administrator knows the maximum subsidy amount it will be required to pay for any respective process. This is useful for budgeting and administration for the USF Administrator. Similarly, the announcement is helpful for potential applicants, allowing them to determine whether there is sufficient subsidy available for them to participate in the competitive bidding process.

A financial cost model can be used to determine the amount of the subsidy for each project. In general, these financial cost models calculate the difference between the capital and operating costs of providing the designated mandatory services in a specific geographical area and the projected revenues from the designated mandatory services. Cost projections may be based on network construction estimates or on national or international benchmark costs for new access lines. Revenue estimates can be developed in different ways. Generally, the maximum subsidy available is calculated as the net present value ("NPV") of the difference between these expenditures and revenues over a determined study period.

Note that the subsidy should only pay for the uneconomic part of any project to be subsidised. For example, it may cost a total of USD 10 million to install and operate one public payphone per

village to 1,000 previously unserved villages over a determined study period. However, the financial cost model may indicate that telecommunications service revenues from those villages can be expected to total USD 2.5 million over the same study period. In this case, the required subsidy from the USF should be no greater than USD 7.5 million, or about US $7,500 per payphone.

2.4 Net expenditures to be financed

One of the most common questions raised with respect to the minimum subsidy auction process is whether it should be used to finance the costs of installing the mandatory services (capital expenditures) only or also incorporate the operation and maintenance of the mandatory services (operating expenses). One of the reasons this question is raised is related to budgeting considerations. In general, absent specific policy reasons or directions to the contrary, it is recommended that an integral approach be implemented, that includes consideration of capital and operating expenditures. We consider this and other related issues (including whether successful licensees have to "justify" their subsidy amount) below:

- **Policy:** Generally, there is no policy reason to include only capital expenditures and exclude operational expenses (or more accurately operational deficits) in a minimum subsidy auction scheme specifically or an universal service obligation (USO) scheme in general. Organization for Economic Cooperation and Development (OECD) countries that have USO schemes do not necessarily exclude operational deficits. The Latin American minimum subsidy schemes upon which this model is based do not explicitly exclude operational deficits. There are strong policy grounds for seeking to ensure that at the end of the relevant project licensing period, the operator is financially viable on a going-forward basis and hence has the incentive to continue to provide the designated mandatory services beyond the designated service period. This objective, however, does not necessarily mean that operational deficits should be excluded from the subsidy.

- **Precedence:** In the Latin American minimum subsidy schemes, the winning bidders do not have to "justify" their subsidy amount. Further, if there were to be a requirement that the applicants justify the winning subsidy amount, such a requirement raises the issue of what the USF Administrator would do if the winning subsidy amount could not be "justified". There are obvious incentive problems with this requirement. It is hoped that the winning subsidy amount will be the result of a competitive bidding process. Once the USF Administrator is satisfied that the process was competitive it would not be desirable to "second-guess" the competitive result. In this respect, for instance, it is interesting to note that the Peruvian USF Administrator stressed this point in its request for proposal when requesting financial statements: "The amount of the requested [subsidy] doesn't have to coincide with the referential costs [presented in forms below]."

- **Practicality:** Even if, from a policy perspective, it was decided that only capital expenditures were to be subsidised, there would be significant practical difficulties in making such an approach operational. If the subsidy is not allowed to incorporate operational deficits, symmetry would suggest that operational surpluses also be excluded. This exclusion of surpluses would foreclose the possibility that the capital expenditure amount could be partially or fully offset by expected operational surpluses, as has been the case in the Latin American countries where the winning bids were generally well below the maximum subsidy allowed, sometimes at zero-subsidy. This would mean that the actual subsidy amount may be higher than necessary. Further, if justification is required, smart applicants may "game" the process in the following manner: calculate the net present value (including estimated capital expenditures

and operational surpluses and/or deficits) to get the required subsidy amount X; backward engineer the capital expenditure and operational numbers so that the capital expenditure amount is the same (or greater) than amount X. This possibility may reduce the credibility of the entire process.

2.5 Selection and Sequencing of Projects

As discussed in sub-Section 2.2 a net present value ("NPV") analysis may also be used to select the order of projects to be financed. This sub-section provides a summary description of how NPV analysis may be used to determine the sequence of projects to be financed.[2]

The Chilean USF Administrator evaluates each of the potential projects to be financed based on general government-approved methods of cost-benefit analysis. For each project, two measures of net present value ("NPV") are calculated: private and social. Projects that have a positive private NPV are excluded from the list, based on the criteria that these projects are capable of being financed solely from project revenues without a government subsidy. The USF Administrator then ranks the remaining projects (those with a negative private NPV) based on the relationship between social and private NPV, among other factors. This formulation aims to maximise the social returns per dollar of private investment. For these "subsidisable" projects, the maximum subsidy is calculated as the absolute value of private NPV.

Private NPV for each project is calculated based on a forecast of costs and revenues attributable to the project and accruing to the operator during the 10 years of the mandatory service period. Costs and revenues are discounted at prevailing interest rates. The remainder of the process may be summarised as follows:

- **Private Costs.** Once the totality of localities that are eligible to receive a public payphone has been identified, the USF Administrator uses an engineering model to help identify feasible network solutions and analyse investment costs of various technology alternatives including cables, terrestrial radio links, and satellite links. As a result of this optimization process, the model helps to group localities into a smaller number of technically-viable projects.

- **Private Benefits.** The total revenue generated by a project is the sum of the revenues generated by each locality, and is estimated as the average per capita income in the locality multiplied by the proportion of income people are willing to spend in telephone calls multiplied by the proportion of the locality's population effectively served by the payphone. The expected number of outgoing calls is the revenue divided by the maximum regulated price per minute and by the expected average call duration. In addition, incoming calls are estimated at 30 percent of outgoing calls.

- **Social Cost-Benefit Analysis.** To calculate the social NPV of each project, the USF Administrator forecasts and discounts the costs and benefits attributable to the project (private costs and benefits only) and accruing to the national economy as a whole (includes public costs and benefits) during the 10 years study period. Social costs and benefits are derived from the private costs and benefits. Projects whose social NPV is less than zero would result in a loss to the economy and would not be financed by the USF Administrator. Projects whose social NPV is equal to or greater than zero would be undertaken. Private costs are adjusted to reflect real long-term scarcities in the economy. This may involve a series of corrections for perceived distortions in the price system. In addition to private revenues, social benefits

[2] This sub-section is based upon research performed by B. Wellenius in 2002 cited in the References.

include an estimate of the increase in consumers' surplus[3] resulting from being able to use the subsidised payphone[4]. As a last step in the selection process, the remaining projects are ranked by social NPV per unit of maximum subsidy (absolute value of private NPV). The projects with the highest social return per dollar of private investment are ranked highest and are placed at the top of the list of projects to be financed.

2.6 Consistency with existing Obligations

Service and/or roll-out obligations imposed prior to the implementation of the Programme have to be taken into account in any Programme design.

There are generally two types of service or rollout obligations. The first is a general obligation to provide service to all customers willing to pay the regulated prices. In some countries, this obligation is described as an "obligation to serve". Geographic or population limits are sometimes prescribed for areas where such an "obligation to serve" is imposed. For example, such areas could include urban areas but not rural areas. Alternatively, such an obligation could stipulate that rural towns above a certain population must be provided with service. In most cases, new services must be installed within a prescribed time after an application for service is received by the operator. The operator with this type of obligation to serve all customers is usually referred to as the "carrier of last resort" ("COLR"). In most cases, the COLR is the incumbent operator[5]. The other type of obligation is to extend certain types of designated services to a pre-specified number of subscribers or localities and are referred to as roll-out obligations.

Below we analyse the following four situations, based on the two main types of obligations discussed above and the time perspective[6] of the obligations:

- **Forward-looking COLR-type obligations.** In the future the COLR may be expected to provide new service to customers in the geographic areas included in the Programme. Whether the Programme has to be adjusted will depend on the specifics of the COLR-type obligation. For example, in Peru the COLR had an obligation to provide telecommunication services for all rural towns with a population of more than 3,000 inhabitants. The Peruvian Programme, however, was designed so that its target population was that of rural towns with more than 400 inhabitants but less than 3,000 inhabitants. Therefore, there was no duplication between forward-looking COLR-type obligations and the Peruvian Programme.

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3 The difference between what consumers actually pay and the higher amount they would have been prepared to pay.

4 This is calculated by estimating the corresponding demand curve, the price and quantity of calls for the project. A higher point on the demand curve is identified, based on estimates of the higher cost of communicating without the project. This assumes that, because potential users would otherwise be forced to travel to other payphones, they incur transportation and time costs in addition to paying the price of the call of the other payphone. Consumers' surplus is calculated based on the difference between the "with" and "without" project demand results based on the data above.

5 Note that, depending on whether prices are cost-oriented or not, the "obligation to serve" certain customers or certain geographical areas may not be economical for the COLR. If prices are not cost-oriented, the COLR is probably incurring losses for some services and/or for some geographical areas and is subsidising such losses from other profitable services and/or areas. The only sustainable and long-term solution to the situation above is some combination of progressive rebalancing of prices towards cost-orientation and/or direct funding from the Government or the USF. Before the rebalancing exercise is finalised, or if only partial rebalancing is undertaken, direct funding from the Government or the USF may also be required. The mechanisms and procedures to implement this type of direct subsidy funding for infrastructure and services that are already in place are outside the scope of this document.

6 Time perspective refers to whether these obligations were to be initiated in the past (and maintained for a certain period) or whether the obligation is to be initiated in the future. An example of the former would be the installation of a public payphone in the past and its maintenance into the future and is referred to as an "existing obligation". An example of the latter would be the installation of a public payphone in the future, referred to as a "forward-looking" obligation.

- **Existing COLR-type obligations.** The principal consistency issue is one of geographic or locality-specific coverage - obviously, the Programme should not include any localities already provided under COLR-type obligations.

- **Forward-looking rollout obligations.** Whether there is a need for co-ordination will depend, as in the case above, on the specifics of the rollout obligations and the localities that could be covered under the Programme. For instance, it is possible that the rollout obligations do not specifically require the operator to provide service in rural areas. That is, the rollout obligation could be met by providing additional lines in urban areas only. Under this scenario, the Programme could be implemented without any need for adjusting the forward-looking rollout obligations. Alternatively, if there exist rural-specific rollout obligations these will have to be carefully reviewed. This is because the Programme could include some localities that would otherwise be included as part of these rollout obligations. As such, the Programme would be freeing the designated rollout operator from some (or all) of its obligations.

- **Existing rollout obligations.** Some analysts have noted that existing services that are the result of the implementation of historic roll-out obligations should not receive any financing because they were assumed as part of a "package". These obligations may have been a component of a privatization or licensing process, and as such their total cost (including the future maintenance) would have been included in the overall calculation of the package. Hence, any direct funding would upset the balance of the original package and may unduly benefit the operator. As such, the Programme would be freeing the designated rollout operator from some (or all) of its obligations.

3. Bidding Process

Most countries have implemented the minimum subsidy auctions through an international competitive process based on a request for proposal[7]. This section examines some of the key elements in the design and implementation of the competitive process, from the point after which the projects have been defined and selected to the actual installation and operation of the designated mandatory services by the selected operator. Some of the important aspects of the competitive process include the design of the bid strategy and the preparation of the bid documents (including the request for proposal and the proposed licence for the operator). Appendix 2 provides a detailed outline of the indicative contents of a sample request for proposal. This outline may be a useful and practical starting point for USF Administrators who wish to prepare a request for proposal for a minimum subsidy auction process. The sample request for proposal summarises some of the issues covered in this section and documents and identifies other key aspects that remain outside the scope of this model[8].

7 There are a number of terms used around the world for such a process, including Call for Application (CFA), Request for Application (RFA), Request for Bids (RFB), etc. We use the term request for proposal .

8 One of the main issues that is outside the scope of this document is licensing. Clearly, in order to promote the government's policy, the USF Administrator should be able to implement or have implemented (by the licensing authority) a liberal and light-handed approach to licensing the operators that will be required to implement the subsidised projects. By licensing we mean the administrative steps followed by the NRA or the ministry (whichever is the licensing authority) to issue the required authorisation to construct and operate the network and provide the mandatory services. By liberal and light-handed we mean, *inter alia*, that there are no exclusivity provisions that do not permit the entry of new operators, including the rural operators that would provide the services under discussion in this document. We also mean that the licensing regime should allow the new rural licensees to provide the mandatory services in the designated geographic areas only – there should be no requirement to establish any other type of infrastructure elsewhere. We also refer to entry and ongoing licence fees – please see sub-section 3.7 for further discussion on this issue. Clearly, the USF Administrator will need to co-ordinate with the licensing authority to ensure that this liberal and light-handed licensing approach is in fact implemented. The licensing regime

3.1 Competitive Bidding

Even the best USF Administrators will generally have less information than telecommunications operators about the real costs and benefits of implementing rural public access telecommunications projects. Therefore competitive bidding approaches should always be used to determine the actual subsidy amount disbursed for each project. Competitive bidding has the advantage of generally reducing the total funding required to meet universal access objectives. As described Appendix 1, the actual winning bid amounts awarded in Latin American programmes were generally well below the maximum subsidy amount calculated by the USF Administrator to be required to provide service. In Chile, over the 1995-1999 period, the average winning subsidy was about 50% of the maximum subsidy offered. Similarly, in Peru, in 1999-2000, the average winning subsidy has been about 25% of the maximum subsidy offered. In the first set of projects auctioned in Colombia in 2000 the average winning subsidy was 45% of the maximum subsidy offered.

3.2 Bidding Strategy and Auction Design

There are a number of objectives to take into account when designing the bidding strategy. Clearly, from the point of view of the Government, one objective is to minimise the actual subsidy amount to be disbursed. This subsidy minimisation objective,[9] however, is subject to the constraint that the designated services are actually provided for the specified time duration at reasonable consumer tariffs and at an acceptable quality-of-service ("QOS"), among other conditions. The USF Administrator has to stipulate a clear, logical and proportionate set of provisions to ensure that such mandatory service constraints are fulfilled.

It is very important to recognise that there is a direct trade-off between the mandatory services constraint and the subsidy minimisation objective. If the service constraint is enlarged or made more onerous, the corresponding subsidy amount required by potential operators will increase and the USF Administrator will have to pay more money to implement its universal access policy.

There are a number of other factors that also have a significant and direct impact on the subsidy minimisation objective. These could include country risks such as security, economic stability and credit worthiness, which are beyond the direct control of the USF Administrator. Other aspects, however, such as transparency are certainly under the influence of the USF Administrator and are discussed below. These aspects should be reviewed and modified if necessary with a view to optimising the trade-off between the subsidy minimisation objective and the mandatory services constraint. Below we discuss some of the aspects that should be considered in this process.

Once the bidding strategy has been decided, the auction process should be determined. To date, all USF Administrators have adopted one round simple auctions. However, multiple-round auctions, such as used in the late 1990s for cellular spectrum, could be used for some minimum subsidy projects. The Peruvian USF Administrator has already implemented a multiple-project bidding approach. Bidders were encouraged to bid simultaneously on more than one project. The objective was to provide the lowest total subsidy for all projects involved. This way USF Administrators can attempt to capture any economies associated with multiple projects. A description of this auction

should not interfere in the implementation of the governments' policy – if it is expected or actually found to do so, the licensing regime should be amended.

9 Note that this objective is the equivalent of the objective of maximising the bid amount for a mobile cellular licence or other such attractive opportunities in the telecommunications sector.

process is included in Module 6 of the Telecommunications Regulation Handbook.[10] Results of this approach are in included in the Peru section of Appendix 1.

3.3 Transparency

Regardless of which particular auction design it selects, the USF Administrator should ensure that the entire competitive process is procedurally transparent. Transparency requires that the process be conducted openly and that the selection of the winning operators be made based on criteria published in advance. Key features of transparent processes include:

- advance publication of the request for proposal, with process rules, qualification and selection criteria;
- separation of qualification and selection processes;
- return of unopened financial offers (bids) to applicants who do not meet the published qualification criteria; and
- public opening of sealed financial offers from qualified applicants.

Transparency is best measured from the point of view of the participants in the competitive process. It is good practice for a USF Administrator to take all reasonable steps to ensure that participants in the competitive processes, as well as the general public, perceive the process to be fair.

Conducting a transparent competitive process is sometimes perceived to be more time consuming and difficult than less transparent alternatives. The process, for instance, of publishing procedural rules and selection criteria in advance can be difficult for a newly formed USF Administrator in a country where procedural transparency is not entrenched. However, the absence of transparency undermines confidence in the fairness of the entire competitive process, the regulatory framework and in the telecommunications market itself.

It is good practice to engage in public consultation before and during a competitive minimum subsidy process. To start, it may be useful for an USF Administrator to invite public comment on the approach to be taken in a proposed competitive process before it starts. Consultation allows the USF Administrator to receive directly the views of consumers and prospective applicants on a proposed competitive process initiative. This allows the terms and conditions and auction procedures to be fine-tuned to maximise the prospects for a successful competitive process.

Consultation can be formal or informal. It is generally advisable, however, for the USF Administrator to establish a formal and transparent consultation process. A good approach is for the USF Administrator to publish a notice stating its intention to launch a competitive process to implement the process, and invite comments on the proposed approach. The notice should set forth in some detail the proposed approach and any specific issues on which comments are sought.

3.4 Distinguishing the Process from Procurement

To the greatest extent possible, the process to select the successful operator should be distinguished from general government procurement processes. Depending on the specific national

[10] The Telecommunications Regulation Handbook may be downloaded from the TREG website at (http://web/ITU-D/treg/related-links/links-docs/Genregulation.html)

legislation, because the USF Administrator is in essence "acquiring" a certain flow of services using public money (the USF), the entire process may be subject to standard procurement processes. Hence, as we discuss below, the mandatory services constraint should be the subject of strict application and enforcement. This does not mean, however, that the entire process, including the competitive selection, has to be subject to government procurement. That is, the mandatory services constraint procurement aspect should be isolated from the rest of the process.

This is of concern because government procurement procedures are generally not suitable for a competitive selection process. Many countries have bureaucratic centralised procurement administrations. Detailed government procurement procedures are often developed for good reason – among them to avoid corruption. However, application of these procedures can cause legal and administrative headaches, and delay and confusion. It is generally best to use a simple and transparent competitive process, based on internationally accepted telecommunications licensing procedures.[11]

3.5 Marketing the Bid Opportunity

The minimum subsidy process may involve significant risk for operators. The USF Administrator must offer potential operators an attractive opportunity that is financially viable. While some telecommunications opportunities sell themselves others, particularly for some rural areas in certain developing countries, must be carefully designed and marketed. Some USF Administrators have retained international advisors to help market the opportunity internationally. Potential operators have to be aware of the bid opportunity if they are to show interest in it. There are a number of steps in promoting awareness and generally marketing the bid opportunity, including:

- **Paid Advertisement** – There are a number of international and regional general business-oriented and telecommunications sector publications that are read by decision-makers in potential applicants. There are also specific tender or other procurement publications that could be of interest. The USF Administrator should consider purchasing an advertisement in one or more of both types of publications.

- **Press Release** –Another means of publicising the bid opportunity is through a press release. These could be sent by the USF Administrator to international or regional trade newspapers and newsletters most likely to be read by decision-makers of potential applicants.

- **Direct Contacts** –Direct contact with the potential applicants that are most likely to be interested in the bid opportunity may also be appropriate. This is also potentially a good means of gathering important market information or other feedback. For example, it may be particularly advantageous to contact operators that are currently rural service providers in the corresponding region or around the world, as well as large foreign operators known for their interest in developing countries.

- **USF Administrator's Website** – This is a practical and cost-effective means to inform potential investors and operators of the minimum subsidy opportunity.

3.6 Attractiveness of Bid Opportunity

There are a number of important legal regulatory and licensing costs that could impact on the financial attractiveness of the bid opportunity. Similarly, there are a number of related revenue

11 For a review of licensing procedures, see Module 2 of the Telecommunications Regulation Handbook.

sources that could impact positively on the financial attractiveness of the opportunity. These are discussed below.

To attract quality foreign and domestic applicants to the minimum subsidy process, there must be clear revenue potential opportunities beyond the designated mandatory services. Clearly, some of these revenue opportunities have to be reviewed to ensure they are not inconsistent with current sector policy.

These revenue possibilities may be considered as optional services. The selected operator would have the right but no obligation to provide such services. These optional services could include some or all of the following:

- enhanced or value-added services inside the designated geographic areas, including Internet, mobile cellular, and other services, either for individual or public access.
- basic services to individual residential and commercial customers.
- national long distance (NLD) services between the designated geographic area and the rest of the country.
- international long distance (ILD) services, including international gateway rights, in the designated geographic area.

3.7 Regulatory, Licence and other fees

Any type of fee to be paid by potential operators, whether to participate in the bid process, acquire the necessary licence to provide the designated mandatory services or must otherwise be paid as a result of providing the mandatory or optional services, will have a direct impact on the attractiveness of the bid opportunity. Any such fees will also have a negative impact on the subsidy minimisation objective and therefore will result in a higher than otherwise subsidy amount being requested by potential applicants.

The USF Administrator should endeavour to eliminate or reduce any applicable fees to the minimum required for "cost-recovery". Cost-recovery schemes involve establishing applicable fees based on the projected or actual costs of providing the relevant services by the corresponding public institution, whether it be the NRA, the USF Administrator or other governmental entities. There should be no or minimal cost-recovery fees associated with the licence acquisition or ongoing operation of the designated mandatory services. Similarly, any applicable spectrum fees should be calculated based on a cost-recovery principle. All operators may generally be required to pay a universal service fee. This type of fee may be considered inappropriate for the operator selected to provide the mandatory services, whose very purpose is to implement the government's rural universal access objectives.

Lastly, the request for proposal and the other bid documents should also make clear that there will be no additional payments of any kind payable by the operator, other than those specified in the bid documents.

3.8 Services Constraint

There are a number of key aspects that have to be considered to ensure that the selected operator fulfils the mandatory service constraints. This sub-section discusses the qualification and selection

of the potential operator and provisions to ensure that the operator installs and provides the designated mandatory services at an acceptable quality over the designated period.

3.8.1 Qualification Criteria

This model recommends designing a two-stage procedure for the selection of the successful operator. It is important, therefore, to distinguish between the criteria relating to the qualification of an applicant to participate in the bid process and the criteria for the selection of a successful operator from among the qualified applicants. The criteria for the selection of operators to provide public access to basic telecommunication services will be the lowest subsidy proposed among the qualified applicants. As discussed in Part I of this model, other criteria may be applied for selecting operators to provide projects for advanced services or for economic and public development.

Qualification criteria are minimum requirements for the right to participate in the selection process. Generally, qualification criteria are limited to ensuring applicants have the financial and technical resources and experience needed successfully to provide the mandatory services. It is important to establish clear, rigorous and proportionate qualification criteria, especially when the selection criteria are based solely on the minimum subsidy offered.

Depending on the scope of the designated mandatory services and the amount of the subsidy available, it may be appropriate to incorporate more than one qualification phase. For instance, in issuing a large bid opportunity, a pre-qualification requirement may be established. This requirement limits the eligibility of applicants who can participate in the final qualification process. It is justified, for instance, where there are high costs incurred by the USF Administrator (and applicants) in conducting a detailed qualification process. In these circumstances it may make sense to discourage participation in the process by applicants who are unlikely to meet the qualification criteria or to submit a competitive application. Various pre-qualification options exist, including payment of a substantial bid opportunity participation fee, in the form of a bid document purchase fee or other similar practices. Another requirement that could be considered in this context is a bid security.

The main qualification criteria used in minimum subsidy processes include:

- Legal status of applicant
- National participation
- Operational experience
- Financial capability

3.8.2 Legal Status of Applicant/Licensee

Some countries require that applicants register as a commercial entity in their country to participate in any governmental bid opportunity. Other countries require such registration only once the entity has been successfully selected. With a view to maintaining the qualification criteria proportionate, such *a priori* registration should not be required unless specifically stipulated in the relevant legislation.

Some processes require that the applicants be organized as a particular legal entity, such as a joint venture or a legal consortium. Again, these types of requirements usually respond to specific

national legislative provisions. Generally, there is merit to maintaining a relatively flexible approach and to not unduly restricting *a priori* the specific legal status of the applicant. One option, which allows a certain degree of flexibility, is to distinguish in the request for proposal between an applicant and a proposed operator (the "licensee"). Hence, the applicant is not required to be the same legal person that becomes the licensee. Under this approach, it is important to distinguish between requirements and other obligations that relate to the proposed licensee, rather than to the applicant. In many cases, it is more logical to seek compliance from the proposed licensee rather than the applicant since it is the proposed licensee that will ultimately provide the designated mandatory services.

3.8.3 National Participation

Regardless of any foreign ownership restrictions, the government may wish to ensure a transfer of knowledge and other skills to national operators or other entities. One means of achieving this goal is to require some minimum level of local participation in the licensee.

3.8.4 Operational Experience

To ensure that the mandatory services are appropriately installed and operated the qualification criteria could include the requirement to show evidence of significant prior operational experience in operating similar types of networks elsewhere in the world. This criteria may be satisfied by showing that either of the following have been met:

- Operated a public telecommunications network with over a certain number of subscribers.

- Operated a public telecommunications network with over a certain number of public telephone access lines in rural areas.

The exact operational thresholds will depend on the size of the respective projects being auctioned. Large projects (e.g., of over one thousand public payphones) will require significantly larger thresholds. One option to consider is that the applicant may either rely on its own operational experience or the experience of a member of the applicant's consortium or an affiliate. An affiliate is just as likely to be able to provide technical support to the Licensee as the other shareholders of the Licensee. It is becoming the norm amongst major operators in the world to have a separate international consulting affiliate.

3.8.5 Financing Capacity

The proposed licensee should have sufficient financing capacity to undertake the subsidised project and provide the mandatory services. The required financial capacity must take into account the estimated maximum and requested subsidy amount. There are traditionally two means by which to show financing capacity. One is to have a substantial net worth. This would provide evidence that the applicant has the independent means to finance the subsidised project. The other means is through the submission of certain financial documents that show that the applicant would be able to otherwise raise the required financing.

One or both of these means may be used jointly. A combination of these two means may also be used. Such an approach may provide greater flexibility. This approach is based on two or more thresholds for the demonstration of financial capacity. As an example -- but depending on the scope of the project (say with an estimated maximum subsidy amount of USD 10 million) -- where a proposed licensee has a net worth of at least USD 10 million, the request for proposal

presumes that the financing capacity of the proposed licensee is established. Second, if the proposed licensee has a net worth that is greater than USD 5 million but less than USD 10 million, the request for proposal requires further proof concerning the financing capacity of the proposed licensee. This further proof could be provided by the submission of the financial documents discussed above. Lastly, proposed licensees with a net worth of less than USD 5 million may not permitted to apply for the licence.

3.8 Bid, Performance and other Guarantees

In this sub-section we consider the two most common forms of guarantees used in minimum subsidy processes: bid and performance guarantees. The latter has to be considered together with the disbursement schedule. Both types of guarantee are costly financial instruments for licensees. The higher the requested amounts and the more onerous the conditions imposed, the more likely it is that applicants will require higher subsidy amounts to compensate for these costs. This direct relationship between costs and conditions and the subsidy minimisation objective should always be kept in mind.

3.9.1 Bid Security

The bid guarantee is designed to penalise a successful applicant from withdrawing from the process before the licence is issued. The amount of the bid guarantee has traditionally varied between 5% to 10% of the corresponding subsidy amount up to a maximum of about USD 5 million. A lower bid guarantee will increase the pool of interested applicants but provide less security for the USF Administrator.

3.9.2 Disbursement Schedule and Performance Guarantee

The performance guarantee is designed to reduce the risk of the operator installing none, some or all of the network and then withdrawing from the project before the designated licence period. Under this scenario the operator could have collected some or all of the subsidy amount for the subsidised project without fulfilling its obligations, which is not acceptable. The type and size of the performance guarantee will depend on the proposed disbursement schedule. There are several main aspects of such schedules: whether the payments are front-end loaded or back-end loaded, whether there one or more disbursements will be paid, and the selection of milestones for disbursements. .

Front-end loading the disbursement schedule will reduce or eliminate the financing costs of the successful operator. This is because the selected operator can use the subsidy funds to pay for the purchase and installation of the required equipment. Such an approach, however, increases the risk of the operator collecting and keeping the funds without installing the network. Front-end loading requires a higher performance guarantee than back-end loaded disbursements. It is not unusual to have a performance guarantee equal to 100% of the winning subsidy amount. Such a guarantee can be reduced as the network is installed and services provided, and eventually eliminated at the end of the licence period.

Using only one disbursement rather than two or more is administratively simpler. For instance, the Chile USF Administrator pays 100% of the winning subsidy amount upon confirmation of operation of the mandatory services. The disadvantage with a single disbursement, however, is that it usually is back-end loaded (as in Chile), which means that the financing costs of the selected operator can be very significant. The operator must finance the associated purchase and installation costs, without receiving any subsidy funds. Only upon installation will the USF Administrator disburse 100% of the requested subsidy amount. The need for a performance

guarantee is less urgent under this scenario. A relatively modest guarantee (less than 25% of the subsidy amount) may be desirable upon disbursement to ensure the operator provides service for the entire designated period.

Alternatively, the USF Administrator could pay multiple disbursements with associated milestones. The disbursements could be tied to the rollout requirements specified in the request for proposal. If the government wishes to have operational 50% of the public payphones to be deployed through the project in 9 months and the remaining 50% within the next 18 months, the disbursement schedule could be designed to mirror such a rollout schedule. That is, 50% of the subsidy to be paid upon completion of the first milestone and the remainder paid upon completion of the second. The required performance guarantee could also be tied to the disbursement schedule, rising from 50% to 100% of the subsidy amount until all the payphones are installed, and subsequently decreasing to zero at the end of the designated licence period.

The disbursement schedule could also be back-end weighted to ensure quality of service (QoS) and other government objectives. For instance, Peru's USF Administrator has used the following disbursement schedule:

- 40% for first tranche on first milestone (50% installation after 9 months)
- 40% for second tranche on second milestone (100% installation after 18 months)
- balance 20% in two annual payments of 10% each at the end of each 12 month period following the 18 month installation period.

A related issue that should be considered with the disbursement schedule and the performance guarantee is the ownership of the assets. It could be justified, for instance, that prior to the completion of the designated mandatory period, the assets associated with the provision of the mandatory services belong to the USF. Hence, in the worst case scenario, if the licensee were to abandon the project the USF would be able to draw upon the performance guarantee and, with the existing assets, be better able to guarantee the continuation of service. If this approach is adopted, it should be included in the request for proposal.

4. Consumer Tariffs and Interconnection Charges

The tariff and interconnection regimes applied to the selected operator are probably the most important regulatory determinants of the success and viability of the entire minimum subsidy process. These two sets of revenue determinants must, in combination with the requested subsidy, ensure that the licensee is financially viable.

This section discusses issues related to these critical regulatory aspects, including a discussion of the economics of rural networks which focuses on the higher costs of providing rural telecommunications services in rural areas. The following sub-sections include a discussion of whether the applicable consumer tariffs should be regulated and the structure of those consumer tariffs if they are to be regulated. It also discusses the interconnection charges applicable to the licensee and the other operators the licensee interconnects with. Appendix 3 develops the illustrative benchmark consumer tariffs that are introduced in this section and provides greater detail with respect to interconnection charges. Appendix 3 also provides a summary table with illustrative consumer tariffs and interconnection charges.

4.1 Key Issues

The issues presented in this section are to be considered in the context of existing laws and regulations dealing with consumer tariffs and interconnection charges. Some countries have highly-developed regimes and methodologies to deal with the calculation of consumer tariffs and interconnection charges, including good information on the incumbent operator's costs and a model of a licensee's costs. Most countries do not. Based on the assumption that the country's framework does not yet have such a detailed framework, it is important that the request for proposal:

- provides certainty regarding the consumer tariffs the licensee can charge;
- ensures that the licensee's consumer tariffs are sufficient to make the licensee financially-viable;
- provides certainty regarding the interconnection charges received and paid by the licensee;
- ensure that the interconnection charges received and paid by the licensee are sufficient to make the licensee financially-viable.

In order to develop a business plan and to calculate the subsidy amount to be requested, potential operators must forecast their revenues. Potential operators must know (or at least be able to reasonably estimate) the consumer tariffs they can charge and the interconnection charges they will receive from and be required to pay to other operators. Otherwise, potential operators face too much uncertainty about their future revenues. Such uncertainty will lead potential operators to conclude that the project is risky and that they therefore require a higher subsidy amount.

There are two approaches to providing certainty. One is to prescribe consumer tariffs and interconnection charges in advance, which is recommended and developed in the remainder of this section and in Appendix 3. The other is to stipulate that consumer tariffs will be unregulated (that is, the licensee would be free to set any consumer tariff). In the latter case, the potential operator will plan, and, if successful in the auction, charge consumer tariffs based on its own demand and cost calculations. The advantages and disadvantages of this approach are discussed in the sub-section below.

A third approach is far more inferior and risky. That is to stipulate that consumer tariffs and interconnection charges will be regulated, but not to provide specific rates. This either will lead to confrontations once the USF Administrator and the licensee finally determine what these prices should be, or, in a worst-case scenario, the licensee will abandon the project.

In the absence of detailed cost information, the request for proposal should therefore specify consumer tariffs and interconnection charges based on a combination of data, including cost-based international benchmarks. Such data could include: 1) appropriate comparable consumer tariffs in the country; 2) the consumer tariffs and interconnection charges of operators actually selected to carry out such projects (for instance, in South America[12]); 3) consumer tariffs and interconnection charges from other countries in the region; 4) any existing consumer tariff and interconnection changes, regulations, guidelines or other information from the country. This approach is developed in Appendix 3.

12 To date, the minimum subsidy auction process and procedures described in this document have been implemented only in a number of countries in South America and the Caribbean. The countries covered in Appendix 1, Chile, Peru and Colombia, were the first three countries in this region to implement the minimum subsidy auctions.

This model further recommends that the specified tariffs be maximum tariffs. That is, the licensee would be free to set the actual consumer tariffs at a lower level.

4.1.1 Regulation of Consumer Tariffs and Interconnection Charges

As stated above, one approach to consumer tariffs for public payphone operators licensed through a universal service project is to stipulate that consumer tariffs will be unregulated, leaving applicants free to set consumer tariffs at any level. There are two main disadvantages to this unregulated approach. One is that tariff regimes are typically applied to liberalized markets where effective competition may be expected to constrain any excessive pricing. For such public payphone universal service projects, however, the licensee can be expected to hold a de facto monopoly. Given the absence of regulatory constraints and the existence of significant barriers to entry, the licensee is likely to behave like any profit-maximising monopolist by charging excessive monopoly pricing and causing a reduction in consumer welfare.

The other disadvantage is that potential operators will calculate their requested subsidy amount based on a consumer tariff that may not be acceptable to the USF Administrator. It is entirely possible that the applicant that requests the lowest subsidy amount, and hence is declared the winning applicant, plans to charge the highest consumer tariffs. As noted above, this may lead to future confrontations as the USF Administrator reviews the consumer tariff proposed by the selected operator. If that consumer tariff is deemed to be too high by the USF Administrator, this could also lead to abandonment of the project.

For the same reasons (certainty and possible abuse of monopoly), this model generally recommends that the interconnection charges that are payable to and by the licensee be regulated. For a general discussion on the rationale for regulating consumer tariffs and interconnection charges, see Modules 4 and 3 of the Telecommunications Regulation Handbook, respectively.

4.2 Economics of Rural Universality

There are two main reasons for the relatively low rural access levels in many developing and least developed countries. The first is that because rural incomes tend to be lower than urban incomes the total amount of (community) income devoted to telecommunications is lower[13]. The second factor is that rural networks are more expensive to install and maintain than urban networks. We discuss this factor below.

The costs of providing telecommunications services in rural areas is generally much higher than in urban areas. Why? One reason relates to he cost characteristics of telecommunications networks, particularly those servicing rural areas. The other is the general lack of associated infrastructure required for the installation and maintenance of rural telecommunications networks.

13 See Module 6 of the Telecommunications Regulation Handbook and the report by Navas-Sabater cited in the References below for a discussion on telecommunications expenditures between and within countries. The principal argument forwarded in these papers is that the most important determinant of telecommunications development is economic development. That is, there is a strong relationship between the national telephone penetration rate, and the nation's per capita gross domestic product. However, although national per capita income levels impose a constraint on telecommunications development, there are significant differences in the percentage of income that is spent on telecommunications in different countries. For example, in some countries with a relatively low GDP per capita, less than 1% of GDP is spent on telecommunications. In other countries with similar GDP per capita, as much as 4 or 5% of GDP is spent on telecommunications. On average, however, around the world, people spend about 2 to 3% of their incomes on telecommunications. This relation, developed in subsequent sub-sections, generally holds true for whole countries, regions, cities, and on average to households.

4.2.1 Telecommunications Network Costs

This sub-section concentrates on fixed wireline technology. This is mostly due to the greater public availability of data on this traditional type of technology. The general principle developed here, that the per-line/access costs of provision are very significantly higher in rural areas than in urban areas, also holds for wireless technology. Note that this general principle is different from the discussion, summarized in sub section 4.2.3, of what type of technology may be most economical for any specific area and application.

Telecommunications and other industries that require networks (e.g. electricity, railways, airlines, sanitation, etc.) generally have cost characteristics that are different from most other industries. In particular, telecommunications networks may exhibit economies of scale and/or economies of scope. Economies of scale exist when the average total cost of the firm decreases with the volume of production. Economies of scale can arise from a number of technological and managerial factors, including fixed costs (i.e. costs that are incurred regardless of how many units of output are produced). When more than one good is being produced, there are sometimes shared equipment or common facilities that make producing them together less expensive than producing them separately. Economies of scope exist if a given quantity of each of two or more goods can be produced by one firm at a lower total cost than if each good were produced separately by different firms.

One particular type of economies of scale in telecommunications networks is economies of density. This phenomenon refers to the decreasing unit cost of providing telephone access within a specific geographic area as the number of access lines increase. The table below shows, for instance, the relative indicative unit cost of providing access lines by certain density zones. The density zone represents the number of access lines per square mile. While these numbers are indicative of the relative costs of local access provision in the seven jurisdictions studied, none of the specific numbers are generally applicable outside the sample. The importance of the table is that it shows that low-density rural lines are very many more times more expensive to construct and operate in comparison to an urban line[14]. This general proposition holds for all countries and regions.

14 According to Cribbett (2000), "average line costs in low-density areas in Australia … were found to be between 6 to 10 times the average cost per line in the rest of Australia". Not surprisingly, the same study concluded that "low density areas are estimated to account for some 25% of the total cost of providing local telephone service, despite having only about 5% of the total number of lines."

Table 1: Indicative relative line costs by line density zones[15]

Lines per square mile	Lines per square kilometre	Model 1 Results Monthly Cost (USD)	Model 2 Results Monthly Cost (USD)
0 to 0.39	0 to 0.1	372.99	300.29
0.39 to 5	0.1 to 1.93	158.90	127.93
5 to 100	1.93 to 38.58	63.41	40.61
100 to 200	38.58 to 77.16	39.30	22.37
200 to 650	77.17 to 250.76	33.23	17.44
650 to 850	250.76 to 327.92	31.50	14.44
850 to 2550	327.92 to 983.76	28.56	12.01
2550 to 5000	983.76 to 1928.94	26.91	10.03
5000 to 10000	1928.94 to 3857.88	23.80	9.15
10000 and above	3857.88 and above	20.66	6.37

Source: P. Cribbett Population Distribution and Telecommunication Costs, 2000.

The main reason that a rural fixed-line is more expensive than an urban fixed-line is related to the extent of support structure sharing with other loops and the average length of the loop. The term support structures refers to all works and facilities that support the actual cable that terminates at the subscriber premises and includes posts, trenches, ducts and other such elements depending on whether the loop is aerial, underground or buried. Clearly, the per local loop cost of the support structure will be much lower if the support structure may be shared with other loops. Given that loop density is much higher in urban areas, there is more opportunity for support structure sharing in urban areas. Hence, the average amount of support structure per urban loop is lower than a rural loop and therefore the average cost of the latter will be higher.

The other reason that rural loops are more expensive than urban loops is that rural loops tend to be longer than urban loops. This means that they need more associated support structures. Also, the actual cabling for the loop is longer. For both these reasons, the per-loop cost tends to be higher in rural areas.

4.2.2 Associated Infrastructure

The other reason rural service is more expensive than urban service is that the quality and quantity of the associated infrastructure required for the installation and maintenance of the telecommunications network is lower in rural areas. Rural transportation networks in developing countries, including roads, tend to be relatively few and not well maintained. Many rural communities may not be accessible by road for part or all of the year, increasing the cost of

15 This study developed density cost proxy estimates based on adapted results from a number of economic cost models. These cost estimates were then used to explain whether observed differences in the average costs structure could be explained by differences in the actual population across the densities. That study was used to analyse average line costs in Australia, New Zealand, Finland and the US States of Alaska, California, Oregon and Washington. The cost models that were adopted are the Benchmark Cost Proxy Model ("BCPM") (Model 1 in the table) and the Hatfield Model (HAI) (Model 2 in the table), models, both developed in the United States. A similar set of relative values were also calculated by the FCC using its Hybrid Cost Proxy Model (HCPM) as part of the regulatory proceedings to establish its universal service regime. As discussed in FCC (1999), the BCPM, HAI and HCPM are bottom-up proxy models that calculate the forward-looking long run incremental costs of providing the designated services. The monthly cost is calculated based on a total annualised costing methodology.

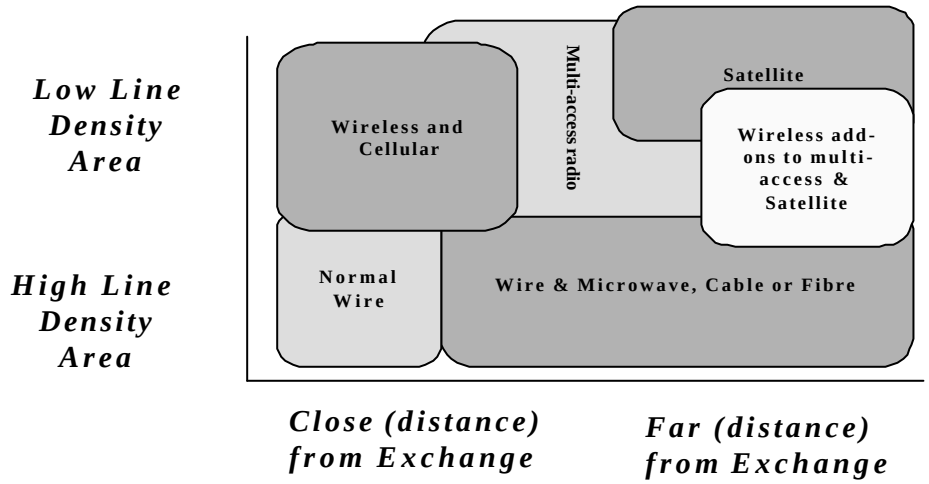
installing and maintaining telecommunications networks in those rural areas. Another critical infrastructure is electricity. Telecommunications networks require a reliable source of energy to function. Not all developing countries enjoy nation-wide electricity networks. The cost of a network is higher where operators must provide their own energy supply rather than relying on the national electricity network.

4.2.3 Other Technologies

Sub-section 4.2.1 discusses the difference between the intra-technology urban/rural relative costs versus the inter-technology relative costs. For instance, it may be the case, that especially for lower density areas, wireless technology may be relatively more economical to construct and operate than wireline technology.

Figure 1, adapted from the report by Navas-Sabater cited in the References below, shows, in a qualitative and graphical manner, some typical market niches (based on cost and other factors) for various technologies by line density and by distance from the exchange. Figure 1 is not necessarily drawn to scale, and the boundaries for each technology may not be as clear-cut as shown. Hence, even though there may be some lower-cost options to wireline technology in low-density zones, these cannot be considered as low-cost options in an absolute sense. Therefore, the general proposition holds that the provision of access to rural low-density areas, regardless of the technology used, is very significantly more costly than equivalent access in urban areas.

Figure 1: Typical Market Niches for Various Technologies



4.2.4 Costs Conclusion

Traditional consumer tariff policy has focussed almost exclusively on income as the main variable when determining tariffs. Under this approach, rural consumer tariffs are regulated to be below or at the same level as urban consumer tariffs. As argued in this sub-section, however, rural costs are very much higher. Based on these relative costs, this traditional approach makes no economic sense. The unintended result of this approach is that operators have simply chosen to under-provide or worse, to not provide, rural telecommunications services because to provide such services means incurring significant losses. This model therefore recommends that the operator selected to provide public payphones in rural areas be authorized to charge cost-oriented consumer

tariffs and cost-oriented interconnection charges. This makes economic sense and is the only logical approach given that the operator will generally not be able to cross subsidise its rural access services from other profitable services. This approach necessarily supports asymmetric pricing in rural and urban areas – that is, consumer tariffs and interconnection charges should be higher in rural areas than in urban areas.

4.3 Consumer Tariffs and Interconnection Charges

Consumer tariffs and interconnection charges are the principal revenue determinants for the licensee. As such, these two sets of revenue determinants must, in combination with the requested subsidy amount, ensure that the licensee is financially viable. This includes a reasonable return on any investment. Any reduction in the expected revenue stream provided by consumer tariffs and interconnection charges will result in the applicants requesting a correspondingly higher subsidy amount, and vice versa.

There are two important policy issues associated with the level and structure of consumer tariffs and interconnection charges. One relates to the actual level of these revenue determinants: consumer tariffs and interconnection charges must be set so that at the end of the relevant licensing period the licensee is financially viable on a going-forward basis and hence has the incentive to continue to provide the designated mandatory services. This is the floor level of consumer tariffs and interconnection charges. On the other hand, consumer tariffs and interconnection charges cannot be so high that the designated mandatory services are unaffordable to a significant majority of the population that is to receive those services. This is the ceiling level of consumer tariffs and interconnection charges Between these two acceptable perimeters, any difference in the level of consumer tariffs and interconnection charges will be reflected directly in differences in the amount of subsidy requested by potential operators.

The other policy issue relates to the relative structure of consumer tariffs and interconnection charges. Assuming that consumer tariffs and interconnection charges calculated based on total costs (of installing and operating the network) would be greater than the ceiling noted above, either consumer tariffs and/or interconnection charges have to be set below corresponding costs. This is a key policy decision for the USF Administrator. Further, consumer tariffs and interconnection charges have to be set in a logical and consistent manner so as to minimise any inefficient calling patterns based on arbitrage opportunities.

4.4 Structure of Consumer Tariffs

It is necessary, before discussing the actual level of consumer tariffs, however, to define the corresponding charging structure for the licensee. The licensee will likely be able to offer local and long distance services within the designated (or target) geographic area that incorporates the corresponding public payphones (the "region")[16]. The licensee should also be able to originate and terminate national long distance ("NLD") and international long distance ("ILD") calls in the region. At least initially, the licensee is not likely to be allowed to provide NLD and ILD services between two points outside of the region, rather only terminate such services within the region. In

16 The "Region" refers to the geographic area that incorporates the corresponding public payphones and within which the licensee will likely be able to offer local and long distance services. Preliminary work suggests that both consumer tariffs and interconnection charges may be very significant revenue determinants. A discussion paper prepared by B Wellenius in 2002, cited below, notes that the study of the traffic patterns in Chile suggest that slightly more than 50% of the licensee's calls are intra-region. The remaining calls, slightly less than 50%, are inter-region calls. A report prepared by A. Dymond for the World Bank in 2002 notes that that incoming calls to public payphones represent a very large percentage of total traffic.

essence, this means that the licensee has to be interconnected with the incumbent to terminate and originate ILD and NLD calls from outside of the region.

Clearly, the principal consumer tariff for the licensee will be the intra-region tariff. One approach is to set one unified consumer tariff for all intra-region calls. Another approach is to differentiate between local and intra-region NLD calls. Both approaches have advantages and disadvantages and the particular approach selected will depend on existing consumer tariff regulations or guidelines (if any exist), the kind of technology likely to be used by the licensee, and the size and shape of the region. For instance, if the region is relatively small and the licensee is likely to use satellite technology (which tends to make calling costs relatively more distance invariant), it is probably more appropriate to have a single consumer tariff for all intra-region calls.

Alternatively, if existing consumer tariff regulations or guidelines specifically stipulate that the licensee must differentiate between local and NLD calls, if the region is relatively large (say with a diameter of more than 500 km), or if the licensee is likely to use wireline technology (which tends to make calling costs relatively less distance invariant), it is probably more appropriate to differentiate between local and intra-region NLD calls. Under this scenario the criteria would have to be established for the definition of a local calling area. Distance charging bands for intra-region NLD calls would have to be established as well. For illustrative purposes this model uses an example of a consumer tariff structure for mandatory services that charges one consumer tariff for all intra-region calls.

The most transparent approach to setting inter-region consumer tariffs is based on wholesale interconnection charges. For instance, for inter-region NLD calls originated in the region, the consumer tariff would be the intra-region consumer tariff plus the applicable termination interconnection charges payable by the operator to the incumbent.

4.5 Level of Consumer Tariffs

Each USF Administrator should determine the applicable consumer tariff for its own Programme. For purposes of the discussion this model uses an illustrative benchmark intra-region consumer tariff of USD 0.10 per minute. While this rate may actually be appropriate to a wide range of countries, it is not necessarily appropriate for all situations. At the very least, the illustrative USD 0.10 per minute tariff may provide a good starting point for a USF Administrator's consumer tariff analysis, and could be used as a benchmark. As further developed in Appendix 3, this figure, for example, is in line with comparable consumer tariffs used in Latin America. It is also consistent with consumer tariffs that communities with income per capita of USD 500 per annum have been shown to spend, and therefore indicative of consumer tariffs that could be paid by end users of rural public payphones.

4.6 Interconnection Charges

The level of interconnection charges paid by and to the operator is a key determinant of financial viability. In an interconnection charge scheme there are generally three interconnection charges: an originating; a transit, and; a termination charge. In most countries, with the incumbent operator usually a national vertically integrated local and long-distance operator, this scheme is generally simplified into just two charges, an origination and a termination charge. One charge would correspond to the licensee and the other to the incumbent, depending on the direction of the call.

Given that rural access costs are very significantly higher than those in urban areas, one of the main regulatory recommendations is that the interconnection charges payable to rural operators

should correspondingly be higher than those paid to urban operators. This is a similar result to that of consumer tariffs.

4.6.1 Interconnection Charges Payable to the incumbent by the Licensee

The licensee must be permitted to interconnect its network with that of the incumbent. For calls originated on its network and terminated on the incumbent's network, interconnection rates should be based on wholesale interconnection charges. This is a critical issue for the financial viability of the licensee. Unless otherwise specifically stipulated in existing interconnection regulations, the incumbent will likely resist being paid wholesale interconnection rates, preferring to be paid higher retail-based consumer tariffs. This is not an appropriate operator-to-operator interconnection arrangement and the government should insist on the adoption and implementation of wholesale interconnection charges.

In terms of establishing the wholesale interconnection charges payable to the incumbent, it is likely that such comparable interconnection charges have already been established for other operators. It is likely that a wholesale NLD interconnection charge is payable to the incumbent operator by mobile cellular operators to carry and terminate calls to the fixed PSTN network. This may be the appropriate benchmark to establish interconnection termination charges payable by the licensee to the incumbent. Alternatively, an interconnection regulation may exist that sets out such wholesale interconnection charges.

If no wholesale interconnection charges are currently used within the country, an interim approach (while the studies are carried out to estimate the corresponding costs), is to use a wholesale-retail discount on the retail consumer tariff to proxy the wholesale interconnection charge, such as a 20% discount from retail consumer tariffs. This approach has been used as an interim measure in a number of countries.

The basis for this approach is that the wholesale interconnection tariff should be lower than the retail consumer tariff because the operator that terminates the call does not have to incur (that is, "avoids") certain costs that are imbedded in the retail consumer tariff. Hence, that operation should be able to charge a lower wholesale interconnection charge. These "avoided" costs include those associated with marketing the service, with collection and billing and other associated costs of retailing the service.

Regulators around the world have used different retail-wholesale discounts when proxying wholesale interconnection charges. The specific amount should be based on national conditions and on whether the retail charges are cost oriented. The NLD terminating interconnection charge payable to the incumbent by the licensee for calls originating in the region could be a wholesale interconnection charge, as determined above. Similarly, for ILD calls originating in the region the licensee should pay the incumbent a termination interconnection charge based on the sum of 1) the wholesale ILD terminating interconnection charge (or, in its absence, the prevailing outgoing ILD consumer tariff less a discount to account for avoided costs; and 2) the applicable NLD wholesale termination interconnection charge. Appendix 3 further develops the illustrative 20% retail/wholesale discount.

4.6.2 Interconnection Charges payable to the Licensee by the incumbent

It is crucial that interconnection charges paid to the licensee be above the floor level consumer tariffs and interconnection charges.

- **Origination Interconnection Charges.** The originating interconnection charge that the licensee would keep either for inter-region NLD or ILD calls could be the same as the licensee's intra-region consumer tariff. that is, the same as the illustrative benchmark USD 0.10 per minute where this is used. Alternatively, in order for the operator to receive a reasonable allocation of the excess profits associated with ILD calling, the cost-based origination charge proposed above could be supplemented by a "revenue-share" of the above-cost profits. This makes sense because the corresponding calls constitute new incremental traffic that would not otherwise exist if it were not for the licensee.[17]

- **Termination Interconnection Charges**. There are at least three approaches with respect to the termination interconnection charges payable to the licensee by the incumbent summarized here. Appendix 3 further develop these concepts, including providing numerical examples:

    - **Set interconnection termination charges as a ratio of the consumer tariff.** For the reasons outlined in Appendix 3, this is not a suitable alternative.

    - **Set interconnection termination rates to recover corresponding costs**.This is one of the preferred options. Refer to Appendix 3 for further discussion..

    - **Set interconnection termination charges to be the same as the proposed consumer tariff**. This is perhaps the preferred option, as long as the proposed consumer tariff is set accordingly (for instance, along the lines of the illustrative benchmark of USD 0.10 USD per minute). . Refer to Appendix 3 for further discussion.

17 This argument was advanced by Dymond (2000) .Note that while the trend around the world is to cost-based interconnection charges, there is significant evidence that prices are well above corresponding costs. This is especially the case with respect to ILD calling, and in particular, international net settlements, in spite of the recent developments. Hence, within a particularly country, the policy question becomes which operator is "entitled" to receive the excess profits from incremental ILD calling. Wallsten (2001) found no evidence that international in payments are correlated with teledensity. On the other hand, the main goal of the Licensee is to expand the network in rural areas. Given this, it appears reasonable that the Licensee should receive a reasonable share of these excess profits. The alternative is that all of these excess profits be handed over to the incumbent.

Appendix 1: Selected Minimum Subsidy Results

In this Section we summarise the results of minimum subsidy results for the provision of new public payphones in the rural areas of Chile, Peru and Colombia. This information includes: the number of firms that participated in each competitive process, what were the actual, and winning subsidy bid for each process, including the maximum available subsidy. Where such information exists, we also summarize data to quantify the extent of any additional telecommunications investment as a result of the minimum subsidy projects. For each country, we also provide some summary socio-economic and telecommunications-specific data.

Chile, Peru and Colombia established USFs in the 1990's to provide one-time subsidies for the provision of public access telephone services in unserved rural and remote areas. In all three cases the subsidies are awarded based on public international bidding process. The qualified applicant that offers to provide the designated services at the lowest subsidy wins the respective process and is awarded that subsidy to implement the designated services. A common feature of all three countries is that a maximum subsidy amount available for the specified projects is established by the USF Administrator before the bidding process is concluded.

Chile

Table A1: Chile – Country and Telecommunications Overview

GDP per capita (2000, USD) = $4638	Population (2000, millions) = 15.2	Urban Population (2000, %) = 85
Area (2000, millions km^2) = 0.75	Pop. density (2000, pop. per km^2) = 20.3	Telecom Rev. / GDP (2000, %) = 3.6
Fixed lines (2000, millions) = 3.4	Teledensity (2000, fixed lines per 100 pop.) = 22.1	
Wireless subscribers (2000, millions) = 3.4	Wireless density (2000, subscribers per 100 pop.) = 22.2	
Public Telephones (2000, thousands) = 19.1	Public density (2000, public phones per 1000 pop.) = 1.3	

The Chilean USF, the *Fondo de Desarrollo de Telecomunicaciones,* (FDT) was established in 1994. The FDT is financed from the Chilean national government budget. Each year, a specific budget allocation is approved for FDT purposes.

Table A2 below summarises the results of the FDT bidding process from 1995, its first year of operation, to 1999, the last year the FDT funded only public access telephony (later the FDT also funded access to the Internet). Between this period, a total of 183 separate projects were auctioned and approved. These projects covered 5,916 localities and served a population of about 2.157 million. A public access telephone was required to be installed and operated in each locality. On average, each public access telephone provided service to about 365 people. Table A2 demonstrates that competition between bidders reduced the actual subsidies paid (US$21.04million), as compared with the maximum subsidies available (US$42.15 million). Overall, the actual subsidy per locality (public access telephone) was US$3.6 thousand.

Table A2: Chile Overview Results

Year	Projects	Localities	Inhabitants in Localities (000)	Maximum Subsidy (US$000,000)	Actual Subsidy Granted (US$000,000)	Actual Subsidy per Locality (US$000)
1995	34	726	240	3.18	2.11	2.9
1996	18	1632	762	4.20	0.90	0.6
1997	70	2146	772	20.36	8.10	3.8
1998	27	858	229	8.89	5.53	6.4
1999	34	554	154	5.52	4.41	7.9
Total	**183**	**5916**	**2157**	**42.15**	**21.04**	**3.6**

The winning applicants must generally install the required public access telephones within a period of 6 to 20 months. Table A3 below shows the year-by-year installation schedule of the 5,916 public access telephones to be installed.

Table A3: Chile – Installation Schedule

		Year of Installation					
		1997	**1998**	**1999**	**2000**	**2001**	**Total**
Year project awarded	**1995**	265	461				726
	1996		979	653			1632
	1997		111	1663	372		2146
	1998			258	600		858
	1999				41	513	554
	Total	**265**	**1551**	**2574**	**1013**	**513**	**5916**

Chile is divided into 12 regions plus a capital region (R.M.). The Regions range from I at the northern end of Chile to XII at the southern end. The central Regions IV to X are the most densely populated. Table A4 below provides a regional analysis of the auction results from 1995 to 1999. It indicates that the average subsidy per locality is significantly higher in outlying regions as compared to the central regions.

Table A4: Chile – Summary of Regional Results

Region	Projects	Localities	Inhabitants (000)	Actual Subsidy Granted (US$000,000)	Actual Subsidy per Locality (US$000)
I	6	72	13	2.14	29.8
II	9	27	5	0.62	22.9
III	6	53	17	0.97	18.2
IV	11	392	115	1.78	4.5
V	15	435	169	0.74	1.7
VI	9	490	250	0.79	1.6
VII	15	969	376	1.04	1.1
VIII	26	1008	313	2.64	2.6
IX	27	998	303	3.54	3.5
X	35	904	263	4.11	4.5
XI	12	50	19	1.46	29.1
XII	7	25	4	0.83	33.4
R.M.	13	493	314	0.40	0.8
Total	**191**[18]	**5916**	**2157**	**21.04**	**3.6**

Table A5 below provides a summary of the five firms that have won at least one project in the competitive bidding processes in Chile. Note that CTC, the incumbent fixed line operator in Chile, has won the largest percentage of projects.

Table A5: Chile – Actual Winning Applicants

Firm	Actual Subsidy Granted (US$000,000)	Actual Subsidy Granted (%)	Number of Projects	Percentage of Projects (%)	Number of Localities	Percentage of Localities (%)
CTC	5.92	28.1%	63	34.4%	1880	31.8%
CTR	3.32	15.8%	38	20.8%	1843	31.2%
GENEVA	0.43	2.1%	8	4.4%	153	2.6%
GVT	7.67	36.4%	56	30.6%	1737	29.4%
MEGACOM	3.71	17.3	18	9.9%	303	5.1%
Total	21.04	100.0%	183	100.0%	5916	100.0%

Table A6 below provides a summary of the analysis carried out in 2001 with respect to the overall investment impact of the public subsidies. Analysis suggests that as a result of the public subsidy of about US$21 million, the five firms involved have undertaken: 1) about US$30 million in additional investment in public access telephones, and: 2) about US$109 million in additional investment in other services (including residential and commercial individual access lines and value added services). This means that, to date, US$1 of public subsidy leveraged over US$6 of private investment in Chile.

18 The total number of projects is shown as 191, rather than 183 in the rest of the tables. This is because some projects cross regional boundaries and hence were counted in more than one region.

Table A6: Chile – Subsidy Investment Impact

	Estimates of additional private investment leveraged by Public Subsidy (US$000,000)		
	Private Investment	**Public Subsidy**	**Total**
Public access telephones	30	21	51
Other Services	109	0	109
Total	**139**	**21**	**160**

Peru

Table A7: Peru - Country and Telecommunications Overview

GDP per capita (2000, USD) = $2084	Population (2000, millions) = 25.7	Urban Population (2000, %) = 73
Area (2000, millions km^2) = 1.3	Pop. density (2000, pop. per km^2) = 20.1	Telecom Rev. / GDP (1999, %) = 2.9
Fixed lines (2000, millions) = 1.72	Teledensity (2000, fixed lines per 100 pop.) = 6.7	
Wireless subscribers (2000, millions) = 1.27	Wireless density (2000, subscribers per 100 pop.) = 5.0	
Public Telephones (2000, thousands) = 84	Public density (2000, public phones per 1000 pop.) = 0.033	

The USF of Peru, the *Fondo de Inversión en Telelecomunicaciones* "FITEL", was created in 1994. FITEL is financed through a mandatory contribution from telecommunications operators at a rate of 1% of gross revenues.

FITEL's program began with the Northern Frontier pilot project, which was awarded in 1998. This project was a test case used to verify the design of the program. The project included 213 localities, with a total of about 59,000 inhabitants. The project required the installation of one new public telephone per locality. The maximum FITEL subsidy for the pilot project was US$4 million. The public bidding process was won by a subsidy bid of US$ 1.66 million to serve the designated communities. This sum was equal to 41% of the maximum available subsidy.

With respect to additional investment, analysis suggests that, to 2001, the original US$ 1.6 million has resulted in an additional investment of about US$3.3 million. This means that, to date, US$1 of public subsidy leveraged over US$2 of private investment.

An innovation of FITEL is that bidders are encouraged to bid simultaneously on more than one project. The objective is to provide the lowest total subsidy for all corresponding projects. There may be synergies in providing service to different localities or across various regions. Hence, an operator's willingness to serve a market at a given subsidy will depend on whether the operator can also serve other areas.

The first complete bidding process was undertaken by FITEL in 1999, with three available projects, corresponding to the South, Centre South and Jungle North regions of the country. In this bidding process the winning firm made a combined bid for all three projects for a total of US$10.99 million. This bid was well below the maximum available subsidy of US$50 million. Actual subsidy per locality was around US$5.7 thousand. The operators are required to install at least one public access telephone per designated locality. Details are provided in Table A8 below.

Table A8: Peru – Summary Results for 1999 process

Project	Localities	Inhabitants in Localities (000)	Maximum Subsidy Available (US$000,000)	Actual Subsidy Granted (US$000,000)	Actual Subsidy per Locality (US$000)
South	534	136	14.00		
Centre South	1029	303	27.00		
Jungle North	374	141	9.00		
Total	**1937**	**580**	**50.00**	**10.99**	**5.7**

Table A9 below provides the actual bids received by FITEL for the 1999 process. Note that all three participating bidders submitted individual bids for the three projects being auctioned at the time. However as discussed above, the winning bid (which minimised the total subsidy amount) was a combined bid for all three projects.

Table A9: Peru – Actual Bidding Results for 1999 process

		Actual Bidders (US$000,000)		
	Project	**Global Village Telecom**	**CIFSA International**	**Telerep**
Individual Bid	South	21.31	5.16	3.94
	Centre South	25.52	8.70	6.43
	Jungle North	22.44	4.39	3.19
Combinatorial Bids	South and Centre South	38.76		8.43
	South, Centre South and Jungle North	53.27	16.90	10.99

The second bidding process was undertaken by FITEL in 2000, with another three projects. On a preliminary basis, the process was won by a firm that made a combined bid for all three projects (this is shown in Tables A10 and A11 **in bold text in dark grey shading)** of US$27.85 million. However, the firm was not awarded the corresponding operating licence by the relevant Ministry. Hence, the preliminary winner was not authorised to provide the designated service and hence was not eligible to receive the subsidy. FITEL subsequently decided to provide the subsidy to the next two lowest bidders. The total combined subsidy paid to these two was the same as that of the original bid, that is US$27.85 million. These figures are presented in the Tables A10 and A11 below ***in italicised bold text in light grey shading***. This bidding process is currently under the review of judicial courts.

Table A10: Peru – Summary Results for 2000 process

Project	Localities	Inhabitants in Localities (000)	Maximum Subsidy Available (US$000,000)	Preliminary Subsidy Granted (US$000,000)	*Actual Subsidy to be Granted (US$000,000)*	*Actual Subsidy per Locality (US$000)*
Centre North	582	318	15.13		***7.00***	***12.0***
Centre West	770	258	20.02		***20.85***	***12.2***
North	938	520	24.39			
Total	**2290**	**1096**	**59.54**	**27.85**	***27.85***	***12.1***

Table A11: Peru – Actual Bidding Results for 2000 process

		Actual Bidders (US$000,000)				
	Project	**C&G Telecom and Avantec**	**Gilat to Home**	**Telefonica del Peru**	**Telecomunicaciones y Representaciones**	**Cifsa Telecom and STM Wireless**
Individual Bid	Centre North	11.18 ***7.00***	11.20	15.12	14.40	13.63
	Centre West	14.12	11.52	19.98	15.84	17.32
	North	18.84	14.97	24.39	17.76	8.82
Combinatorial Bids	North and Centre North	29.20				
	North and Centre West	31.32	***20.85***			
	Centre North and Centre West	24.79				
	Centre North, Centre West and North	40.00	37.70	48.03	47.99	**27.85**

Colombia

Table A12: Colombia - Country and Telecommunications Overview

GDP per capita (2000, USD) = $1921	Population (2000, millions) = 42.3	Urban Population (2000, %) = 75
Area (2000, millions km^2) = 1.03	Pop. density (2000, pop. per km^2) = 40.7	Telecom Rev. / GDP (2000, %) = 5.9
Fixed lines (2000, millions) = 7.2	Teledensity (2000, fixed lines per 100 pop.) = 16.9	
Wireless subscribers (2000, millions) = 2.3	Wireless density (2000, subscribers per 100 pop.) = 5.3	
Public Telephones (1999, thousands) = 106	Public density (1999, public phones per 1000 pop.) = 0.025	

The USF of Colombia, COMPARTEL, was established in 1998. The USF is financed from mandatory sector contributions and national government finances.

The first complete bidding process took place in 1999. A total of 6 projects, consisting of 6,865 localities were auctioned. The operators were required to install at least one public access phone in each designated locality. The total maximum available subsidy for all 6 projects was US$70.6 million. The summary results of this process are presented in Table A13 below.

Table A13: Colombia – Summary Results of 1999 process

Project	Localities	Maximum Subsidy (US$000,000)	Actual Subsidy Granted (US$000,000)	Actual Subsidy per Locality (US$000)
North-East	1574	11.61	5.19	3.3
Atlantic Coast	861	10.40	4.62	5.4
Centre West	1561	13.92	6.20	4.0
South-East	362	14.95	7.14	2.0
Coffee Region	1074	3.05	1.27	1.2
East	1433	16.67	7.42	5.2
Total	**6865**	**70.60**	**31.84**	**4.6**

Table A14 below provides greater detail of the actual bidding results for the seven participating bidders that took part in the 1999 process.

Table A14: Colombia – Actual Bidding Results for 1999 process

	Actual Bidders (US$000,000)						
Project	**GVT and Gilat Satellite Networks**	**Telecom, Hughes Networks and others**	**EDATEL**	**Telefonía Social del Caribe**	**Orientel**	**ERT and Acuavalle**	**Emtelsa and Pereira**
North-East	5.19	6.97	6.50				
Atlantic Coast	4.62	6.76	8.25	7.99			
Centre West	6.20	8.35	13.40		11.38		
South-East	7.14	10.83				14.50	
Coffee Region	1.27	2.13					2.10
East	7.42	10.00					

Appendix 2: Indicative Contents of a Sample Request for Proposal

The following is a summary of the contents of a sample request for proposal. This request for proposal is based upon a specific model that features a reverse-auction minimum subsidy process for the extension of public telecommunications services in rural areas in LDCs. The model involves both the issuance of a licence and the award of the subsidy to the successful applicant through a qualification and eligibility evaluation, followed by a single round reverse-auction. Pursuant to the model, the Licence and the subsidy are awarded to the Applicant that both meets all eligibility and qualification criteria and submits the lowest bid for the subsidy.

The model contemplated in this request for proposal has three stages. First, all applications for licence (AFLs) are opened and evaluated. The AFLs of any applicant that does not meet the eligibility and qualification criteria are rejected. Second, the licensing authority issues a letter of intent to issue the licence (LOI) to the qualified applicant that has proposed the lowest subsidy. The successful applicant then has a set period of time in which it must comply with a number of requirements, including the submission of a performance bond. If the applicant fails to comply with the requirements, the USF Administration has the right to refuse to issue the licence. The third and final stage occurs when the applicant has complied with all requirements and the licensing authority actually issues the licence to the applicant.

The licence that is issued pursuant to this sample request for proposal grants the licensee the right to offer designated services in certain specified geographic regions. The model features network rollout requirements that are based upon a minimum threshold obligation. The licensee must install a specified minimum number of lines in a specified minimum number of geographic regions in each year of the licence. The subsidy consists of a one-time grant payable in a number of tranches that correspond to the network rollout obligations of the licensee.

The contents of this sample request for proposal are shaped largely by the model adopted by it. The contents of an request for proposal that is based upon a different model would likely take into account different issues in its contents.

Contents	Notes
Part I – Definitions	
Definitions	• Should repeat relevant definitions from laws, regulations, etc., to ensure regulatory consistency. • Definitions in other documents may be referenced, e.g. definitions in laws, regulations, regulatory guidelines. • In some cases, definitions are included as an Annex to the request for proposal
Part II – General Introduction	
Introduction	• Provides a brief background to the request for proposal, including identification of: • The type and number of licence(s) that will be issued pursuant to the request for proposal; • The regulatory body issuing the request for proposal and the funding agency (if any); and • The relevant statutes and regulations.
Schedule	• Provides a timetable for the request for proposal process, identifying the various events in the request for proposal process, the number of days between the event and the start of

Contents	Notes
	the process and the calendar date of the event. • Provision should be made for possibility that an event date falls upon a holiday.
Address for Correspondence	• Identifies addressee and address for all correspondence related to the request for proposal.
Part III – Background Information on National Telecommunications Sector	
Information	• Provides background information about the country.
The Incumbent Network	• Describes existing incumbent network, and may include identification of: current operator(s); number of lines; technology employed; and penetration rates.
Rural Telecommunications Service Policy	• Describes rural telecommunications service policy (if any) or universal services policy (if any). • Relevant policy statements in statute, regulations or policy documents may be annexed to the request for proposal.
Tariffs, Numbering and Other Licensees	• References may be made to annexes to the request for proposal which contain detailed information about tariff structure and policies, the current tariffs of operators, the numbering plan and other licensees.
Part IV – Rights and Obligations of Licensee	
Exclusivity	• Define precisely, including time limits of exclusivity (if any), grounds for termination of exclusivity, possible extensions of exclusivity and any pre-conditions for extensions.
Network Roll-out Requirements	• Define precisely the network rollout obligations, including the schedule of network rollout, the network rollout requirements in terms of services and geographic localities and the process by which the rollout will be verified (e.g. through certification of an independent technical consultant appointed by the regulator). • The measure of network rollout may vary, depending on the type of licence. Examples include: number or percentage of lines activated and number or percentage of localities served. The USF Administrator may also specify the geographic regions that must have priority in network rollout. • Clearly specify the consequences for failing to meet the rollout requirements, including applicable penalties. The request for proposal should contain a clause protecting the licensee from the application of penalties where rollout delay results solely from an event of *force majeure.*
Subsidy Payment Schedule	• Define precisely the schedule for the payment of the subsidy, including the nature of the subsidy (e.g. a one-time grant); the maximum subsidy that will be paid; and any preconditions for payment of the subsidy. • The disbursement schedule may be either front-end loaded or back-end loaded. See sub-section 3.9.2. • The subsidy may be payable in a number of tranches. In this case, specify the payment schedule for each tranche; the amount of each tranche, expressed as a percentage of the total subsidy payment; and the pre-conditions for payment. • Include a provision that grants the funding agency the right to choose the bank instrument used to pay the subsidy.
Service Quality and Availability Obligations	• Define specific obligations concerning service quality, including: • Specific indicators (e.g. call completion rates, fault rate per line per annum and fault clearance rates) and relevant definitions, if applicable; • Standards to be met by specified dates; and • Reporting procedures. • Define specific obligations concerning service availability, including: • Hours of operation of public call offices and communications of such hours to the public, and

Contents	Notes
	• Number of lines that must be activated and in operation in each geographic region for the duration of the licence. • Specify clearly the consequences of failing to comply with service quality and availability obligations. • May be addressed or supplemented in other documents annexed to the request for proposal.
Scope of Service	• Approaches to licensing may differ (e.g., licensing of facilities or services). • Define precisely the mandatory services that the licensee will be required to provide, where applicable. See section 2.2. • Depending on the nature of telecommunications regulatory environment, the licensee may be restricted from providing certain services such as NLD (national long distance services) or ILD (international long distance services). Any restrictions should be clearly specified, including the nature of the restriction and the duration of the restriction. • As an incentive to submit an application, licensees may be given the right to acquire licences for restricted services such as NLD or ILD after a certain period. Any such right should be clearly identified, along with the pre-conditions and qualifications on the right to acquire such licences. • Define precisely the optional services that the licensee will be authorised to provide pursuant to the Licence, including the region in which the licensee will be authorised to provide such services, where applicable. See section 3.6.
Regulation of Incumbent	• Indicates that the incumbent will be regulated by the national regulatory authority (NRA) in order to ensure a level playing field between the incumbent and the Licensee and the prevention of anti-competitive behaviour.
Interconnection	• Outlines rights and obligations to interconnect. • Documents pertaining to interconnection (e.g. rates, reference interconnection offer, policies, etc) may be annexed to the request for proposal. See discussion on respective interconnection charges in section 4.6. • Require applicant to provide best estimate of number and size of the interconnection circuits and point(s) of interconnection that it will require during first two to five years of operation.
Regulation of Licensee's Consumer Tariffs	• Outlines regulations governing the licensee's tariffs, including but not limited to: process of tariff approval; maximum tariffs allowable; restriction on charging tariffs higher than those approved by the regulatory authority; indexing formula, if any, to protect licensee from local currency devaluation; and a requirement to post tariffs. See sections 4.4 and 4.5. • Documents pertaining to tariffs (e.g. maximum tariffs permitted, statutory and regulatory provisions and policies) may be annexed to the request for proposal.
Authority to Construct and Use Facilities	• Outline rights and obligations of licensee to construct and use facilities for the provision of services, including: • General authorisation to construct and use facilities; • Identification of authorised technology and technical requirements; • Restrictions on equipment that may be used (e.g. type approval, equipment must be new when installed, etc); and • Rules on procurement procedures, if any.
Access to Public and Private Lands	• Outline rights of licensee to access public and private land, including expropriation rights, if applicable. • Cite legal authority for any such rights. • Include rules of access, if not stated elsewhere (e.g. payment, if any, public safety and convenience, aesthetics, compliance with applicable law).
Co-operation among	• Specific obligation to co-operate with the incumbent, other licensees and any other

Contents	Notes
Licensees	telecommunications service providers in order to ensure compatible and consistent types and quality of service to telecommunications users across the country.
Transfer of Control of Licence	• Rules and restrictions on the transfer of control of the licence and the change of ultimate control of the licensee. Cross reference to applicable statutory and regulatory provisions. • Often transfer of the licence and change of ultimate control of the licensee are not permitted (at least not without consent).
Compliance with Law	• Requirement to comply with all laws of the issuing country.
Term of Licence	• Duration of licence and renewal terms, if applicable. Pre-conditions for renewal should be clearly stated.
Fees Payable by the Licensee	• Specify all fees that licensee will be required to pay, including type of fee, when payable and basis on which fee will be calculated. See discussion in sub-section 3.7.
Frequency	• Spectrum is often licensed separately from licence issued pursuant to the request for proposal. • Specify process and fees for obtaining spectrum authorisations. This provides certainty for Licensees who will use wireless technologies. • Require applicants to specify the spectrum requirements of their proposed service, including frequency bands, number of channels and anticipated use. • Application for spectrum and any applicable policies and regulations may be annexed to the request for proposal.
Part V – Instructions to Applicants	
Selection of Successful Applicant	• Specify clearly the basis upon which the successful applicant will be selected for issuance of licence and the award of the subsidy.
Meaning of "Qualified Applicant"	• Outline clearly the criteria that applicants must satisfy in order to advance in licensing process. May cross-reference other sections of the request for proposal such as the eligibility and qualifications section and the grounds for disqualification section.
General Eligibility and Qualifications	• Describes general eligibility and qualification requirements for the application for licence and the applicant. See section 3.8 for a discussion of eligibility criteria. • There may be limitations on the number of AFLs that any one person may participate in. • Each requirement should correspond to an obligation to provide evidence in the AFL that the applicant has met the relevant requirement. The obligation to provide such evidence should be outlined in the section concerning the content and format for subsidy and structure requirements section.
Eligibility of Applicants	• Describes specific eligibility requirements for applicant. Requirements may include: legal status of applicant; national participation (may be done before or after the issuance of the licence); financing capacity; and operational experience, including field-proven equipment. See section 3.8 for a discussion of eligibility criteria. • Specify clearly what the applicant must demonstrate in order to satisfy the requirements and the evidence upon which the applicant may rely to demonstrate compliance. This promotes transparency and certainty in the request for proposal process. See section 3.8. • Each eligibility requirement should correspond to an obligation to provide evidence in the AFL that the applicant has met the relevant requirement. The obligation to provide such evidence should be outlined in the section concerning the content and format for subsidy and structure requirements section.
Period of Validity of Application	• Specify the validity period of the application from the closing date specified in the request for proposal. This prevents applicants from altering or withdrawing their applications midway through the licensing process. • May include a provision to extend the period of validity. Identify procedures for extending the period of validity, including the length of the extension period and whether the consent of the applicant is required.
Bid Security	• Clearly specify the amount of the bid security, the form of the bid security and identify

Contents	Notes
	which financial institutions will be eligible to issue the bid security. See section 3.9. • Specify mandatory validity period of bid security, including the possibility of extension. Identify procedures for extending the bid security, including length of the extension period and whether the consent of the applicant is required. • Specify when the bid security of the successful and unsuccessful applicants will be released (e.g. 30 days after the licence is issued) in order to promote greater certainty in the licensing process. • Specify clearly the conditions under which the bid security may be forfeited.
Grounds for Disqualification	• Clearly identify the grounds for disqualifying applicants. • Grounds may include: failure to register with the USF Administrator; failure to submit the application by the application deadline; failure to complete the application in accordance with the request for proposal; failure to comply with the procedures and requirements in the request for proposal; failure to submit the bid security; misrepresentation of facts in the application; illegal conduct; corrupt practices; and fraudulent practices. • Specify whether USF Administrator evaluation team will have discretion to disqualify applicants. • May subsequently disqualify a successful applicant and revoke the licence without compensation if evidence arises after the issuance of the licence of any of the grounds for disqualification.
Content and Format of Application for Licence (AFL)	• Set out the content and form of the application in general terms. • Generally includes two components: the "qualifications and service proposal" and the "subsidy proposal".

Structure Requirements	• Describe clearly the documents and information that must be included in the AFL.
	• All documents and information that are necessary to establish that the applicant has met the eligibility and qualification requirements described in the request for proposal should be a required component of the AFL.
	• Typical documentation and information may include:
	  • Cover letter, including a description of the applicant and the proposed licensee; an indication of a firm commitment to apply for the licence and subsidy; the bid security; powers of attorney; and a formal application for the licence.
	  • Information and documentation pertaining to the bid of the applicant, if applicable.
	  • Information about the proposed licensee, including information and documentation about the proposed licensee's legal status and organization.
	  • Information and documentation about the requirements pertaining to national participation; financing capacity; technical expertise and professional skills; equipment; and operational experience.
	  • Network description.
	  • Information about operations, including how the applicant proposes to run the business; a summary of any land that must be procured; a description of the proposed licensee's procedures and systems related to quality standards, performance monitoring, call metering and billing and maintenance.
	  • Pro forma financial statements.
	  • Proposed tariffs.
	  • Interconnection requirements.

Subsidy Proposal	• Include Instructions on the required form for the bid proposal.

Contents	Notes
	• The bid proposal should be submitted in a sealed envelope clearly marked "bid proposal" in the AFL. • A bid proposal form may be annexed to the request for proposal.
Compliance Checklist	• Require applicants to complete a "compliance checklist" that lists all required information and documents, indicates whether the applicant has included the relevant material and cross references the specific parts and page numbers of the AFL with the required information and documentation. • Checklist should be included as an annex to the request for proposal.
Submission of the AFS	• Provide clear instructions concerning the submission of the AFL. • Instructions should include: • A summary of what documents and information comprise the AFL. • The number of copies to be submitted. • Particular instructions concerning the bid security. • Delivery instructions, including address for delivery. • Instructions concerning the labelling and sealing of the AFL package. • Closing date and time of submission. • Information about any pre-proposal information meetings. • The date, time and location for the opening of the AFLs.
Evaluation of Applications	• Specify clearly the procedure for the evaluation of the applications in order to promote transparency and certainty. • Specify when the bid proposals of applicants will be opened. Approaches vary. Sometimes the bid proposals are opened at the same time as the general AFL package is opened. Other times, the bid proposals of qualified applicants are opened only after the NRA has determined which applicants meet the qualification and eligibility requirements.• Specify the procedure to be followed in case of a tie between applicants.
Issuance of Licence	• Issuance of licence typically involves (a) the issuance of a letter of intent to issue the licence (LOI), followed by (b) the issuance of the licence, provided that the conditions of the LOI have been met. • LOI confirms the licensing authority's intention to award the licence to the proposed licensee of the successful applicant. However, the LOI makes the actual issuance of the licence contingent on the satisfaction of a number of conditions. For example, the licence may not be issued until the performance guarantee is submitted. All such conditions should be clearly specified. • Specify that the issuance of the LOI does not give the successful applicant the right to obtain the licence and subsidy. The successful applicant must comply with all provisions of the request for proposal and the LOI prior to the issuance of licence.
Performance Guarantee	• Outlines clearly the requirements for the performance guarantee, including the amount of the guarantee; financial institutions approved to issue the guarantee; the validity period of the performance guarantee; and the schedule for the release of the performance guarantee. Sometimes a certain percentage of the performance guarantee may be released prior to the end of the licence term if certain conditions are met. See section 3.9. • Identify the circumstances in which the performance guarantee will be forfeited. Such circumstances may include: the failure to meet the rollout requirements and the failure to meet the service quality and availability guidelines. • The form of the performance guarantee may be annexed to the request for proposal.
Attendance Register and Minutes of Meetings	• Outlines requirement of NRA to maintain an attendance register for any pre-proposal meetings, as well as for the meeting where the AFLs are opened. • Outlines responsibility of NRA to prepare minutes of such meetings.
Information Provided	• USF Administrator will try to ensure that all applicants are provided with the same

Contents	Notes
by USF Administrator	information during the application process. • Limitation of liability of the USF Administrator, its employees, etc with respect to use of information provided in respect of the request for proposal process.
Communications and Requests for Clarification	• Outlines procedures for communicating with the USF Administrator concerning the request for proposal process. • May include a procedure for posing questions of clarification to the USF Administrator.
Confidentiality of Applications	• Describes how applications will be treated with respect to confidentiality. • Approaches to confidentiality differ. For example, in some cases, applicants may claim total confidentiality. In other cases, the USF Administrator determines what information will be treated confidentially. • Sometimes, a hybrid approach is used. For example, applications are treated as confidential throughout the request for proposal process. After the issuance of licence, the USF Administrator may place some or all of the AFLs on the public record, but is required to provide the applicant with an opportunity to request that commercially sensitive or proprietary information be treated as confidential. • Typically includes a limitation of liability of the USF Administrator, its employees, etc in respect of any damages or harming resulting from a failure to maintain confidentiality.
NRA Use of Applications	• Reserves right of the NRA to use or reproduce ideas and information in an AFL without notice or payment to the applicant.
Cost of Application and Bidding	• Clearly allocates the responsibility for the costs of the preparation and submission of the AFL to the applicant.
Modification of the Terms of Licence	• Reserves the right of the NRA to modify the terms of the draft licence annexed to the RFA. • Once the licence has been issued, the licence may only be modified in accordance with the terms of the licence.
Reservation of Rights	• Reserves the right of the USF Administrator to modify or terminate the application process or to revoke the LOI at any time before the licence is actually issued. • Typically includes a limitation of liability of the USF Administrator, its employees, etc in respect of any damages or harm resulting from any action or decision taken in connection with the evaluation or disqualification of an application.
Legal and Formal Requirements	• Identifies the governing law of the request for proposal and any licence issued pursuant to the request for proposal. • Identifies the procedures to be applied to the settlement of disputes (e.g. the application of the UNCITRAL Arbitration Rules). • Identifies the languages in which an AFL, accompanying documentation and any correspondence with the USF Administrator must be. • Identifies the currency for payment of amounts identified in the request for proposal.
Part VI – Annexes	
Annex 1: List of Localities to be served	• Where the licence will be issued for a specific geographic region or for certain localities, include a list of such regions or localities.
Annex 2: Telecommunications Law	• Include an updated version of the telecommunications law.
Annex 3: Telecommunications Regulations (or Guidelines)	• Include any relevant telecommunications regulations or guidelines.
Annex 4: Telecommunications Policy	• Include any relevant telecommunications policies.

Contents	Notes
Annex 5: General Guidelines on Interconnection	• Include any guidelines on interconnection, if any have been developed.
Annex 6: Reference Interconnection Offer of PTT	• Include the current reference interconnection offer of the incumbent.
Annex 7: Tariff Guideline	• Include the current tariff guideline, if one has been developed.
Annex 8: Existing Consumer Tariffs of incumbent.	• Include the current consumer tariffs of the incumbent.
Annex 9: Map of Country	• Include a map of the country.
Annex 10: Description of incumbent network, including map/diagram switching/transmission network	• Include a description of the incumbent network. This may be included in the body of the request for proposal.
Annex 11: National Numbering Plan	• Include the national numbering plan, regional numbering plan and related documents, if applicable.
Annex 12: Subsidy Proposal Form	• Include a form for the subsidy proposal.
Annex 13: Application for Frequency	• Include standard application for frequency.
Annex 14: Bid Security Form	• Include a form for bid security.
Annex 15: Performance Guarantee Form	• Include a form for the performance guarantee.
Annex 16: Draft of Proposed Licence	• Include a draft of the proposed licence. • Terms of the draft licence should mirror relevant provisions in the request for proposal.
Annex 17: Compliance Checklist	• Include a compliance checklist, as discussed in the request for proposal. • Provisions of the compliance checklist should mirror relevant provisions in the request for proposal.

Appendix 3: Development of Illustrative Consumer Tariffs and Interconnection Charges

Appendix 3 further develops the illustrative consumer tariff of USD 0.10 introduced in section 4. It also provides greater detail concerning termination interconnection charges payable to the licensee, and conclude by presenting these findings in table format.

Level of Consumer Tariff

Sub-section 4.5 of Part II of the model notes that each USF Administrator should determine the applicable consumer tariff for its own Programme. Part II of the model also introduces an illustrative benchmark intra-region consumer tariff of USD 0.10 per minute. The sub-sections below summarize a methodology to develop this type of benchmark.

Comparable Consumer Tariffs

It is very likely that the proposed consumer tariff of USD 0.10 per minute is at or below a current regulatory or market-determined consumer tariff for comparable or similar services in the country. For instance, the proposed consumer tariff is below the average of the total payment (from the called party and the calling party) of a mobile cellular call in developing countries[19]. Similarly, new services such as WLL, VSAT, and other alternative technologies to a wired local loop are probably priced in these ranges. Lastly, the proposed intra-Region consumer tariff of US 0.10 is also probably similar to the existing NLD rates for relatively short distances (i.e. less than 250 to 500 kilometres).

Sub-section 4.2 argues that rural access is significantly more costly than urban access and that it may be as much as 6 to 10 times more expensive. It is also likely that the proposed consumer tariff of USD 0.10 per minute is significantly below the 6 to 10 multiples of the current local consumer tariff in urban areas in the country. This is all to say that the proposed tariff of USD 0.10 appears to be quite reasonable.

Willingness-to-Pay

The proposed consumer tariff of USD 0.10 per minute also appears to be consistent with the following very general "back of the envelope" willingness-to-pay ("WTP") analysis. Assume that each locality has an average population of approximately 371 people. Detailed analysis of actual calling patterns in Chile suggest that the locality would generate approximately 390 outgoing calls per month, or about 39 outgoing minutes per day (assuming an average call duration of three minutes and a 30-day month). At the proposed consumer tariff of USD 0.10, that amount of calling would mean total expenditures of US$3.90 per day per public payphone.

As noted above, international experience suggests that communities as a whole are willing to spend at least 2.5% or more of total community income on telecommunications expenses. As a very conservative figure, this Appendix uses 1.5%. Based on an income per capita benchmark of USD 500 per annum, 1.5% of community income is US$7.62 per day (371x$500x0.015/365). This

19 According to ITU (2002), the average subscription charge for cellular service is US$12.50 per month in "Low Income Countries". For Lower Middle Income Countries the average subscription is US$18.30 per month. An average peak 3 minute local call is US$0.43 and US$0.69, respectively. Assuming an conservative average of about 125 and 150 minutes of use per month, respectively, the effective per minute cellular tariff (including the subscription fee) is (12.50+(0.43/3X125))/125=0.243 and (18.30+(0.69/3X150))/150=0.352, respectively.

WTP figure is greater than the estimated expenditures resulting from the proposed consumer tariff. Even for the smallest of localities, those with 251 inhabitants, total expenditures per public payphone of about USD 3.50 per day would still be lower than the corresponding WTP of about USD 5.16.

Cost Benchmarks

The proposed consumer tariff of USD 0.10 per minute is consistent with comparable consumer tariffs in actual use in Latin America. In Colombia for instance, the operator may charge up to the following per minute consumer tariffs from its respective public payphones: USD 0.123 for local calls; USD 0.174 for intra-Region NLD calls; and USD 0.272 for inter-Region NLD calls. In Chile, local and intra-Region NLD calls are USD 0.11 per minute. Inter-Regional NLD calls are USD 0.11 per minute plus the corresponding long distance carriage charge and the termination charge in the destination network.

Discussion of Benchmark Consumer Tariff

As discussed above, rural telecommunications access service could be as much as 6 to 10 times more costly than urban service. Based on a similar analysis as that carried out above for cellular tariffs, and based on ITU (2002) data, the average effective per minute wireline call in Low Income and Lower-Middle Income countries is ($3.60+(0.08/3*3975))/375=0.036 and (4.00+(0.05/3*450))/450=0.026, respectively. Hence the proposed tariff of US$0.10 per minute is only 3 to 4 times the comparable effective consumer tariff. Note also that it is recognized that monthly subscription and local call tariffs are not cost-oriented and are often well below their respective costs.

One potential disadvantage of this benchmark approach is that the proposed consumer tariff of USD 0.10 could be below the floor level of consumer tariffs. In the absence of the relevant forward-looking cost data it is not possible to be definitive whether the proposed USD 0.10 per minute tariff is below or above the corresponding floor level. Based on comparable benchmarks to determine relevant costs (i.e. the Chile example), the proposed USD 0.10 per minute consumer tariff is very likely below the corresponding costs.

Termination Interconnection Charges

Sub-section 4.6.2 introduced three options with respect to the termination interconnection charges payable to the licensee. These options are further developed here, including with numerical examples, based on the illustrative consumer tariff of USD 0.10.

Set interconnection termination charges as a ratio of the consumer tariff

Under this approach, termination rates are set at a percentage of the consumer tariff. Where, for example, the consumer tariff is USD 0.10, and the applicable ratio 40%, the termination charge would be about USD 0.04. Where the consumer tariff is set below cost, however, this alternative runs the risk that in combination, these consumer tariffs and interconnection charges may be well below the floor level. Further, this alternative would imply that the licensee termination charge would be lower than and different from the licensee origination charge as proposed above – as such, this alternative could result in inefficient calling patterns based on arbitrage opportunities. For both these reasons it is not recognized as a suitable alternative.

Set interconnection termination rates to recover corresponding costs

This alternative implies that the termination service would not be subsidised. In the absence of relevant forward-looking cost data, we would have to rely on comparable benchmarks to determine comparable costs. In Chile other operators are required to pay an interconnection access charge of USD 0.187 per minute for terminating calls on the licensee's network. In Chile, unlike the licensee's consumer tariffs, which are subsidised, interconnection charges are calculated to recover all of the corresponding costs. Based on, *inter alia*, the Chile example, therefore, this charge could be in the range of US 0.15 to USD 0.20 per minute. This alternative would imply that the licensee termination charge (USD0.15 to USD0.20) would be higher than and different from the licensee origination charge. Hence, there could be a risk of inefficient calling patterns based on arbitrage opportunities. However, this alternative reduces the possibility that the interconnection charges fall below the floor level.

Set interconnection termination charges to be the same as the proposed consumer tariff.

This alternative would imply that the termination interconnection charge would be equal to the proposed origination interconnection charge. This alternative reduces the possibility that the interconnection charges fall below the floor level. Given that the origination and termination charges are the same, the possibility of inefficient calling patterns would be eliminated.

Discussion of interconnection termination charges

Another factor to take into account is to ensure that the total consumer tariff paid by consumers outside of the region who wish to call the designate public payphones does not approach the respective ceiling level. For many callers, a termination charge of USD 0.10 could mean a total NLD rate of over USD 0.20. This is based on the lower (second alternative) termination rate of USD 0.10 (plus any applicable retail premium on the wholesale termination rate), in addition to the incumbent standard NLD rate (for the call to be carried to the Point of Interconnection), which is likely to be in the vicinity of about USD 0.10.

The total consumer tariff of about USD 0.20 could rise to as high as USD 0.30 if the higher (third alternative) termination charge is chosen. The higher NLD consumer tariff of USD 0.30 to call the region is probably too high and may be approaching the ceiling level of consumer tariffs for people outside of the licensee's network.

This balance between the interests of the user's within the region and those outside should also take into account relative incomes and associated willingness-to-pay. For instance, a higher licensee termination rate may be justified in countries where urban dwellers are on average many times richer than their rural compatriots. That means that urbanites that call the region can better afford the higher consumer tariffs.

Table of Illustrative Consumer Tariffs and Interconnection Charges

Table 2 below summarizes the discussion of section 4 and Appendix 3 and presents in table format the illustrative consumer tariffs and interconnection charges.

Table 2: Illustrative Consumer Tariffs and Interconnection Charges

	Intra-Region Call originated & terminated on Licensee network	**Outbound National Long Distance (NLD) Call** originated on Licensee and terminated on incumbent[(2)]	**Outbound International Long Distance (ILD) Call** originated on Licensee and transited by incumbent[(2)]	**Inbound NLD or ILD Call** originated or transited by incumbent and terminated by Licensee
Basic Licensee Consumer Tariff [(1)]	$0.10	$0.10	$0.10	0 (zero)
Supplementary Licensee Consumer Tariff [(1)]	0 (zero)	The corresponding incumbent NLD wholesale termination interconnection charge plus a retail premium of 25% [(8)]	A) The corresponding incumbent NLD wholesale termination interconnection charge, where applicable to carry call to incumbent international gateway plus a retail premium of 25% [(6)] plus B) Incumbent's prevailing ILD consumer tariff.	0 (zero)
Interconnection (termination) Charge payable by Licensee to incumbent [(1)(2)]	N/A	The corresponding incumbent NLD wholesale termination interconnection charge	A) The corresponding incumbent NLD wholesale termination interconnection charge, where applicable to carry call to incumbent international gateway plus B) Incumbent's prevailing ILD tariff minus a wholesale discount of 20% [(6)]	N/A
Interconnection (termination) Charge payable by Incumbent to Licensee [(1)(3)]	N/A	N/A	N/A	$0.10 plus any supplementary "revenue-share" from profitable NLD or ILD calling

Notes:
N/A Not applicable
(1) All rates are in USD per minute, unless otherwise indicated.
(2) Paid by the Licensee to the incumbent or other operator, unless different a rate is mutually agreed.
(3) Consumer tariffs and interconnection to be indexed, as per note below.
(4) Termination interconnection charges discussed in text above.
(5) The 20% wholesale discount is the same as discussed in main text.
(6) The 25% retail premium is the equivalent of the 20% wholesale discount in [(5)] above.

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