

Designing Pro-Poor Water and Sewer Concessions: Early Lessons from Bolivia

Governments in many developing countries are looking to private concessionaires to improve water and sanitation services in low-income areas. To design pro-poor concession arrangements in the water sector, policy makers must pay careful attention to how the proposed contract and existing or proposed regulations will affect the obligations, ability, and financial incentives of the private concessionaires to serve low-income households.

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Summary of findings

To design pro-poor concession arrangements in the water sector, policy makers must pay careful attention to how proposed contract and existing regulations will affect the obligations, ability, and financial incentives of the private concessionaires to serve low-income areas.

The Bolivian government awarded a concession for water and sewer services in La Paz-El Alto in 1997. One goal of the process was to expand in-house water and sewer service to low-income households. Komives uses the Aguas del Illimani case as a basis for exploring how the design of typical concession agreements (i.e. monopoly private service supplier) can affect outcomes in poor neighborhoods.

She finds that concession contracts, the contract bid process, sector regulations, and regulatory arrangements all have the potential to affect service outcomes. Policy makers can increase the likelihood of improvements in low-income areas by (1) making contract objectives clear and easily measurable, (2) eliminating policy barriers to serving the poor (e.g. service boundaries that exclude poor neighborhoods, property title requirements), and (3) designing financial incentives that are consistent with service expansion or improvement objectives for low-income areas. As contracts are subject to renegotiation, expansion or connection mandates alone do not guarantee that concessionaires will serve poor areas. Provisions and standards that reduce service options (e.g. requirement to eliminate all alternatives to in-house connections) or restrict the emergence of new service providers (e.g. exclusivity in the service area) have the potential to cause more harm than good.

In its two years of operation, Aguas del Illimani met its first expansion mandate and took many steps to facilitate the expansion of in-house water connections in low-income areas. The company and the Bolivian water regulator proved willing to discuss and seek possible solutions to problems related to serving poor neighborhoods. Nonetheless, it is too early to conclude that these gains will be sustainable or to predict how privatization will ultimately affect poor households in La Paz and El Alto.

Introduction¹

Water and sanitation services in La Paz, Bolivia exhibit a pattern common to urban areas in developing countries: the city's utility provides in-house water and sewer service to wealthier residents in the city center, while poorer residents in outlying areas rely on an assortment of alternative water and sanitation solutions. Some argue that poverty creates this service disparity: poor households simply cannot afford improved water and sanitation service. Others place the blame with the water utilities: low cost recovery, insufficient investment capital, poor management, and susceptibility to political influence have prevented utilities from expanding their service into poor neighborhoods.

If weaknesses in utilities are a major barrier to improving water and sanitation for the poor, then private concession agreements offer a possible solution. Governments in developing countries have signed an increasing number of water and sewer concession contracts in recent years. Concessions give private companies responsibility for the operation and maintenance of public water and sewer assets over a period of time -- usually 25 to 30 years -- and for new capital investments in the system. Most contracts follow a monopoly utility model -- the private concessionaire, like the public utility before it, remains the sole supplier of water and sanitation services. The typical contract seeks to improve services in low-income areas by requiring the concessionaire to expand formal water and sewer networks into these neighborhoods. Private concessions introduce the possibility that competition for the service monopoly, better management, private investment funds, specific performance and expansion objectives, and stricter regulatory oversight will improve services for the poor. Privatization reforms in the water and sanitation sector have shied away from other possible strategies for improving services in low-income areas (e.g. competition between service providers within one market area, wide-spread use of alternatives to formal network connections, et cetera).

In July 1997, the government of Bolivia awarded a concession for the operation and expansion of water and sewer services in La Paz-El Alto to Aguas del Illimani -- a consortium headed by Lyonnaise des Eaux. This contract is a central piece of the government's strategy to provide all households in the poor peri-urban neighborhoods of La Paz and El Alto with access to high-quality water and sewer connections. To win the concession contract, Aguas del Illimani committed to extend in-house water connections to virtually all unconnected households in the metropolitan area by December 31, 2001.

¹ Research for this paper was done during a 1998 summer internship with the Private Participation in Infrastructure Group at the World Bank. The research and writing were possible thanks to the assistance and helpful comments of many people in La Paz and Washington, D.C. I am particularly grateful to: Penelope Brook, Vincent Gouarné, Tova Solo, Sue Goldmark, Nicola Tynan, Grace Sorensen, and Jordan Schwartz of the World Bank; Alain Mathys, Miguel Vargas, Sandra Siles, and Laureen Chung of the UNDP-World Bank Water and Sanitation Program in La Paz; Alain Carbonel, Ernesto Martínez, Pierre Segré, Guillermo Mingolla and Eduardo Arauco of Aguas del Illimani; Luis Guillermo Uzín, Claudia Vargas, and Lilia de Aguirre of the Bolivian Superintendencia de Aguas; Guillermo Arroyo of SAMAPA; Juan Payeras and William Bulmer of the IFC; the NGO Red Habitat; and many officials of the Bolivian, El Alto, and La Paz governments.

The company also agreed to a gradual expansion of sewer service, achieving 90 percent coverage in 2021.²

The Aguas del Illimani contract generally follows the typical monopoly concession model. What sets this contract apart from other agreements is its almost exclusive focus on extending the service area while maintaining a high level of service. Most contracts also seek to achieve other objectives, such as tariff reductions, which could conflict with service expansion goals. Thus, Aguas del Illimani makes a particularly good case for examining how traditional concession structures might improve water and sewer service in poor urban areas.

The goal of this paper is not to evaluate the performance of Aguas del Illimani or to assess the impact of water privatization on low-income households. That type of analysis would be premature, as Aguas del Illimani was only in its second year of operation when research for this paper was conducted. Instead, this paper uses the Bolivian experience to draw preliminary conclusions about how to design “pro-poor” concession arrangements -- arrangements that complement the policy objective of improving urban water and sanitation services in low-income areas. “Pro-poor” concession arrangements should, at a minimum, avoid harming poor households. At best, “pro-poor” arrangements would actively encourage concessionaires to meet the demand for improved services in low-income areas, without jeopardizing the financial viability of the concession arrangement.

Concession contracts are just one element in concession arrangements; sector policies and regulations, the contract bid process, and the regulatory regime are also important components of these arrangements. For this reason, this paper examines not only the Aguas del Illimani contract, but also other policies and institutions that affect water and sanitation service in the La Paz-El Alto metropolitan area.

The paper is organized in three sections.

- *Current situation* Section one briefly describes the water and sanitation situation in the La Paz-El Alto metropolitan area.
- *Policy framework* Section two describes the evolution of the Bolivian urban water and sanitation policy framework, beginning with municipally-controlled services and moving toward national enforcement of a universal service strategy in urban areas.
- *Designing “pro-poor” concession arrangements* Finally, section three examines how specific elements of the La Paz-El Alto concession arrangement could help or hinder the general goal of improving water and sanitation service in low-income areas.

² Financing for the first 5-year phase of the Aguas del Illimani concession is currently being arranged by a group of multilaterals including the International Financial Corporation.

I. The water and sanitation situation in La Paz and El Alto

The La Paz-El Alto metropolitan area has a population of over 1.3 million. The population is roughly divided between La Paz and its rapidly growing neighbor El Alto.³ Development in La Paz initially was nestled in a steep river valley, but the city has since grown up the sides of the valley and into El Alto on the vast plain above. The wealthiest residents of the metropolitan area live deep in the valley, while low-income families live in El Alto and on the steep slopes, or “laderas,” surrounding central La Paz.

As in many Latin American cities, public services in the poorer, often newer, neighborhoods on the outskirts of the metropolitan area lag behind services in the wealthier and older central area. Water and sewer services are no exception. In-house water and sewer connections are much more prevalent in central and southern La Paz than in El Alto and the laderas of La Paz.

Somewhere between 83 and 93 percent of El Alto and La Paz residents have access to some form of piped water service: either an in-house water connection or a public tap near their homes.⁴ Households without in-house water connections or access to public standposts meet their demand for water with a combination of water vendors, municipal water delivery service, neighbors with water service, rainwater collection, private household wells, and nearby streams.⁵

An estimated 66 percent of La Paz homes and between 30 and 45 percent of El Alto homes have sewer service.⁶ For households without sewer service, septic tanks offer an alternative, but in 1992, only a small number of households had septic tanks: 4 percent of households in El Alto and 21 percent in La Paz.⁷ Households without septic tanks or sewer connections in their homes use stream beds, latrines, public toilets, and toilets in other private homes.

³ Estimates place the current El Alto population at 600,000 residents and the La Paz population at 740,000. These estimates are based on census figures from 1992 and the historical growth rate in the two cities. In 1992, the population of El Alto and La Paz was 405,492 and 713,378 respectively. From 1982 to 1992, El Alto grew at 9.4 percent per year and La Paz at 1.6 percent per year. *Censo de Población y Vivienda 1992*.

⁴ Current coverage figures are based on estimates of the number of housing units in La Paz and El Alto and of the number of households that use each public tap. Because exact data is not available, different sources produce different estimates. In 1992 (the date of the most recent census), 33 percent of El Alto residents, as compared to 55 percent of La Paz residents, reported having in-house water connections. *Censo de Población y Vivienda 1992*.

⁵ *Informe Final: Diagnóstico Rápido sobre las Condiciones de Saneamiento Básico en las Zonas Urbano Marginales de la Ciudad de El Alto*, 1998, prepared for the UNDP-World Bank Water and Sanitation Program by Centro de Estudios y Proyectos of Bolivia.

⁶ Like water coverage figures, sewer coverage figures are estimates based on inexact data. Estimates from different sources, therefore, vary.

⁷ *Censo de Población y Vivienda 1992*

II. Evolution of Bolivian water and sanitation policy: towards national enforcement of a universal service strategy

Responsibility for the provision and expansion of piped water and sewer service in the La Paz-El Alto metropolitan area has evolved over the past century. Municipalities, and their public utilities, are principally responsible for water and sewer services in Bolivia, but national oversight and control of these services has increased over time. One motivation for increasing the national government's role in the water and sanitation sector has been to improve service in low-income urban neighborhoods.

Bolivia's *Ley de Aguas*, ratified in 1906, leaves to the municipalities the responsibility for developing rules governing the distribution of water in urban areas.⁸ In 1966 the government chartered the first municipally-owned, semi-autonomous water utility for La Paz: SAMAPA (Servicio Autónomo Municipal de Agua Potable y Alcantarillado).⁹ The utility was responsible for providing water and sewer service in La Paz. When the northern portion of La Paz became the independent municipality of El Alto in 1988, SAMAPA continued to provide service for El Alto as well.¹⁰

SAMAPA was governed by a five-member board. The mayor of La Paz chaired SAMAPA's board, and the board was responsible for appointing SAMAPA's general manager. The national government retained the right of final approval over some aspects of SAMAPA's operations, such as tariff setting, but local policies and decisions about water and sewer service had greater influence over SAMAPA's operations and expansion plans.

In the 1990s, the national government announced a national plan to expand coverage of water and sewer service in urban areas.¹¹ This plan called for increasing national supervision over urban water and sanitation. As a result, in 1992, the Ministry of Urban Affairs developed National Regulations for Water and Sanitation Service in Urban Areas (1992 Regulations). These regulations defined in-house water and sewer service (as opposed to public standposts, tanker truck delivery, and latrines) as the only acceptable long-term water and sanitation solution for urban areas. The regulations directed utilities to offer in-house service to neighborhoods prepared to cover the cost of secondary network expansion. All providers of urban water and sewer service were required to abide by these regulations¹², but in practice the regulations were not widely enforced.¹³ As a result, utilities could continue to operate much as before: in La Paz, local political priorities and SAMAPA's own policies and procedures had more influence on service outcomes than did national guidelines.

⁸ The *Ley de Aguas* was originally the 1879 *Reglamento de Dominio y Aprovechamiento de Aguas* (Decreto, September 8, 1879). This regulation became law in 1906.

⁹ Decreto-Ley No. 07597, April 25, 1966.

¹⁰ SAMAPA was not officially chartered to provide water service in El Alto. El Alto tried to establish its own water and sewer utility, but the role of this municipal entity has been very limited. Piped water and sewer service in El Alto remained the responsibility of SAMAPA.

¹¹ Bolivia's 1992-2000 National Plan for Water and Sanitation was called "Programa de Agua Para Todos."

¹² Resolución Ministerial No. 510, October 29, 1992, Ministry of Urban Affairs.

¹³ The Department of Basic Water and Sanitation (DINASBA) in the Ministry of Urban Affairs was charged with the enforcement.

In 1994, the national government took the first step toward the creation of an independent national regulator for the water sector: the *Superintendencia de Aguas*. The SIRESE law passed that year outlined the regulatory structure,¹⁴ and the specific powers and responsibilities of the regulator were established in the 1997 Regulations for Institutional Organization and Concessions in the Water Sector (1997 Regulations).¹⁵ The Superintendent of Waters -- head of the regulatory body, the *Superintendencia de Aguas* -- is responsible for granting concessions for the provision of water and sanitation services, for regulating and supervising these concession contracts, and for approving tariffs.

The 1997 Regulations also define the market structure for the Bolivian water and sanitation sector. Until 1997, water and sanitation service providers had been controlled and supervised by municipalities. Now all entities (public or private) that provide water or sanitation service to the public need to have a concession from the Superintendent for the provision of that service.¹⁶ This includes both piped network services, such as household water and sewer connections and public standposts, and non-network service, such as water distribution by tanker trucks and alternative methods of wastewater extraction. The 1997 Regulations do not define service level or quality requirements for the concessionaires; nor do they set coverage standards. Presumably these obligations would be included in each individual concession contract or would be defined by other existing regulations, such as the 1992 Regulations regarding urban water and sewer service.¹⁷

With the creation of the *Superintendencia de Aguas*, national control over who provides service, and over what type of service the providers can offer, greatly increased. The first active example of this new national involvement in local water and sanitation service is the La Paz-El Alto metropolitan area. Efforts are on-going to sign concession agreements with existing water and sanitation service providers in other Bolivian cities.¹⁸

In July 1997, the Superintendent approved a concession contract in which *Aguas del Illimani* assumed control of SAMAPA's operating functions and responsibilities.¹⁹ One major goal for this concession contract was to achieve universal service objectives articulated in the 1992 Regulations by extending in-house water and sewer connections throughout the metropolitan area. The contract seeks to solve the water problem first by quickly expanding in-house water service to as many households in La Paz and El Alto as possible. Sewer service expansion will take place more gradually over time. The Bolivian government expects that the private concessionaire will be more successful than SAMAPA at achieving these national coverage goals. However, while some elements of the concession arrangement are

¹⁴ Ley No. 1600, October 28, 1994.

¹⁵ These regulations were approved with Decreto Supremo No. 24716, July 24, 1997.

¹⁶ Article 14, 1997 Regulations.

¹⁷ Article 2 of the 1997 Decreto Supremo No. 24716 states that provisions of the 1992 Regulations will be applied only as supplements to the concession contracts, and only if they do not contradict the 1997 Regulations.

¹⁸ As a first step to signing concession agreements with existing providers, the Superintendent required all existing service providers to submit information about their legal operating status, their current service area, and the environmental impact of their activities.

¹⁹ SAMAPA continues to exist as a legal entity. The organization's responsibilities, however, are now limited primarily to administering the asset leasing contract that is part of the *Aguas del Illimani* concession agreement.

consistent with improving services in low-income areas, others could work against this national objective and could even harm some of the households the government seeks to help.

III. Designing “pro-poor” concession arrangements

Many different elements of concession arrangements have the potential to influence outcomes in low-income areas. In this paper, I address a number of common concession provisions that fall into two broad categories: performance requirements, and provisions related to financial risk and return.

Performance requirements define:

- WHAT type and quality of service the concessionaire may and must provide;
- HOW MANY connections the concessionaire must make and WHEN those connections must be installed; and
- WHERE and TO WHOM the concessionaires may and must offer service.

Thus, performance requirements affect the kinds of service that low-income households are offered and when (or whether) the concessionaire is likely to serve low-income households.

Provisions regarding financial risk and return also may influence outcomes in low-income neighborhoods. These provisions determine how much households will be asked to pay for the concessionaire’s service and shape the concessionaires’ financial incentive to serve particular households or neighborhoods. The financial incentive structure of a contract is important even when the contract includes stringent performance requirements. As concession contracts are written for 25-30 year periods, contract provisions are subject to renegotiation. If a concessionaire cannot recover its costs, the company will require renegotiation of some contract provisions, possibly including its performance obligations in low-income neighborhoods. Moreover, whether or not the concessionaire has a financial incentive to serve poor neighborhoods will affect how hard it works to overcome any barriers or difficulties it encounters in serving the poor.

This section of the paper examines the two categories of provisions in turn: first performance requirements and then provisions related to financial risk and return. A close examination of the Aguas del Illimani arrangement provides a basis for exploring how provisions common to many concession agreements could be designed to be “pro-poor.” The case also demonstrates how certain provisions could jeopardize improvement goals.

Performance requirements

WHAT: the technical specifications

Most concession contracts have something to say about what kind of water and sanitation services must be delivered. They may specify outcomes (universal access to potable drinking water, reduction in water-borne disease), outputs (type of service, service quality and reliability), or inputs (materials standards, design standards, procedural requirements). It is very difficult to measure compliance with outcome standards; thus the technical specifications in most concession contracts include only output and/or input standards.

Technical specifications can be designed to require concessionaires to provide high-quality service in low-income areas. They have the danger, however, of reducing companies' flexibility to make efficient operating and investment decisions. Less-efficient operators are in turn less likely to find it profitable to expand or improve service. As a general rule, therefore, technical specifications are best designed to tell concessionaires what to do, but not how to do it: output standards are preferable to input standards. The Aguas del Illimani contract is fairly consistent with this principle. Another danger of technical specifications is that they limit concessionaires' flexibility in service offerings. This can be problematic in low-income areas if demand is low for the only service concessionaires are authorized to provide.

Output standards: type of service, service quality, service reliability, and customer service

SAMAPA was not subject to national output standards until drinking water quality standards were established in 1985.²⁰ The 1992 Regulations added an additional output specification: they restricted the type of service the utility could provide. These regulations made metered household water connections the only acceptable permanent water supply solution in urban areas; public standposts became provisional solutions that the water utilities could install only while in the process of extending water and sewer mains.²¹ To emphasize the provisional nature of the public standposts, the regulations went as far as prohibiting the distribution of water by public standposts in streets that have piped water distribution networks.²² Consistent with this requirement, SAMAPA steadily decreased the number of public standposts and unmetered private connections.

Aguas del Illimani's concession contract reiterates the service level standards in the 1992 Regulations: metered in-house water and sewer connections are the only acceptable type of service. The contract also sets more stringent water quality standards than those required by the Bolivian national standards and establishes additional quality and reliability requirements, such as mandatory water pressure levels.

The contract's quality and reliability standards are designed to ensure that Aguas del Illimani does not reduce service quality to increase profit. The in-house connection requirement is meant to make sure the same service is available to all households in the metropolitan area (rich or poor). The standards, therefore, appear to be in the interest of low-income neighborhoods.

The potential problem with the output standards is that they limit Aguas del Illimani's flexibility to offer various products -- at different prices -- to meet differing demand for water and sanitation service. The Aguas del Illimani contract implicitly assumes that all households in the concession area will choose to pay for in-house water and sewer connections at the prices set in the contract. This may well be true: network water and sewer service is often much less expensive than alternative services, and the convenience of in-house connections makes them very desirable. The following table presents some rough estimates of current monthly expenditures on water and sanitation for average El Alto households relying on different service options.²³ To put the estimated expenditures in the table in perspective, the minimum wage in Bolivia is approximately US\$45 per month.²⁴

²⁰ Norma Boliviana NB-512-85, July 17, 1985.

²¹ Article 64, 1992 Regulations.

²² Article 100, 1992 Regulations.

²³ These estimates are compiled from a variety of studies and other sources. They are not meant to be exact, but only

Table 1:
Estimated monthly expenditures on water and sanitation services in La Paz-El Alto
by households relying on different service options (connection costs excluded)

	Water vendor: 2 m ³ /month = \$7.27	Unmetered standposts: 1.5 m ³ /month = \$0.50	In-house connection: 10 m ³ /month = \$2.21
Private toilets \$6.00/month ²⁵	\$13.27	\$6.50	\$8.21
Riverbed \$0.00/month	\$7.27	\$0.50	\$2.21
Sewer connection \$0.00/month ²⁶	N/A	N/A	\$2.21

As this table demonstrates, the benefits from moving to an in-house water connection can include both increased water use and decreased monthly expenditures on water. Households with in-house connections use much more water on average than other households, but they pay much less than households that buy from water vendors and use private toilets. Only households currently using standposts will see their expenditures on water rise once connected. Another benefit of in-house connections, which is not captured in this table, is time savings: household members no longer have to travel to the river or standpost to collect water.

To many of us, the benefits of in-house water connections seem clear. But each household will make its own decision about whether or not to connect to the network system. Whether households currently using standposts will be willing to pay more for a household connection will depend on how much they value the benefits that a connection provides. Households may also have other reasons – besides the monthly cost of service – for choosing not to connect to the water or sewer system. High up-front connection fees or the need to buy sinks, toilets, and other fixtures to take advantage of the service may be a barrier for some households.²⁷ Other families may be wary of the uncertainty of variable monthly bills, and home owners may not be willing to invest in connections for rental properties.

Without knowing more about household demand for water and for in-house connections, it is difficult to predict exactly how households will respond when offered the opportunity to connect to Aguas del

to illustrate the possible variation in expenditures and water consumption among households. The calculations include only consumption charges, not the cost of connecting or otherwise obtaining these services.

²⁴ US\$1.00 = 5.5 Bolivianos

²⁵ Many households with toilets let individuals use their facilities for a fee of between US\$0.04 and US\$0.05 per visit. The private toilets become a significant monthly household expenditure for those who choose to use them: just 4 visits per household per day would amount to US\$6.00 per month.

²⁶ Household pay a unified water and sewer tariff. This means that, once the sewer connection fee is paid, households that are already paying monthly water bills face no additional monthly charge for sewer service.

²⁷ As we shall see in more detail later in the paper, Aguas del Illimani has taken some measures to reduce these possible barriers to connection. The measures include allowing households to finance connection fees.

Illimani's water or sewer network. Some may prefer to keep their water and sanitation expenditures low by continuing to use public standposts or riverbeds. Other households will be very willing to pay more in order to obtain an in-house connection. The important point from a contract design perspective is that Aguas del Illimani does not have the flexibility to alter its product offerings if demand for high quality and highly reliable in-house connections proves to be low in some neighborhoods.

The output standards in the Aguas del Illimani contract are a deliberate decision: the Bolivian government wants the concessionaire to meet the government's national objectives for the water and sanitation sector: universal coverage of in-house connections. The appeal of this vision is obvious, but is important to realize that the requirement to provide a single uniform type and quality of service could hinder service improvement in low-income areas in two ways. First, if households do not want to pay for the in-house service Aguas del Illimani is authorized to provide, it may simply not be possible to achieve the Bolivian government's universal service goals (at least without increasing subsidies to households). Second, if some households in a neighborhood want connections and others do not, the density of connections will drop and the Aguas del Illimani's costs will rise, making cost recovery more difficult.

In the Aguas del Illimani case, the output standards require that the concessionaire provide a high-cost level of service. A concession contract could also require a concessionaire to provide only a low-tech solution, such as community wells or collective pit latrines. In this case, households would not have to decide to connect to the system, but they would decide whether or not to pay to use these collective services.²⁸ If demand for these low-tech solutions were weak, then the concessionaire would have cost recovery problems, again jeopardizing the fundamental goal of improving services in low-income areas. The important point is that any requirement that concessionaires provide only a single level and quality of service can create problems if demand for that level of service is not high enough.

To avoid these pitfalls of output standards, concession contracts and sector regulations often include exclusivity provisions designed to ensure that households accept a single level of service from a single service provider (reduce the scope of household choice). Exclusivity reduces market risk, but it presents its own dangers for poor households; these problems are discussed in more detail below.

Input standards: materials, design, and procedures

Input standards dictate how concessionaires must achieve the output standards. For example, a concessionaire may be required not only to meet water quality standards, but also to do so by using a specific chemical and/or a specific filtration process.

Materials and design standards SAMAPA, like all other public utilities in Bolivia, was subject to Bolivian standards for materials and system design in the water and sanitation sector. In designing the La Paz concession, the government intended to offer the concessionaire slightly more flexibility than SAMAPA had in this area. The Aguas del Illimani contract states only that the company must use "first

²⁸ There is ample evidence from willingness to pay studies in developing countries that some households in some communities choose not to use low-tech systems, and instead invest in private solutions (e.g. private wells or standpost) that provide a higher level of service.

class" equipment that complies with all relevant norms.²⁹ The contract then allowed the concessionaire to choose, subject to the Superintendent's approval, the material standards to which it would adhere. Aguas del Illimani chose, and the Superintendent approved, the Bolivian standards for water and sanitation materials and equipment. The end result is that Aguas del Illimani is subject to the same materials and design standards as SAMAPA was.

One problem with the Bolivian standards is that they limit Aguas del Illimani's flexibility to reduce investment costs. Aguas del Illimani must use specific materials and designs, even though there may be less expensive ways of meeting output goals. The Superintendent recognizes that the materials and design standards could make it difficult for the concessionaire to serve some poor neighborhoods. He has therefore shown some openness to relaxing the input constraints. The Superintendent has made it clear that he will only accept *in-house* connections, but he is willing to let Aguas del Illimani experiment with lower-cost technologies for providing these connections. Most notably, the Superintendent has given his approval to a pilot project in which the utility will offer lower-cost condominium sewer and water connections to 10,000 households.³⁰ Condominial systems have been used in Brazil for about two decades. These systems provide in-house connections at lower cost by using smaller pipe diameters and burying pipes in shallow trenches in yards or under sidewalks.

The contract itself also opens the door for altering input standards in some limited circumstances. Aguas del Illimani can recommend exceptions to the materials' standards if expansion into certain parts of the concession area using existing standards would significantly raise total costs.³¹

Procedural requirements Another common type of input standard is procedural requirements. Bolivia's water and sanitation sector regulations contain some procedural requirements, but Aguas del Illimani's contract imposes few additional required procedures. The company has taken advantage of its operational flexibility to dramatically simplify the process of applying for a household connection.

The 1992 Regulations require that applications for household water and sewer connections include: the utility's official application form (which the applicant must purchase), a copy of the property title, and a *plano sanitario* -- an architectural drawing of the number and location of water or sewer connections on the applicant's lot. SAMAPA required households soliciting connections to submit all of these documents. In addition, SAMAPA required that households obtain municipal permission to open a trench in a public right of way. Because communities often bought materials and installed the

²⁹ Contract section 9.3.1.

³⁰ This pilot project is a cooperative effort between the UNDP-World Bank Water and Sanitation Program, Aguas del Illimani, the Swedish International Development Cooperation Agency, and the Bolivian government. Aguas del Illimani's limited experience to date with the condominium water and sewer systems suggests that changing materials and design can dramatically reduce water and sewer connection costs. In the first three condominium projects, installing condominium water systems cost only 1/3 as much as a conventional design (\$44 versus \$146 per connection on average); condominium sewer systems were 1/4 the cost of conventional sewer connections (\$62 versus \$242 per connection on average). Whether there are cost differences in the operation and maintenance of the two systems, however, will only become evident over time.

³¹ This requirement relates to the *area no servida*, which is discussed in more detail below. The *area no servida* is the currently uninhabited fringe of the concession area. Aguas del Illimani is only required to serve this area once it reaches a designated development density.

connections themselves, households also had to request lists of approved materials from SAMAPA inspectors and arrange for visits from the inspectors at various points in the installation process. In sum, the connection process under SAMAPA was a confusing, time-consuming, and expensive process; in a recent study of El Alto households, more households cited *trámites*, or bureaucratic procedures, than cost as the reason they had not connected to the water supply network.³²

One of Aguas del Illimani's first procedural changes was to simplify this application and connection process. Within weeks of taking over, the company moved all of the officials who had to sign off on applications into one room. Applicants then knew exactly where to go to apply for a connection and could watch their paperwork move from official to official. This simple change significantly reduced the time required to solicit a connection. Aguas del Illimani has since further simplified the application process. The company eliminated the need for each applicant to individually solicit permission from the municipality to open a trench; the utility itself now solicits the permission for groups of applicants. Aguas del Illimani has also taken advantage of a contract provision about the required *plano sanitario*: the contract states that the concessionaire must solicit the *plano sanitario*, but a household's failure to submit the *plano* does not relieve the concessionaire of the obligation to connect the household to the water or sewer system.³³ This would seem to suggest that the expansion mandate takes precedence over the *plano sanitario* requirement.³⁴ Aguas del Illimani informs households of the *plano sanitario* requirement, but does not delay the connection or take any action if the households fails to submit the plan within the timeframe Aguas del Illimani sets.

Changes like this help make service expansion less costly and more attractive to the utility, and also make service more accessible to households. The out-of-pocket expenses that applicants now incur in the application process are lower. Aguas del Illimani has also reduced the time costs by simplifying and shortening the application procedure. All new applicants (rich and poor) will benefit from these changes.

HOW MANY AND WHEN: expansion mandates

A second type of performance requirement in concession contracts is expansion mandates. Expansion mandates define private concessionaires' obligation to expand their service area; they tell the concessionaire how many new connections the company must make and by what date the connections must be made. If enforceable and enforced, expansion mandates set the minimum acceptable expansion rate and have the potential to induce utilities to connect customers they might otherwise be reluctant to serve. Including expansion mandates in a concession contract is not, however, a guarantee that concessionaires will actually meet the requirements. Experience with water and sewer concessions in other countries has shown that contract provisions (such as tariff levels) are often adjusted or renegotiated in the first years of the agreement. There is no inherent reason to expect that expansion mandates would be any less subject to adjustment than other contract elements.

³² Centro de Estudios y Proyectos of Bolivia, 1998.

³³ Concession contract, appendix 2.

³⁴ The 1992 Regulations also allow utilities to make exceptions to the *plano sanitario* requirement in certain cases: in special cases where the company can verify that the house has only the minimum sanitary fixtures, the company can eliminate the *plano* requirement or can give the household a window of time within which to submit the *plano*.

SAMAPA and other Bolivian public water utilities have very weak expansion mandates. The 1966 decree creating SAMAPA established generally that SAMAPA would be responsible for providing water and sewer service in La Paz. The decree recognized the right of all households to solicit in-house water and sewer connections, but it stopped short of requiring the utility to provide universal service or to achieve specific coverage goals. Nor did the 1992 Regulations require SAMAPA to provide water or sewer service in all poor neighborhoods. The 1992 Regulations require public utilities to provide water and sewer connections to all houses with direct access to a public right of way where water and sewer pipes are already installed.³⁵ The regulations do not, however, require utilities to expand the networks unless the population that will benefit from the expansion is prepared to cover the full cost of expanding the secondary network.³⁶ Moreover, even if the population is prepared to cover the cost, utilities have the right to reject or postpone any network expansions for technical, administrative, or legal reasons.³⁷ The effect of the regulations, if enforced, would be to prevent SAMAPA from denying water or sewer service to any household in a served area, but not to require the utility to expand its service area. In contrast to SAMAPA, Aguas del Illimani has a clear mandate to expand service. Indeed expansion mandates in the concession contract are the Bolivian government's primary strategy for improving of water and sanitation services in low-income peri-urban areas of La Paz and El Alto.

Unlike many countries seeking private involvement in the water and sanitation sector, Bolivia did not seek to reduce tariffs through the contract bid process. Pre-privatization tariffs in La Paz and El Alto were below cost recovery levels, and so the government raised tariffs before the concession contract was signed. As tariff reduction was not an objective, government officials decided to use the bid process to maximize water service expansion in low-income areas.³⁸ The Request for Proposals for the La Paz-El Alto contract fixed the length of the concession, the tariffs and connection fees, the required sewer expansion schedule, and the minimum acceptable water expansion schedule. Interested private companies were asked to submit bids of the number of in-house water connections they would commit to install in the El Alto subsystem by December 31, 2001. (The El Alto subsystem is the largest and poorest of the three subsystems in the metropolitan area.³⁹) The winning Lyonnaise des Eaux consortium -- Aguas del Illimani -- committed to install 71,752 new in-house water connections in the El Alto subsystem by the end of 2001.⁴⁰ The bid was significantly more than the minimum of 37,922 new connections set in the bid document and also more than the 35,767 connections that SAMAPA had installed in El Alto over the preceding five-year period (1991-1996).

³⁵ Article 16, 1992 Regulations.

³⁶ Article 17, 1992 Regulations.

³⁷ Article 17, 1992 Regulations.

³⁸ Aguas del Illimani is required to abide by the Bolivian laws and regulations, including the 1992 Regulations that provided such a weak expansion mandate. However, the 1992 Regulations are only supplementary to the concession contract; thus, the expansion mandates in the concession contract take precedence over the directives in the 1992 Regulations.

³⁹ The El Alto subsystem consists of the municipality of El Alto and the laderas of La Paz.

⁴⁰ Aguas del Illimani was in fact the only company to submit a bid, though International Water Limited participated until the last minute of the bid process.

No one knows exactly how many homes are without household water connections in the El Alto subsystem, but by some estimates the 71,752 new connections will achieve 100 percent coverage in the area.⁴¹ Over the life of the concession, Aguas del Illimani cannot drop below the water coverage level that it achieves by installing the 71,752 connections. The company must also reach 90 percent sewer coverage in this subsystem over the life of the contract. In the other two subsystems, Aguas del Illimani must achieve 100 percent water coverage by 2001 and 95 percent sewer coverage by the 2021.

Table 2:
Water and sewer coverage targets in the El Alto subsystem,
fixed in RFP and bid by Aguas del Illimani

Year	Private water connections	Sewer connections
2001	100% Bid ⁴²	41% Fixed
2006	100% Bid	43% Fixed
2011	100% Bid	47% Fixed
2016	100% Bid	71% Fixed
2021	100% Bid	90% Fixed
2026	100% Bid	90% Fixed

The idea behind including expansion mandates (fixed or bid) in a concession contract is that they require private concessionaires to make service expansion a priority. As low-income areas often lack formal network services, expansion mandates are expected to improve services for low-income households. In order for expansion mandates to have this effect, however, they must be monitored and enforced. There are many different forms of expansion mandates, and some are easier than others to monitor. Designing clear and enforceable mandates is thus an important first step, but governments also need a strong, independent regulator to make sure that companies fulfill their commitments.

The final Aguas del Illimani contract contains three types of expansion mandates: connection requirements, percent-coverage targets, and the requirement to connect households meeting certain criteria. Connection requirements, such as Aguas del Illimani's commitment to install 71,752 new water connections by December 31, 2001, are fairly straightforward to monitor, provided that what counts as a connection is well-defined. This is clear in the Aguas del Illimani case: only in-house water and sewer

⁴¹ At the end of 1996, SAMAPA had 132,216 domestic water connections in the El Alto subsystem. The estimated population of the subsystem in 1997 was 856,000. Estimates of the number of persons per dwelling unit range from 4-6, so in 1997 there were probably somewhere between 142,000 and 214,000 homes in the subsystem. This number could increase significantly over the life of the concession, as the El Alto subsystem is the most rapidly growing subsystem in the metropolitan area.

⁴² This assumes that the 71,752 connections will achieve 100 percent coverage. If the 71,752 connections do not achieve 100 percent coverage, the company must reach and maintain at least 90 percent coverage by 2011.

connections count. To allow for annual monitoring of progress towards the 2001 goal, the contract specifies that 25 percent of the required connections must be installed by December 31 of each year.⁴³

Percent-coverage targets, on the other hand, pose more problems for the regulator. As no one knows how many houses there are in El Alto or La Paz, no one knows exactly how many connections will achieve the coverage targets in the Aguas del Illimani contract. To solve this problem, the contract calls for the Superintendent of Waters to use population projections to translate the coverage targets for each five-year period into specific connection requirements. The Superintendent sets the connection requirements at the beginning of each five-year period, so that the company and the regulator agree on the goals to be obtained over the period. For the first five-year period, the contract already contained the translation of the sewer coverage targets into a specific number of sewer connections.

Table 3:
Sewer connections required by December 31 of each year⁴⁴

Subsystem	1998	1999	2000	2001	2001 coverage target
Achachicala	1,000	1,000	1,100	1,000	81%
Pampahasi	1,300	1,800	1,800	1,800	83%
El Alto	10,700	3,000	3,100	10,400	41%

The third type of expansion mandate in the contract requires Aguas del Illimani to extend service to any area that meets specific population density criteria.⁴⁵ The company must program expansion to areas that meet this criteria, but the contract does not set enforceable deadlines for completing the expansion. Thus, this form of mandate creates a possible source of debate between the company and the regulator.

Another type of mandate common to concession contracts is a dollar investment requirement; the Aguas del Illimani contract does not contain this type of mandate. Dollar investment requirements commit the concessionaire to invest a certain dollar value in the system within a given time period. Dollar investment requirements appear on the surface to be easy to enforce, but it is difficult for the regulator to control whether the concessionaire pays competitive prices for its investments. Moreover, the regulator has no control over whether the company's investments benefit poor areas.

Poorly-designed expansion mandates complicate a regulator's job, but even clear mandates need to be backed by incentives for compliance. The strongest incentive for compliance is an independent regulator with the power and the will to take action against concessionaires that do not honor their expansion commitments. Optimal design of regulatory bodies is beyond the scope of this paper⁴⁶, but the Aguas

⁴³ December 31, 1998 was the first deadline, as the concessionaire was only in operation for 5 months prior to December 31, 1997.

⁴⁴ Concession contract, appendix 3.

⁴⁵ The concessionaire must serve areas that have more than 50 inhabitants or 15 buildings per *manzana*, or more than 6 buildings per block. Concession contract, appendix 3.

⁴⁶ For more information on this topic see Michael Klein, 1996, "Economic Regulation of Water Companies," Policy Research Working Paper 1649, The World Bank, Washington, D.C

del Illimani case provides some examples of how concession contracts can support the enforcement of expansion mandates.

Most notably, Aguas del Illimani faces three types of penalties for failure to comply with expansion goals. First, the number of required connections for a given year will increase by *one* connection for every *five* required connections the company fails to install by the end of the previous year. In addition, if Aguas del Illimani is more than 15 percent short of the connection goal, the company must pay a fine of US\$500 per connection it fails to install. The Superintendent of Waters also has the power to cancel the concession contract if Aguas del Illimani falls more than 25 percent behind its expansion mandate. If the contract is canceled, the Superintendent can execute a five million dollar guarantee.⁴⁷

These penalties are only effective if they are credible; Aguas del Illimani must believe that the Superintendent would carry through on his threat. In general, independent regulatory bodies that are not easily subject to political interference are the most credible. Other factors, such as the number of companies who bid for a concession contract and the presence of similar companies for bench-marking, may also affect the regulator's leverage over the concessionaire. Bolivia's Superintendent of Waters has already demonstrated that he is willing to impose sanctions on Aguas del Illimani. He has fined the company \$4,000 for unscheduled interruptions in water service.⁴⁸

In terms of designing "pro-poor" concession contracts, the anticipated advantage of expansion mandates of any form is that they will induce utilities to extend networks into poor neighborhoods. Concessionaires may in general be reluctant to make large investments early in the life of a contract if there is uncertainty about the independence and sustainability of regulatory arrangements. Or, they may consider certain low-income neighborhoods in particular too costly or risky to invest in. Providing service in poor neighborhoods can be technically and operationally more complicated than providing service in wealthier areas. Billing may be more complicated, vandalism more common, settlements less organized, or households less familiar with urban service systems. Expansion mandates are meant to force utilities to overcome this reluctance to operate in low-income areas. The problem is that expansion mandates do not by themselves resolve any of the issues that make concessionaires reluctant to serve the poor. Unless other measures are taken, concessionaires may succeed in arguing that they cannot comply with the expansion mandates due to the magnitude of the obstacles they face in low-income neighborhoods.

Moreover, if expansion mandates call for anything less than 100 percent coverage, even concessionaires that meet their expansion mandates will not necessarily reach poor areas. We can expect private companies to meet their expansion requirements as cost efficiently as possible, expanding first to neighborhoods where they expect demand to be the highest and/or where the expansion costs are lowest (higher housing density and/or existing network). If low-income areas are financially less desirable to serve, these neighborhoods may be left out of the expansion program. The Aguas del Illimani contract tries to address this problem by placing some restrictions on where the company must

⁴⁷ Concession contract, appendix 5 and clause 27.

⁴⁸ The Superintendent first fined Aguas del Illimani \$15,000 for these interruptions. Aguas del Illimani appealed the decision to the General Superintendency, the supervisory body for all sector regulatory agencies. In October 1998, the General Superintendency ruled that the Superintendent of Waters should return \$11,000 to Aguas del Illimani.

install its connections. For example, 50 percent of the 71,752 water connections that the company will install in the El Alto subsystem by December 31, 2001 must be expansion, rather than in-fill, connections.⁴⁹ Telling concessionaires where to make connections always threatens to drive up investment costs, but this provision in the Aguas del Illimani contract at least leaves the company some wiggle room: the limit on in-fill connections does not apply to the yearly connection mandates, so Aguas del Illimani can postpone major water network expansion until later in the first five-year period. This is in fact what the company has done: the majority of the water and sewer connections in the company's first year of operation are in-fill connections on existing mains, rather than expansion into neighborhoods without any in-house connections.

It is very difficult in designing a contract to strike the right balance between requiring that concessionaires serve low-income areas and allowing the companies the flexibility they need to operate efficiently and reduce costs. Governments that set low expansion mandates in concession contracts may be losing an opportunity to speed up service improvement in poor areas, but overly ambitious or directive mandates may drive away potential bidders or significantly increase the cost of expansion. Unfortunately, governments almost always lack the detailed information about costs and demand that they would need to set optimal expansion mandates.

The Aguas del Illimani case represents one possible way around this problem – use the bidding process to set the expansion mandates. Nonetheless, even this process can be problematic if there is little competition for the bid, if the minimum acceptable expansion set in the bidding documents is unreasonably high, or if concessionaires are able to negotiate expansion mandates down after winning the contracts. For these reasons, governments cannot necessarily rely on expansion mandates alone to generate maximum service extension into low-income neighborhoods; the financial incentive structure of the concession contract is also important. If the financial structure of a concession contract discourages the concessionaire from serving poor areas, the concessionaire is unlikely to exceed, and may not even meet, the required expansion schedule. The financial structure of concession contracts is discussed in more detail below.

TO WHOM: concession areas and land tenure restrictions

Intimately related to expansion mandates are performance requirements that define to whom the utility may and must offer connections. Expansion mandates only apply to the areas that concessionaires are required to serve, and even in the required service area, any policies that restrict who may receive a water or sewer connection could get in the way of expansion mandates. Here I address two types of policies that could affect whether the utility offers connections to low-income neighborhoods: concession and service area boundaries, and restrictions on providing urban services in illegal settlements.

Concession and service areas

⁴⁹ Concession contract, appendix 6.

SAMAPA did not have a clearly-defined service area. The public utility was simply responsible for providing water and sewer service in La Paz. Aguas del Illimani, on the other hand, is only permitted to provide service within a precisely-defined concession area.⁵⁰

The concessionaire is not expected to serve the entire concession area in the foreseeable future. Instead, the contract identifies a subset of the concession area - called the *area servida*, or served area - to which the expansion goals of the contract apply.⁵¹ The Superintendent of Waters will use the boundaries of the *area servida* to translate percent-coverage targets into required numbers of water and sewer connections. The area that falls outside the *area servida*, but inside the concession area, is called the *area no servida*. Aguas del Illimani presumably could extend service to the *area no servida*, but currently has no obligation to do so.⁵²

The boundaries of concession areas and service areas have very obvious implications for low-income neighborhoods. First, concession area boundaries prohibit the utility from serving households that fall outside the concession area; thus if the concession area were drawn to exclude poor neighborhoods those neighborhoods would not have the opportunity to benefit from the concessionaire's expansion. Second, the *area servida* and *area no servida* distinction in the Aguas del Illimani contract separates the areas that the utility *must* serve from the areas the utility *may* serve. This boundary becomes particularly important if the company does not have a clear financial incentive to serve households outside the required service areas.

In the La Paz-El Alto case, the *area no servida* is composed of outlying areas that are currently rural in character, but that are likely to become home to new rural-to-urban migrants, most of whom are poor. The area is also a logical home for new industrial expansion and for industry fleeing the more developed areas of the city. The financial impact for Aguas del Illimani of expanding service into the *area no servida* is not clear. It will depend on the future customer base in the area, the tariff structure, and the magnitude of new investments required to meet demand in the area. If the area fills up only with low-income households, the expansion could imply significant investments and little new revenue. On the other hand, if industry locates in the *area no servida*, Aguas del Illimani could capture more revenue from industry by expanding its service area. The existing tariff structure has an industrial-to-residential cross-subsidy, so new industrial connections would be particularly valuable to the company.

⁵⁰ The concession boundary is defined as the city boundaries in the 1994 *Ley de Participación Popular*. The concession contract permits Aguas del Illimani to sell bulk water outside the concession area, provided that no other concessionaire exists where the bulk water is sold or that other concessionaires request to purchase the bulk water.

⁵¹ The *area servida* is defined as the area served by SAMAPA at the time the contract was signed as well as all areas included in the expansion goals of the concession contract.

⁵² The concession contract stipulates that the Superintendent of Waters may request that Aguas del Illimani extend service into the *area no servida*, but these requests are justification for extraordinary tariff revisions if they significantly increase the company's costs. Popular resistance to tariff increases is very strong in La Paz and El Alto at the moment, so expanding service into the *area no servida* may not be politically possible if it increases Aguas del Illimani's costs.

Land tenure and illegal settlements

Just as concession boundaries can prohibit utilities from serving households outside the concession area, other laws and regulations can prohibit utilities from extending network service to households *within* the concession area. One example is laws that prohibit the provision of public services to households lacking legal title to their land. Municipalities advocate these laws because the restrictions discourage illegal settlements, prevent the installation of expensive infrastructure in areas that may be resettled, and encourage households to register land for property tax purposes. In practice, however, illegal settlements are common in developing countries, and many households never register their properties despite these regulations.

El Alto and the laderas of La Paz have a number of different land tenure problems. Illegal settlements exist where households have settled on public land reserved for reforestation, parks, schools, or roads or where households have appropriated private land. The municipalities have periodically legalized these illegal settlements. El Alto in mid-1998 had over 400 petitions for legalization from squatters on private lands, but the municipality had frozen action on these requests. Another common land tenure problem in El Alto and the laderas comes from multiple claims to ownership of the same piece of property. The municipality will not register a property or a subdivision until these claims are resolved in court. Finally, some property owners have legal title to the land, but have not completed all of the steps necessary to officially register their properties with the municipalities; official registration introduces the obligation to pay property taxes.

The 1992 Regulations require that a property title accompany all requests for water and sewer connections.⁵³ SAMAPA required households to present the title to their property, as well as evidence that the title was properly registered with the municipality.

Aguas del Illimani's contract does not directly address property ownership or illegal settlements, but two contract provisions touch on the issue. First, the company was required to prepare, for the Superintendent's approval, a sample service contract stating the responsibilities of the utility and of applicants for new household connections. The service contract that the Superintendent approved in March 1998 lists proof of property title as one requirement for service connection. This suggests that Aguas del Illimani must obtain proof of property title, but a second contract provision suggests otherwise. The concession contract states that the concessionaire must provide connections and service to all buildings in the *area servida* that request a connection.⁵⁴ This clause suggests that the expansion mandate may trump the requirement to show proof of property title.

Aguas del Illimani recognizes that requiring households to present properly registered legal title to their land is a potential barrier to connections. The company, therefore, has experimented with whether and where to require proof of legal title before providing a connection. In 1998, Aguas del Illimani was cooperating with the municipality of El Alto by not connecting any subdivisions that lack the approval of the municipality because of land title problems. If all title issues in El Alto are not resolved before the end of 2001, Aguas del Illimani could face a conflict between its obligation to make 71,752 water

⁵³ Article 16, 1992 Regulations.

⁵⁴ Concession contract, appendix 2.

connections and its agreement with the municipality not to extend service to disputed territories. Nonetheless, Aguas del Illimani does not consider illegal settlements to be a serious threat to achieving their contractual obligations; the company expects that the municipalities of La Paz and El Alto will continue to periodically legalize settlements as they have in the past.

Financial Risk and Return

Technical specifications, expansion mandates, concession area boundaries, and land tenure requirements all have the potential to affect low-income households by shaping concessionaires' performance requirements. But performance requirements alone are not enough to predict the outcome of privatization in low-income areas. Performance requirements translate into costs, and the viability of a concession depends on companies' ability to recover those costs through a combination of tariffs, connection fees, and external subsidies. Moreover, we can expect the financial incentive structure of the contract to affect marginal operating and investment decisions, to the benefit or the detriment of low-income households.

The remainder of the paper examines how the design of provisions related to financial risk and return might affect outcomes in poor neighborhoods. First is a discussion of tariff design. Next I examine provisions aimed at reducing revenue and market risk.

Tariffs and connection fees

Tariffs and connection fees determine what households must pay to connect to and to receive water and sanitation service. All else being equal, households (rich or poor) would prefer to pay less for the service they receive; lowering tariffs benefits customers. This limited view of prices, however, does not help us understand how tariff and connection fee design relates to the improvement of services in low-income areas. To understand this relationship, we need to examine how tariffs and fees affect the behavior of concessionaires and of households. Tariffs and connection fees affect outcomes in low-income neighborhoods in three very basic ways: by affecting the cost recovery potential of the concession, by shaping the concessionaire's marginal incentive to serve certain customers over others, and by affecting demand for the concessionaire's services.

Cost recovery

In most concession agreements, tariffs and connection fees are the major source of revenue for the concessionaire. If tariffs and fees are not set high enough for cost recovery, they jeopardize the viability of the concession arrangement. Public utilities in developing countries are often unable to generate sufficient revenue to recover both operating and investment costs. Service quality and expansion plans suffer as a result. Unlike public utilities, private companies like Aguas del Illimani will not in the long run accept anything less than full cost recovery. To attract bidders concession contracts obviously need to be structured to allow private companies to make a profit. Concessionaires will require tariff or subsidy increases or modifications of their service or expansion obligations if they are unable to generate the minimum acceptable financial return on their investment. Modifications of the expansion obligations

could leave some of the households that could most benefit from improved services out of the expansion program.

Under SAMAPA, tariffs were never set to achieve full cost recovery. SAMAPA's governing board, with the complacency of the national tariff setting body, kept tariffs low, and the utility depended on central government subsidies. In response to financial hard times in the late 1980s, the national government began pressuring utilities to increase tariffs and reduce their dependence on subsidies. After repeated increases, SAMAPA's 1990 tariff still only allowed the utility to finance 25 percent of its investment costs out of its own revenues.⁵⁵ World Bank pressure to raise tariffs induced the government to make additional small tariff increases in the 1990s. The government's desire to obtain a loan from the IDB and to involve the private sector in the operation and expansion of the La Paz/El Alto water system finally provided the motivation for a major tariff revision in late 1996. CONATA - the national tariff board - approved this new tariff in December 1996, but SAMAPA did not apply the tariff until July 1997, less than one month before Aguas del Illimani took over operation of the water and sewer systems.

Table 4:
Tariff structure for Aguas del Illimani
(varies by user category and monthly water consumption)

Tariff US\$/cubic meter⁵⁶	Domestic⁵⁷	Commercial	Industrial
1.1862	301 m ³ and above	21 m ³ and above	1 m ³ and above
0.6642	151 to 300 m ³	1 to 20 m ³	
0.4428	31 to 150 m ³		
0.2214	1 to 30 m ³		

This new tariff was designed with cost recovery in mind;⁵⁸ Aguas del Illimani will not receive any direct subsidies from the government. The concession contract provides for automatic renegotiation of the tariffs once every five years. The procedure for calculating the new tariff is based on the company's projected costs and on the cost of the expansion plan for the next five years. The contract also provides for extraordinary tariff revisions after the first two years of the contract if the concessionaire's costs go up more than 7 percent for any one of several reasons (expansion into *area no servida*, change in tax

⁵⁵ World Bank, November 6, 1990, *Bolivia: Major Cities Water and Sewerage Rehabilitation Project*, World Bank Staff Appraisal Report, The World Bank: Washington, D.C.

⁵⁶ The tariff, like all public utility tariffs in Bolivia, is indexed to the US dollar.

⁵⁷ Ninety-nine percent of all domestic consumers use less than 150 cubic meters of water per month, so in practice very few consumers ever pay the same unit cost as the commercial and industrial users.

⁵⁸ Whether the current tariff succeeds in covering costs, however, will be difficult to determine until the five-year tariff revision period. There is some evidence that cross-subsidy tariffs fail to achieve cost recovery if they do not take into account the price elasticity of demand of industrial and commercial users; when industrial and commercial customers fail to consume as much water as expected, they do not generate enough extra revenue to subsidize the domestic users. Guillermo Yepes, 1998, "*Do Cross-Subsidies Help the Poor Benefit from Water and Wastewater Services?*" TWU Infrastructure Note, The World Bank: Washington, D.C.

code, etc.). Thus, in principle, the contract is designed to ensure that Aguas del Illimani always achieves total cost recovery.

On the other hand, public opinion may constrain Aguas del Illimani's ability to take full advantage of the contract's tariff revision procedures. The private operator met with much opposition early in its tenure, in part because La Paz and El Alto residents associated Aguas del Illimani with the tariff hikes. If marches against Aguas del Illimani continue, it might not be politically feasible to propose tariff increases. The general manager of Aguas del Illimani has publicly stated that he will not raise prices in the first five years of the contract, even if the company's costs rise.⁵⁹

Marginal incentives: who to serve and what investments to make first?

Cost recovery is one, but not the only, important consideration in tariff and fee design. Tariff and fee structures also determine which customers will be most profitable to serve. Concessionaires will have an incentive to serve areas where capital expenditure costs are low and/or quickly recoverable and where tariffs cover or exceed the actual cost of providing on-going service. Thus, any tariff or fee structure that has low-income households pay less than true cost could provide a disincentive for concessionaires to serve them. In contrast, when tariffs and fees make serving poor households financially attractive, concessionaires are more likely to prioritize reaching these households. Below I discuss how three different characteristics of the tariffs and fees in the Aguas del Illimani contract shape financial incentives to serve low-income households.

Uniform connection fees In the water and sanitation sector, tariffs are usually designed to cover operations and maintenance and the investment cost of water and sewer trunk lines. Connection fees then cover the cost of the secondary network expansion and the installation of individual household connections. Connection fees allow the utility to quickly recover a portion of the capital costs of expansion.

When SAMAPA ran the water and sewer system in La Paz and El Alto, the utility calculated, for each neighborhood or household, the exact cost of extending the secondary network and installing household connections. Communities could choose to pay this fee to SAMAPA, or to buy and install the materials themselves and pay SAMAPA a supervision fee. By definition, then, all households that solicited and received connections from SAMAPA were paying the cost of the secondary network and household connections. Apartment buildings and houses in dense areas cost less per household to connect while houses in the sparsely populated outskirts of El Alto cost significantly more. In-fill connections on existing lines were less expensive than connections in expansion areas.

Unlike SAMAPA, Aguas del Illimani cannot adjust the connection fee it charges to reflect the cost of each specific connection. The concession contract sets maximum connection fees per building of US\$155 for water and US\$180 for sewer. Evidence from a small number of SAMAPA connection projects in El Alto suggests that the cost of the water connections in this area can range from as little as US\$110 to almost US\$200 per household. Sewer connections can cost between US\$250 and

⁵⁹ Alain Carbonel, General Manager of Aguas del Illimani, May 1998 television program called "Sin pelos en la lengua" (La Paz, Bolivia)

US\$360 per household.⁶⁰ Given these illustrative costs and the maximum connection fees Aguas del Illimani can charge, the company would seem to have a greater incentive to make water connections than sewer connections. In addition, the company's priority would be to make in-fill connections, and to expand service only in densely-populated areas where per connection expansion costs are lower. The concession contract seeks to counteract the inclination to make in-fill connections by mandating that in-fill account for no more than half of all new connections. Nonetheless, Aguas del Illimani is likely to save the more sparsely populated areas of El Alto for the end of its expansion plan.

Unified water and sewer tariff Aguas del Illimani charges a unified tariff for water and sewer, as did SAMAPA. All households pay for sewer service even if they are not connected to the sewer network. In other words, a household with a water connection but no sewer connection will have the same monthly bill as a household with a sewer connection and the same level of water consumption. This situation is likely to discourage Aguas del Illimani from expanding sewer service, as expansion of the sewer network implies new investment but generates no additional revenue. This problem may be resolved in 2001: Aguas del Illimani's contract calls for the company to propose separate water and sewer tariffs at the first five-year tariff revision.

In the near term, however, the unified tariff could have interesting implications for expanding water service to poor neighborhoods. Households with both water and sewer service are presumably the most costly for Aguas del Illimani to serve. Some of Aguas del Illimani's costs do not vary with the number of services each household receives (for example, monthly billing). Other costs, such as maintenance, however, should be higher for households with both water and sewer service. Since water-only and water-and-sewer customers pay the same tariff, water-only customers may be paying more than the true cost of the service they receive. If water-only customers are paying more than what it costs Aguas del Illimani to serve them, then Aguas del Illimani would have a financial incentive to increase the number of water-only connections. This incentive would be consistent with the expansion schedule in the concession contract: quickly reach universal coverage of in-house water connections in poor neighborhoods and then only gradually expand sewer service in these areas. It is extremely difficult, however, to analyze whether water-only customers are indeed paying more than the cost of water service because there are other cross-subsidies in the tariff structure.

Cross-subsidies The Aguas de Illimani contract contains two prominent cross-subsidies. First, industrial, commercial, and government users subsidize service for domestic connections: all households, except the tiny number using more than 150 cubic meters of water per month, pay less than the average per unit tariff; all industrial, commercial, and government customers pay more.⁶¹ Second, the tariff differentiates between low-volume and high-volume users. For domestic connections, the increasing block tariff includes a lifeline unit tariff that falls well below estimated marginal cost for the first 30 cubic

⁶⁰ Calculations include administrative fees, materials, and labor for the secondary network and the household connection, but not the intrahousehold connection and fixtures.

⁶¹ This tariff structure need not be a cross-subsidy if the per unit cost of serving industrial and commercial users is indeed higher than the cost of serving domestic customers. The information to make this determination, however, is not available.

meters of water per month.⁶² As table 5 shows, most households in El Alto use much less than 30 cubic meters of water per month. The sale of water to these low-consumption households is thus a loss-making proposition, particular since households do not pay a monthly fee to cover fixed costs like meter reading and billing. Given this tariff structure, we can expect that Aguas del Illimani's preference would be to first serve industrial and commercial customers, then high-volume domestic users, and lastly the low-volume domestic users in El Alto who are the focus of the contract's expansion goals.

Table 5:

Effective per unit price of water for households with in-house water connections in various neighborhoods of the La Paz-El Alto metropolitan area

	Avg. monthly water consumption⁶³	Monthly revenue from avg. connection	Price per cubic meter of water
El Alto Subsystem			
El Alto - Norte	7 cubic meters	\$1.54	\$0.22
El Alto - Sur	11 cubic meters	\$2.44	\$0.22
La Paz - Tacagua	10 cubic meters	\$2.21	\$0.22
Other subsystems			
La Paz- Cota Cota	60 cubic meters	\$20.53	\$0.34

These are just three examples of how the design of tariffs and fees in a concession contract shape financial incentives to serve or not serve particular households or areas. These financial incentives undoubtedly influence companies' investment and operating strategies. But it is important to note that companies may have political or even financial reasons for expanding service into areas where they know they will suffer losses, even over the long-term. For example, companies that are worried about losing political support for privatization might prefer to accept limited losses from unprofitable connections than to risk a potentially larger loss if the government were to seek to terminate the concession contract for non-compliance with mandates. Or companies may see losses on certain household connections as a small price to pay for access to other opportunities: a favorable tariff renegotiation, entry into the more lucrative industrial water market, additional concession contracts in other areas, opportunities to sell other services and manufactured materials, et cetera.

By the same token, private water and sanitation companies may have reasons not to extend service into low-income neighborhoods, even if they could recover the direct costs of connecting and serving those areas. If the capacity of the system is severely limited, for example, and new connections would require a costly plant expansion or a new water supply, the company may seek to delay expanding its service areas. This problem should be avoidable, however, if tariffs are set to cover future system expansion costs.

⁶² The tariff study done to create the Aguas del Illimani tariff estimated long-run marginal cost to be \$1.18, the tariff in the highest usage block.

⁶³ Alain Carbonel, General Manager of Aguas del Illimani, television interview, May 1998, "Sin pelos en la lengua" (La Paz, Bolivia).

Pricing flexibility and demand

The discussion up to this point has focused on whether the tariff and fee structures in concession contracts will incite utilities to extend service to low-income areas. We have implicitly assumed that all households in expansion areas would choose to connect to the water and sewer system. In reality, however, tariffs and fees designed to give the utility an incentive to expand service might also discourage some households from connecting. Low connection rates in expansion areas would increase the company's costs.

There are a number of ways to avoid this problem. One strategy is to allow concessionaires to offer households a range of different services to satisfy differing levels of demand. Aguas del Illimani does not have this option. As described earlier, the technical specifications in the contract and sector regulations dictate that the company sell only in-house connections. Another strategy is to increase demand by restricting and illegalizing competing service options. The consequences of this strategy are discussed in detail below. Finally, tariff and fee structures can be designed to give concessionaires some flexibility in how they price their services. The Aguas del Illimani contract does give the company some leeway in this regard.

Aguas del Illimani's concession contract sets maximum tariffs and connection fees for water and sewer service, but it does not prevent the company from lowering prices or offering financing schemes to increase demand for the in-house water and sewer connections. The Municipality of El Alto and Aguas del Illimani took advantage of this flexibility in an agreement signed by the two parties in July 1997.⁶⁴ The agreement was an attempt to address some of the municipality's concerns about the concession agreement, which had been negotiated by the national government. In the agreement, Aguas del Illimani agreed to take two measures to reduce the probability that the lump-sum connection fees would discourage households from soliciting connections. First, Aguas del Illimani agreed to give households the option of paying a reduced fee in exchange for supplying labor during the connection process (see Table 6). This work option has been very popular with households in El Alto. Only 20 percent of households that have received water connections through August 1998 chose to pay the full fee.⁶⁵

Table 6:
Connection fees available to households
willing to supply labor during the connection process

Household...	Water Fee	Sewer Fee
Does not supply labor	\$155	\$180
Digs trench for household connection	\$135	\$150
Digs trench for connection and network line	\$105	\$130

⁶⁴ *Acuerdo Entre El Gobierno Municipal de El Alto Y Aguas del Illimani*, July 24, 1997.

⁶⁵ Data provided by Aguas del Illimani for connections through August 1998.

Second, Aguas del Illimani agreed to offer “the population most in need” a 3 to 5 year financing plan to pay the connection fees. Financing connections introduces a repayment risk. Utilities would like to minimize that risk by financing connections as infrequently as possible and over as short a time period as possible. Consistent with this principle, Aguas del Illimani tries to offer only one-year financing packages in central and southern la Paz. In poorer neighborhoods, Aguas del Illimani makes the longer financing periods available. Aguas del Illimani makes it even easier for poor households to pay for connections by offering subsidized interest rates to households in the outlying areas of El Alto. In most of the metropolitan area, Aguas del Illimani charges a 12 percent interest rate; in parts of El Alto, households pay only 8 percent interest. This subsidized interest rate was not part of the agreement with the Municipality of El Alto.

Because Aguas del Illimani has some flexibility in the pricing and financing packages that it offers its clients, the company can create payment packages to tailor to particular demands, needs, or concerns -- while taking care that its offers make financial sense. Concession contracts that require long financing periods or subsidized interest rates, however, could be dangerous because these measures may not be financially sustainable over the long-term.

Risk

Tariffs and connection fees can be designed -- on paper -- to guarantee total cost recovery and to provide financial incentives for serving poor neighborhoods. In practice, however, concessionaires face many risks that may alter this picture. Risk is of course a normal part of the private market, but concession contracts and sector regulations often include provisions to reduce various types of risk. Discussion of how risk should be allocated in concession design is beyond the scope of this paper⁶⁶. Here I consider only how two common risk-reduction provisions could affect low-income households: disconnection regulations and exclusivity provisions.

Nonpayment and disconnection

Some concessionaires experience problems collecting bills from customers. Billing customers at cost recovery tariff levels does little good if customers do not pay their bills. Thus, concessionaires generally seek some leverage over nonpaying households. In Bolivia, the 1992 Regulations permit utilities to cut off service to any households that do not pay their water and sewer bills within two months. Armed with this power, both SAMAPA and Aguas del Illimani have achieved high collection rates from domestic customers.⁶⁷ Many countries, however, prevent disconnections for nonpayment or make cutting off service a very long and difficult process.

One could argue that low-income households *with* water and sewer connections would actually benefit in the short-run if governments prohibited disconnection; this move would effectively remove the

⁶⁶ For more information on risk allocation, see World Bank. 1997. “*What a Private Sector Participation Arrangement Should Cover*,” Tool Kit #3, The World Bank: Washington, D.C.

⁶⁷ They have a much harder time collecting from public entities. In 1996, nearly 67 percent of SAMAPA’s customer debt belonged to government bodies. Aguas del Illimani’s most delinquent customer is the municipality of La Paz. Aguas del Illimani recently reached an agreement with the government to compensate it for debts it inherited from SAMAPA.

obligation to pay water and sewer bills. Low-income areas *without* access to the water and sewer network, however, would lose out if a no-disconnection policy resulted in low collection rates. Low collection rates jeopardize cost recovery, and concessionaires that are unable to cover their costs are likely to reduce their service expansion plans.

Exclusivity

Most concessionaires in the water and sanitation sector are granted the exclusive right to provide services in their concession areas. Exclusivity is often justified on the basis that it reduces revenue risk -- and thus increases the attractiveness of projects with high capital costs and long amortization periods. It is also advocated as a way to protect the revenues of concessionaires that are required to cross-subsidize some groups of consumers; exclusivity prevents competitors from “cherry picking” customers who are charged high prices to support the cross-subsidy scheme.

Exclusivity is obviously to the disadvantage of industrial or high-volume domestic users, who are typically the cross-subsidizers. These users would benefit from lower prices in a competitive service market. But exclusivity can also be quite harmful to the low-income households who are expected to benefit from a cross-subsidy tariff. Exclusivity illegalizes and suppresses the emergence of alternative service providers within the concession area, even in parts of the concessionaire area that the private utility does not plan to serve in the near future. This could delay improvements or even reduce existing water and sanitation options because only the concessionaire is authorized to provide service within the concession area.

The La Paz-El Alto contract does not explicitly state whether Aguas del Illimani has exclusivity over its concession area, but Bolivia’s regulations regarding concession awards imply that Aguas del Illimani is the only entity that can legally provide water service in its concession area. Article 14 of the 1997 Regulations states that if two entities request concessions for the same purpose and the same area, the Superintendent of Waters must award the concession with a competitive bidding process. This suggests that Bolivia permits only one concessionaire per service per area. The same article clarifies that all providers (network or non-network) are required to have a concession contract. As Aguas del Illimani is currently the only service provider with a concession for water service in the La Paz-El Alto area, other providers operating in the area (water vendors, NGO small-scale piped systems, etc.) do not appear to be authorized.

Bolivia’s water sector regulations and the concession contract provide another source of protection for the concessionaire: they seek to eliminate competition from communal standpipes and septic tanks. Aguas del Illimani is required to meter and then eliminate all standposts in the first years of the contract, and the 1992 Regulations prohibit Aguas del Illimani from leaving public standposts open once a street receives in-house water connections. Similarly, households must obtain authorization from the utility to keep a septic tank open once sewer service is available on their street.⁶⁸

The 1992 Regulations also give utilities significant control over private water sources in their concession areas. All individuals and entities that want a private water source (such as a groundwater well) must

⁶⁸ Article 47, 1992 Regulations.

receive permission from the water utility. Moreover, the utility can charge users of private water sources for the volume of water they extract and consume.⁶⁹ This provision effectively gives utilities property rights to all water used in their concession area. If utilities chose to exercise this power, they could reduce the attractiveness of using private water sources as an alternative to the network supply.

SAMAPA never made a serious attempt to exercise its control over private water sources or septic tanks. Aguas del Illimani, however, has begun to use these provisions of the 1992 Regulations. The company suggested to the Superintendent that use of groundwater should be regulated in order to protect the Tilata aquifer and to control the flow of polluting effluents from industries. In response, the Superintendent approved a tariff that Aguas del Illimani could charge private wells for groundwater abstraction. As of August 1998, Aguas del Illimani had equipped 10 wells with water meters, but the company's power to bill private water sources was being challenged in court. Should Aguas del Illimani fully exercise its power to restrict the availability of other water and sanitation services in its concession area, households within the area will have few or no legal service options until the utility extends the water and sewer network into their neighborhoods.

If the concession simply created a new service option, households in areas that currently lack in-house connections could only benefit from Aguas del Illimani's expansion plans. Those households willing to pay for the new service would connect, and any who preferred not to invest in an in-house connection would choose not to. The Aguas del Illimani contract and the water sector regulations, however, do not simply offer households a new option; they have the potential to reduce households' existing service options by restricting competition in the water and sanitation market. Reducing service options will not affect the many households that want, and are offered, in-house connections. However, any households that may prefer to retain the less expensive option of public standposts will no longer be able to do so because public standposts will be shut down. For households in the *area no servida*, restricting water and sanitation options poses a different, but equally troubling problem. These households could lose existing service options (because their current providers do not have permission to operate in the concession area) even the *area no servida* has no guarantee of receiving network connections during the concession period.

Exclusivity and other provisions aimed at reducing competition need to be treated with caution in the design of "pro-poor" concession arrangements because they have the potential to cause harm if strictly enforced by either the concessionaire or the regulator. It is important to point out that, in this case, Aguas del Illimani has permitted and even expanded some alternative water distribution systems within its service area. The Municipality of El Alto provides water delivery by tanker truck to some areas, and in July 1998 Aguas del Illimani initiated a similar service for households without access to the water network. Moreover, Aguas del Illimani requested and received authorization from the Superintendent of Waters not to meet the contract's schedule for metering and removing communal standposts. Nonetheless, Aguas del Illimani remains the monopoly decision-maker over all service options in its service area. We do not know whether poor and/or rich households would get a better deal in a more open service market, but exclusivity provisions in concession contracts clearly close down the possibility

⁶⁹ Article 63, 1992 Regulations.

of employing competition in the market to reduce prices, improve service, or provide alternative service options.

IV. Conclusion

The Aguas del Illimani case provides a good first look at the promise of and problems with relying on the traditional concession model to improve water and sanitation for the poor. The first two years of experience in La Paz-El Alto offer some early lessons about how to design “pro-poor” concession contracts. These lessons are yet to be tested, however, and the case leaves a number of important policy questions unanswered. The preliminary lessons from the Aguas del Illimani case are, thus, only a first step in learning how best to involve the private sector in improving water and sanitation conditions in low-income neighborhoods.

Promise In its first two years of operation, Aguas del Illimani has survived strong public opposition to privatization and has taken many steps to facilitate, both financially and procedurally, water connections for poor households. The company also successfully met its first expansion mandates in December 1998. Equally promising have been the willingness of the private company and the Superintendent of Waters to discuss and seek possible solutions to problems related to serving poor neighborhoods (e.g. requirement to eliminate public standposts, experimenting with alternative technologies for in-house connections, et cetera). These discussions do not appear to have altered or undermined the regulator’s resolve to enforce the requirements of the concession contract.

Problems Despite these positive signs, the Aguas del Illimani case suggests that traditional concession arrangements can be subject to many of the same problems that plagued the public monopoly utility models they replace. Concessions do not necessarily eliminate the policy barriers that stood in the way of public companies, and concession contracts that are not designed with poor neighborhoods in mind could even impose new requirements or restrictions that would frustrate efforts to serve poor neighborhoods.

In this case, for example, Aguas del Illimani (like SAMAPA before it) will have to work around restrictions on serving households without clear property titles. Even more importantly, the concession arrangement preserves the uniform, universal service goals that SAMAPA was expected to pursue. Uniform standards for a single level and quality of service are often conceived as a way to get high-quality service to low-income neighborhoods. However, this universal service vision is at best an important partial solution to the immediate water and sanitation problems in poor neighborhoods. It will be years before many households in La Paz and El Alto receive access to in-house water and sewer services, even if expansion proceeds as planned. The Aguas del Illimani contract does not include any interim solution for improving water and sanitation services. Moreover, Aguas del Illimani has even less flexibility than SAMAPA to offer lower-cost water and sanitation improvements, should demand for in-house connections prove weak in some neighborhoods. Restricting a concessionaire’s flexibility in service provision in this way could threaten the financial viability of the contract. If concessionaires have to negotiate down their expansion mandates, poor households are likely to lose out.

Another problematic characteristic of the traditional concession model is that it involves restricting alternative suppliers and alternative service options. As we have seen, exclusivity provisions and

restrictions on alternatives to in-house connections may delay improvements or even eliminate existing service options in some neighborhoods. This is particularly problematic in neighborhoods that the utility will not reach for some time, but that alternative suppliers may be willing to serve now.

Early lessons on contract design The precise effect of contract provisions and sector regulations on the poor will vary in different settings, depending on the specific physical, technical, and social characteristics of each case. Nonetheless, several important principles that emerged from the Aguas del Illimani case offer general guidance for the design of “pro-poor” concession contracts.

First, government officials can increase the probability that a concessionaire will improve service in low-income areas (1) by making objectives clear and easily measurable, (2) by eliminating policy barriers to achieving the goals, and (3) by making the contract’s financial incentive structure consistent with overall objectives and mandates.

Second, low-income households, like all utility customers, are best served by a utility that can offer them service that they want. Demand for service improvements usually varies by household and neighborhood and will change over time. Thus, poor households would benefit from private operators that have the flexibility in operations and product offerings to meet varied demand.

Finally, government officials need to be extremely cautious about any provision that reduces the service and price options available to households or restricts the emergence of new service providers or service alternatives. Exclusivity provisions and strict technical specifications, for example, have the potential to harm some households by eliminating, postponing, or outlawing the availability of some types of water and sanitation services.

Unanswered and untested questions Despite the early gains of the Aguas del Illimani concession, it is too early to tell whether the pace of service expansion in La Paz-El Alto will be sustainable. The concessionaire and the regulator have yet to pass through the first tariff renegotiation. This process will test resolve to maintain the pace of expansion into low-income neighborhoods if tariff studies show that expansion will require a tariff increase. Aguas del Illimani also still faces the challenge of working in the most difficult peri-urban areas – the poorest areas, the steep and often unstable slopes of the laderas, and neighborhoods that operate their own improved (albeit sub-standard) water and sanitation services. And, it is not yet clear whether the concessionaire’s decision to offer subsidized interest rates and to finesse the property title and public standpost issues will prove financially and politically sustainable in the long-run.

The replicability of the Aguas del Illimani model also needs to be tested. La Paz and El Alto are very different in a number of important ways from other large urban areas in developing countries. To begin with, the starting water coverage levels – though lacking – are higher than in many other cities. Moreover, areas without water and sewer connections are generally laid out in a very orderly pattern of blocks, lots, and streets that does not at all resemble the cramped and unplanned neighborhoods in and around many cities. Low-income communities in La Paz and El Alto also benefit from the presence of many NGOs that offer services to complement Aguas del Illimani’s service expansion objectives (e.g.

micro-credit for home improvement). From a business development perspective, the La Paz-El Alto metropolitan area offers the concessionaire the possibility of connecting many industrial and commercial enterprises that currently rely on their own water sources. The La Paz-El Alto concession also has the advantage that bulk water supply is not a problem at this point. Finally, Aguas del Illimani's parent company – Suez Lyonnaise des Eaux – would like the La Paz-El Alto concession in particular to be an example of how the company can successfully contribute to improving water and sanitation services in low-income peri-urban areas. For all of these reasons, it will be important to study whether the early lessons from the La Paz-El Alto concession hold true later in the concession period and in other concession arrangements as well.

Future research regarding the design of “pro-poor” concession arrangements will also need to move beyond the traditional concession model. The Aguas del Illimani case reveals many of the potential benefits and pitfalls of the traditional concessions, but the case leaves unanswered questions about how low-income households could be served under different forms of private sector involvement. Would small competing service providers be better at satisfying demand for improvements in low-income neighborhoods? Would there be any advantage to a model where concessionaires or public utilities collaborated with small private or non-profit providers to serve some neighborhoods? What role can the private sector play in areas that are unsuitable for standard in-house water or sewer connections? Would large private concessionaires be willing and able to undertake large-scale implementation of more than one level of water and sewer service? Future work on these types of questions will significantly add to policy advice about the design of “pro-poor” concession contracts and sector regulations.

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