Subnational Series

Connecting to Water and Sewerage in Mexico

Pilot Indicator







WORLD BANK GROUP

Connecting to Water and Sewerage in Mexico Pilot Indicator

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Case Study: Connecting to Water and Sewerage in Mexico

Water is a key resource for businesses. Production chains across a wide range of industries rely on a steady supply of water—whether for heating, cooling, cleaning or use as a product component. Facilitating access to this resource—in sufficient quantity and quality and at a reasonable cost—is basic to promoting investment and economic growth. An inefficient water system may harm the productivity of businesses as well as undermine the financial viability of the water utility. The United Nations estimates that 78% of jobs worldwide depend on access to water.[1] Research by the World Health Organization suggests that each dollar invested in improving access to drinking water and sanitation generates a return of $3–34, depending on the region and the technology involved.[2]

In Mexico the share of the urban population with access to drinking water rose from 78.4% in 1990 to 92.4% in 2015.[3] The share with access to sewerage increased by even more—from 61.5% to 91%.[4] But efficiency remains a concern. Estimates suggest that about 45% of the water supplied to the distribution systems goes unbilled as a result of losses in the systems, metering inaccuracies or illegal connections.[5] Aging pipelines, water quality issues (such as the degree of hardness) and constant changes in pressure levels due to intermittent water supply not only disrupt business operations but may also lead to the deterioration of machinery, thus affecting business productivity.

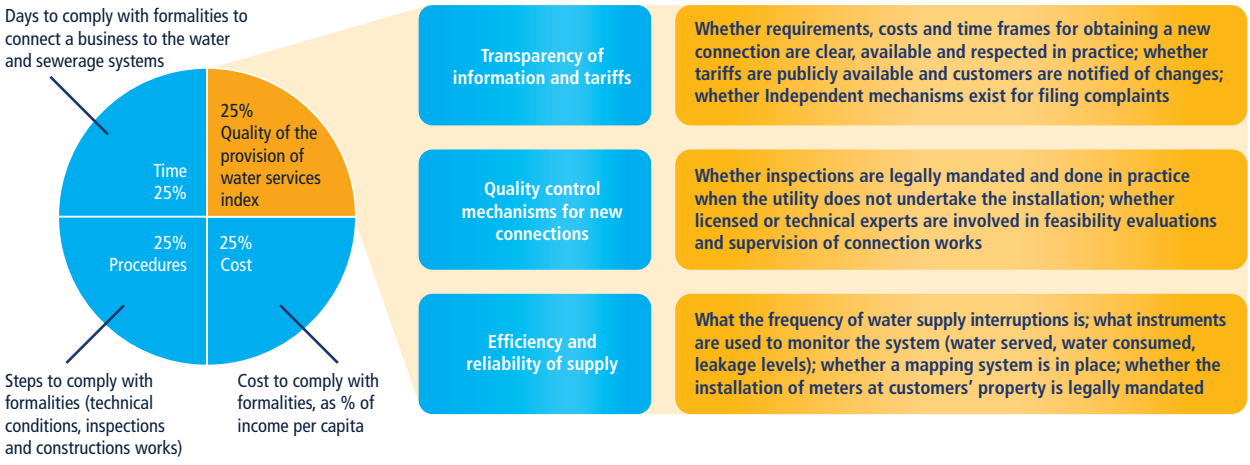
Subnational Doing Business, through a set of pilot indicators, analyzes the process that an entrepreneur in Mexico must undertake to connect a commercial establishment to the water and sewerage systems. Comparing 16 Mexican cities, the analysis captures both the efficiency of the process and aspects related to the quality of the services provided by the utility companies and of the regulations governing the process.[6]

WHAT DO THE PILOT INDICATORS ON CONNECTING TO WATER AND SEWERAGE MEASURE?

The connecting to water and sewerage indicators measure all *the procedures* required to connect a commercial establishment to the water and sewerage systems as well as the time and cost associated with each procedure. In addition, a fourth indicator, the *quality of the provision of water services index*, assesses aspects of the quality of the relevant regulations and of the public water and sewerage systems. This index has three component indices: the *transparency of information and tariffs index, the quality control mechanisms for new connections index and the efficiency and reliability of supply index* (figure 1.1).

To make the data comparable across cities, several assumptions about the commercial establishment and the water and sewerage connections are used. The establishment is assumed to provide laundry services in the periphery of the municipality's urban area. It is located 10 meters (33 feet) away from the system main, and its average consumption is 6,600 liters (1,743 gallons) per day. The water connection will have a diameter of 1 inch, and the sewerage connection a diameter of 6 inches.[7]

FIGURE 1.1 What do the connecting to water and sewerage indicators measure?



HOW DOES THE CONNECTION PROCESS WORK IN MEXICO?

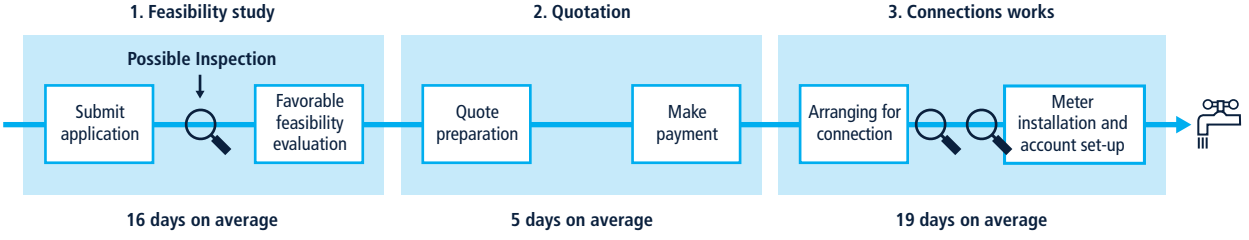
At the federal level, the National Water Commission (Comisión Nacional del Agua, or Conagua) is responsible for managing national water resources and ensuring drinking water safety in Mexico.[8] One of its objectives is to strengthen the technical and financial capacity of the water and sewerage utilities (*organismos operadores de agua*). At the local level, these utilities operate the water and sewerage systems under a concession agreement (*titulo de concesión*) and are responsible for providing basic water and sewerage services to the population. Among the 16 utilities operating in the cities covered by the study, 14 are public, 1 is private and 1 is mixed.[9] The utilities' coverage area also differs. Nine operate at the municipal level, 3 at the intermunicipal level and 4 at the state level.[10] According to the National Institute of Statistics and Geography, there are 2,356 water and sewerage utility companies operating in Mexico.

To connect a commercial establishment to the water and sewerage systems, an entrepreneur must undertake up to 10 procedures with the corresponding utility company. These are carried out in three phases (figure 1.2). First, the customer requests, and the utility carries out, a service feasibility study to determine whether the utility can supply the required quantity and quality of water and can discharge the required quantity of wastewater. Second, the utility prepares a quotation listing all the costs to be paid by the customer—including connection fees and the costs of materials, labor and a meter—which the customer pays before the connection works begin. Finally, the connection works are completed, and the customer signs a supply contract. In addition, the utility performs inspections at different points of the process.

Connecting a business to the water and sewerage systems in the 16 cities takes 8 procedures and 40 days on average, and costs 47.7% of income per capita. Culiacán has the fastest process, at 16 days, with the feasibility study and connection works each taking a week. Guadalajara has the lowest cost, at 12.4% of income per capita. The average score on the quality of the provision of water services index is 17.8 (of a possible 34 points). Guadalajara, Culiacán and Monterrey have the highest scores (table 1. 1).

The number of procedures ranges from 6 in Aguascalientes, Colima and Mexico City to 10 in Campeche and Querétaro. The

FIGURE 1.2 The connection process is carried out in three phases



Source: Doing Business database.

TABLE 1.1 Where is it easiest to obtain a water and sewerage connection?

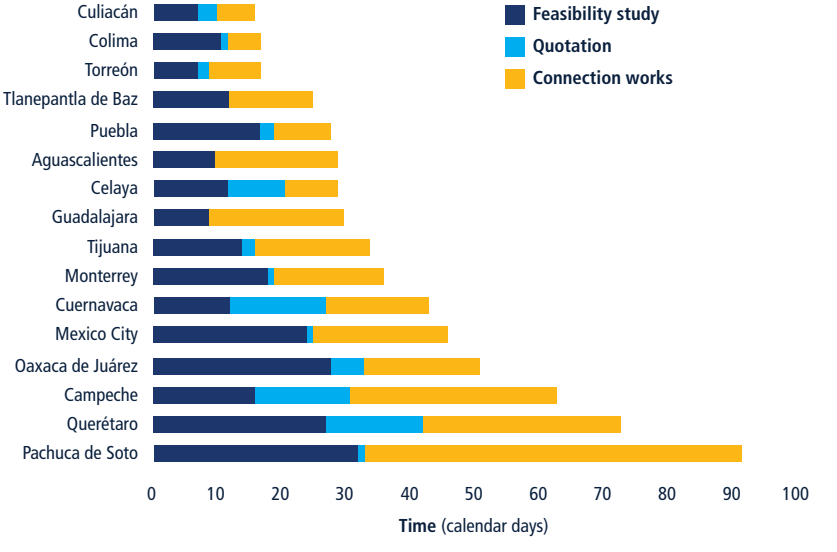
City (State)	Distance to frontier score (0–100)	Procedures (number)	Time (days)	Cost (% of income per capita)	Quality of the provision of water services index (0–34)
Colima (Colima)	87.25	6	17	15.0	18
Aguascalientes (Aguascalientes)	81.82	6	29	13.6	15.5
Guadalajara (Jalisco)	77.38	8	30	12.4	26.5
Culiacán (Sinaloa)	76.30	8	16	33.1	26
Mexico City	69.96	6	46	45.2	18
Torreón (Coahuila)	67.70	9	17	15.9	17.25
Celaya (Guanajuato)	64.82	8	29	38.3	18
Tijuana (Baja California)	62.45	7	34	74.1	21
Monterrey (Nuevo León)	56.18	8	36	81.6	24.5
Tlalnepantla de Baz (México)	52.62	7	25	108.9	15.75
Oaxaca de Juárez (Oaxaca)	50.15	9	51	27.1	12.5
Cuernavaca (Morelos)	44.94	9	43	68.4	16.25
Campeche (Campeche)	42.03	10	63	13.3	10.5
Puebla (Puebla)	40.91	9	28	109.8	18.5
Pachuca de Soto (Hidalgo)	37.21	9	92	35.7	16.25
Querétaro (Querétaro)	23.75	10	73	70.3	10

Source: Doing Business database.
Note: The distance to frontier score is based on the average distance to frontier scores for procedures, time, cost and the quality of the provision of water services index. The distance to frontier score is normalized to range from 0 to 100, with 100 representing the frontier of best practices across the 16 cities (the higher the score, the better).

variation is driven by whether the water and sewerage connections can be processed jointly and how many inspections are carried out by the utility company. In all the cities except Campeche, Cuernavaca, Querétaro and Tlalnepantla de Baz, the applications for the two connections can be processed jointly. The utility companies may carry out up to three on-site inspections at different stages. The first inspection is carried out at the beginning of the process, to assess the technical feasibility of the new connection and determine what work is required to establish it. A second inspection may be carried out before the connection works begin to determine whether the internal installation (the supply pipes from the property boundary into the property itself), which is the customer's responsibility, meets the regulatory standards. A third and final inspection may take place if the connection works to the water main were not completed directly by the utility.

In the cities where the process is fastest—Culiacán, Colima and Torreón—all three phases are efficient, with each requiring less than one week on average. In contrast, in Pachuca de Soto, where the process can take up to 92 days, each phase takes one month on average. The connection works account for the biggest differences in the time required (figure 1.3). Although completing the works takes just one or two days, the wait from the time the entrepreneur pays the connection cost until the works begin can

FIGURE 1.3 The connection process takes less than three weeks in Culiacán, Colima and Torreón—but it takes three months in Pachuca de Soto



Source: Doing Business database.

last from three or four days in Celaya, Colima and Torreón to as much as one month in Campeche and Pachuca de Soto.

The cost to obtain a water and sewerage connection ranges from 12.4% of income per capita in Guadalajara to 109.8% in Puebla—with the connection works representing 86% of the total cost on average. The differences stem largely from the variation in the parameters used to determine costs (figure 1.4). While the feasibility study is free of charge in Culiacán, Mexico City, Monterrey and Querétaro, seven cities apply a flat rate, and the rest use a variable rate that depends on the estimated consumption, property size or land use (whether residential, commercial or industrial). Similarly, to estimate the cost of the connection works, the 16 cities apply one or more parameters from a set of five (water intake diameter, surface area, distance to the distribution main, estimated consumption or land use).

MEASURING THE QUALITY OF THE PROVISION OF SERVICES

The efficiency of the connection process—as measured by the number of procedures, time and cost—is important to entrepreneurs. But it is not all that matters. Combining quantitative and qualitative data, the quality of the provision of water services index captures other aspects of the process that also have an important impact on business activity. The index is composed of three scored indices aimed at measuring the transparency of information relating to the connection requirements and tariffs (8 points), the quality control mechanisms in place during the connection works (8 points) and the efficiency and reliability of the water and sewerage systems (18 points) (figure 1.5).

Transparency of information and tariffs

Clear and accessible regulation helps ensure that customers can obtain advance notice of all the requirements, time frames and costs applicable to the connection process. Besides reducing confusion about how to proceed, this information can reduce the likelihood of additional requirements or cost overruns being imposed arbitrarily. This is particularly relevant when the customer's property is relatively far from the water main, which can considerably increase connection costs and time frames. In Mexico the connection cost for a new intake that is 150 meters (492 feet) from the main can reach up to $22,000.[11]

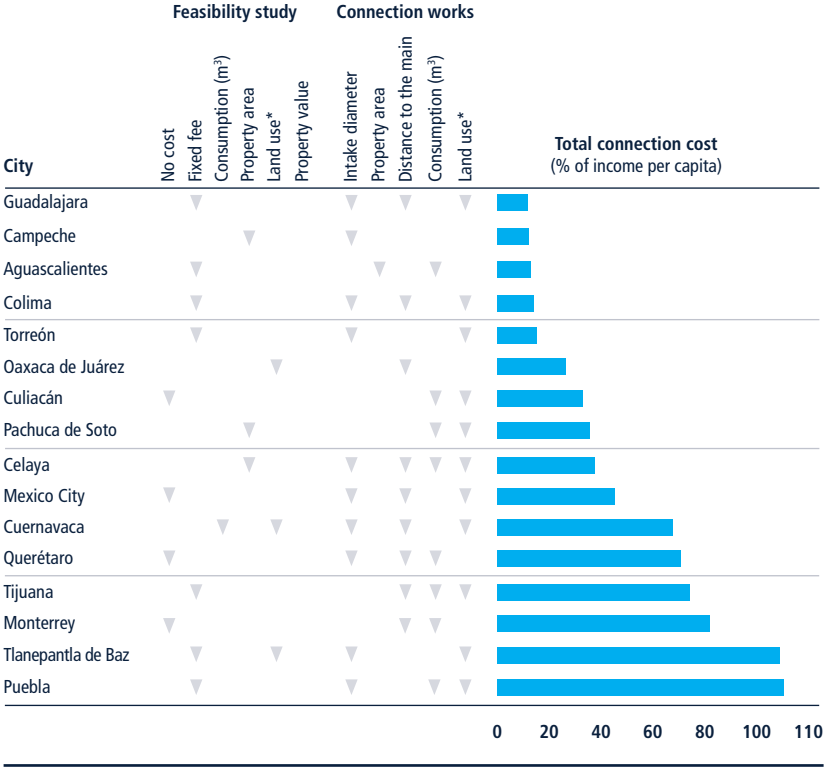
The transparency of information and tariffs index assesses the clarity and accessibility of the list of requirements, installation costs and time frames for a new connection, and whether these are respected in practice. It also assesses whether consumption tariffs are publicly available and whether customers are informed about changes ahead of time. Finally, it assesses whether customers can file complaints with an agency (one that is independent from the water utility) and obtain a response in the majority of cases.

In all 16 cities covered by the study, the regulation clearly specifies the requirements for obtaining a new connection. But in Campeche, Oaxaca de Juárez and Torreón it does not specify connection time frames, and in Campeche, Mexico City and Oaxaca de Juárez it does not break down the installation costs. In 13 of the cities customers can find the applicable tariffs online.[12] Eight of the cities compile the requirements and time frames for each connection procedure in a single document that is available online.

Quality control mechanisms for new connections

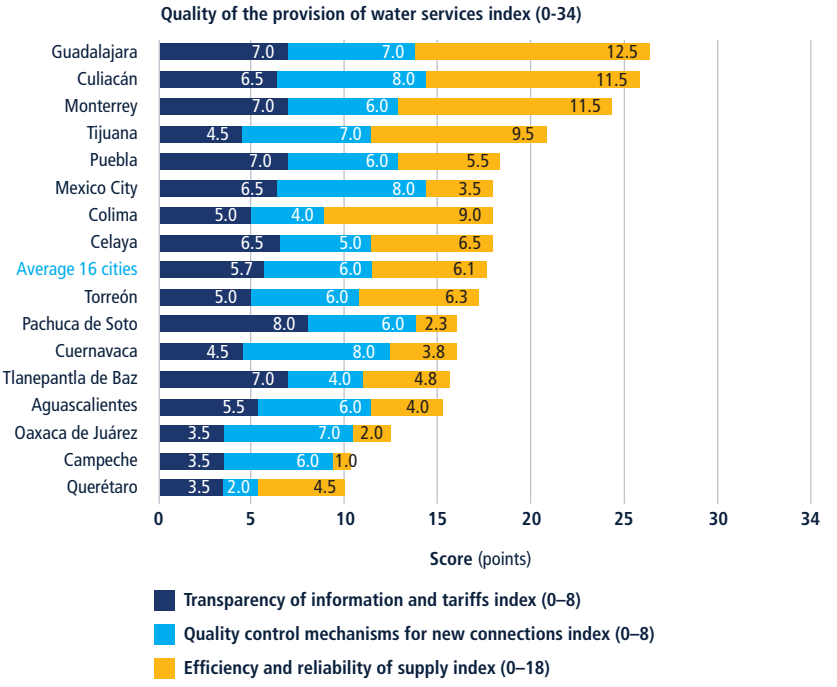
The professionals who review and approve feasibility applications determine whether the utility can provide

FIGURE 1.4 Which factors influence the connection costs?



Source: Doing Business database.
▼ Parameter used to calculate cost.
* Whether residential, commercial or industrial.

FIGURE 1.5 Customers experience important differences in the efficiency and reliability of water supply depending on their location



Sources: Doing Business database; Mexican Water Technology Institute, Water Utility Management Indicator Program (Instituto Mexicano de Tecnología del Agua, Programa de Indicadores de Gestión de Organismos Operadores) for three indicators used in the efficiency and reliability of supply index (micro-metering, macro-metering and physical efficiency).

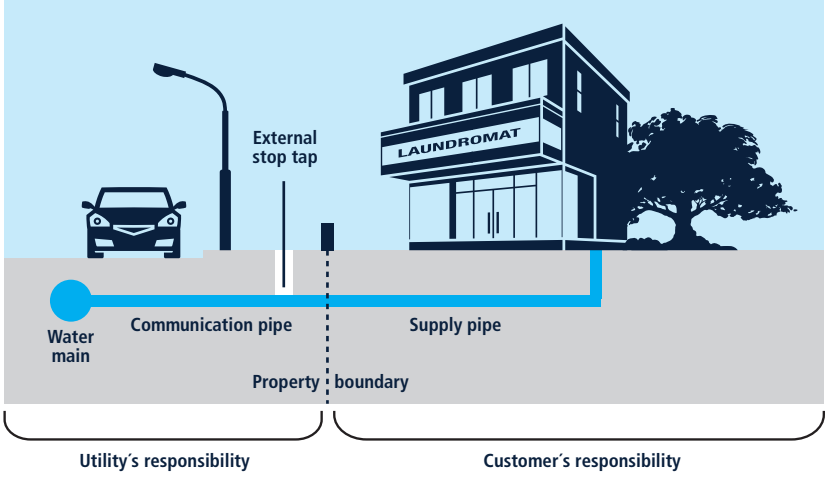
access to water and sewerage to a given property depending on such factors as the volume and pressure needs, the distance to the water main, the land use and the characteristics of the terrain. These individuals need certain technical expertise to ensure that the new connections meet the quality standards established by the regulation. Similarly, the professionals who supervise the installation works need technical expertise to ensure compliance with safety and quality standards.

The quality control mechanisms for new connections index assesses the qualification requirements for the technical experts who approve the feasibility studies and those who supervise the installation works. In all 16 cities the professional responsible for issuing the feasibility certificate must have a university degree or a minimum number of years of experience. In Culiacán, Guadalajara and Monterrey this professional must also pass an exam. In 14 cities the technical staff responsible for supervising the connection works must have a university degree or a minimum number of years of experience.

Another aspect of quality control relates to inspections. Utility companies are generally responsible for the water mains and the pipes between the mains and the boundary of a customer's property (communication pipes) but not for the pipes that carry drinking water from the property boundary into the property itself (supply pipes) (figure 1.6). A mechanism is needed to ensure that the installation of supply pipes complies with the regulations—either an inspection system or a requirement that the work be carried out by a certified contractor—because failure to follow adequate procedures or use approved materials can lead to leaks or public health hazards. A final inspection is even more important where a private company is allowed to install the communication pipes or even the connection to the water main, because deficiencies in this work can have greater impact.

The quality control mechanisms for new connections index assesses whether an inspection is both required and carried out in practice when someone other than the water company or a certified contractor undertakes the installation of the supply or communication pipes and the connection to the water main. Among the 16 cities, 8 allow certified contractors to install communication pipes, and 6 allow them to complete the connection

FIGURE 1.6 What is the utility's responsibility, and what is the customer's?



to the water main. In these 6 cities the utility always carries out a final inspection. None of the cities allow uncertified companies to undertake the connection to the water main.

Efficiency and reliability of supply

Frequent water supply interruptions or inadequate water quality and pressure levels can hinder business operations and even damage company assets. These problems may also dissuade entrepreneurs from establishing new businesses in a location. The efficiency and reliability of supply index assesses such issues by recording the tools used to monitor the system and detect deficiencies, the intermittency of the water supply and the water waste caused by the system.

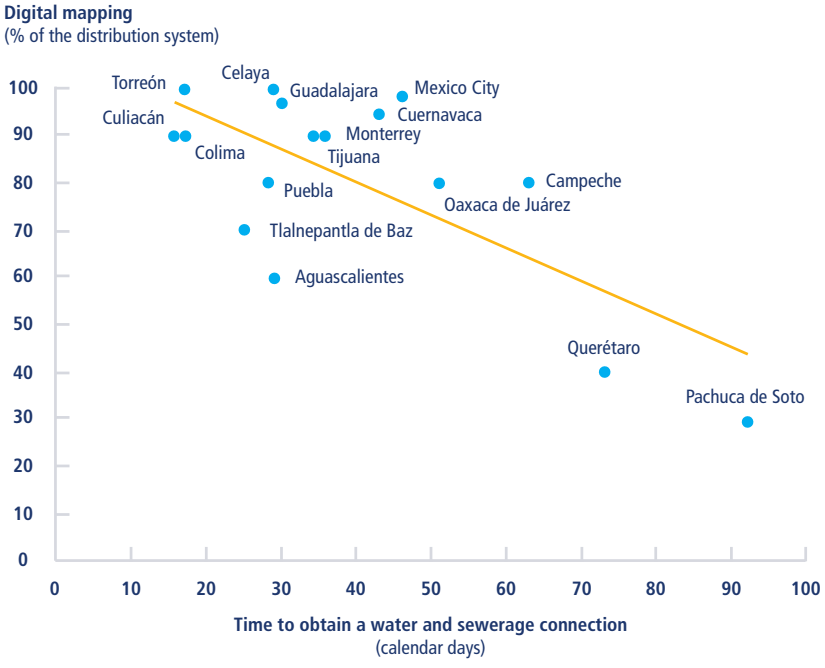
To achieve efficiency in the operation, planning, construction and maintenance of a system, operators need to know the exact location of the network assets, their characteristics, their installation dates and the modifications introduced. Having a computerized model of the system that integrates information from sensors, meters and other monitoring devices can help (such as by facilitating the detection of leaks or the allocation of inspection and maintenance resources). One component of the index records the percentage of the distribution systems that are mapped, along with the mapping format—while another assesses whether urban development officers have access to these data and if through interconnected databases or hard copies. In 9 of the 16 cities more than 90% of the water system is digitally mapped. Only in Pachuca de Soto and Querétaro are the mapping percentages below 50%. The cities that have the highest digital mapping percentages also tend to have the fastest connection processes (figure 1.7). When the utility staff have electronic access to all the necessary data, a feasibility application can be approved more easily, with no need for an inspection.

Metering also supports efficiency. In Mexico estimates indicate that about 45% of the water served is not billed to the customers, mainly because of water losses. In many areas finding leaks is a manual process. In the absence of a monitoring system, utilities often find a leak by trial and error; crews listen for leaks and may start digging without knowing the magnitude of the problem. When a leak is not visible, finding and repairing it can take years. Having a metering system in place allows utilities to know exactly how much water is served and how much consumed by the customers—and therefore how much is lost before reaching them. It also enables utilities to accurately evaluate the network conditions, prioritize problems and create an implementation plan for correcting deficiencies. A third component of the index records information on the use of both macro-meters (installed at the water sources) and micro-meters (installed at the customer's property). Among the 13 cities for which full data are available, only Aguascalientes, Celaya and Querétaro have rates exceeding 70% for both macro-metering and micro-metering (figure 1.8).

In addition, the installation of micro-meters allows utility companies to bill each customer for the actual volume of water consumed. When no meters are installed, a utility has to estimate consumption as a function of less objective parameters, such as the number of people in a household or the business activity carried out on the property. A fourth component of the index looks at whether installing a meter is legally mandated for new water connections. The data show that in all the cities except Campeche, the law requires the installation of a meter for every new connection.

Yet another component records whether water supply service is continuous or carried out through scheduled interruptions. In 6 of

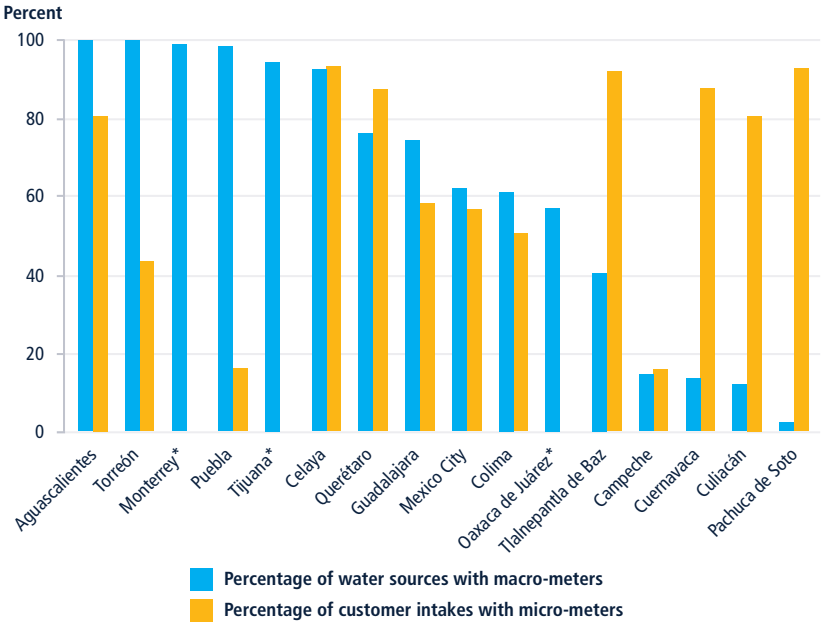
FIGURE 1.7 The connection process tends to be faster in the cities where the utility staff have more precise information



Source: Doing Business database.

Note: The digital mapping percentages were provided by the 16 utilities operating in the cities studied. The correlation coefficient between the two variables is –0.71. The relationship is significant at the 1% level after controlling for state GDP per capita.

FIGURE 1.8 Only Aguascalientes, Celaya and Querétaro have meters installed at more than 70% of both water sources and customer properties



Source: Mexican Water Technology Institute, Water Utility Management Indicator Program.
* Micro-metering data are not available for Tijuana, Monterrey and Oaxaca de Juárez

the cities continuous supply is available: Culiacán, Guadalajara, Monterrey, Tijuana, Tlalnepantla de Baz and Torreón. In the 10 other cities supply is carried out through a rationing system in some or all areas. Among these 10 cities, supply is available between 70% and 100% of the time in Aguascalientes, Celaya, Mexico City and Querétaro, and less than 70% of the time in the rest.

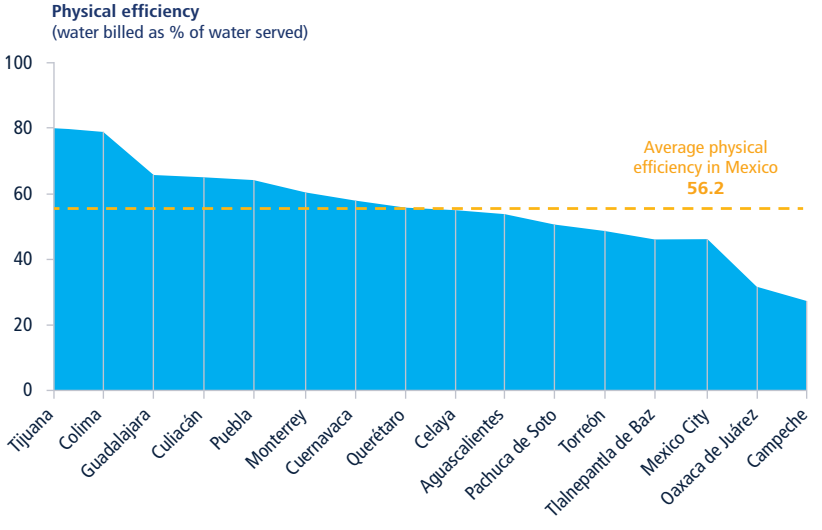
One tool commonly used by utilities to assess the efficiency of water systems is the physical efficiency indicator. This measures the percentage of water served through a water system that is billed to the customers. A high percentage indicates high efficiency—most of the water served reaches the customers rather than being lost through leaks, for example. Under the methodology for the efficiency and reliability of supply index, a threshold of 56.2% has been established for this indicator.[13] For the cities that do not reach this threshold, the score obtained on the index is divided by 2. Even if a utility is using the most advanced tools to monitor its system, a large loss in the water served indicates low efficiency and therefore a high score cannot be granted (figure 1.9).

CONCLUSION

This study finds substantial differences across cities in both the efficiency of the connection process—as measured by the number of procedures, time and cost—and the quality of the provision of water services. While the analysis covers only 16 of the 2,356 water and sewerage utilities operating in Mexico, it suggests the magnitude of the differences faced by entrepreneurs in different locations. Approval processes, inspection systems, the information available and the reliability of supply service may differ substantially even between neighboring cities. The fragmentation of the water distribution systems makes this subnational benchmarking exercise especially relevant.

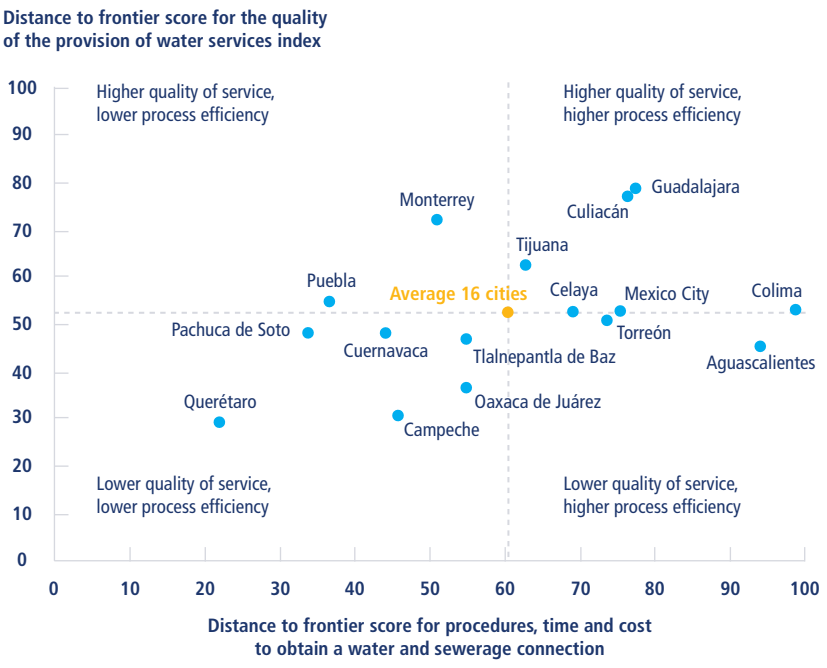
The data show a relationship between the efficiency of the connection process and the quality of supply service. Among the eight cities where the process is fastest and least costly, six have a score on the quality of the provision of water services index that is above the average. Similarly, among the eight cities where the process is slowest and most costly, six have an index score that is below the average (figure 1.10).

FIGURE 1.9 The share of water served that reaches the customers ranges from 25% to 80% across the 16 cities



Source: Mexican Water Technology Institute, Water Utility Management Indicator Program.
Note: Physical efficiency is the water volume billed to customers divided by the total water volume served. The average shown for Mexico is based on 2015 data for 149 water and sewerage utility companies evaluated by the Mexican Water Technology Institute under its Water Utility Management Indicator Program.

FIGURE 1.10 The cities that have higher-quality supply service also tend to have a more efficient connection process



Source: Doing Business database.

Note: The distance to frontier score for procedures, time and cost is the average for these three indicators. The distance to frontier score is normalized to range from 0 to 100, with 100 representing the best performance across the 16 cities (the higher the score, the better).

Not surprisingly, the cities where water utilities have advanced tools and more developed mechanisms for network management also tend to have a simpler and faster connection process. Advanced metering systems, appropriate quality control mechanisms, ongoing communication with the municipality and an updated digital cadastre of the hydraulic infrastructure are all examples of factors that help support efficiency. For example, if technicians responsible for reviewing feasibility applications have access to all the necessary information on their computer, they can issue approvals without an on-site inspection. And if municipal technicians can exchange information with the utility, they can issue construction permits without requiring a water feasibility application.

A clear and accessible regulation can also expedite the connection process. When applicants can find all the requirements clearly specified in a regulation that is easily available, they can submit higher-quality documentation. That helps to reduce the number of interactions and the time required to complete certain procedures.

NOTES

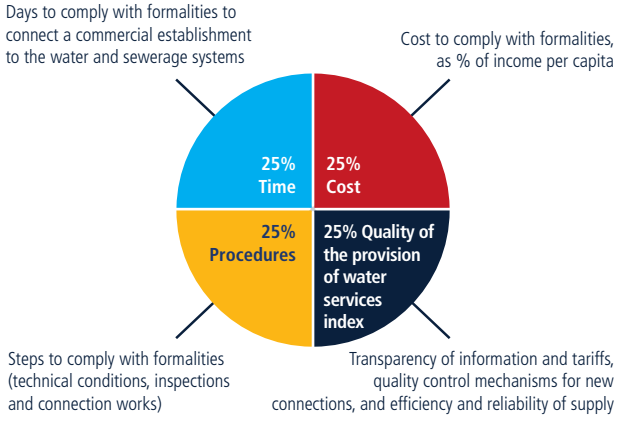
1. WWAP (United Nations World Water Assessment Programme), *The United Nations World Water Development Report 2016: Water and Jobs* (Paris: UNESCO, 2016).
2. WWAP, *The United Nations World Water Development Report 3: Water in a Changing World* (London: Earthscan; Paris: UNESCO, 2009), http://unesdoc.unesco.org/images/0018/001819/181993e.pdf.
3. Comisión Nacional del Agua, *Estadísticas del agua en México, edición 2015* (Mexico City: Secretaría de Medio Ambiente y Recursos Naturales, 2015).
4. Comisión Nacional del Agua, *Estadísticas del agua en México, edición 2015* (Mexico City: Secretaría de Medio Ambiente y Recursos Naturales, 2015).
5. Based on the average physical efficiency of 149 Mexican water and sewerage utility companies evaluated by the Mexican Water Technology Institute under its Water Utility Management Indicator Program. Data are for 2015.
6. The 16 cities are Aguascalientes, Campeche, Celaya, Colima, Cuernavaca, Culiacán, Guadalajara, Mexico City, Monterrey, Oaxaca de Juárez, Pachuca de Soto, Puebla, Querétaro, Tijuana, Tlalnepantla de Baz and Torreón.
7. See the methodology section for a full description of the case study assumptions.
8. The national water resources are those owned by the nation under the terms of paragraph 5, article 27 of the Political Constitution of the United Mexican States.
9. The private company Agua de Puebla operates the water and sewerage networks in the municipality of Puebla. Aguascalientes has a mixed model: the Citizen Commission for Drinking Water and Sewerage (Comisión Ciudadana de Agua Potable y Alcantarillado; CCAPAMA) of the Municipality of Aguascalientes analyzes and defines service feasibility, and the private company Concesionaria de Agua de Aguascalientes S.A. (CAASA) operates the water network and bills users for the services.
10. Utilities in Colima, Guadalajara and Pachuca de Soto have intermunicipal coverage, and those in Monterrey, Oaxaca de Juárez, Querétaro and Tijuana operate at the state level.
11. Data are for the dealing with construction permits indicators, from World Bank, *Doing Business in Mexico 2016* (Washington, DC: World Bank, 2016).
12. These 13 are Campeche, Celaya, Colima, Cuernavaca, Culiacán, Guadalajara, Mexico City, Monterrey, Pachuca de Soto, Puebla, Tijuana, Tlalnepantla de Baz and Torreón.
13. The threshold is equal to the average physical efficiency of 149 Mexican water and sewerage utility companies evaluated by the Mexican Water Technology Institute under its Water Utility Management Indicator Program. Data are for 2015.

Methodology for the Connecting to Water and Sewerage Pilot Indicators

The connecting to water and sewerage indicators measure all the procedures required to connect a commercial establishment to the water and sewerage systems as well as the time and cost associated with each procedure. A fourth indicator, the quality of the provision of water services index, assesses aspects of the quality of the relevant regulations and of the public water and sewerage systems.

The distance to frontier score for connecting to water and sewerage is the simple average of the distance to frontier scores for each of the four indicators (figure 2.1). The distance to frontier score illustrates how far a given economy is from "the frontier," represented by the most efficient practices or the highest score obtained on each indicator. The score is normalized to range from 0 to 100, with 100 being the frontier.

FIGURE 2.1 Connecting to water and sewerage: efficiency and quality of the connection process



The data collection for this pilot study was carried out between May and August 2016, through study of existing legislation, personal interviews and questionnaires administered to private and public sector experts in the field. Eighty three local experts from the private sector (engineers and building companies) as well as technical staff from the water and sewerage utilities were interviewed in the 16 cities benchmarked. These cities are Aguascalientes, Campeche, Celaya, Colima, Cuernavaca, Culiacán, Guadalajara, Mexico City, Monterrey, Oaxaca de Juárez, Pachuca de Soto, Puebla, Querétaro, Tijuana, Tlalnepantla de Baz and Torreón.

EFFICIENCY OF THE CONNECTION PROCESS

The study records all the procedures required for a company building a commercial establishment to connect that establishment to the water and sewerage systems, including applying for all corresponding licenses required for the connections. These procedures include the following:

- Request, pay for and obtain a water and sewerage feasibility study.
- Receive inspection to gather information to analyze feasibility.

- Request and obtain a quotation for the water and sewerage connection works.
- Receive inspection to gather information to prepare the quotation.
- Pay fees and obtain connection to the water and sewerage systems.
- Installation works.
- Receive a final inspection (if connection works were conducted by a private company).
- Request and sign a water supply and sewerage contract.
- Meter installation.

Case study assumptions

To make the data comparable across cities, several assumptions about the commercial establishment and the water and sewerage connections are used.

Characteristics of the commercial establishment:

- Provides laundry services.
- Has an area of 100 square meters and is 100% owned by the company.
- Is registered in the cadastre and in the public property registry.
- Is located in the periphery of the municipality's urban area.
- Is not located in a special economic or industrial zone, but meets the zoning requirements for the activity to be developed.

Details of the water and sewerage connection:

- The average water consumption is 6,600 liters (1,743 gallons) per day, and the average sewage flow is 6,400 liters (1,690 gallons) per day. Water and sewerage consumption is constant.
- The store is located 10 meters (33 feet) away from the water and sewerage networks.
- The diameter of the water intake is 1 inch, and the sewer diameter is 6 inches.
- All the installation costs are considered, excluding the work to install the internal supply pipes.
- A septic tank with the smallest possible size must be installed or built if there is no sewerage infrastructure.
- A well must be excavated if there is no water supply infrastructure.

Definitions of procedures, time and cost

A *procedure* is defined as any interaction with external parties (municipalities, companies, regional administration or private organizations) related to the water and sewerage connection process. This includes all inspections that must be received. Some of the procedures may take place simultaneously. A procedure is considered to be simultaneous with another one when both can be carried out at the same time without one of them being a prerequisite for the completion of the other.

Time is recorded as the average duration of each procedure in calendar days, from the time of application to the issuance of the document or certificate. The minimum time required for procedures done in person is one day; for online procedures the minimum time is half a day (when the procedure can be fully completed online and the response is immediate).

Cost includes only official costs and fee payments for each procedure (informal payments or bribes are not considered). Cost is expressed as a percentage of income per capita. The study uses Mexico's income per capita for 2014 published in the World Bank's *World Development Indicators 2015*, equivalent to US$9,980 (134,014 Mexican pesos). The applied exchange rate is US$1 = 13.43 pesos.

QUALITY OF THE PROVISION OF WATER SERVICES

The quality of the provision of water services index is based on three component indices: the transparency of information and tariffs index, the quality control mechanisms for new connections index and the efficiency and reliability of supply index (table 2.1).

TABLE 2.1 What do the indicators on the quality of the provision of water services measure?

Transparency of information and tariffs index (0–8)
Accessibility and clarity of the relevant information for obtaining a new connection
Notification of tariff changes
Independent agency to file complaints
Quality control mechanisms for new connections index (0–8)
Qualification requirements for the professional responsible for verifying the feasibility of a new connection
Qualification requirements for the professional responsible for supervising the connection works
Internal and final inspections
Efficiency and reliability of supply index (0–18)
Continuous or intermittent water supply
Distribution system mapping format
System monitoring tools to evaluate losses
Installation of water meters for new connections
Information exchange between the municipality and the utility company
Physical efficiency (water billed/water served)
Quality of the provision of water services index (0–34)
Sum of the transparency of information and tariffs, quality control mechanisms for new connections, and efficiency and reliability of supply indices

Transparency of information and tariffs index

The transparency of information and tariffs index ranges from 0 to 8, with higher scores indicating greater transparency. Scores are assigned for three components:

- Whether the relevant information for obtaining a new connection to the water and sewerage systems is provided in the regulation, is available to the public and can be easily accessed. The following scores are assigned based on the availability of four types of information (with 4 being the highest possible total score):

	Score		
Type of information	**Available online**	**Available but not online**	**Not available or available but not respected in practice**
List of requirements	1	0.5	0
Consumption tariffs	1	0.5	0
Connection rights or fees	1	0.5	0
Connection time frames/ installation costs	1 (if at least one is available)	0.5 (if at least one is available)	0

- Whether the water utility informs customers about changes in consumption tariffs. A score of 2 is assigned if the water utility or another agency directly notifies customers before the new tariff is applied; 1 if the information is just published in the regulation (such as in the income law) or customers are notified indirectly (such as through advertisements in newspapers); 0 if no advance notice is provided.

- Whether there is an agency independent from the water utility at which customers can file complaints. A score of 2 is assigned if there is an independent agency and the customer receives a response in the majority of cases; 0 if customers cannot file complaints at an independent agency or if they can but do not receive a response in the majority of cases.

Quality control mechanisms for new connections index

The quality control mechanisms for new connections index ranges from 0 to 8, with higher scores indicating stronger quality controls. Scores are assigned for three components:

- What the qualification requirements are for the professional responsible for verifying the feasibility of a new connection. A score of 2 is assigned if the professional must meet at least two of the following requirements: have a university degree in architecture or engineering, have a minimum number of years of practical experience or pass a qualification exam. A score of 1 is assigned if the professional is required to have either a university degree or a minimum number of years of experience. A score of 0 is assigned if the professional is subject to no qualification requirements.

- What the qualification requirements are for the professional responsible for supervising the connection works. A score of 2 is assigned if the professional must meet at least two of the following requirements: have a university degree in architecture or engineering, have a minimum number of years of practical experience or pass a qualification exam. A score of 1 is assigned if the professional is required to have either a university degree or a minimum number of years of experience. A score of 0 is assigned if the professional is subject to no qualification requirements.

- Whether the utility or a certified professional carries out an inspection to check the internal installation (supply pipes) and the external installation (communication pipes and main) if the work is carried out by a private company. A score of 4 is assigned if an internal and external inspection are required by law and implemented in practice, or if either the utility company or a certified contractor carry out the installation; 0 if either an internal or an external installation is carried out by a noncertified private company.

Efficiency and reliability of supply index

The efficiency and reliability of supply index ranges from 0 to 18, with higher scores indicating greater efficiency and reliability. Scores are assigned for five components:

- Whether the water supply service is continuous or carried out through scheduled interruptions. A score of 4 is assigned if there is a steady water supply 24 hours a day; 2 if water is supplied more than 70% of the time and supply interruptions are scheduled; 0 if water is supplied less than 70% of the time.

- Whether the water and sewerage distribution systems are mapped and, if so, in what format and whether the mapping system provides asset specifications (such as the model, diameter, materials and installation date). The following scores are assigned based on the format and content of mapping (with 4 being the highest possible total score):

		Score	
	Mapping format and content	**>70% mapped**	**<70% mapped**
Water distribution system	Paper or scanned	0.5	0
	Digital	1	0
	Digital + asset specifications	2	0
Sewerage distribution system	Paper or scanned	0.5	0
	Digital	1	0
	Digital + asset specifications	2	0

- How the utility company estimates the volume of water served to the system and consumed by customers and therefore the volume lost before the water reaches the customers. A score of 3 is assigned if 100% of the water sources have meters installed (macro-meters); 1.5 if at least 70% do; 0 if less than 70% do. In addition, a score of 3 is assigned if 100% of the customer intakes have meters installed (micro-meters); 1.5 if at least 70% do; 0 if less than 70% do.

- Whether installation of a meter is required for new connections, to allow proper metering of water consumption. A score of 2 is assigned if meter installation is required by law and done in practice; 0 if it is not required by law or not done in practice.

- Whether the department responsible for issuing construction licenses in the municipality and the water utility exchange information. A score of 2 is assigned if the municipality and the utility share information electronically; 1 if they share information in a physical format; 0 if they do not share information.

Even if a utility is using the most advanced tools available to monitor the water supply system, there could still be efficiency problems. One indicator commonly used to measure the efficiency of water supply systems is the physical efficiency indicator, obtained by dividing the volume of water billed to the customers by the total volume served. A high percentage indicates high efficiency, meaning that most of the water served reaches the customers rather than being lost as a result of leaks, for example. For cities that do not reach a threshold of 56.2%, the score on the efficiency and reliability of supply index is divided by 2.[1] A large loss in distribution indicates low efficiency and therefore a high score cannot be granted.

NOTES

1. The threshold is equal to the average physical efficiency of 149 Mexican water and sewerage utility companies evaluated by the Mexican Water Technology Institute under its Water Utility Management Indicator Program. Data are for 2015.

Annex I. Indicator Details

					Quality of the provision of water services index			
City (State)	Distance to frontier score (0–100)	Procedures (number)	Time (days)	Cost (% of income per capita)	Total score (0–34)	Transparency of information and tariffs (0–8)	Quality control mechanisms for new connections (0–8)	Efficiency and reliability of supply (0–18)
Aguascalientes (Aguascalientes)	81.82	6	29	13.6	15.5	5.5	6.0	4
Campeche (Campeche)	42.03	10	63	13.3	10.5	3.5	6.0	1
Celaya (Guanajuato)	64.82	8	29	38.3	18	6.5	5.0	6.5
Colima (Colima)	87.25	6	17	15.0	18	5.0	4.0	9
Cuernavaca (Morelos)	44.94	9	43	68.4	16.25	4.5	8.0	3.75
Culiacán (Sinaloa)	76.30	8	16	33.1	26	6.5	8.0	11.5
Guadalajara (Jalisco)	77.38	8	30	12.4	26.5	7.0	7.0	12.5
Mexico City	69.96	6	46	45.2	18	6.5	8.0	3.5
Monterrey (Nuevo León)	56.18	8	36	81.6	24.5	7.0	6.0	11.5
Oaxaca de Juárez (Oaxaca)	50.15	9	51	27.1	12.5	3.5	7.0	2
Pachuca de Soto (Hidalgo)	37.21	9	92	35.7	16.25	8.0	6.0	2.25
Puebla (Puebla)	40.91	9	28	109.8	18.5	7.0	6.0	5.5
Querétaro (Querétaro)	23.75	10	73	70.3	10	3.5	2.0	4.5
Tijuana (Baja California)	62.45	7	34	74.1	21	4.5	7.0	9.5
Tlalnepantla de Baz (México)	52.62	7	25	108.9	15.75	7.0	4.0	4.75
Torreón (Coahuila)	67.70	9	17	15.9	17.25	5.0	6.0	6.25

Source: Doing Business database.
Note: Rankings are based on the average distance to frontier score for procedures, time, cost and the quality of the provision of water services index. The distance to frontier score is normalized to range from 0 to 100, with 100 representing the frontier of best practices across the 16 cities (the higher the score, the better).

Annex II. Questionnaire Instrument

WORLD BANK GROUP

SUBNATIONAL DOING BUSINESS

Connecting to water and sewerage in Mexico

City (Region)

Dear Contributor:

On behalf of the World Bank Group, we would like to thank you for your participation in the "Project name" project. The purpose of this work is to identify good practices and eliminate obstacles to doing business in order to create a more conductive environment for the private sector in "City". Your extensive experience in this area is essential to the success of this project.

The study is based on the World Bank's *Subnational Doing Business* reports. These reports measure the efficiency of regulations affecting small and medium-size enterprises in different locations within the same country and propose reforms in each one of the areas measured. You may find additional information about our project on our website at www.doingbusiness.org/subnational.

As part of this benchmarking exercise, we would appreciate your participation in the questionnaire on **Connecting to water and sewerage** in "Country". We believe that your experience and knowledge in this area can provide us with an accurate and objective picture of the process of connecting a retail store to the water and sewerage systems in "City". We are honored to be able to count on your expertise.

This questionnaire is divided into 2 sections:

1. **List of procedures:** In this section we ask you to provide information concerning all the necessary procedures to connect a retail store to the water and sewerage services in your city and identify the time and cost associated with each of them.

2. **Qualitative aspects of the connection process, system infrastructure and operation process**: This section contains 3 sets of questions aimed at measuring the transparency of information with regards to the connection requirements and tariffs, the quality control mechanisms in place during the connection works, and the efficiency and reliability of the water and sewerage systems.

Please return the **completed questionnaire** by **XX de XX** to XXX@worldbank.org.

Please do not hesitate to contact us if you have any questions.

Sincerely,

XXX
T XXX
E XXX

XXX
T XXX
E XXX

WORLD BANK GROUP

CONTRIBUTOR INFORMATION

Primary Contributor Information: Please check the box next to information you do not want us to publish.

Title	[ ]	Do not publish ☐
First Name	[ ]	
Last Name	[ ]	
Position/Profession	[ ]	Do not publish ☐
Company	[ ]	
Address	[ ]	Do not publish ☐
City	[ ]	
State	[ ]	
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E-Mail	[ ]	

Additional contributor(s): If there are more people whom you would like us to acknowledge, kindly e-mail us.

Name	Company / Title	E-mail	Telephone	Address	
[Name] [Surname]	[Company/Department] [Position] [Profession]	[ ]	[Telephone] [Mobile]	[Street and number] [Subdivision and municipality] [State and PC]	Do not publish ☐
[Name] [Surname]	[Company/Department] [Position] [Profession]	[ ]	[Telephone] [Mobile]	[Street and number] [Subdivision and municipality] [State and PC]	Do not publish ☐
[Name] [Surname]	[Company/Department] [Position] [Profession]	[ ]	[Telephone] [Mobile]	[Street and number] [Subdivision and municipality] [State and PC]	Do not publish ☐

THE WATER AND SEWERAGE UTILITY COMPANY

Who manages the water and sewerage systems in your city?

WATER SYSTEM

Name of agency:	[ ]
Area of jurisdiction:	[Municipal, intermunicipal or state]
Responsibility scheme:	[Public, private or public/private]

Is the water utility company different from the sewerage utility company? ☐ Yes ☐ No
If yes, please complete the following table:

SEWERAGE SYSTEM

Name of agency:	[ ]
Area of jurisdiction:	[Municipal, intermunicipal or state]
Responsibility scheme:	[Public, private or public/private]

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PART 1. LIST OF PROCEDURES

Before completing the information on all the necessary procedures to connect commercial establishment to the water and sewerage systems, **please carefully read the assumptions of the case study below.** Please answer the questions in this section based on the case study assumptions.

Case study assumptions	
The company WaterCo builds a commercial establishment that will **provide laundry services** in the peri-urban area of "City". WaterCo will have to apply for the necessary licenses and permits and receive the necessary inspections to get connected to the water and sewerage systems. The specific characteristics of the construction company, the property, the establishment, and the connections are described below:	
The construction company WaterCo	• Operates in "**City", "State"**. • Has workers and other employees, all of them "Country national" with the technical expertise and professional experience necessary to connect a building to the water and sewerage systems, if necessary. • Has paid all taxes and has taken out all necessary insurance applicable to its regular business activity.
The land on which the commercial establishment is built	• Has an area of **100 m^2** and is 100% owned by the company. • Is registered in the cadastre and land registry. • Is located in the peri-urban area of "City". • Is not located in any special economic or industrial zone and meets the zoning requirements for the activity to be developed.
The commercial establishment	• Will provide **laundry services** • Has **4** washing machines and **2** driers. • The water consumption is **40 liters of water per kg of washed clothes**. • On average, **165 kg of clothes are washed per day**
The water and sewerage connection	• The average water consumption is **6,600 liters per day**, and the average sewage flow is **6,400 liters per day**. Water and sewerage consumption is constant. • The store is located **10 meters away from the water and sewerage systems** and an excavation will have to be carried out in public land. • The diameter of the water intake is **1 inch (2.54 centimeters**) and the sewer diameter is **6 inches (15.24 centimeters)**. • All material costs must be considered when estimating the cost of connections (except for the cost of the refundable security deposit for water connection). • A septic tank with the smallest possible size must be installed or built if there is no sewerage infrastructure. • A borehole must be excavated if there is no water supply infrastructure.

In addition to the specific assumptions applicable to the case study, please consider the following definitions when answering the questions:

Procedure, time, and cost definitions	
Procedure	Any **interaction of the company (WaterCo) building the retail store with external parties** (municipalities, companies, regional administration, and private organizations) related to the water and sewerage connection process. **This includes all inspections that must be received.** Some of the procedures may take place simultaneously. A procedure is considered to be simultaneous with another one when both can be carried out at the same time **without one of them being a prerequisite for the completion of the other.**
Time	**Average duration** of each procedure in **calendar days,** from the time of application to the issuance of the document/certificate. The **minimum time required** for procedures done in person is **1 day** and for online procedures the minimum time is **half a day** (when the procedure can be fully completed online and the response is immediate). For example, if you file **your application today in person and you receive the response today**, this is recorded as **1 day**; if you **file your application today in person and receive the response tomorrow**, this is recorded as **2 days.** However, if you complete an application online and receive the response or approval immediately, it will be recorded as half a day (unless the response takes more than one day).
Cost	Only **official costs and fee payments** are considered for each procedure (informal payments or bribes will not be considered).

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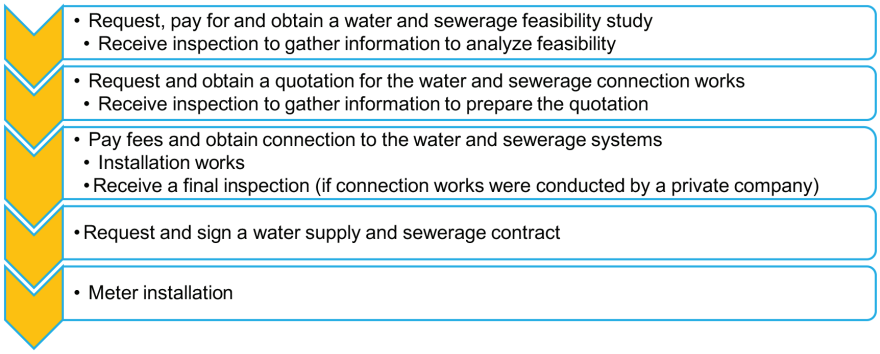
Below is a general scheme of the process of connecting a retail store to the general water and sewerage systems:



Necessary procedures to connect a retail store to the water and sewerage systems in your municipality:

Please complete the spaces in gray with the information concerning your municipality, keeping in mind the case study assumptions described above (taking **Figure 1 as an example**). *TABLE 1* contains 11 different procedures that may or may not be applicable in your municipality. Please indicate which of these procedures are applicable and fill in the corresponding information. If any additional procedure not described in *TABLE 1* is carried out in your municipality, please include it in *TABLE 2*.

Figure 1. Example of a completed procedure:

Procedure name	Procedure number	Time (calendar days)	Cost
a. Request, pay and obtain a water and sewerage feasibility study Does this procedure apply in your city? ☒ Yes ☐ No Agency in charge: [Sistema intermunicipal de los Servicios de Agua Potable y Alcantarillado de XXX] Can it be done online? ☐ Yes ☒ No Web site: [ ]	Procedure: [1]	Time:[21] days Comments: [ ]	Cost: [1770] MXN Breakdown: [MXN 131.34 application form + 819.55 feasibility study resolution]. Cost regulation: [The procedure is legislated in Art. 42 of the Finance Act for the Municipalities of Nuevo León.]
Procedure details: [It is the process that confirms the possibility of providing a potable water and sewer service connection in a certain area of the city. The procedure is legislated in Art. 42 of the Finance Act for the Municipalities of XXX.] Requirements: [To perform the procedure, WaterCo must have: a. Unique form to request the service; b. Sketch of the location] Can it be done simultaneously with other procedures? ☐ Yes ☒ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☒ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [7] calendar days			

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TABLE 1

Procedure name	Procedure number	Time (calendar days)	Cost
a. Request, pay for and obtain a water and sewerage feasibility study Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
b. Request water connection services and obtain a quotation for the connection works Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
c. Request sewerage connection services and obtain a quotation for the connection works Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]

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Procedure name	Procedure number	Time (calendar days)	Cost
d. Pay fees and obtain connection to the water system (connection work) Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
e. Pay fees and obtain connection to the sewerage system (connection work) Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
f. Receive final inspection once connection works have been completed Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ]	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
g. Obtain permit for the installation of a well or septic tank Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]

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Procedure name	Procedure number	Time (calendar days)	Cost
h. Install well or septic tank Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ]	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
i. Install water tank Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ]	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
j. Request and sign water supply and sewerage contract Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
k. Install water meter Does this procedure apply in your city? ☐ Yes ☐ No Agency in charge: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ]	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]

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If there are any additional procedures applicable in your city that have not been included in the previous table, please include them below:

TABLE 2

Procedure name	Procedure number	Time (calendar days)	Cost
Name: [ ] Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
Name: [ ] Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]
Name: [ ] Agency in charge: [ ] Can it be done online? ☐ Yes ☐ No Web site: [ ] Procedure details: [ ] List of required documents that must be submitted: [ ] Can it be done simultaneously with other procedures? ☐ Yes ☐ No If yes, which other procedure(s): [ ] Is a field inspection required to complete this procedure? ☐ Yes ☐ No If yes, what is the time frame between scheduling and receiving the actual visit: [0] calendar days	Procedure: [1]	Time:[0] days Comments: [ ]	Cost: [ ] MXN Breakdown of cost: [ ]. Legal basis for cost: [ ]

Additional questions related to the list of procedures:

1. Is the water connection request independent from the sewerage connection request?
   - ☐ No, they are filed in the same format at the same time, but are internally processed at different departments
   - ☐ No, they are filed in the same format and are processed at the same department
   - ☐ Yes, both applications are independent and are processed at different departments.
   - ☐ Others. Please specify. [ ]

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PART 2. WATER AND SEWERAGE CONNECTION QUALITY INDEX

The quality of the provision of services index has 4 components, each one with a separate set of questions. Please keep in mind that the questions in this part are not related to the case study presented in Part 1.

- **A**. Transparency of information and tariffs
- **B**. Quality control mechanisms for new connections
- **C**. Efficiency and reliability of supply

A) Transparency of information and tariffs

1.1 Which of the following concepts are clearly specified in the regulation, the website, on public billboards, or at the agency?

	It is available					
	In the legislation or a decree	Online	Public billboards or brochures	At the request of the interested party at the agency	Regulatory requirements are respected in practice in the majority of cases	Not available
List of documents and requirements to apply for a connection	☐ Specify:[ ]	☐ Web:[ ]	☐	☐	Yes ☐ No ☐	☐
Connection time frames	☐ Specify:[ ]	☐ Web:[ ]	☐	☐	Yes ☐ No ☐	☐
Connection fees and meter cost	☐ Specify:[ ]	☐ Web:[ ]	☐	☐	Yes ☐ No ☐	☐
Installation costs (labor and materials)	☐ Specify:[ ]	☐ Web:[ ]	☐	☐	Yes ☐ No ☐	☐
Consumption tariffs depending on the type of use (i.e., industrial, commercial, residential, etc.)	☐ Specify:[ ]	☐ Web:[ ]	☐	☐	Yes ☐ No ☐	☐

Additional comments: [ ]

1.2 Is there a single document that contains and specifies all the steps, requirements, and expected connection time frames to obtain a water connection in your municipality?

☐ Yes, available online. Please specify the web page: [ ]
☐ Yes, available free of charge by requesting it personally at the utility company
☐ Yes, distributed in brochures or official gazettes free of charge. Please specify: [ ]
☐ Yes, by paying a fee to access it
☐ There is no such document or it is not accessible to the public
☐ Other. Please specify: [ ]

Additional comments: [ ]

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1.3 How are customers notified when there is a change in the tariff of water?

- ☐ Public consultation is sought on proposed tariff increase by regulator. Customers are then made aware of the ensuing tariff change ahead of the billing cycle
- ☐ The utility or authority notifies clients before they receive a new bill
- ☐ The rates are published in the regulation ahead of the billing cycle but the utility company does not notify users
- ☐ Other. [ ]
- ☐ Users are not informed about rate changes until they receive a new bill

Additional comments: [ ]

1.4 Are there official statistics available to the public concerning the quality of the water supply?

- ☐ There are no statistics available to the public
- ☐ Yes. The statistics are calculated by the utility company based on its own methodology. No other agency contrasts or audits the data
- ☐ Yes. The statistics are calculated by the utility company based on a standardized methodology at a national /regional level. No other agency contrasts or audits the data
- ☐ Yes. The statistics are calculated by the utility company based on a standardized methodology at a national /regional level. The statistics are contrasted or audited by an independent agency/company before publication

Please indicate the web link to these statistics if available: [ ]

Additional comments: [ ]

1.5 Is there an institution independent from the utility company where customers can file claims?

- ☐ Yes. Please specify [ ]
- ☐ There is no independent institution

Additional comments: [ ]

1.5.1 If yes, does the customer obtain a response in the majority of the cases?

- ☐ Yes
- ☐ No

1.6 Are there any penalties applied to the utility company in case of non-compliance with the standards defined in the regulation regarding…

	Yes *(Please describe)*	Are they applied in the majority of cases?	No
…Water quality?	☐ [ ]	☐ Yes ☐ No	☐
…Supply cutoffs or pressure failures?	☐ [ ]	☐ Yes ☐ No	☐
…Waste water treatment?	☐ [ ]	☐ Yes ☐ No	☐

Legal basis where the penalties are specified: [ ]

Additional comments: [ ]

B) Quality control mechanisms for new connections

2.1 What are the qualification requirements for the utility company officer responsible for approving a water connection application (feasibility study resolution)? *(Please select **ALL** applicable options).*

- ☐ Minimum number of years of practical experience. Please specify the number of years: [ ]
- ☐ University degree (at least a bachelor's degree) in engineering or related field
- ☐ Must be a registered member of the national order (association) of engineers/architects
- ☐ Must pass qualification exam
- ☐ There are no qualification requirements
- ☐ Other. Please specify:[ ]

Additional comments: [ ]

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2.2 Who is part of the committee or team that reviews and verifies that the plans/drawings associated with the water and sewerage connection are in compliance with existing regulation?

- ☐ Association of architects or engineers
- ☐ Civil servant at the utility company with a bachelor´s degree in engineering or related field
- ☐ Civil servant at the utility company but university degree in engineering or related field is not required
- ☐ Private firm or private expert (independent of the utility company)
- ☐ Compliance of plans/drawings with existing regulation does not have to be verified
- ☐ Other. Please specify:[ ]

Additional comments: [ ]

2.3 Who can carry out the **connection works to the water and sewerage systems** in your municipality? Please mark all the applicable options:

	Water system				Sewerage system			
	Utility company	The developer	Licensed private company	Any company	Utility company	The developer	Licensed private company	Any company
Extension works from the property to the water/sewerage main	☐	☐	☐	☐	☐	☐	☐	☐
Connection works to the water/sewerage main (junction)	☐	☐	☐	☐	☐	☐	☐	☐

Additional comments: [ ]

2.3.1 Based on your previous answer, what are the qualifications requirements for the professional who **supervises the extension and/or connection works**? Please mark all the applicable options:

	Extension works from the property to the water/sewerage main	Connection works to the water/sewerage main
There are no qualification requirements	☐	☐
Minimum number of years of practical experience	☐	☐
University degree in engineering or similar profession	☐	☐
Registered member of the national order (association) of engineers	☐	☐
Must pass a qualification exam	☐	☐
Other [ ]	☐	☐

2.3.2 If a private company (any entity other than the utility company) carries out the connection works, is a final inspection required by law once the connection works are completed?

- ☐ Yes, the utility company must conduct a final inspection by law.
- ☐ Yes, an in-house supervising engineer (i.e., an employee of the building company) must sign off on the connection works and submit a final report
- ☐ Yes, an external supervising engineer (i.e., cannot be an employee of the building company) must sign off on the connection works and submit a final report
- ☐ No

Additional comments: [ ]

2.3.2.1 If a final inspection of the connection works is mandated by law, is it implemented in practice?

- ☐ Yes, always
- ☐ Most of the times (in more than 50% of cases). Approximate percentage [ ]
- ☐ Only in certain cases. Approximate percentage [ ]
- ☐ A final inspection is not mandated by law, but it does commonly occur in practice in more than 50% of cases
- ☐ Never

Additional comments: [ ]

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2.4 Is there a set of technical regulations or guidelines to be followed when a new connection to a water main is carried out?

	Are there technical regulations or guidelines?		Are they implemented in practice?	
Set at a national level	☐ Yes	☐ No	☐ Yes	☐ No
Set at a state (regional) level	☐ Yes	☐ No	☐ Yes	☐ No
Set at a municipal level	☐ Yes	☐ No	☐ Yes	☐ No
Set by a civil association (association of engineers or association of water utility agencies, for example)	☐ Yes	☐ No	☐ Yes	☐ No
Set by the utility company	☐ Yes	☐ No	☐ Yes	☐ No
There are no standardized technical guidelines	☐ Yes	No ☐		

2.5 Who covers the costs of the extension works from the property to the water main? Is there a certain number of meters for which the applicant is not required to pay?

	Water system	Sewerage system
Up to a certain number of linear meters (please specify in the table), the connection works has no cost for the applicant, but each additional linear meter has a cost.	[ ] linear meters at no cost [ ] MXN per additional meter	[ ] linear meters at no cost [ ] MXN per additional meter
The applicant must pay per each linear meter regardless of the distance from the system.	[ ] MXN per meter	[ ] MXN per meter
There is no defined criterion to determine connection costs.	☐	☐

Additional comments: [ ]

2.6 If the connection works crosses public land (for example, a street), who must apply for an excavation permit?

- ☐ The developer or construction company
- ☐ The water utility company
- ☐ It depends on who carries out the connection works. Please specify: [ ]
- ☐ No excavation permit is required. Please explain: [ ]

2.6.1 How long does obtaining an excavation permit take and how much does it cost?

- Time (in calendar days): [ ]
- Cost: [ ] MXN
- Additional comments: [ ]

2.6.2 Does the utility company coordinate with other service companies (telephone, electricity) and the municipality before opening a trench (so that the same trench is not opened multiple times and all the agencies are aware of the exact location of other service companies' underground infrastructure)?

- ☐ Yes, through periodic meetings or working groups
- ☐ Yes, through a digital database
- ☐ No
- ☐ Other. Please specify: [ ]

Additional comments: [ ]

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C) Efficiency and reliability of supply

3.1 What percentage of the water and sewerage systems in your municipality are mapped and in what format(s)? (Please mark all the applicable options).

	What % of the water system	What % of the sewerage system	Latest year that maps were updated for water:
On paper	☐ [ ] %	☐ [ ] %	[ ]
Digital scanned			
Fully digital map	☐ [ ] %	☐ [ ] %	[ ]
Fully digital map + system monitoring information and asset specifications?	☐ [ ] %	☐ [ ] %	[ ]
The system is not mapped	☐ [ ] %	☐ [ ] %	

Additional comments: [ ]

3.2 How does the water utility company assess water losses (leakage from all parts of the system) in the system?

☐ There are no data available regarding actual losses.
☐ Losses are estimated without micro-measurement or telemetry tools.
☐ Yes, there are micro-measurement tools, but no telemetry is available. A technician must collect the data at different locations across the city.
☐ Yes, there are micro-measurement tools with telemetry that provide real-time data.
☐ Other: [ ]

Additional comments: [ ]

3.3 Do new water connections require the installation of a meter?

☐ Yes. Please specify the legal basis where this is indicated: [ ]
☐ No

Additional comments: [ ]

3.4 Do civil servants from the municipality (for example, urban development officers) have access to data concerning the water and sewerage systems?

☐ Yes, the municipality and the utility company share the same database.
☐ Yes, although they use separate databases, they are interconnected.
☐ Yes, they share information but in paper format.
☐ No, the municipality and the utility company do not share information.

Additional comments: [ ]

3.4.1 If the municipality and the utility company share information electronically, is there any agreement through which they commit to keep the information updated with a certain frequency?

☐ Yes. Please specify: [ ]
☐ No

3.5 Do the utility company, the municipality (urban development and municipal cadastre), and the public registry use the same property identification system (same identification number or reference)?

☐ Yes. Please specify: [ ]
☐ No

Additional comments: [ ]

3.6 Please provide the following data (if available) for your city:

- Number of non-scheduled supply cutoffs during 2015: [ ]
- Average duration of each non-scheduled cutoff during 2015: [ ]
- I do not know ☐

Additional comments: [ ]

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3.7 On average, how many hours per week does a user have running water supply?
[ ] hours per week
Additional comments: [ ]

Additional questions on water billing and consumption

4.1 Please answer the questions below based on the following case study: a laundromat operates daily from 9 am to 5 pm in your area (there are no water supply cutoffs) and has a monthly water consumption of 198 cubic meters (198,000 liters). The laundry operates 30 days per month; therefore, the **daily water consumption is 6.6 cubic meters**.

4.1.1 Please indicate how the consumption bill is calculated and the formula that is used. **Please base your answers on the tariffs of February 2015 and February 2016.**

	February 2015	February 2016	Comments
With meter			
Base consumption of [ ] m3	[ ] MXN	[ ] MXN	[ ]
Additional consumption	[ ] MXN Breakdown of cost: [ ]	[ ] MXN Breakdown of cost: [ ]	[ ]
Others. Specify [ ]	[ ] MXN Breakdown of cost: [ ]	[ ] MXN Breakdown of cost: [ ]	[ ]
TOTAL	[ ] MXN	[ ] MXN	[ ]
Without meter			
Flat rate	[ ] MXN	[ ] MXN	[ ]

Please provide the legal basis for the rates above: [ ]

4.1.1.1 Please attach a copy of a water bill for **commercial consumption** to this questionnaire (even if the parameters differ from the ones mentioned in the case study).

4.1.1.2 With what frequency is water billed in your municipality (i.e., monthly, bi-annually, etc.)? [ ]

4.3 Does the tariff structure that is applicable in your city consider the following concepts? (Please mark all the applicable options.)

- ☐ Operational costs and capital costs incurred by the utility company are taken into consideration. Please specify: [ ]
- ☐ The tariff per liter supplied varies depending on the volume of consumption of liters. The tariff considers the marginal cost of supplying an additional liter of water. Please specify: [ ]
- ☐ Subsidies are directly incorporated into the tariff and are applicable to all users regardless of their income level. Please specify: [ ]

Additional comments: [ ]

4.4 How can a customer pay a water bill? (Please mark all applicable options.)

- ☐ Online. Please provide the link: [ ]
- ☐ Through the telephone
- ☐ At the operating agency
- ☐ At banks or convenience stores (supermarkets and others stores)
- ☐ Other. Please specify: [ ]

Additional comments: [ ]

Thank you very much for completing the *Getting a Water and Sewerage Connection* questionnaire.
We sincerely appreciate your contribution. Your work will be gratefully acknowledged in our publication and on our website: www.doingbusiness.org/subnational/, according to the preferences you expressed in the questionnaire.

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