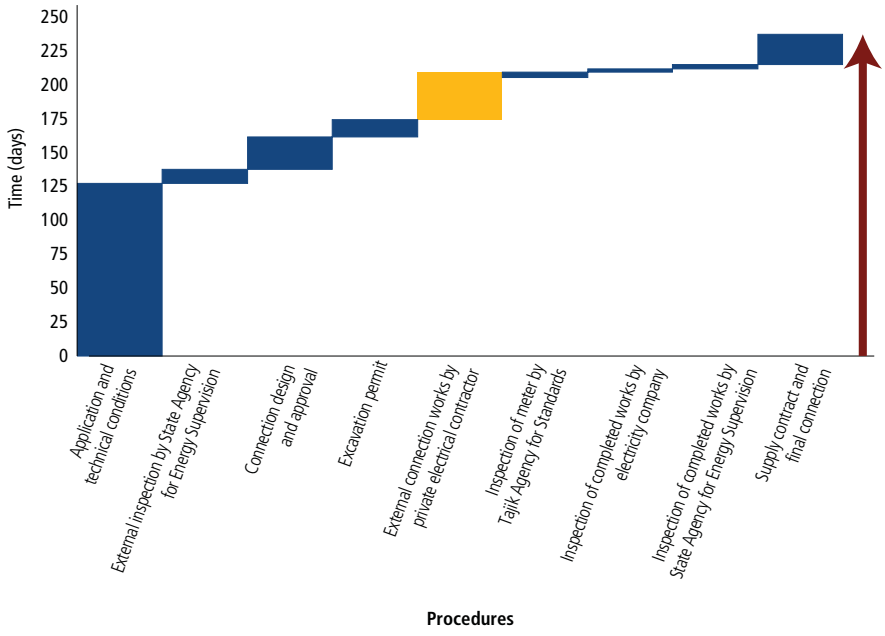
Getting electricity

A young entrepreneur who manufactures home furnishings in Dushanbe, Tajikistan, is working hard to expand her business by setting up a new warehouse. She negotiated financing with the bank, spent weeks getting building and operating permits and invested in new machinery as well as a new building. She has employees lined up and is ready to get started. But she will have to wait. She still needs to get a new electricity connection for the warehouse—a process that takes more than 7 months and 9 interactions with the utility and other agencies (figure 1).

The first and longest step is to get the technical specifications (or conditions) for the external connection. During the winter this can be a source of delay—indeed, the longest delay—because of the electricity supply shortage in that season. To avoid overburdening the electricity network, the electricity company, Barki Tojik, postpones the issuance of the specifications. After this step is completed, the State Agency for Energy Supervision inspects the construction site twice, once before the connection works are carried out and once afterward, to ensure that the new external and internal installations meet the technical standards. The utility also inspects the connection works, and the Tajik Agency for Standards checks the meter. The process also requires an excavation permit and approvals of the connection design from multiple organizations.

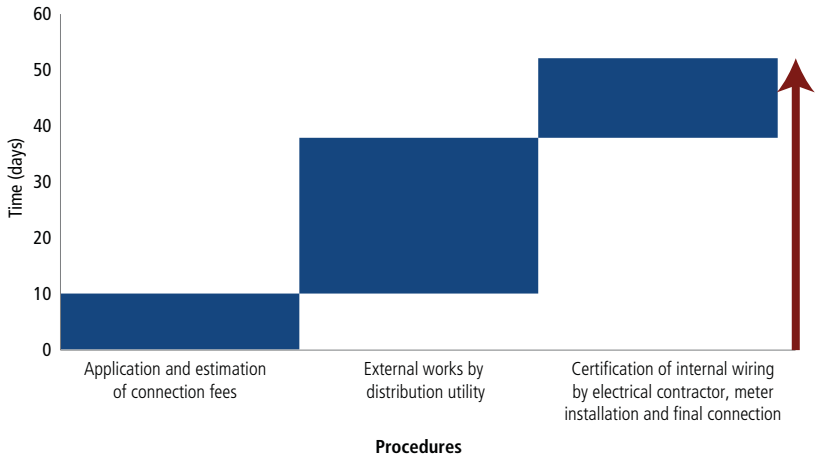
It does not have to be this way. Getting an electricity connection in Sweden takes a customer only 3 interactions with the utility and 52 days (figure 2). Inspections are limited.[1] The private utility, Vattenfall, uses a geographic information system (GIS) device enabling it to prepare an estimate of the connection fees without going on-site. A licensed electrician guarantees that the

FIGURE 1 Getting an electricity connection in Tajikistan requires 9 procedures and 238 days



Source: Doing Business database.

FIGURE 2 Getting an electricity connection in Sweden takes only 3 steps and 52 days



Source: Doing Business database.

internal wiring meets the standards. Because Vattenfall carries out the external works, it also takes care of related procedures, such as inspecting the works and approving their design. The utility is also responsible for getting any materials needed and obtaining approvals from public agencies, such as an excavation permit. Vattenfall's quality of service standards set strict time limits for its work, in compliance with the Swedish Energy Agency's policies. The utility usually meets these standards, but if it takes an unreasonable amount of time to connect a customer, the customer can complain to the Energy Markets Inspectorate.

Doing Business measures the procedures, time and cost for a small to medium-size business to get a new electricity connection for a standardized warehouse with standardized electricity needs (figure 3).[2] The warehouse is assumed to be located in the largest business city, in an area where electricity is most easily available. Around the world, electricity connections are provided by distribution utilities that often retain monopolistic positions even in otherwise liberalized electricity markets. Businesses and other customers have little choice.

WHY DOES GETTING ELECTRICITY MATTER?

Infrastructure services, particularly electricity, are a concern for businesses around the world. World Bank Enterprise Surveys show that managers in 109 economies, 71 of them low- or lower-middle-income economies, consider electricity to be among the biggest constraints to their business (figure 4). In addition, managers estimated losses due to power outages at an average 5.1% of annual sales.[3] Studies have shown that poor electricity supply adversely affects the productivity of firms and the investments they make in their productive capacity.[4] Researchers estimate that eliminating the electricity outages in Eastern Europe and Central Asia would increase GDP by 0.5%.[5] It is therefore essential for businesses to have reliable, good-quality electricity supply.

But whether electricity services are reliable or not, the first step for customers is to get a new connection, the process measured by the getting electricity indicators. This process represents only a small part of electricity services. Yet the indicators offer information on a number of issues for which data were previously unavailable, complementing other indicators measuring outcomes such as outages. Analysis of data for 140 economies suggests that the getting electricity indicators can serve as a useful proxy for the broader performance of the electricity sector.[6] Greater time and cost to get an electricity connection are associated with lower electrification rates. Additional connection procedures are more likely to occur in economies where the electricity supply is weak as a result of high losses in the transmission and distribution systems.

Electricity services are among the most regulated areas of economic activity. Whether better sector performance in infrastructure services can be linked to the quality of regulatory institutions has already received attention from researchers and policy makers. A study covering 28 developing economies found that a high quality of regulatory governance is associated with higher per capita electricity generation.[7]

The connection process is governed by many laws and regulations covering quality of service, general safety, technical standards, procurement practices and internal wiring installations. And it involves institutions including utilities, municipalities, testing agencies, transport agencies, regulatory agencies and agencies responsible for safety controls. *Doing Business* gives insights into the regulatory aspects surrounding electricity connections and

FIGURE 3 *Doing Business* measures the connection process at the level of distribution utilities

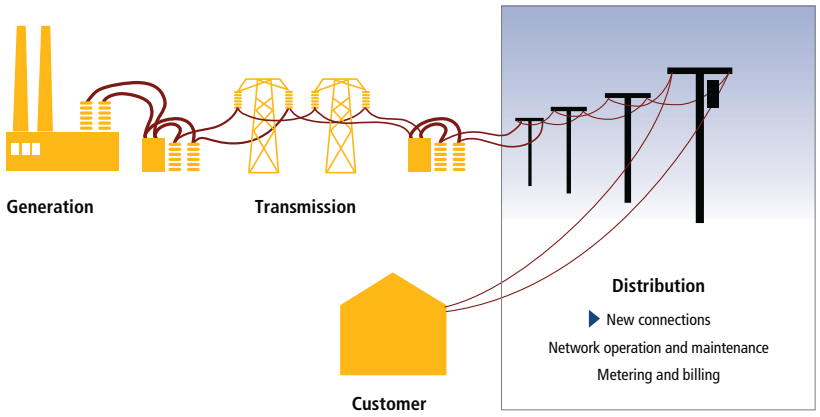
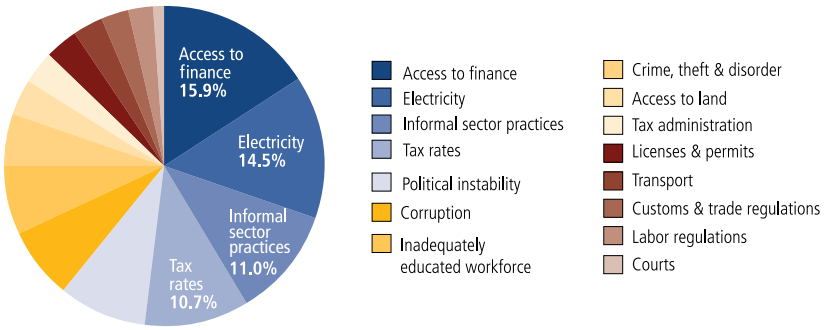


FIGURE 4 Firms consider electricity one of their biggest constraints

Share of managers identifying issue as the most serious obstacle to their business operation (%)



Note: The data sample includes 109 economies.
Source: World Bank Enterprise Surveys (2006–10 data).

measures how such regulations and institutions affect businesses when getting a new connection. *Doing Business* can help identify the bottlenecks in a connection process. What policy makers and regulators can do is facilitate this first step.

TABLE 1 Where is getting electricity easy—and where not?

Ease of getting electricity (rank)[a]

Easiest	RANK	Most difficult	RANK
Iceland	1	Sierra Leone	174
Germany	2	Belarus	175
Taiwan, China	3	Nigeria	176
Hong Kong SAR, China	4	Malawi	177
Singapore	5	Tajikistan	178
Switzerland	6	Madagascar	179
Uruguay	7	Guinea-Bissau	180
Sweden	8	Kyrgyz Republic	181
Thailand	9	Bangladesh	182
United Arab Emirates	10	Russian Federation	183

Procedures (number)

Fewest	RANK	Most	RANK
Comoros	3	Angola	8
Germany	3	Mongolia	8
Japan	3	Nigeria	8
Micronesia, Fed. Sts.	3	Sierra Leone	8
Qatar	3	Azerbaijan	9
St. Vincent and the Grenadines	3	Mozambique	9
Sweden	3	Tajikistan	9
Switzerland	3	Uzbekistan	9
Timor-Leste	3	Russian Federation	10
Iceland	4	Ukraine	11

Time (days)

Fastest	RANK	Slowest	RANK
Germany	17	Vanuatu	257
St. Kitts and Nevis	18	Nigeria	260
Iceland	22	Ukraine	274
Austria	23	Czech Republic	279
Taiwan, China	23	Russian Federation	281
St. Lucia	25	Kyrgyz Republic	337
Rwanda	30	Bangladesh	372
Chile	31	Madagascar	450
Puerto Rico (U.S.)	32	Guinea-Bissau	455
Côte d'Ivoire	33	Liberia	586

a. Rankings are the simple average of the economy's percentile rankings on the procedures, time and cost to get an electricity connection. See the data notes for details.

Source: Doing Business database.

HOW DOES GETTING ELECTRICITY VARY AROUND THE WORLD?

Getting an electricity connection is easiest in Iceland, where it takes 4 procedures and 22 days, and Germany, where it takes 3 procedures and 17 days (table 1). In economies where the process is most efficient, requiring fewer interactions of the customer with authorities and less time, the utilities often carry out the external connection works themselves. As part of this, they obtain the necessary approvals, streamlining procedures with other agencies. *Doing Business* measures the number of interactions, the time and the cost a customer faces when applying for a new connection.[8] Efficient utilities set standards for the quality of their services, to ensure that customers bear no extra costs or delays. And they ensure the safety of consumers, but without imposing an unnecessary burden on the customer. In many of these same economies the safety of installations is guaranteed by regulating the electrical profession rather than imposing additional checks.

Getting an electricity connection in small states involves unique circumstances.[9] The demand for connections is usually smaller, for example, and the regulatory frameworks less complex. The process takes an average of 4.8 procedures and 89 days in small states (table 2), faster on average than in larger states. Compare this with the same process in a large economy such as Canada, where it requires 8 interactions with the utility and other agencies, takes more than 5.5 months and costs 1.5 times income per capita. But this is not always the case. In Vanuatu, getting a new connection takes more than 8.5 months because the utility takes a long time in procuring distribution transformers that have to be imported.

Challenges in getting an electricity connection vary across regions. The process is easiest on average in OECD high-income economies (table 3). Procedures between the utility and other public agencies are streamlined, and utilities usually have enough capacity to accommodate additional demand with a simple network extension. The connection process is most complex in Eastern Europe and Central Asia. There, connection works and design are usually outsourced by the utility to private electrical contractors and design companies, but then have to be approved and inspected by multiple public agencies, including the utility.

Businesses in Sub-Saharan Africa face the highest average connection cost, around 5,400% of income per capita. In most of the region's economies the electricity network has limited capacity. As a result, even the standard connection type covered by *Doing Business* often requires that customers purchase a distribution transformer and hire an electrical contractor to install it. In some economies transformers are not available at the utility or in the marketplace, causing additional delays. Mauritius and Rwanda are exceptions. In Mauritius, where getting a connection takes 4 procedures and 3

TABLE 2 Which small states make getting electricity easy—and which do not?

	Rank	Procedures (number)	Time (days)	Cost (% of income per capita)	Income per capita (US$)
Easiest					
Singapore	5	4	36	31.1	40,920
St. Lucia	13	4	25	241.1	4,970
Antigua and Barbuda	16	4	42	150.1	10,610
Papua New Guinea	20	4	66	66.9	1,300
St. Vincent and the Grenadines	21	3	52	307.9	4,850
Most difficult					
Guyana	144	7	109	518.7	3,270
Vanuatu	147	5	257	1,171.3	2,760
Seychelles	149	6	147	504.8	9,490
Kiribati	159	6	97	5,162.7	2,010
Guinea-Bissau	180	7	455	2,049.6	540

Source: Doing Business database; World Bank 2011.

months, connection materials and metering equipment are usually available in the utility's stock. In Rwanda the process takes 4 procedures and 1 month.[10] Another challenge in Sub-Saharan Africa is lack of safety controls, such as for internal wiring. In nearly half the region's economies the internal installation in the case study warehouse is never checked before the building is connected to the network.

Getting an electricity connection takes the least time in Latin America and the Caribbean. Most connections are overhead, demanding less work and time to install than underground connections. But security deposits can impose a burden. Most utilities require a security deposit from customers, averaging about $20,000.

In high-income economies in the Middle East and North Africa connection works usually require a simple line extension to the closest point of supply. And in all these economies except Saudi Arabia, the distribution utility inspects the internal wiring installation or requires installation by an electrical contractor registered with the utility. But in lower-income economies in the region businesses face challenges similar to those in Sub-Saharan Africa. Getting a connection often requires the installation of a distribution transformer, and internal wiring goes unchecked.

In East Asia and the Pacific getting a new electricity connection takes 5 procedures, 3 months and more than 10 times income per capita on average. In most of the region's economies the new connection requires an expansion of the network as well as an excavation permit, which the customer must obtain in a quarter of the region's economies.

WHO REFORMED THE CONNECTION PROCESS—AND WHAT HAS WORKED?

Economies where getting an electricity connection is easy have several good practices in common. Some are being adopted by other economies. Over the past 2 years 18 economies took measures to make it easier to get an electricity connection, including 9 economies in the past year (table 4).

TABLE 3 Which regions make getting electricity easy—and which do not?

	Rank	Procedures (number)	Time (days)	Cost (% of income per capita)
OECD high income	54	4.7	103	93
Middle East & North Africa	71	5.1	79	1,317
Latin America & Caribbean	72	5.5	65	594
East Asia & Pacific	75	4.8	88	1,079
Sub-Saharan Africa	122	5.2	137	5,430
South Asia	128	5.6	145	1,776
Eastern Europe & Central Asia	129	6.6	168	751

Source: Doing Business database.

TABLE 4 Who made getting electricity easier in 2010/11—and what did they do?

Feature	Economies	Some highlights
Improved process efficiency	Afghanistan; Brunei Darussalam; Hong Kong SAR, China; Latvia; Tonga	Latvia simplified the approval process for external connection designs for simpler projects. The new regulations reduced the time required for preparation and approval of project designs by 45 days.
Improved regulation of connection costs	Russian Federation; Switzerland	Switzerland revised the conditions for connections, reducing the cost to get an electricity connection by 7.41% of income per capita.
Streamlined procedures	Hong Kong SAR, China	Hong Kong SAR, China, increased the efficiency of public agencies and streamlined the utility's procedures with other government agencies, cutting the time to get a connection by more than half.
Reduced financial burden of security deposits	Lebanon	Lebanon reduced the security deposit for a new connection by 80%.
Reduced time by outsourcing task to customer	The Gambia	The Gambia started allowing customers to choose private, prequalified contractors to do the external connection works. This cut the total time, part of which was previously spent by the utility on tendering, by 100 days.

Source: Doing Business database.

Among the most effective and common features have been streamlining procedures with public agencies or within the utility, regulating the electrical profession to ensure the quality of internal wiring, increasing the transparency of the connection cost and lessening the burden of security deposits (table 5).

Streamlining approval processes

Streamlining approvals by utilities and other public agencies is among the most effective ways to reduce connection delays and the duplication of formalities. In Germany the customer has few interactions with agencies. Procedures are limited to submitting the application, concluding a supply contract and completing the connection works. No wonder the process takes only 17 days on average.

Where delays occur because other public agencies are excessively bureaucratic, some utilities shift the administrative hassle to their customers. Among the procedures most commonly transferred to customers is applying to the municipality or the department of roads or transport for an excavation permit or right of way so that the utility can lay the cables or extend wires for the connection. Customers seeking a connection undertake such procedures in 48 economies. Wait times range from 1 day in Algeria and West Bank and Gaza to 60 days in Mongolia and República Bolivariana de Venezuela. In Ireland obtaining an excavation permit for less than 100 meters takes only a couple of days. Beyond that distance a road risk control analysis is needed, which delays the process by 3 months. In the Arab Republic of Egypt customers have to contact 2 agencies to obtain an excavation permit: the district office and the Greater Cairo Utility Data Center.

Efficient utilities engage with other service providers to ensure that working relationships are clear and function smoothly. Take

recent efforts in Hong Kong SAR, China. In March 2011 the government conducted a liaison group meeting with CLP Power Hong Kong Limited. Participants reviewed the application process for excavation permits relating to electricity supply for 2-story warehouses in nonresidential areas. That led the transport department to further streamline its procedures and reduce the time for processing proposals for temporary traffic detours from 21 days to 14. The necessary guidance note for the police force and the highway and transport departments has been revised. These changes followed a first stage of regulatory reforms in April 2010 to reduce the time needed to obtain an excavation permit from around 2 months to a little over 3 weeks. But that's not all. In 2011 the utility reviewed its internal work processes for connecting a 2-story warehouse. This shortened the connection process by another 10 days (figure 5).

Tonga is another example. After reviewing past practices and procedures, the electricity commission produced a formal operations manual for supervising electrical safety and set time limits of 7–15 days for each stage of the internal wiring inspection. This resulted in a reduction of 8 days in the time taken by the commission to inspect the internal wiring over the past year.

Regulating the electrical profession

The safety of internal wiring installations is a concern not only for those using a building but also for utilities. One customer's faulty internal wiring can lead to power outages affecting other customers connected to the same distribution line. In most economies customers therefore need to comply with certain procedures aimed at ensuring quality. But the approach taken to address safety issues varies (figure 6).

Some economies address safety by regulating the electrical profession, establishing clear liability arrangements for electrical contractors. In economies such as Denmark, Germany and Japan the quality of the internal wiring is the responsibility of the electrical contractor who did the installation. The utility simply requests certification by the electrical contractor that the internal wiring was done in accordance with the prevailing standards, usually established by the relevant professional bodies. In Iceland the electrician in charge of the internal wiring must be approved by and registered with the consumer agency, which is responsible for the safety of electrical housing installation. The utility refuses applications for new connections if they involve an electrician who is not registered.

Other economies regulate the connection process, by requiring customers to obtain additional inspections and certifications from the utility or outside agencies before a new connection is granted. This approach

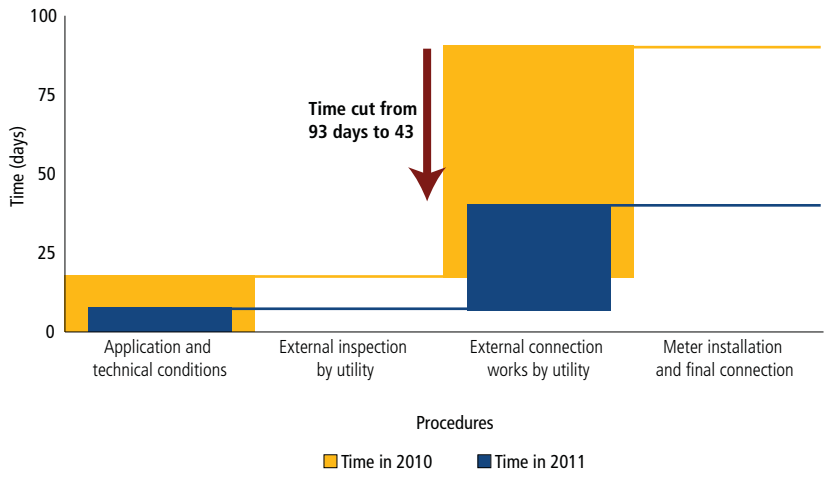
TABLE 5 Good practices around the world in making it easy to get an electricity connection

Practice	Economies[a]	Examples
Streamlining the approval process between the utility and other public agencies	Hong Kong SAR, China; Moldova	Moldova eliminated duplication in internal wiring inspections. Before 2010, both the utility and the State Energy Inspectorate inspected the internal wiring, effectively doing the same job twice. Now only the State Energy Inspectorate inspects the internal installations.
Ensuring the safety of internal wiring by regulating the electrical profession, rather than the connection process	Denmark; Germany; Iceland; Japan; Singapore	In Germany only master electricians licensed with the chamber of commerce and holding a craftsman diploma are authorized to install internal wiring. Master electricians in Berlin are registered with and certified by the utility. Assured by the electricians' qualification process, the utility performs no internal inspections of the warehouse.
Providing transparent connection costs and processes	France; Germany; Ireland; Netherlands; Trinidad and Tobago; United Kingdom	In 108 of 181 economies connection fees are easily accessible through websites, regulations, laws and utilities' announcement boards. Many utilities provide information on the step-by-step process of getting an electricity connection. In France the utility publishes details on different connection schemes, including the procedures and costs, on its website.
Reducing the financial burden of security deposits for new connections	In 97 of 183 economies utilities charge no security deposit.	In Austria the utility asks only customers with a weak credit history to put up a security deposit. In Argentina the utility requires security deposits only from customers who do not own the property being connected.
Setting performance requirements for new connections and providing customer service standards	Benin; Dominica; Suriname; Russian Federation; United Kingdom	In the United Kingdom in October 2010, the electricity and gas regulator introduced performance standards setting deadlines for distribution utilities to issue budget estimates and quotes for new electricity connections. Utilities failing to meet the standards must pay a daily penalty to the customer affected. In Benin utility employees underwent training to improve customer service and were asked to sign a guide to good practices in dealing with customers.

a. The list of good practice economies is not exhaustive.

Source: Doing Business database.

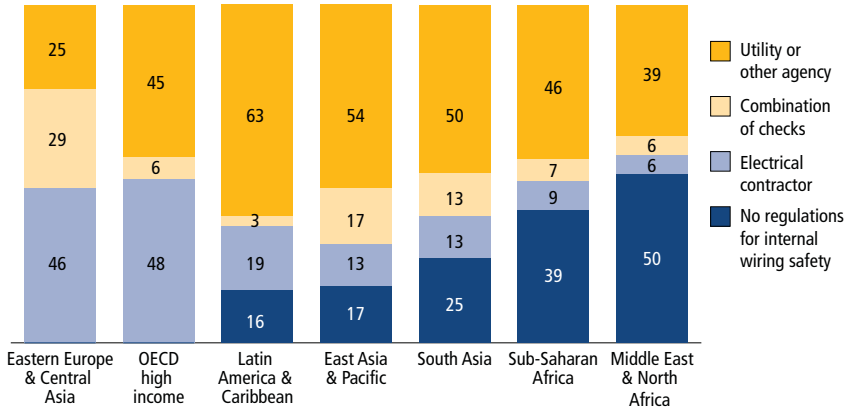
FIGURE 5 Hong Kong SAR, China, cut the time to get an electricity connection by more than half



Source: Doing Business database.

FIGURE 6 Who is responsible for enforcing safety standards?

Economies by type of safety certification for internal wiring (%)



Source: Doing Business database.

leads to a greater burden on customers and longer average connection delays than regulating the electrical profession.

As a first step toward creating a supportive institutional framework for ensuring electrical safety, economies can regulate the electrical profession. Yet regulating the profession might not suffice where professional standards are poorly established and qualified electrical professionals in short supply. Take the experience of South Africa. In an effort to free utilities from the burden of inspecting internal wiring, the government made private electricians liable for the quality of the installations. But the shortage of qualified electrical professionals posed problems.[11] In Pakistan the electrical contractor certifies the internal wiring, but this has not proved to be a good check of wiring quality. Poorly installed wiring is still causing many fires.[12]

Such risks are even greater in economies where needed safety checks are lacking. In 38 economies, many of them in the Middle East and North Africa and Sub-Saharan Africa, internal wiring installations are never checked.[13] At the other extreme are governments that require multiple checks, imposing an excessive burden on customers seeking a connection. In 19 economies, many of them in Eastern Europe and Central Asia, internal wiring must undergo an average of 2 checks.

Increasing the transparency of connection costs and processes

The type of connection works can vary depending on the network's capacity.[14] If that capacity is constrained, a more complicated connection may be required, effectively leading to an expansion of the distribution network. The resulting capital investments (such as the installation of a distribution transformer) must be covered by the new customer. This obligation, more common in low-income economies, substantially raises the total connection cost (table 6).

Connection costs should be as transparent as possible, to allow customers to contest them when they feel they are paying more than they should. As utilities allocate the costs for new connections between existing and prospective customers, they also have to balance considerations of economic efficiency and fairness. But it is often difficult in practice to distinguish between capital works needed to connect specific customers and those needed to accommodate projected growth or to improve the safety or reliability of the distribution network. This leaves room to make new customers pay for investments in the network that will benefit other customers as well.

TABLE 6 Who makes getting electricity least costly—and who most costly?

Cost (% of income per capita)			
Least		Most	
Japan	0.0	Madagascar	8,390.9
Hong Kong SAR, China	1.7	Djibouti	8,799.1
Qatar	4.1	Malawi	9,665.8
Norway	7.1	Guinea	10,421.7
Trinidad and Tobago	7.9	Central African Republic	12,852.1
Australia	9.2	Chad	13,123.8
Israel	12.2	Burkina Faso	13,356.8
Iceland	13.6	Benin	15,205.3
United Arab Emirates	14.6	Congo, Dem. Rep.	28,801.5
Panama	15.4	Burundi	34,477.0

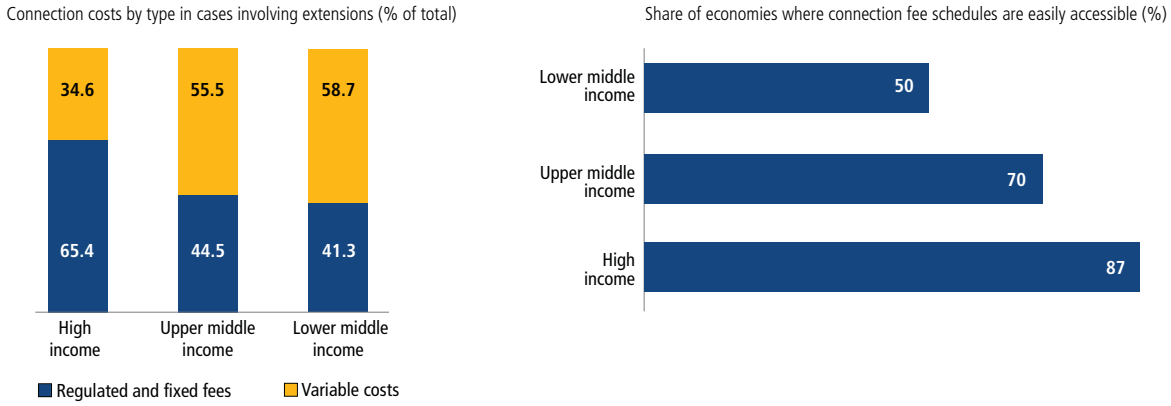
Source: Doing Business database.

In many economies connection costs are not fully transparent. Utilities far too often present customers with individual budgets rather than follow clearly regulated capital contribution policies aimed at spreading the fixed costs of expanding the network over several customers. Costs can usually be divided into 2 categories: a clearly regulated connection fee based on a formula or set as a fixed price; and variable costs for the connection, accounting for the actual labor and material required.

Where a new connection can be made directly to the low-voltage network, regulated and fixed fees represent a larger share of the connection cost in high-income economies (figure 7). In general, the higher the income per capita in an economy, the higher the share of regulated fees in the total cost. Sweden is among those that provide clear regulation of fees. For the 140-kilovolt-ampere (kVA) connection assumed in the case study, costs are fixed and based on an average for similar projects in the area. Information on fees also tends to be more easily accessible in higher-income economies—in a regulation, on a website, or through a brochure or board at a customer service office.

Low capacity of a network does not necessarily mean high cost for a customer.[15] Where the new connection requires a more complicated installation that means installing a distribution transformer, utilities can still regulate the cost that customers must pay. Trinidad and Tobago clarified connection costs and made them more transparent through a new capital contribution policy. Before August 2009 connection costs were calculated case by case, making it difficult for customers to assess whether they were charged too much. Now the utility bears the connection costs and then distributes them across all customers through clearly regulated consumption tariffs. This reduced the connection cost for the case study customer in Port of Spain by 52% of

FIGURE 7 Higher-income economies make connection costs more transparent



Note: Includes only economies where the case study scenario would involve an extension of an electricity line. Excludes low-income economies because in only one would the scenario involve an extension. Fee schedules are considered easily accessible if they can be obtained through the website of the utility or government agencies or through public notices, without a need for an appointment with an official.

Source: Doing Business database.

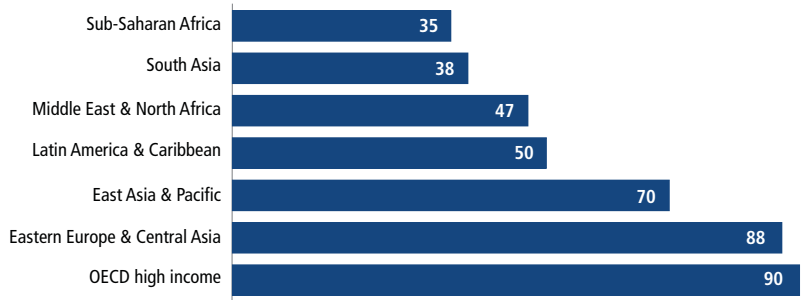
income per capita. In Papua New Guinea the customer initially pays the costs associated with a network expansion for a new connection, but the utility then reimburses the customer for these expenses through deductions in electricity bills.

Efficient utilities make it easy for customers to find out what they need to know. They post all the necessary information about procedures and paperwork for new connections on their website, in their office or in other public offices. They also post their performance standards, such as for turnaround time. Utilities in OECD high-income economies and in Eastern Europe and Central Asia make it easier for customers to find information on connection fees than those in other regions (figure 8). In France the distribution utility ERDF has a detailed document on its website that describes different connection schemes and the formulas used to calculate the connection costs.

Some energy regulators monitor the fairness of the connection cost. Preliminary research shows that regulators in 42 of 113 economies request quotes presented by utilities to customers. In Bulgaria and Dominica the regulator requests quotes at least once a year. Such monitoring is good not only for customers but also for the electricity sector. Recent research found that the mere existence of a regulatory agency affects the performance of utilities in Latin America.[16] The quality of the regulators matters too.

FIGURE 8 Connection fee schedules least accessible in Sub-Saharan Africa and South Asia

Share of economies where fee schedules are easily accessible (%)



Note: The data sample includes 181 economies.

Source: Doing Business database.

Easy access to fee schedules and low fees often go hand in hand. Regardless of income levels, connection fees tend to be lower in economies where fee schedules are easily accessible (figure 9). In economies where the connection tariffs are more difficult to access, the cost to get an electricity connection is 275% higher (relative to income per capita).

Lessening the burden of security deposits

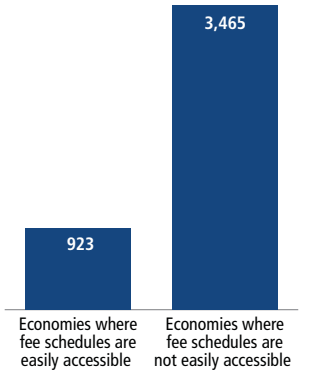
Utilities in 86 of the 183 economies surveyed in 2010/11 charge customers security deposits as a guarantee against nonpayment of future electricity bills.[17] Security deposits are particularly common in Latin America and the Caribbean and in Sub-Saharan Africa. While they average $9,423, they can run as high as $55,914 in Dominica.[18]

Because most utilities hold the deposit until the end of the contract and repay it without interest, this requirement can impose a substantial financial burden on small and medium-size businesses, especially those facing credit constraints. In the Central African Republic a medium-size company effectively grants the utility an interest-free credit equivalent to 1,195% of income per-capita—and meanwhile is prevented from putting the money to a more productive use.

Because security deposits are supposed to protect utilities against the risk of nonpayment, it is not surprising that they

FIGURE 9 Electricity connection costs are lower in economies with clear disclosure of fees

Average cost to connect to electricity (% of income per capita)



Note: The data sample includes 181 economies. Relationships are significant at the 1% level after controlling for income per capita.

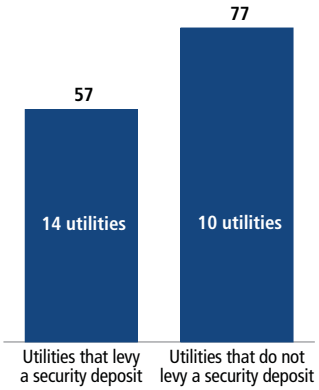
Source: Doing Business database.

are more likely to be charged in economies where utilities cannot count on efficient court systems and have to fear that contracts can be enforced only with significant delays.[19] But utilities might charge security deposits not only to protect themselves against financial losses from delinquent customers; they might be tempted to do so to improve their cash flow as well. Analysis of a sample of 24 utilities in Sub-Saharan Africa found that those with a lower cost recovery rate are more likely to charge a security deposit (figure 10).[20]

Where cash flow considerations are not the motivation for charging security deposits, but utilities still feel that they must rely on them to deter nonpayment, they should at least consider lessening the financial burden that security deposits represent for customers. A start would be to return the deposit after 1 or 2 years and not at the end of the connection contract. Returning the deposit with interest is a route that some utilities already pursue. In 17 economies utilities also allow customers to settle the security deposit with a bank guarantee or bond rather than deposit the entire amount with the utility. The service cost for such bank guarantees usually amounts to less than the interest that customers would lose on the deposit. More important, bank guarantees both allow customers to keep control of their financial assets and improve their cash flow.

FIGURE 10 Utilities in Sub-Saharan Africa with lower cost recovery rates are more likely to charge security deposits

Average cost recovery rate of utilities (%)



Note: Relationships are significant at the 5% level after controlling for income per capita. The data sample includes 24 utilities in Sub-Saharan Africa.

Source: Based on data from Foster and Briceño-Garmendia (2010).

DATA NOTES ON GETTING ELECTRICITY

Doing Business records all procedures required for a business to obtain a permanent electricity connection and supply for a standardized warehouse. These procedures include applications and contracts with electricity utilities, all necessary inspections and clearances from the utility and other agencies and the external and final connection works. The survey divides the process of getting an electricity connection into distinct procedures and calculates the time and cost of completing each procedure. The ranking on the ease of getting electricity is the simple average of the percentile rankings on its component indicators (figure A.1).

Data are collected from the electricity distribution utility, then completed and verified by electricity regulatory agencies and independent professionals such as electrical engineers, electrical contractors and construction companies. The electricity distribution utility surveyed is the one serving the area (or areas) where warehouses are located. If there is a choice of distribution utilities, the one serving the largest number of customers is selected.

To make the data comparable across economies, several assumptions about the warehouse and the electricity connection are used.

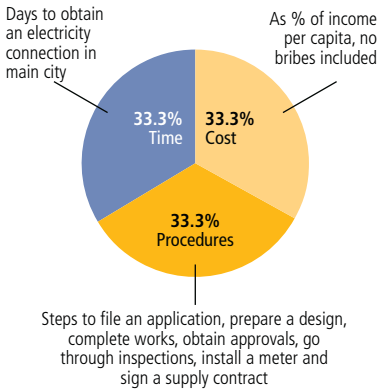
Assumptions about the warehouse

The warehouse:

- Is owned by a local entrepreneur.
- Is located in the economy's largest business city.
- Is located within the city's official limits and in an area where other warehouses are located (a nonresidential area).
- Is not located in a special economic or investment zone; that is, the electricity connection is not eligible for subsidization or faster service under a special investment promotion regime. If several options for location are available, the warehouse is located where electricity is most easily available.
- Has road access. The connection works involve the crossing of a road (for excavation, overhead lines and the like), but they are all carried out on public land; that is, there is no crossing onto another owner's private property.
- Is located in an area with no physical constraints. For example, the property is not near a railway.

FIGURE A.1 Getting electricity: obtaining an electricity connection

Rankings are based on 3 indicators



- Is used for storage of refrigerated goods.
- Is a new construction (that is, there was no previous construction on the land where it is located). It is being connected to electricity for the first time.
- Has 2 stories, both above ground, with a total surface area of approximately 1,300.6 square meters (14,000 square feet). The plot of land on which it is built is 929 square meters (10,000 square feet).

Assumptions about the electricity connection

The electricity connection:

- Is a permanent one.
- Is a 3-phase, 4-wire Y, 140-kilovolt-ampere (kVA) (subscribed capacity) connection.
- Is 150 meters long. The connection is to either the low-voltage or the medium-voltage distribution network and either overhead or underground, whichever is more common in the economy and in the area where the warehouse is located. The length of any connection in the customer's private domain is negligible.
- Involves the installation of only one electricity meter. The monthly electricity consumption will be 0.07 gigawatt-hour (GWh).The internal electrical wiring has already been completed.

TABLE A.1 What do the getting electricity indicators measure?

Procedures to obtain an electricity connection (number)
Submitting all relevant documents and obtaining all necessary clearances and permits
Completing all required notifications and receiving all necessary inspections
Obtaining external installation works and possibly purchasing material for these works
Concluding any necessary supply contract and obtaining final supply
Time required to complete each procedure (calendar days)
Is at least 1 calendar day
Each procedure starts on a separate day
Does not include time spent gathering information
Reflects the time spent in practice, with little follow-up and no prior contact with officials
Cost required to complete each procedure (% of income per capita)
Official costs only, no bribes
Value added tax excluded

Procedures

A procedure is defined as any interaction of the company's employees or its main electrician or electrical engineer (that is, the one who may have done the internal wiring) with external parties such as the electricity distribution utility, electricity supply utilities, government agencies, electrical contractors and electrical firms. Interactions between company employees and steps related to the internal electrical wiring, such as the design and execution of the internal electrical installation plans, are not counted as procedures. Procedures that must be completed with the same utility but with different departments are counted as separate procedures (table A.1).

The company's employees are assumed to complete all procedures themselves unless the use of a third party is mandated (for example, if only an electrician registered with the utility is allowed to submit an application). If the company can, but is not required to, request the services of professionals (such as a private firm rather than the utility for the external works), these procedures are recorded if they are commonly done. For all procedures, only the most likely cases (for example, more than 50% of the time the utility has the material) and those followed in practice for connecting a warehouse to electricity are counted.

Time

Time is recorded in calendar days. The measure captures the median duration that the electricity utility and experts indicate is necessary in practice, rather than required by law, to complete a procedure with minimum follow-up and no extra payments. It is also assumed that the minimum time required for each procedure is 1 day. Although procedures may take place simultaneously, they cannot start on the same day (that is, simultaneous procedures start on consecutive days). It is assumed that the company does not waste time and commits to completing each remaining procedure without delay. The time that the company spends on gathering information is ignored. It is assumed that the company is aware of all electricity connection requirements and their sequence from the beginning.

Cost

Cost is recorded as a percentage of the economy's income per capita. Costs are recorded exclusive of value added tax. All the fees and costs associated with completing the procedures to connect a warehouse to electricity are recorded, including those related to obtaining clearances from government agencies, applying for the connection, receiving inspections of both the site and the internal wiring, purchasing material, getting the actual connection works and paying a security deposit. Information from local experts and specific regulations and fee schedules are used as sources for costs. If several local partners provide different estimates, the median reported value is used. In all cases the cost excludes bribes.

Security deposit

Utilities require security deposits as a guarantee against the possible failure of customers to pay their consumption bills. For this reason the security deposit for a new customer is most often calculated as a function of the customer's estimated consumption.

Doing Business does not record the full amount of the security deposit. If the deposit is based on the customer's actual consumption, this basis is the one assumed in the case study. Rather than the full amount of the security deposit, *Doing Business* records the present value of the losses in interest earnings experienced by the customer because the utility holds the security deposit over a prolonged period, in most cases until the end of the contract (assumed to be after 5 years). In cases where the security deposit is used to cover the first monthly consumption bills, it is not recorded. To calculate the present value of the lost interest earnings, the end-2010 lending rates from the International Monetary Fund's *International Financial Statistics* are used. In cases where the security deposit is returned with interest, the difference between the lending rate and the interest paid by the utility is used to calculate the present value.

In some economies the security deposit can be put up in the form of a bond: the company can obtain from a bank or an insurance company a guarantee issued on the assets it holds with that financial institution. In contrast to the scenario in which the customer pays the deposit in cash to the utility, in this scenario the company does not lose ownership control over the full amount and can continue using it. In return the company will pay the bank a commission for obtaining the bond. The

commission charged may vary depending on the credit standing of the company. The best possible credit standing and thus the lowest possible commission are assumed. Where a bond can be put up, the value recorded for the deposit is the annual commission times the 5 years assumed to be the length of the contract. If both options exist, the cheaper alternative is recorded. In Honduras in June 2011 a customer requesting a 140-kVA electricity connection would have had to put up a security deposit of 126,894 Honduran lempiras (L) in cash or check, and the deposit would have been returned only at the end of the contract. The customer could instead have invested this money at the prevailing lending rate of 18.87%. Over the 5 years of the contract this would imply a present value of lost interest earnings of L 73,423. In contrast, if the customer chose to settle the deposit with a bank guarantee at an annual rate of 2.5%, the amount lost over the 5 years would be just L 15,862.

The data details on getting electricity can be found for each economy at http://www.doingbusiness.org.

NOTES

1. *Doing Business* records the lead time and actual time for inspections. An inspection is counted as a procedure if it is common for the customer or another party representing the customer to be present during the inspection.
2. For more details on the methodology, see the data notes.
3. World Bank Enterprise Surveys (2002–10). The data sample includes 113 economies.
4. Calderon and Servén 2003; Dollar, Hallward-Driemeier and Mengistae 2005; Reinikka and Svensson 1999; Eifert 2007; Iimi 2008.
5. Iimi 2008.
6. This analysis, by Geginat and Ramalho (2010), was done in 2009, when the data sample for the getting electricity indicators included only 140 economies. For 2011 the indicators cover 183 economies.
7. Cubbin and Stern 2006.
8. For more details on the methodology, see the data notes. *Doing Business* records all the procedures, the time and the cost required for a business to obtain an electricity connection for a newly constructed building, including an extension or expansion of the existing infrastructure. All 3 aspects have the same weight, and the ranking on the ease of getting electricity is the simple average of an economy's percentile rankings on those 3 components.
9. According to the World Bank (2008, p. 1), "Despite their differences, Small Island Developing States (SIDS) share many features. Small islands are often isolated, lack economies of scale, have high transportation and communication costs, are susceptible to natural disasters and have limited means and capacity to develop infrastructure."
10. Despite a relatively fast connection process, Rwanda's electricity sector is still underdeveloped. For example, the electrification rate is 8% (Castalia 2011).
11. For more details on this example, see World Bank (2010).
12. "Causes of Fire Emergencies Managed by Rescue 1122 in Punjab, Pakistan," Hemmingfire.com, http://www.hemmingfire.com, accessed August 30, 2011.
13. In Senegal, where less than 7% of residential wiring installations meet the standards, a decree that would make the inspection of internal wiring mandatory was validated 10 years ago but must still be signed by the president before it enters into force.
14. *Doing Business* distinguishes between 2 cases: connecting to the low-voltage network and connecting to the medium-voltage network. The first case involves laying low-voltage underground cables or installing low-voltage overhead wires from the metering point to the closest connection point on the network. The second case usually occurs when the capacity of the utility's low-voltage network cannot accommodate the power demand of a customer. This case involves installing a distribution transformer and connecting it between the customer's installation and the utility's medium-voltage network. According to the standardized case study, the customer requests a nontrivial but still relatively modest 140-kilovolt-ampere (kVA) connection. By comparison, the demand of a residential connection is about 20 kVA.
15. Connection costs are not just a function of the general infrastructure in an economy. They vary significantly among economies within income groups, suggesting room to reduce the cost regardless of existing infrastructure.
16. Andres, Guasch and Lopez Azumendi 2008.
17. The number of economies where utilities charge security deposits does not include those where security deposits are rolled over into consumption bills for the first 3 months (Tunisia and the United States).
18. Although *Doing Business* records only the present value of the interest lost on the security deposit, even those amounts can be high—in Madagascar, as high as $14,000. In economies where a security deposit is requested, the cost of the security deposit accounts for an average of 12% of the entire connection cost for the customer.
19. World Bank 2010.
20. The cost recovery ratio is based on the average effective tariff and the costs of power production (operating and capital expenditure). Since capital expenditure is a harder data point to get, a replacement cost approach was used in which physical assets on the ground were considered and the unit costs of replacing these assets were used to estimate their total value. These estimates were then averaged over power consumption.

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