

# Utility Reforms

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Since 1990, many countries have undergone major reforms to their utility sectors, aimed at reducing the fiscal burden of financing public services, and improving the performance of dysfunctional utility operators. Reforms often have been successful in improving government finances, turning around enterprise performance, and expanding access to services. However, reforms have often also involved major tariff increases for essential services, substantial layoffs among public sector employees, and huge asset transfers. As a result, utility reform has proven to be politically and socially controversial, and is strongly opposed by some constituencies. Early reforms often failed to take the full social consequences of reform into account and, therefore, did not incorporate policies to mitigate these effects and improve the overall distribution of benefits across society. This underlines the importance of undertaking Poverty and Social Impact Analysis (PSIA) in advance of such reform measures. Moreover, during the last decade, considerable experience has accumulated on how to improve the design and distributional impact of utility reforms, suggesting that future reform efforts are better placed to balance fiscal and efficiency gains with adequate social safeguards.

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This chapter is concerned with the utility services, water, electricity, gas, and telecommunications. These sectors have been grouped together because they present a common set of economic and political issues. The transportation sector is not explicitly included in the analysis, although some of the reform issues may be similar. The chapter is organized as follows:

- **Types of Reform** characterizes the main types of reforms that are typically undertaken in the utilities, and the ways in which they are usually combined in each sector.
- **Rationale for Reform** explains the contrasting macroeconomic and microeconomic rationales for undertaking utilities reform and their differing impacts on the design of reforms.
- **Typical Direction, Magnitude, and Evolution of Impacts** documents the impacts of utilities reform along seven key dimensions: employment, prices, quality, access, fiscal flows, asset ownership, and entry conditions.
- **Stakeholders in Reform Process** identifies the key stakeholders to any utility reform, including workers, consumers, owners, competitors, and the state.
- **Mitigation of Reform Impacts and Risks** describes mitigating measures that can be taken to attenuate negative impacts on any of the stakeholder groups.
- **Tools for Measuring Social and Distributional Impacts** describes the data needed to evaluate the social impact of utility reforms, and describes rapid diagnostic methods, as well as more sophisticated quantitative and qualitative analysis techniques.

## **TYPES OF REFORM**

The utility sectors have been subject to a very broad range of reform measures, which can nonetheless conceptually be broken down into the following building blocks:

### **Public sector reform**

Historically, utility service provision has tended to be institutionally embedded within the state, whether at the central or municipal level. This has led to extensive politicization of service provision, also known as clientelism, leading to artificially depressed prices, overemployment, political manipulation of investment priorities, and associated construction contracts, as well as a lack of managerial autonomy, technical competence, and

stability over time. To minimize these undesirable effects, there is growing recognition of the need to increase the managerial and financial autonomy of utilities relative to the state. A number of autonomy-enhancing measures can be taken within the context of public sector service provision. These include incorporation of the utility, accounting separation from public administration, signature of performance contracts with the executive, governance reforms aimed at increasing the independence of the board, and changes in the legal status of the enterprise (for example, by conversion to a public limited company that is freed from public sector procurement, employment, and investment regulations). Such reforms have become less commonplace since the growth of private sector participation (PSP) in the 1990s. However, they increasingly are being considered again in sectors and countries where private sector participation may not be a feasible option in the medium term.

### **Private sector participation**

PSP is one of the deepest institutional reforms that can be undertaken on public utilities, and the one that offers the potential of providing the greatest degree of insulation from political interference in the day-to-day management of the utilities. PSP can itself take a wide variety of contractual forms, depending on the extent of responsibilities and associated risks that are transferred from the public to the private sector (Table 3.1). At one end of the spectrum, it may entail no more than subcontracting-specific operational functions, while at the other end of the spectrum, it may involve a full transfer of asset ownership. The appropriate form of PSP will be highly dependent on the sectoral and country-specific context. A key consideration is the extent to which the utility revenue stream and economic and political conditions in the country present a suitable environment for supporting private sector investment. The wide variety of forms of PSP make it inappropriate to make generalizations about its likely social and distributional effects, because the nature and depth of the impacts will depend on the specific form of PSP that is selected in any particular case.

### **Regulatory reform**

Regulatory reform essentially aims to strengthen the framework of accountability for utility operators. Historically, public utilities were assumed to be self-regulating because of their supposed public interest focus. However, in practice this often led to the poacher-gamekeeper problem with low accountability leading to poor performance. Regula-

**TABLE 3.1 Spectrum of Options for Private Sector Participation**

<i>Option</i>	<i>Asset Ownership</i>	<i>Investment</i>	<i>Revenue collection</i>	<i>Management</i>	<i>Operation</i>	<i>Typical duration</i>
Service contract	Public	Public	Public	Public	Public and private	1–2 years
Management contract	Public	Public	Public	Private	Private	3–5 years
Lease or affermage	Public	Public and private	Private	Private	Private	8–15 years
Concession	Public	Private	Private	Private	Private	25–30 years
Build-operate-transfer (BOT)	Private and public	Private	Private	Private	Private	20–30 years
Full or partial divestiture	Private	Private	Private	Private	Private	Indefinite

Source: Authors.

tory reform therefore requires an explicit legal framework defining accountability, and often entails institutional separation of the regulatory function from both the utility and the state to create an independent watchdog. The two most central components of any regulatory reform are the mechanisms introduced for regulating tariffs and quality of service. Tariff regulation typically involves the introduction of rules requiring tariffs to reflect the efficient costs of service provision, with adjustment mechanisms to reflect changes in these costs over time. Quality regulation typically defines specific quality targets, sets up a system for monitoring quality performance, and establishes sanctions for performance deficiencies. While regulatory reform is an absolute necessity when one of the more complete forms of PSP is introduced, it also remains relevant as a tool for improving the performance of public utilities.

### **Sector restructuring**

This can take the form of horizontal or vertical restructuring. Under vertical restructuring, institutional responsibilities for different stages in the production process are changed. For example, instead of having a single electric utility responsible for generation, transmission, and distribution, these functions are allocated to three separate utilities. Under horizontal restructuring, the number of units responsible for a given stage of service provision is reduced or (more typically) increased. For example, instead of having a single national company managing all electric generation

assets, these are broken down into subsets and allocated to four separate companies. Centralization and (more typically) decentralization reforms are a special case of horizontal restructuring, where the geographical boundaries of service provision are altered to reflect the structure of different tiers of government.

## **Market liberalization**

Historically, most utility services have typically been provided under legal or de facto monopolies. In some subsectors, such as water and electricity distribution, this is inevitable because of the natural monopoly nature of the infrastructure networks. However, there has been growing recognition that in other subsectors, such as electricity generation and long-distance telephone calls, competition may often be both feasible and desirable. This has led to reforms that gradually lift legal monopoly restrictions allowing competition to emerge, often accompanied by the creation of a broader antitrust framework for the economy. Market liberalization is often preceded by sector restructuring measures designed to separate the components of the production chain most susceptible to competition, and to break up any market power that may currently exist in those activities. In the case of the water sector, liberalization may also refer to the legal recognition of alternative, often informal and small-scale providers, which provide competing services at the margins of the existing network distribution system.

In most cases, a number of these measures will be packaged together simultaneously, although the typical reform package differs significantly across the utility sectors.

## **Energy sector**

In the electricity sector, it is typical to restructure the sector along vertical lines to separate generation, transmission, and distribution activities. In generation, the market is usually liberalized to allow entry of new independent power producers, while existing generation assets may be privatized sometimes following horizontal restructuring measures designed to increase the number of market players. Furthermore, the introduction of competition entails the creation of complex wholesale market institutions. Distribution, and to a lesser extent transmission, are sometimes privatized by asset sale or concession, or sometimes reformed within the public sector. The regulatory framework is typically established through a national law, and national regulatory agencies are commonplace, although

distribution is sometimes regulated at the state or provincial level. In the gas sector, vertical restructuring is commonplace, with transportation and distribution functions subject to a national regulatory framework.

### **Telecom sector**

In the telecom sector, PSP has become the norm, often entailing the sale of the national monopoly provider. The long-distance market is typically liberalized, although a transition period of exclusivity, or sometimes duopoly, may be granted. In parallel, licenses for cellular telephony are usually bid out to private operators. The regulatory framework is invariably established through a telecommunications law leading to the establishment of a national regulatory agency, that sometimes shares responsibility with the antitrust agency.

### **Water sector**

In the water sector, it is increasingly typical for utilities to be decentralized to the state (provincial) or municipal level, depending on the political structure of the country (unitary or federal). Public sector provision remains the norm in the vast majority of cases, and some measures may be taken to reform utilities within that institutional context. While there have been numerous cases of PSP, it remains comparatively unusual overall and rarely, if ever, involves transfer of ownership. Significant use has been made of various contractual forms of PSP, including management contracts, lease contracts (mainly in Africa), concessions (mainly in Latin America), and Build-Operate-Transfer schemes as a vehicle for financing new drinking water and wastewater treatment plants. In many cases regulation remains implicit or is incorporated into the contract for PSP. Regulatory agencies take a variety of forms, including municipal, state level, or national entities.

## **RATIONALE FOR REFORM**

There are essentially two broad motivations for utility reforms.

### **Macroeconomic**

From a macroeconomic perspective, utilities reform can be seen primarily as a means to improve public finances. Utilities often constitute some of the state's most valuable assets, occasionally referred to as crown jewels. Nevertheless, their historic mode of operation within the public sector has tended to create a large fiscal drain on the state, because of the

transfer of large operational and capital subsidies. For both of these reasons, privatization and some other forms of sector reform can become particularly attractive in times of fiscal austerity. On the other hand, in some countries, macroeconomic concerns about inflation can present an impediment for the achievement of financially sustainable tariffs.

## **Microeconomic**

From a microeconomic perspective, reform can be seen as a means to improve sector performance, in particular by strengthening efficiency incentives, improving accountability for the quality of service, and increasing the availability of funds to finance service expansion. In these cases, reform is designed primarily to address the deficiencies observed in the historic performance on public utilities, with an emphasis on sector restructuring, institutional transformation, liberalization, and regulation.

Economists have long argued that maximization of efficiency, not government revenues, should be the goal of sector reform. Nevertheless, in practice, it is often the case that fiscal constraints provide the immediate pressure for reform, and that the Ministry of Finance plays a central reform in the reform process. These two reform motivations tend to conflict with one another, and the political economy of these conflicts substantially shapes the way in which such reforms are carried out.

In a macroeconomically motivated reform, the paramount objective is to maximize net fiscal flows. This tends to create pressure to create attractive transactions, by reducing competition, keeping regulation light, and minimizing investment obligations. Conversely, in a microeconomically motivated reform, the central aim is to improve sector performance. This requires a much stronger focus on sector restructuring, regulatory reform, and market liberalization, which may reduce short-term sale revenues but substantially improves the medium-term performance for the sector, with major greater impacts on consumer welfare.

## **TYPICAL DIRECTION, MAGNITUDE, AND EVOLUTION OF IMPACTS**

The various types of utility reform described above affect a number of key variables with important distributional implications.

### **Employment and wages**

Public utilities have traditionally been characterized by labor hoarding; therefore any reform measure designed to promote efficiency is likely to lead to an immediate and often significant reduction in employment. The

evidence indicates that workforce reductions of the order of 30–50 percent can be typical. Although this is a substantial labor market shock to one sector of the economy, as a whole, infrastructure services rarely employ more than 1–2 percent of the workforce, so the overall impact on employment may be much more modest. The contribution of infrastructure services to formal employment, however, may be significantly higher than their contribution to overall employment, depending on the structure of the economy.

While the immediate employment effects are typically negative, these may be offset to some degree in the medium term, either by increased employment among subcontractors to the utility (as services are contracted out), or because of faster sectoral growth triggered by the reforms (particularly in sectors such as telecommunications, where liberalization often triggers rapid market expansion).

For workers who are laid off, a key determinant of welfare will be the terms of the redundancy package, including whether the layoff is voluntary or involuntary. It is also important to consider their reemployment prospects with reference to the utility sector and in terms of the broader employment situation in the economy. Although some workers may be reemployed by subcontractors to the utility, their terms and conditions of employment may not be as favorable as when they were employed directly by the utility.

For workers who remain in the industry, pay and work conditions can also be expected to change. Where PSP is implemented, this may lead to a higher dispersion of salaries and more flexible labor contracts.

## **Prices of services**

Reforms affect both the average level of tariffs and the tariff structure. Regarding tariff levels, the impacts can be major, although the direction of change is ambiguous and may evolve over time. Where tariffs have historically been kept artificially low for political reasons, reform will typically necessitate tariff increases to restore the financial sustainability of the utility. This situation is most typical in the water sector, and sometimes in the electricity sector, where the need for tariff increases may be particularly large (in excess of 100 percent in many cases). Where tariffs have historically covered costs, but enterprises have been inefficiently run, reform will probably lead to tariff reductions as consumers benefit from improved efficiency. This situation is more typical in subsectors such as electricity and telephony, which have a history of greater commercial management within the public sector and where some degree of competition may be possible.

Where tariffs have been kept historically low, and enterprises are also inefficient, initial tariff increases may eventually give way to tariff reductions as regulatory reform helps to improve efficiency. Nonetheless, in sectors where large investment programs need to be financed, even large efficiency gains may not liberate enough resources to finance the necessary investments, leading to tariff increases in spite of efficiency improvements.

Substantial changes in tariff structures are often necessary because of the fact that utilities have historically tended to cross-subsidize either among services provided by a given utility or among different consumers of the same service. For example, in many countries public telephone monopolies have tended to cross-subsidize between local and long-distance calls, charging below cost for the former and above cost for the latter. Again, many utilities discriminate between residential and nonresidential customers, charging substantially higher prices to the latter group although they may be less costly to serve. Such cross-subsidies can be perceived as unfair and may significantly distort economic decisions, leading larger industries to self-supply even when it may be more economically efficient to connect to the public network. In either case, they are not sustainable in the context of a competitive market because customers paying above cost to the incumbent utility will be open to capture by competitors.

### **Quality of services**

Deficient quality of service provided by utilities imposes major coping costs on consumers. These usually take the form of investments in alternative supplies (water storage tanks, water treatment equipment, electricity generators, candles, and batteries) to deal with supply interruptions and inadequacies. Where consumers are not able to mitigate the consequences of inadequate supplies, they may also suffer from lost production or reduced household welfare.

Successful reforms can potentially have a major impact on quality of service parameters, with consequent improvements in economic productivity and quality of life. Improvements that are typically observed following utility reform include greater service continuity, reduced service interruptions, better customer service, more stable pressure or voltage, more accurate billing, and shortened waiting times for new connections.

### **Access to services**

To the extent that reforms improve the availability of investment finance for utility operators, they should pave the way for more rapid

expansion of services. However, operators will only voluntarily expand into market segments where they face a clear commercial incentive to do so. Underserved market segments are often associated with low-income neighborhoods, or isolated rural communities, that often present a commercially unattractive combination of low demand and high cost of service provision. In these cases, reforms will need to incorporate special policy measures to encourage service expansion in these areas. Potential instruments include universal service obligations, connection targets, connection subsidies, amending regulations to allow for the use of low-cost technologies, and providing financing facilities to amortize connection costs.

### **Asset ownership**

Some types of reform can lead to major changes in ownership. Given the scale and value of the assets concerned, this can have a significant effect on the ownership structure of the economy. The two key changes in ownership occur in decentralization reforms, where assets are transferred to subnational tiers of government, and in divestitures, where assets are sold to the private sector.

In the case of privatization, the scale of the transaction, as well as its detailed technical design, and choice of sale mechanism can substantially affect the nature of the subsequent private owner and the degree of concentration of ownership. Because of limited development of stock markets, governments have tended to sell directly to private investors via auction methods. Such transactions tend to be dominated by multinational companies. However, by keeping transactions relatively small and reducing capital requirements, governments can substantially increase participation of the local private sector. Restrictions on cross-ownership within restructured industries can also prevent a single multinational firm from acquiring a dominant position within a given country.

In some cases, broader ownership of assets can be achieved through stock market flotation with special facilities for small investors, or where that is not possible through voucher schemes (as in Eastern Europe) or pension funds (as in Bolivia). However, the application of voucher methods in Eastern Europe has generally been disappointing. It led to insiders (managers and workers) or privatization investment funds owning controlling stakes in privatized firms. In the process, it also impeded the restructuring required for better management of utilities. In some cases, managers sold assets for personal gain, at the expense of smaller shareholders. As a result, some have advocated a compromise: limit voucher

privatization to minority stakes in firms after selling a controlling majority share to a strategic investor.

### Fiscal flows

Utility reform can have a major positive impact on public finances. In this context, it is important to distinguish between one-time windfall gains and ongoing fiscal flows. Where asset sales are involved, there may be major fiscal windfalls in terms of sale revenues. Although of lesser financial importance, concession contracts can also sometimes be designed to generate a canon or royalty payment. A key issue is the treatment of the historic debt of public utilities. This may either be written off against privatization revenues, transferred to the balance sheet of the private operator, or reabsorbed into the public sector balance sheet.

Although windfall gains can be substantial, experience suggests that the positive impact from improved ongoing net fiscal flows to the utility sector can be at least as large. Such improvements in ongoing net fiscal flows can be expected from any type of reform that facilitates the achievement of financially sustainable tariffs for the utility service, thereby allowing state subsidies to be substantially reduced or even eliminated. This fiscal benefit may be partially offset by the need to provide publicly funded subsidies to cushion the most vulnerable households from the tariff increases that may be associated with utilities reform. Nevertheless, a targeted social subsidy of this kind tends to cost only a fraction of untargeted historic supply-side subsidies to these sectors. Another offsetting factor arises when governments decide to privatize highly profitable state utilities. In this case, the fiscal benefits mentioned above must be offset against the loss of dividend payments from the utility that previously accrued to the state.

After utilities become commercially viable, governments often start to regard them as an interesting tax base, given their broad reach and rel-

**TABLE 3.2 Summary of Utilities Privatization Revenues, 1990–99**

<i>US\$1999m</i>	<i>East Asia and Pacific</i>	<i>Europe and Central Asia</i>	<i>Latin America and Caribbean</i>	<i>South Asia and Sub-Saharan Africa</i>	<i>Total</i>
Power	522	968	3,900	151	5,541
Telecom	2,600	2,300	411	0	5,311
Total	3,122	3,268	4,311	151	10,852

Source: World Bank 2001.

atively low price elasticity. As a result, they may begin to generate substantial tax revenues in the medium term.

The ultimate distributional impact of these changes in net fiscal flows will depend on how the government chooses to use the additional fiscal space created by utilities reform, whether to reduce the stock of public debt, or increase public expenditure on social programs or other areas of public initiative.

### **Summary overview**

Table 3.3 summarizes the extent to which each of the five components of utilities reform identified at the outset of this chapter can be expected to yield impacts along each of the channels identified in the discussion above. The table illustrates that each of the different types of utility reform can have a very broad range of impacts.

Furthermore, the annexes to this chapter provide a comprehensive summary overview of the literature on the impacts of utilities reform, comprising 46 country studies (Annex 1) and 13 cross-country studies (Annex 2). These annexes indicate which of the six channels of impact described above are covered in each of the studies, and also briefly summarize the methodology used according to the typology developed below. The annexes illustrate how difficult it is to make generalizations about the magnitude and direction of impacts of any specific type of reform, without reference to specific country and sector conditions, as well as the detailed design of the reforms themselves. All of the studies cited in these tables are fully referenced in the bibliography to this chapter.

## **STAKEHOLDERS IN REFORM PROCESS**

Utility reform processes affect a number of stakeholder groups with disparate and often conflicting interests. Moreover, each group presents a certain amount of internal heterogeneity that complicates the characterization of its interests.

### **Consumers**

Consumers represent by far the largest group, although they are often the most diffuse and least organized of all the stakeholders. Furthermore, consumers include a number of different groups with very distinct, and potentially conflicting, interests.

TABLE 3.3 Summary of Expected Impacts of Different Types of Utility Reform

	<i>Employment and wages</i>	<i>Price of service</i>	<i>Quality of service</i>	<i>Access to service</i>	<i>Asset ownership</i>	<i>Fiscal flows</i>	<i>Entry conditions</i>
Public sector reform	Employment <i>may</i> <sup>a</sup> fall because of increased pressure for efficiency.	Prices <i>may</i> adjust upward or downward toward efficient cost-reflective levels.	Quality <i>may</i> improve because of better management.	Access <i>may</i> improve because of improved finances.	n.a.	Subsidies to the sector <i>may</i> be reduced.	n.a.
Private sector participation	Employment <i>should</i> <sup>b</sup> fall because of increased pressure for efficiency.	Prices <i>should</i> adjust upward or downward toward efficient cost-reflective levels.	Quality <i>may</i> improve because of better management.	Access <i>may</i> improve because of improved finances.	Asset sales increase private ownership, concentration depends on design details.	Subsidies to the sector <i>should</i> be reduced, sale revenues <i>may</i> be large, and tax revenues <i>may</i> follow thereafter.	n.a.
Regulatory reform	Employment <i>may</i> fall because of increased pressure for efficiency.	Prices <i>should</i> adjust upward or downward toward efficient cost-reflective levels.	Quality <i>should</i> improve because of increased oversight and accountability.	Access <i>should</i> improve because of increased oversight and accountability.	n.a.	Subsidies to the sector <i>should</i> be reduced as tariffs converge to cost-reflective levels.	Regulatory decisions <i>may</i> affect terms of competition between providers. (continued)

**TABLE 3.3 Summary of Expected Impacts of Different Types of Utility Reform (Continued)**

	<i>Employment and wages</i>	<i>Price of service</i>	<i>Quality of service</i>	<i>Access to service</i>	<i>Asset ownership</i>	<i>Fiscal flows</i>	<i>Entry conditions</i>
Sector restructuring	Ambiguous effects on employment.	n.a.	n.a.	n.a.	Decentralization transfers assets to subnational governments.	Responsibility for subsidization may shift to subnational government.	n.a.
Market liberalization	Employment may rise because of sector growth, but wages may fall because of competition.	Prices should fall because of competitive pressures.	Quality should improve as a result of competition.	Access should improve because of entry of new providers, and wider consumer choice.	Private ownership increases because of entry of new operators.	Entry fees may generate revenues, and tax revenues should increase.	Liberalization should open up market for entry of new players.

Source: Authors.

Note: n.a. = not applicable.

a may indicates possible impact.

b should indicates probable impact.

The first distinction that must be made within the customer category is between current consumers and potential consumers who are not yet served by the utility. It is also relevant to distinguish what is often an important third category of customers, namely, those who receive service through clandestine connections.

**Potential.** Potential customers are those who do not yet receive utility service, but are located in areas where expansion may be possible in the medium term. Most of the poorest members of society tend to fall into this stakeholder group, and they may often lack the political organization to make their voices heard. This group will not be immediately concerned with how any reform affects the price and quality of current utility services. In many cases, these customers depend on alternative supplies that can sometimes be more costly than those provided by the utility, and offer a much less convenient and reliable service. From their perspective, the key element of the reform will be the potential to accelerate service expansion, which can have a major impact on the household welfare of beneficiaries. They may also be concerned about reforms that affect the cost, quality, and availability of the alternative services on which they often have to rely. Within this group, a further distinction might be drawn between urban and rural customers. Only the former typically have anything to gain from utilities reform, because this seldom affects service availability in rural areas, unless very specific policy mechanisms are included for this purpose. However, there is a danger that rural services will be overlooked in the drive to improve urban service provision.

**Current (legitimate).** The utility's current customers will be concerned primarily about changes in the price and quality of utility services and the extent to which these will be subject to adequate regulatory protection. In utilities that provide low cost but highly deficient service, existing customers may well be willing to pay a somewhat higher price for real service improvement. However, because of prevailing skepticism about the utility, this willingness to pay may often materialize only after the service quality improvement has actually been brought about, raising delicate issues regarding the timing of tariff increases. In cases where utilities provide relatively good services at a cheap price, existing consumers may feel that they can only lose out from any proposed reform to the sector. Nevertheless, because any given utility service only represents a small share of the household budget, the impact of price increases on overall household welfare may not be large.

**Current (clandestine).** Most reform processes tend to strengthen incentives for commercial management of utilities. Therefore, one of the most immediate impacts of reform is a crackdown on clandestine connections, as well as a stricter enforcement of payment obligations and service disconnection for legitimate customers who have fallen behind with their payments. For these clandestine customers, who are often paying an effective tariff close to zero, the tariff increase resulting from reform is even larger than for legitimate customers. Nevertheless, clandestine customers do stand to gain from being formally incorporated into the utility's cadastre. First, service quality may improve more for clandestine than for legitimate customers, because the technical deficiencies of illegal connections often jeopardize service quality. Second, in some cases, clandestine customers pay substantial sums to intermediaries to secure access. Thus, the effective tariff increase they experience may not be as large as appears at first sight. Finally, acquiring formal status as a utility customer can confer a broader range of benefits, in particular facilitating applications for bank accounts, identity cards, and legal tenure documents. Notwithstanding these offsetting benefits, this is undoubtedly a delicate issue that must be handled carefully to promote the formation of a payment culture without major recriminations.

A second critical distinction that can be made within the category of current customers is between residential and nonresidential (that is, commercial and industrial) users.

**Residential.** In addition to the general customer resistance to tariff increases described above, residential customers may also be concerned that they will be adversely affected by the removal of cross-subsidies that may have favored them at the expense of nonresidential customers. Within the class of residential customers, there will also be conflicts of interest between small and large consumers, because changes to tariff structures that affect the size of monthly fixed charges, or the step structure of block tariffs, can significantly affect the distribution of welfare between these two groups.

**Nonresidential.** Nonresidential customers may take a more favorable view toward reform than residential customers. As mentioned above, they potentially stand to benefit from the removal of cross-subsidies that have traditionally penalized them and, in some cases, forced them to seek alternatives to utility supply. Furthermore, nonresidential customers potentially have the most to gain from market liberalization.

## **Workers**

Employees tend to be one of the best organized and most vocal stakeholder groups, because of the relatively high degree of unionization typically found in utility workforces. Unions tend to be strong opponents of reform from the outset, because of their concern about layoffs. Once reform processes are under way, their interventions will focus on improving severance conditions for those laid off and ensuring that pay and conditions of employment do not deteriorate for those who are retained. A potential upside that arises in some privatization processes is the distribution of utility shares among retained employees.

Finally, beyond the current utility workforce, reforms that lead to market liberalization or increased reliance on subcontracting may create new opportunities for workers in upstream supply industries or in competitor companies. Furthermore, to the extent that the reform enhances the dynamism of the sector, new job opportunities may be created. However, these potential beneficiaries are highly diffuse and disorganized, and therefore they do not often form part of stakeholder discussions.

## **Competitors**

Reforms that affect the extent and conditions of market liberalization will also be of major concern to the utility's potential competitors. In general, competitors stand to gain from utility reforms. However, they will be concerned to establish a level playing field for competition, given that the former state monopoly incumbent may continue to exercise a dominant position and enjoy substantial competitive advantages.

In addition to traditional competitors, utilities may often also compete with small informal providers of substitute services, particularly in peri-urban areas where utility networks may be absent or deficient. These providers may often be forced to operate in the shadow of illegality, and reforms may either improve or, more typically, worsen this situation.

## **Owners**

In reforms that involve transfer of asset ownership, the interests of current and future owners need to be carefully considered.

In the case of PSP entailing full asset sale, the citizenry at large rightly perceives itself as being the ultimate owner of the public utility assets. As a result, the general public may raise concerns about whether the family's assets are being sold at a fair price. There may also be considerable sensi-

tivity to transferring ownership of such strategic assets to foreign companies, or concentrating it in the hands of the local elite. In addition, the public may be concerned that the transaction be carried out with adequate transparency to avoid the proceeds from being diverted by corruption. At the same time, the potential new private sector owners will be concerned to have the transaction structured in a way that is favorable to them, pressuring for higher prices, laxer regulations, weaker competition, and fewer investment obligations.

In cases of decentralization, where asset ownership is transferred between different tiers of the state, different levels of the government will have concerns about the fair allocation of assets, as well as associated historic liabilities (both explicit and contingent). An additional concern is the extent to which decentralization of responsibility for service provision will be matched by the necessary increase in fiscal transfers to support the cost of operating, maintaining, and expanding services, where relevant.

## **State**

Aside from its role as owner of assets, the state usually holds the ultimate constitutional responsibility for ensuring that utility services are adequately provided in any particular country. In most reform settings, the state is distancing itself from service provision, whether by delegating to a corporate public entity or contracting with the private sector. As a result, the state is in some sense reducing its direct responsibilities for maintaining service provision, and greatly easing its financial burden. However, by the same token, it is also reducing its degree of control over a highly strategic and politically sensitive sector. This step can therefore generate very ambivalent reactions from the public bureaucracy. The Ministry of Finance may see it as a very positive step, while the Sector Ministry may present a more ambiguous range of responses, depending on whether it is primarily relieved to be rid of the responsibility, or feels that its political influence is being threatened or reduced.

## **Summary of stakeholder impacts**

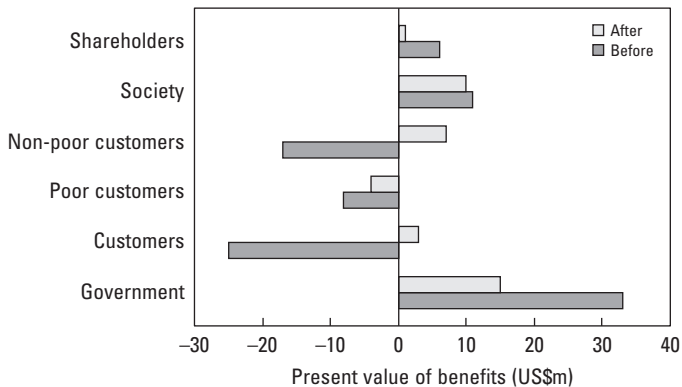
Table 3.4 summarizes the extent to which each of the stakeholder groups stands to gain or lose from impacts passing through each of the transmission channels identified in the preceding section, namely, employment and wages, price of service, quality of service, access to service, asset ownership, fiscal flows, and entry conditions. The table clearly identifies that each stakeholder group is concerned about a specific subset of the

### BOX 3.1 Ex Ante Simulation of Winners and Losers from Reform

In most utility transactions, financial advisers use models to examine the viability of the utility and the expected fiscal gains from the transaction. While important, this perspective overlooks the issue of how benefits are distributed across different stakeholder groups, and hence the ultimate equity and political acceptability of the reform. To address these concerns, the World Bank developed a model to estimate the net benefits of reform to each stakeholder group and the overall net social benefits of the transaction.

This model was applied to three water utilities based in some of the smaller Argentine provinces that were developing a concession arrangement with the private sector. The draft concession documents were used as the basis to simulate how the reform would affect each of the stakeholder groups. In each case, the analysis indicated that the reforms would benefit society with economic rates of return in the range of 24 to 54 percent, reflecting the gross inefficiency of the existing utilities. However, in all cases, the proposed concession documents were found to lead to a highly inequitable distribution of benefits, with the government generally being the major beneficiary at the expense of consumers. Indeed, in two of the three utilities, it was found that consumers would actually lose out from the proposed reforms, although they were beneficial for society as a whole. This was as a result of high canon payments to the government, high connection costs for new customers, and tariff structures that did not provide adequate incentives for service expansion.

After seeing the results of the simulations (summarized in red in the figure), local government officials were motivated to modify the design of the contract by reducing connection targets, using part of the transaction revenues to subsidize new connections, reforming the tariff structures, and slowing the pace of new investments in sewage treatment. As a result, the distribution of benefits became significantly more equitable (see green columns in the figure), producing a more balanced and probably more robust contract.



Source: van den Berg, 2000.

**TABLE 3.4 Summary of Key Concerns of Different Stakeholder Groups**

	Employment	Price of service	Quality of service	Access to service	Asset ownership	Fiscal flows	Entry conditions
Customers	n.a.	Current customers stand to <i>lose</i> from tariff increases or from paying tariffs for the first time.	Current customers stand to <i>gain</i> from quality improvements.	Potential customers stand to <i>gain</i> from acceleration in access, stand to <i>lose</i> from restrictions to alternative suppliers.	n.a.	n.a.	n.a.
Workers	Stand to <i>lose</i> from layoffs or	Residential customers stand to <i>lose</i> from removal of cross-subsidies.			Stand to <i>gain</i> from share	n.a.	n.a.
		Nonresidential customers stand to <i>gain</i> from removal of cross-subsidies and arrival of competition.					

Competitors	n.a.	reduced pay and conditions of employment.	n.a.	n.a.	ownership in certain forms of PSP.	n.a.	Stand to <i>gain</i> from new business opportunities.
Owners	Private owners	stand to <i>gain</i> higher profits from lower wage bills.	Private owners	stand to <i>gain</i> higher profits from price increases	n.a.	General public	stands to <i>lose</i> from sale of public assets or <i>gain</i> from democratization of ownership.
State	n.a.	Sector Ministry	stands to <i>gain</i> from reduced responsibility but to <i>lose</i> direct political control.	Sector Ministry	stands to <i>gain</i> from reduced responsibility but to <i>lose</i> direct political control.	Sector Ministry	stands to <i>gain</i> from increased public spending in other sectors.
		Sector Ministry	stands to <i>gain</i> from reduced responsibility but to <i>lose</i> direct political control.	Sector Ministry	stands to <i>gain</i> from reduced responsibility but to <i>lose</i> direct political control.	Ministry of Finance	stands to <i>gain</i> from improved fiscal flows.

Source: Authors.

Note: n.a. = not applicable; PSP = private sector participation.

impacts caused by utilities reform, and may be positively or negatively affected depending on the direction of the change. Box 3.1 provides a concrete example of how simulation techniques can be used to improve the distribution of reform benefits across stakeholder groups.

## **MITIGATION OF REFORM IMPACTS AND RISKS**

When errors are made in the design of a reform, the impacts described in the preceding section can become large, unleashing political forces strong enough to derail the entire process or even to reverse it once it has been implemented. Labor unions can (and have) mobilized major strikes to prevent the sale of the relevant public enterprise and associated redundancies and changes in working conditions. Communities around the world can (and often have) responded with organized (and sometimes violent) civil disturbances to substantial tariff increases, mandatory connection charges, formalization of clandestine customers, supply interruptions, and plans to sell public enterprises to foreign investors.

These examples illustrate that utility reform is a risky process and that significant attention should be paid to the incorporation of measures to mitigate negative impacts on different stakeholder groups and ensure that the positive impacts of reform are fairly distributed between them.

Indeed, it is important to understand that the distribution of benefits among stakeholder groups is no accident, but a fairly predictable consequence of the way in which the sector reforms are designed, and the choices that are made regarding each of the key variables identified in the section on the “Typical Direction, Magnitude, and Evolution of Impacts.” It follows that the design of any utilities reform process should ideally estimate the costs and benefits accruing to each stakeholder group, and identify design changes that may make this distribution more equitable and thereby secure broader political support for the reform.

Among these potential design changes are a range of mitigating measures that help to attenuate the adverse impacts on any specific group. Table 3.5 summarizes the main mitigating measures proposed for each dimension of impact. These are discussed in further detail below. Estache, Foster, and Wodon (2002) provide a more extensive discussion of the mitigating measures that help to safeguard access and affordability of services by the poor in the wake of utilities reform.

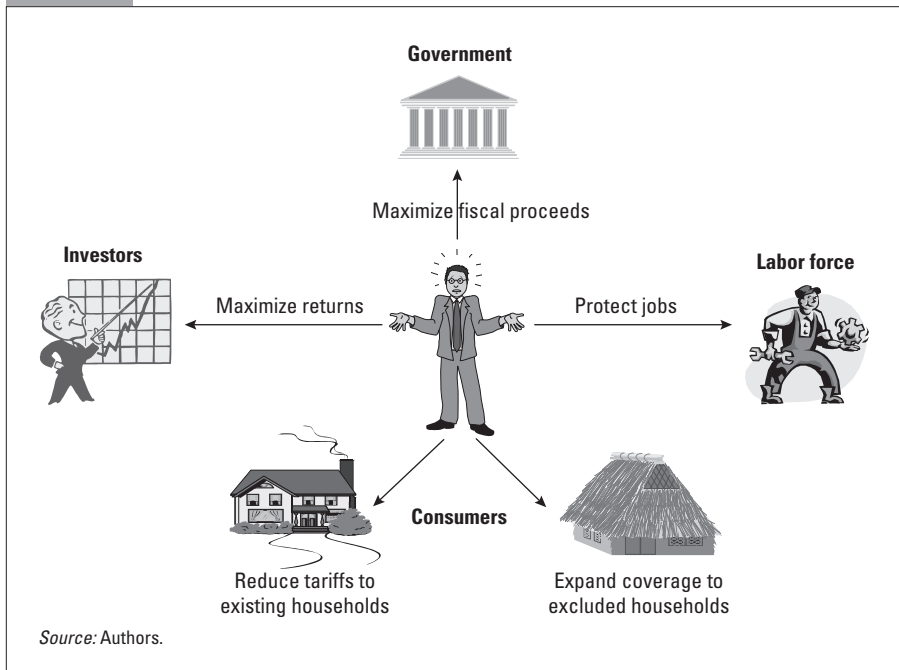
It is essential to recognize the substantial tradeoffs that exist among the interests of the different stakeholder groups and, hence, among the application of the various mitigating measures identified in Table 3.5. For example, the higher the sale price of the enterprise, the greater the fiscal

revenues will be to the government, *but* the lower the financial return to investors. Similarly, the greater the efficiency gains, the lower the tariffs offered to consumers will be, *but* the higher the number of redundancies in the labor force. And again, the more ambitious the plans to expand service coverage, the greater the benefits will be to the excluded poor, *but* the lower the sale value of the enterprise will be to the state. The balancing of interests among these different stakeholder groups is ultimately a political choice and depends critically on the design of the original transaction and how effectively it is subsequently regulated.

### Employment and wages

Where major labor retrenchment is anticipated, careful consideration should be given to the conditions under which this is done. Issues to be considered are whether this should be done before or after a PSP transaction, whether voluntary or involuntary schemes need to be developed, how much compensation workers will receive and how their pension rights will be treated, whether special assistance needs to be provided to

**FIGURE 3.1** Conflicts of Interest in Privatization Processes



**TABLE 3.5 Mitigating Measures for Each Dimension of Impact**

<i>Mitigating measures</i>	
Employment and wages	<ul style="list-style-type: none"> <li>• Generous severance package and retraining opportunities for laid-off workers</li> <li>• Voluntary rather than compulsory redundancies</li> <li>• Distribution of utility shares among retained workforce</li> </ul>
Price of service	<ul style="list-style-type: none"> <li>• Reduce scale of investment program and delay its implementation</li> <li>• Reduce quality of service targets to reduce investment requirements</li> <li>• Reduce minimum sale price or canon payment requested for utility</li> <li>• Phase in tariff increases gradually over time</li> <li>• Synchronize tariff increases with quality of service improvements</li> <li>• Incorporate a social tariff mechanism to protect most vulnerable households</li> <li>• Improve balance of fixed and variable charges in the tariff structure</li> <li>• Provide more frequent payment options, such as prepayment meters</li> <li>• Provide the option of consumption-limiting devices</li> </ul>
Quality of service	<ul style="list-style-type: none"> <li>• Incorporate strict quality of service regulation</li> </ul>
Access to service	<ul style="list-style-type: none"> <li>• Incorporate universal service obligation into regulatory framework</li> <li>• Define explicit connection targets for the utility</li> <li>• Provide connection subsidies for the utility</li> <li>• Reduce costs of connection through appropriate technology and labor contributions</li> </ul>
Asset ownership	<ul style="list-style-type: none"> <li>• Design transaction to permit participation of local firms</li> <li>• Incorporate mechanisms to broaden ownership of shares.</li> </ul>
Fiscal flows	<ul style="list-style-type: none"> <li>• Substitute dividend payments with tax revenues.</li> <li>• Increase minimum sale price for enterprise.</li> </ul>
Entry conditions	<ul style="list-style-type: none"> <li>• Develop an explicit policy and regulatory framework for alternative water suppliers</li> </ul>

Source: Authors.

facilitate retraining and reemployment of those laid off. In all of these areas, compliance with national and international regulations on labor standards will help to ensure that workers are fairly treated.

### **Price of service**

Where a utility reform process looks likely to result in substantial tariff increases, which appear to be unaffordable for the most vulnerable consumers or that (while strictly speaking of affordable increase) are likely to result in a major political backlash, steps should be taken to reduce the necessary price increases or soften their social and political impact.

The price level for the utility service is highly sensitive to the projected investment program, which in turn reflects the expansion and quality obligations imposed on the utility. Because these obligations are largely a public policy decision, price increases can be reduced by adopting a less ambitious set of expansion and quality targets, or by introducing govern-

ment cofinancing for part of the investment obligations. In cases of PSP, another variable with an important impact on the price level is the minimum sale price determined for an asset sale or minimum canon payment determined for a concession. Once again, this is almost entirely a public policy decision and can be modified if necessary to improve the distribution of benefits between taxpayers (who benefit from a high sale price) and consumers (who benefit from a lower sale price).

Where the resistance to price increases stems from political opposition, as opposed to genuine affordability concerns, it may be relevant to think about the timing and presentation of the tariff increases. It may make a difference, for example, whether price increases are adopted in one sudden adjustment or as part of a lengthy process of convergence. There is no *a priori* reason to think that one strategy would work better than another, but local considerations may provide reasons for preferring a particular strategy. Gradually phasing in higher tariffs, as opposed to doubling tariffs overnight, may make the adjustment process less painful for customers. Furthermore, the timing of tariff increases to coincide with the advent of improved levels of service will also help to improve the acceptability of this reform.

In situations where the bulk of the population is able to accommodate higher tariffs, but a more vulnerable minority faces genuine affordability problems, it will be important to accompany reform efforts with the introduction of an appropriate social tariff or other safety net scheme. Doing so will cushion this group from the effects of the tariff increase on the cost of meeting their most basic needs. A wide range of direct subsidy and cross-subsidy instruments exist, such as lifeline tariffs, zonal subsidies in low-income neighborhoods, or subsidies to individuals who qualify for other welfare benefits. Each of these instruments has advantages and disadvantages, which need to be carefully evaluated against any particular country setting. The basic principle, however, is that instruments of social protection need to be found in cases in which reforms raise tariffs beyond the reach of vulnerable social groups.

Beyond subsidies, other measures can be used to improve the affordability of utilities services to the poor, most of which are linked to changes in the utilities' commercial policy. Where utility tariff structures present high fixed charges, shifting costs toward variable components of the tariff structure in a revenue neutral manner gives low-income households greater control over their utility bills by ensuring that economy measures taken within the household yield payoffs in terms of lower bills. In some cases, payment difficulties have more to do with cash-flow problems than with affordability problems. Thus, providing an option for more frequent pay-

ment of bills can make it easier for households with limited cash reserves to budget the cost of utility services. An extreme example of this is devices such as prepayment meters that allow households greater control over the timing of their expenditures. In some context, consumption-limiting devices can be used to restrict the volume of service that can be drawn from the public network, which can sometimes keep utility expenditure within affordable limits, while ensuring that the most basic needs can be met.

### **Quality of service**

While quality of service could be expected to improve as a result of reform, this cannot be taken for granted; thus, an adequate quality of service regulatory framework is needed to provide the necessary incentives and obligations. This framework should include well-defined service targets, as well as an adequate system for monitoring the achievement of those targets, combined with appropriate sanctions to operators and compensations to consumers.

### **ACCESS TO SERVICE**

Utility reform typically strengthens commercial incentives to expand into new markets. However, many of the unserved markets in developing countries—including low-income peri-urban and rural areas—are not commercially attractive to serve. To compensate for the lack of commercial incentives, and to ensure that the benefits of reform reach these key disadvantaged groups, it is typically necessary to incorporate within the design of the reform a package of policy instruments aimed at promoting access. These instruments can be regulatory measures to require utilities to serve these markets, financial incentives to make these markets more commercially attractive, or measures aimed at reducing the cost faced by new customers in connecting to the network.

The most commonly used regulatory measure is the universal service obligation, requiring utilities to provide services to all customers requesting them within a specified service area. While desirable, this provision has limited relevance when major network expansions are required to reach new communities, or where low-income households may desire service but be unable to pay for it. Therefore, it may be preferable to use mandatory connection targets that are referenced to specific (low-income) neighborhoods over a specific time horizon.

However, regulatory instruments will not be effective if there is a real economic barrier in customers covering the up front capital costs associated

with connecting to the network. One alternative, in these cases, is the use of connection subsidies to reduce the economic barriers faced by customers and to improve the overall return of the investment to the operator. These may either be publicly funded grants or cross-subsidy funds raised within the sector (for example, through some kind of universal access surcharge). Where connection subsidies are not financially viable, alternative instruments can be used to reduce the cost of extending services to low-income areas. These may include the adoption of alternative technologies or the contribution of community labor to the construction of new networks.

### **Asset ownership**

A concern often raised by utility reforms, particularly where asset sales are involved, is the concentration of asset ownership in the hands of a relatively small (often multinational) group of commercial interests. A number of measures can be taken to reduce the probability of this outcome. One approach is to break up large transactions into smaller packages that may be more manageable to local investors, often entailing horizontal restructuring measures before the reform. Another alternative is to introduce legal restrictions that prevent a single firm from acquiring assets in different segments of the market or that require international investors to partner with local firms. Finally, ownership democratization measures can be considered, such as giving or selling shares to employees, pension funds, or the general public.

### **Fiscal flows**

As noted above, utilities reform (and in particular PSP) tends to have a positive impact on the public finances, not only through sale revenues but also as a result of subsequent tariff increases. Situations sometimes arise, however, in which well-run public utilities are significant fiscal contributors through the dividend payments they make to the state. The potential loss of these dividends may therefore become a concern, and in some cases even an obstacle, to reform. One way to compensate for the loss of such dividends is to create a tax regime for the privatized utility that compensates, at least to some degree, for the loss of fiscal revenues.

### **Entry conditions**

Utilities reform usually leads to greater liberalization, which leads to market entry, intensified competitions, and improved choice for consumers.

The exception to this rule is the water sector, in which concession contracts often incorporate exclusivity provisions that outlaw alternative suppliers within the concession zone. In areas where significant coverage deficits remain, this kind of provision has the undesirable effect of stifling the only medium-term alternatives that may be available to lower-income customers. Consequently, it is desirable for water utility reform processes to incorporate an explicit analysis and policy framework for improving services in this segment of the market. This may include a framework that obliges the formal utility to provide certain alternative forms of service in unserved neighborhoods and measures to regulate and improve the functioning of alternative supplies, and facilitates partnership between the formal utility and the alternative suppliers (for example via bulk supply of potable quality water).

## **TOOLS FOR MEASURING SOCIAL AND DISTRIBUTIONAL IMPACTS**

The following section discusses data availability, as well as simple and more complex, quantitative, and qualitative techniques for evaluating utilities reform. The tools are discussed separately, but a combination of several techniques may be used. Each tool provides a unique perspective but may also have specific drawbacks. Using them in combination provides a rich source of information on diverse aspects of the poverty and social impact of utility reforms. However, data limitations may well be a binding constraint in many cases.

### **Data availability**

Data availability can often be a significant limitation in assessing the impact of reforms to the utilities sector. The typical data sources that exist are listed and briefly described below, and a comparative summary is provided in Table 3.6. With the exception of utility data and international benchmarks, the best overall source for most of the data identified is the National Statistics Office.

**Utility data.** A lot of important information can be obtained directly from the utility, including the tariff structure, the costs of service provision, the quality of service provision, and broader enterprise performance indicators, as well as the consumption and payment record of customers. A key drawback of utility data, however, is that it does not usually identify the socioeconomic conditions of the household. Furthermore, it only doc-

uments the formal segment of the market and thus does not provide much information on the consumption patterns of households that have illegal connections or rely on alternative forms of water and energy services.

**Census.** The census is often a good source of comprehensive information on basic access data as well as physical housing characteristics. However, it seldom incorporates more sophisticated variables and never measures income directly. Moreover, because it is conducted at most once per decade, it is often too out of date to be useful for the purposes at hand. Nevertheless, there are techniques available for combining household survey and census data to produce relatively reliable poverty maps (Elbers, Lanjouw, and Lanjouw 2003). This is typically done by developing regression models with household survey data that predict income based on housing variables common to both the census and the household survey.

**National household surveys.** An increasing number of countries conduct regular national surveys that include some relevant information about utilities in combination with socioeconomic data for households.

- *Labor Force Surveys (LFS)*—The most frequently available surveys tend to be LFS, which are conducted at least once each year, but may only report on access to utilities (if that).
- *Household Expenditure Surveys (HES)*—Many countries conduct HES every few years to update the weights in the consumer price index. Such surveys can often contain interesting information on household expenditure.
- *Living Standards Measurement Surveys (LSMS)*—An increasing number of countries are conducting LSMS on an occasional basis. To varying degrees, many of these draw on the standardized international format developed by the World Bank. LSMS typically have the richest source of information on utilities, because they combine data on household socioeconomic circumstances with data on access to utilities, characteristics and quality of service, use of utilities, expenditure on utilities, and quality variables. However, they can also present a number of limitations. First, the timing of the surveys may not always be well synchronized with utility reform processes, so the data is not necessarily available for the key time periods of interest (that is, immediately before and some time after the reform). Second, availability and definitions of key impact variables may vary over time, making it difficult to perform the analysis even when surveys exist for the relevant points in time. Third, they are usually representative only at the national and regional

level, and (with the exception of large metropolitan areas) not at the city level, which is often the relevant geographic unit of analysis for utilities reform. Moreover, rural coverage is sometimes limited.

**Ad hoc household surveys.** Occasionally, smaller city-level or utility-level surveys are conducted for specific purposes or may be funded in the context of a PSIA. These offer the best opportunity to tailor information-gathering to analytical needs, although they are costly (approximately US\$50,000) and time-consuming (4–8 months). In addition, they are not always capable of measuring household income and poverty with the same precision as the national household surveys, given the complexity of this task and the desirability, for example, of requiring households to keep expenditure diaries over extended periods.

**National statistics.** The Sector Ministry often has helpful national statistics on the utility sectors, while the Social Development Ministry should be able to provide information on poverty lines, poverty rates, and any national poverty databases or welfare-targeting systems, such as poverty maps.

**International statistics.** For the purposes of comparing the situation of a specific utility with respect to other countries, it can be useful to have benchmarking parameters from other countries that have a similar geographic and socioeconomic environment. A number of international databases exist for benchmarking enterprise performance across utilities. In addition, country case studies (such as those cited in the annexes) can provide a useful point of reference.

This review makes it clear that there is no single perfect source of data to support analyses of the social impact of utilities reforms. The central challenge is to combine information about utility consumption patterns with information about socioeconomic conditions at the level of specific individual households. A good starting point is to gather as many data sources as are readily available and then evaluate the desirability and feasibility of conducting an ad hoc survey. In most cases, a considerable degree of ingenuity and sleuthing is needed to splice data from different sources and draw appropriate inferences.

One of the most important and difficult data collection challenges is to obtain joint readings on physical utility consumption and socioeconomic characteristics at the level of individual households. Table 3.6 discusses some of the methodological options available, highlighting the particular drawbacks that arise in each case.

TABLE 3.6 Comparative Summary of Data Sources

	Variables	Strengths	Weaknesses	Source
Utility data	Tariffs, costs, quality, payment, and consumption records	Detailed time series on payment and consumption	Only covers formal market; no socioeconomic information	Utility
National census	Access, housing characteristics	Comprehensive	Often out of date; no data on income or consumption	National Statistics Office
National household surveys	n.a.	n.a.	n.a.	National Statistics Office
• LFS	Access	Frequent, readily available	Limited coverage of relevant variables	National Statistics Office
• HES	Access, expenditure	Sometimes readily available	Excludes some relevant variables	National Statistics Office
• LSMS	Access, expenditure, consumption patterns, socioeconomic characteristics	Sometimes readily available, broad coverage of variables	May not be well-timed or representative, may omit some variables	National Statistics Office
Ad hoc household surveys	Access, expenditure, consumption, income, socioeconomic variables	Extremely flexible, representative of target population	Costly, time-consuming, may not measure poverty very precisely	National Statistics Office
National statistics	Sector: aggregate data on coverage, consumption, prices, and quality Social: poverty lines, poverty rates, poverty maps, poverty databases	Often readily available	Often too aggregated to be very useful	Sector Ministry and Social Ministry
International statistics	Benchmark parameters on utility performance, as well as access, expenditure, and consumption	Useful point of comparison	May not cover countries and variables of interest	Academic and policy literature Water: WB-IBNET Electricity: IEA Telecom: ITU

Source: Authors.

Note: n.a. = not applicable; LFS = Labor Force Survey; HES = Household Expenditure Surveys; LSMS = Living Standards Measurement Surveys; WB-IBNET = World Bank-International Benchmarking Network; IEA = International Energy Agency; ITU = International Telecommunication Union.

### BOX 3.2 The Challenge of Measuring Physical Consumption

There are a number of strategies available for trying to measure the physical consumption of utility services.

*Direct measurement.* The ideal approach to obtaining joint readings of physical consumption and socioeconomic characteristics would be to conduct an ad hoc household survey that takes the utility's customer cadastre as a sample reference frame, thereby permitting socioeconomic data to be matched up against the household's complete consumption and payment history. Confidentiality considerations may make this almost impossible to do in practice. Moreover, even if it can be done, it does not resolve the issue of measuring consumption of unmeasured or clandestine utility customers, or those who obtain services from alternative providers.

*Field measurement.* For households that lack meters, or for whom utility data cannot be accessed, there is the possibility of measuring consumption directly in the field. This can be done by making engineering estimates based on household appliances and reported use patterns, requiring households to keep detailed consumption diaries, or installing temporary measurement devices purely for observation purposes. In practice, the field measurement approach, although probably the least accurate, may be the only practical and cost-effective option.

*Reading from bill.* Where an ad hoc household survey is conducted, it may be possible to ask households to show the interviewer their latest utility bill, allowing consumption to be read directly from the bill. However, many households may never actually receive a utility bill (for example, tenants), while many others may be unable or unwilling to present the document. Even when the bill is available, careful interviewer training will be required to ensure that it is adequately interpreted. Experience with this approach indicates success rates of not much more than around 25 percent, leading to potential selectivity biases.

*Expenditure inference.* Given the difficulties identified with these methods, often the only way of estimating the physical volume of consumption is to infer it from reported utility expenditure, using the prevailing tariff structure to "back out" the level of consumption. Although relatively straightforward, this approach also presents serious limitations. In particular, it may not always be easy to identify which tariff structure a given consumer is paying under or whether the consumer is being effectively metered. Furthermore, it is not possible to ascertain whether the last month's expenditure relates solely to the last month's consumption, or also includes payment of arrears.

Source: Authors.

### Simple diagnostics

Even when time and data availability are extremely limited, there are some very simple diagnostic indicators that can be quite easily put together from the sources described above and that shed light on the likely severity of each of the impacts on the most affected stakeholder groups. Table 3.7 identifies the key diagnostic indicators for each dimension of impact. These are discussed in further detail below.

**TABLE 3.7 Diagnostic Indicators for Each Dimension of Impact**

<i>Diagnostic indicators</i>	
Employment and wages	<ul style="list-style-type: none"> <li>• Utility workforce as a percentage of total national and local workforce</li> <li>• Estimate of potential redundancies in the utility labor force</li> <li>• Potential redundancies as percentage utility workforce</li> <li>• Potential redundancies as percentage of local and national workforce</li> <li>• Age and skill profile of potential redundancies</li> <li>• Current rate of unemployment in the national and local labor market.</li> <li>• Unionization rate of utility workforce</li> </ul>
Price of service	<ul style="list-style-type: none"> <li>• Current average price of service</li> <li>• Estimated percentage increase in price needed to reach efficient cost-recovery level</li> <li>• Cost of subsistence level of consumption as percentage of poor family monthly income</li> <li>• Actual expenditure on utility service as percentage of poor family monthly income</li> </ul>
Quality of service	<ul style="list-style-type: none"> <li>• Current quality of service indicators</li> <li>• Estimate of potential improvements in quality of service</li> <li>• Estimate of coping costs incurred because of current quality deficiencies</li> </ul>
Access to service	<ul style="list-style-type: none"> <li>• Current coverage rate of service</li> <li>• Socioeconomic profile of customers currently lacking access</li> <li>• Average price of alternative services used by households without access</li> <li>• Connection charge for services</li> <li>• Connection charge as percentage of poor family monthly income</li> <li>• Monthly installment of connection charge as percentage of poor family monthly income</li> </ul>
Asset ownership	<ul style="list-style-type: none"> <li>• Extent of foreign enterprise ownership and investment in the economy</li> <li>• Extent of concentration of local enterprise ownership and investment in the economy</li> </ul>
Fiscal flows	<ul style="list-style-type: none"> <li>• Potential sale value of utility</li> <li>• Present value of fiscal transfers to utility</li> <li>• Present value of tax revenues paid by the utility to the state</li> <li>• Present value of dividends paid by the utility to the state</li> <li>• Present value of debt service on historic debts retained by the state</li> </ul>
Entry conditions	<ul style="list-style-type: none"> <li>• Explicit and implicit entry costs imposed on new market players</li> <li>• Welfare cost of delaying transition to a competitive market</li> </ul>

*Source:* Authors.

**Employment and wages.** To assess the severity of potential impacts on employment and wages, it is relevant to first try and estimate how large the scope of redundancies might be, both in absolute terms and relative to sectoral employment and overall employment in the economy. This can be done by comparing current levels of labor productivity (employees per thousand connections) with those in benchmark utilities that

have undergone reform, or by applying historic parameters on the potential percentage of layoffs following reform. These numbers should be compared with local and national rates of unemployment. An assessment of the buoyancy of the local labor market, as well as the age and skill profile of the current workforce, can also be made to assess the probability of reemployment for workers that could be laid off.

**Price of service.** To estimate the potential severity of social impacts arising from price increases, it is necessary to estimate the potential magnitude of tariff increases that may take place as a result of the reform. Taking an estimate of subsistence consumption, as well as a reference income level for a household living below the poverty line, it is then possible to estimate how much the tariff increase is likely to affect the affordability of the service.

**Quality of service.** To assess the extent to which quality of service improvements may help to compensate consumers for tariff increases, it is relevant to compare the utility's current quality levels with those that might be expected following reform, based on international benchmarks. It is also relevant to explore how severely the population is affected by current quality of service deficiencies, for example, by incurring coping costs to compensate for deficient service (such as back-up generators or water tanks).

**Access to service.** To evaluate the potential upside of reform in terms of expanding access to services, it is helpful to look at current coverage rates and past coverage trends to see whether adequate progress has been made toward universal access. It is also important to have a reasonable characterization of the population without access, including their geographic location, socioeconomic status, and the cost and quality of the substitute services on which they depend. All of these help to gauge the likely benefits of access expansion, as well as the potential socioeconomic obstacles. In this sense, it is relevant to compare connection costs with the typical income level of the unconnected population to determine the extent to which connection subsidies or other social policies aimed at connection may be needed as part of the reform package.

**Asset ownership.** To gauge the potential sensitivity of asset ownership issues in a reform process, it will be relevant to look at the current patterns of participation of foreign investors in the country. Statistics on foreign investment and foreign ownership of assets are relevant points of reference. Where possible, it also is relevant to look at the concentration of market power in the hands of powerful local business interests.

**Fiscal flows.** To estimate the changes in fiscal flows likely to result from utility reform, it is necessary (where relevant) to estimate the sale value of the utility. In addition, the dynamic fiscal effects need to be considered by quantifying the present value of future fiscal flows, whether positive or negative. On the positive side, there is the present value of avoided subsidies and increased tax revenues. On the negative side, there is the present value of foregone dividends and debt service payment on historic debts absorbed by the state.

**Entry conditions.** To gauge the impact of the reform on entry conditions for competitors, it is important to calculate the explicit or implicit entry costs that are imposed by the regulatory framework. These include any license payments and required investments (for example, to provide nationwide service presence), as well as costs associated with bureaucracy and red tape. Where the reform process creates exclusivity periods, it is relevant to estimate the welfare loss to consumers from the delayed transition to a competitive market. This is done by comparing the differing pace of market expansion and price reduction in competitive versus monopoly markets in other countries.

### Quantitative techniques

When time, data availability, and resources permit, more sophisticated methodological tools can be used to either predict the impact of reform *ex ante* or measure the impact *ex post*. These tools become complex in technical terms, because they depend on assumptions about household behavior and about the links between markets and households. They are also much more demanding in terms of data requirements. The availability of suitable household survey data becomes absolutely essential, complemented where possible by data on physical volumes of utility consumption, as discussed above.

When performing *ex post* analysis, the minimal requirement is for repeated surveys before and after the reform. However, for strong conclusions to be reached, it is critical to have panel data, constructed by visiting the *same* households before and after the reform process. With repeated surveys, it is necessary to make (sometimes dubious) assumptions about how comparable different groups are over time. For example, if reform has strong distributional effects, it is not possible to assume that, say, the bottom 20 percent of the population is composed of the same type of households before and after a given reform. Panel data overcomes these difficulties.

Based on a review of the literature summarized in the annexes to this chapter, the main methodological approaches commonly used are identified and briefly described below. Most of the techniques covered focus on the problem of measuring changes in consumer welfare as a result of changes in service price, quality, and access, because this is by far the most methodologically challenging aspect of the problem. Impacts on employees, owners, and the state are usually quite straightforward to measure in terms of net present value of earnings or returns. In addition, benefit incidence analysis focuses on analyzing the distribution of benefits as opposed to their absolute value. Finally, counterfactual analysis and computable general equilibrium (CGE) models are two techniques for integrating the different impacts of reform into a single methodological framework.

### ***Impact on budget shares***

Several elements of reform, including changes in tariffs, increased enforcement of utility contracts, and legalization of illegal connections, result in changes in the utility expenditures of the poor. Such changes can be simulated by first estimating a demand for the service and then simulating how household demand would react to the new prices. This type of simulation can be useful *ex ante* in the identification of the need for subsidy schemes (for example, when expenditure shares exceed generally accepted international norms, such as the World Health Organization's recommendation of 5 percent for water), as well as in political economy analyses highlighting groups that are likely to be particularly hurt by and, hence, oppose the reform.

*Ex post* analysis can be used to observe how the expenditure pattern of various groups has evolved over time and can present these changes for different groups of the income distribution (in a way analogous to the benefit incidence analysis discussed below). This type of analysis does not fully capture the impact of changes on the welfare of the poor, which depends on the quantities consumed rather than on expenditure levels. However, it can provide a useful approximation of the direction and magnitude of welfare changes.

### ***Welfare impact measurement via consumer surplus***

As mentioned above, utility reforms may have a complex array of welfare impacts on consumers, operating through changes in prices, quality of service, and access conditions. The key instrument for analyzing this complex outcome is provided by the estimation of changes in consumer surplus, which, under reasonable assumptions, approximates to changes in consumer welfare. However, the use of consumer surplus

measures is premised on the assumption of zero income effects. Therefore, the methodology may not be very reliable in situations in which price changes are large in relation to existing expenditure levels.

There are different ways of approximating the consumer surplus. The simplest one is to assume that changes in welfare are proportional to the quantity initially consumed. However, more complex formulae also take into account how demand reacts to changes in utility prices. This type of calculation can also be extended to groups that do not initially have access to a utility service by imputing virtual prices (that is, the lowest price at which households do not consume a service even if they have access), allowing an overall evaluation of the benefits. An advantage of this type of calculation is that it provides a monetary metric for the changes in welfare that households experience. This allows their costs and benefits to be directly compared with those of other stakeholders, such as investors, employees, or the state.

### ***Welfare impact measurement via willingness to pay***

In addition to the consumer surplus methods described above, welfare impacts can be measured directly or indirectly through a variety of other techniques. Many of these techniques have been developed in environmental economics literature in response to the problem of valuing goods that are not openly or explicitly traded in the market place. This problem makes it impossible to directly observe the demand function and calculate consumer surplus using the standard techniques described above. This broad set of methodologies, reviewed in detail elsewhere (Devicienti, Klytchnikova, Paternostro 2004), aims at gauging households' willingness to pay for specific services or service characteristics.

One family of methods relies on obtaining households' willingness to pay, which is estimated directly from ad hoc surveys, by asking how much households would be willing to pay for something they do not have (Contingent Valuation) or by asking households to rank different price and quality bundles for specific services (Contingent Ranking). The central challenge of these methodologies is how to ensure that responses to hypothetical questions accurately reflect real valuations.

Another family of methods relies on inferring willingness to pay from household behavior in markets for goods and services that are complements or substitutes for the good or service of interest. Examples might include estimating savings on candles and kerosene lamps when evaluating the benefits of rural electrification, or savings in time of water collection when evaluating the benefits of a household tap. In the case of industrial customers, it may be possible to value the economic losses that

they suffer from supply interruptions or from maintaining their own generator or borehole to compensate for deficiencies in public supply.

One salient example of these methodologies is the hedonic regression, which explains the value of housing or rents paid on the basis of the physical characteristics of the house, the type and quality of services to which it has access, and the general characteristics of the neighborhood. This makes it possible to isolate house price premiums associated with access to particular types of services or different levels of service quality. For this method to work, there must be significant variation in service characteristics across the area under study. Moreover, information about service characteristics must be widely available, otherwise they will not be adequately reflected in house prices or rents.

### ***Impact on nonmonetary dimensions of poverty***

Utility reform processes can also have important impacts on many proximate determinants of some key nonmonetary dimensions of well-being. Thus, access to (good quality) utility service is often significantly correlated with improved nutrition, sanitation, lower child and infant mortality, and so on. Although these benefits are not directly amenable to monetary quantification, any improvements in these variables evidently represent key (potential) impacts of reform. A simple approach to the measurement of this type of effect is to consider the incidence of these nonmonetary deprivations by income groups, and cross-tabulate them against access to utility services. Such cross-tabulations can be easily constructed from comprehensive household surveys following the LSMS model.

Ex post valuations can focus on changes in these nonmonetary indicators among groups that, for example, have benefited from connection to services they previously did not have. Monetary measures of the impact of access to services on nonmonetary deprivations can be obtained by first estimating reduced form models of nonmonetary deprivation and then using the coefficients to calculate by how much the income or consumption of poor groups would need to be increased to provide the same effect as a connection to one of these services. This method provides ballpark estimates of the impact of access to utilities, although concerns can be raised on the robustness of the results to model specification and, in particular, omitted variable bias.

### ***Benefit incidence analysis***

Where the objective is to measure the distribution of benefits, rather than to measure the welfare impact of the reform, benefit incidence analysis may be a useful analytical tool. A benefit incidence analysis calculates the

monetary value of the benefits accruing to different members of the population; for example, as a result of a change in the tariff or subsidy policy of a utility.

If the subsidy (or other benefit delivered) is constant across beneficiaries, a simple analysis of errors of inclusion and exclusion—by group (poor-nonpoor) and by decile of the income distribution—can highlight how well it is reaching its intended beneficiaries.

If the subsidy (or other benefit delivered) has a complex distributional pattern, a fuller incidence analysis needs to be undertaken. A powerful way to summarize this type of analysis, and possibly compare alternative subsidy schemes, is through distribution curves, where the x axis shows the cumulative distribution of the households or individuals when ranked in increasing order, and the y axis shows the percentage of benefits and subsidy received. If the subsidy is progressive (or regressive), the resulting curve lies above (or below) the 45 degrees line.

An important caveat in interpreting these results is that they might differ from results of other methodologies that estimate the welfare impact of utility provision, because this type of analysis focuses on the costs for the provider of the utility rather than the welfare benefits. These studies, however, can provide useful estimates of the resources that can be targeted in a pro-poor fashion as well as how their distribution can be improved.

Finally, to obtain a full picture of distributional incidence, it is important to consider the entire population of poor and not simply those directly connected to an existing utility network.

### ***Counterfactual analysis***

One of the most difficult issues in evaluating the impact of utilities reform is to establish an appropriate counterfactual against which to compare the results of the reform. This question is relevant under all methodological approaches and can be answered to varying degrees of sophistication. The simplest approach is to compare the situation before and after the reform. However, a more accurate methodology is to extrapolate historic trends observable in the years before reform and compare them with the new trends observed in years after the reform. The impact of reform should show up as a change in the long-term trend of the different variables under consideration. Clearly, the key methodological problem with this approach is having a sufficiently solid basis on which to predict the counterfactual, given that prereform data are often very scarce or may only be available for one or two years, making it difficult to establish the historic trend.

### **Computable general equilibrium models**

CGE models form a class of models in which production activities, factors, and institutions and their internal links within the economy, are fully specified. These require both national accounts and survey data. The data are compiled into a single information (or social accounting) matrix in which the links among activities, factors, and institutions are organized. These models are attractive because they allow the impact of reforms to be fully traced through the entire economy, as opposed to focusing on first-order, first-round effects. Because they are technically demanding and data-intensive, however, they have rarely been used to examine the impact of utility reforms.

The conclusions of this review of quantitative methodologies for measuring the impact of utilities reform are summarized in Table 3.8, which identifies key examples of case studies that have applied each of the techniques described.

### **Qualitative techniques**

In addition to the quantitative techniques described above, a number of qualitative approaches are also effective in shedding light on the design and impact of reforms.

**Focus groups.** These are structured discussions with small (and not necessarily representative) groups of people drawn from specific stakeholder perspectives. These groups make it possible to explore issues and concerns in a more open-ended way than normally would be possible through a questionnaire-based survey. It is also possible to brainstorm about potential mitigating measures. This approach is being used by Guasch to understand the negative perception of utility reform in Peru through in-depth discussions with utility customers, customers receiving first-time connections following the reform, and employees laid off as a result of the reform.

**Stakeholder analysis.** This particular tool uses qualitative data to describe the interests and level of influence of selected groups with respect to policy reforms, thereby clarifying the political economy dynamics. This is a qualitative version of the analysis of winners and losers described above. This method is used to examine the potential for building consensus across competing interest groups. Walker, Velasquez, Ordoñez, and Rodriguez (1999) performed an interesting application of this technique to the problem of water sector reform in Honduras.

**TABLE 3.8 Summary Overview of Quantitative Techniques**

	<i>Purpose</i>	<i>Method</i>	<i>Examples</i>
Impact on budget shares of poor	To gauge nature of impact of price changes on consumers	Measure changes in expenditure on utilities as a result of price changes	Wallich and Freund 1995
Benefit incidence analysis	To determine equity characteristics of a price or subsidy policy on consumers	Measure how benefits are distributed across a particular target population	Gómez-Lobo and Contreras 2003
Welfare impact measures through consumer surplus	To measure welfare impact of price changes (and access) on consumers	Measure changes in consumer surplus via approximations to the demand function	McKenzie and Mookherjee 2003
Welfare impact measures through willingness to pay	To measure welfare impact of changes in service price, quality, and access on consumers	<b>Direct methods</b> Ascertain willingness to pay directly through survey questions <b>Indirect methods</b> Infer willingness to pay through observed demand for complements or substitutes	<b>Direct methods</b> Whittington, Lauria, and Mu 1991 <b>Indirect methods</b> Foster and Araujo 2004 Korman 2002 Lampietti and Meyer 2002
Impact on non-monetary dimensions of poverty	To measure impact of access on broader quality of life of consumers	Cross-tabulate nonmonetary dimensions against access to service by income level before and after reform; value changes in nonmonetary dimensions	Foster and Araujo 2004 Ruggeri Laderchi 1999
Counterfactual analysis	To compare situations of all stakeholders before and after reform	Project all relevant variables under a nonreform scenario to compare with reform outcomes	Galal, Jones, Tandon, and Vogelsang 1994
Computable general equilibrium models	To gauge the first and second order impacts of reform on the entire economy	Construct model-capturing links between inputs and outputs within the reformed sector and across the rest of the economy.	Chisari, Estache, and Romero 1999

Source: Author's creation.

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ANNEX

1

# Summary of Selected Country Studies on the Impact of Utility Reforms

**ANNEX 1: Summary of Selected Country Studies on the Impact of Utility Reforms**

<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
Argentina	EP	M	P	1990s	Ennis and Pinto 2003
	EP	M	P	1990s	Benitez, Chisari, and Estache 2003
	EP	M	P, R1, R2	1989–93	Chisari, Estache, and Romero 1999
	EA	W	P, R1	Ongoing	van den Berg and Katakura 2004
	EP	M	P	1990s	Foster and Araujo 2004
Armenia	EP	E2	T	1999	Lampietti, Kolb, Gulyani, and Avenesyani 2001
Chile	EP	E2	P	1986	Galal et al. 1994

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Method	Impact							Summary
	E	W	P	Q	A	S	D	
B, BI, CS	■	■	■		■		■	Access increased, relative prices of services decreased, and employment fell but has since recovered.
CGE, EV			■	■	■		■	Significant gains from improvements in quality, access, and productivity, especially among the poor. But gains are not enough to offset credit shocks. Fiscal gains are larger under bad regulatory environment.
CGE	■		■	■			■	General increase in employment; gains (price decrease or improvement in quality) from privatization accrue mainly to rich; while gains from regulation of privatized firms accrue to low-income classes.
BI, CS, NM			■				■	Society as a whole benefits. The government is the big winner while consumers, particularly the poor, stand to lose from the proposed reform. The projected outcome for investors is mixed.
B, BI			■				■	Social policy measures adopted at time of sector reform are poorly targeted toward low-income households. Targeting performance can be substantially improved by subsidizing connection rather than consumption.
B, DB			■				■	Electricity consumption fell by 17 percent while consumption of substitutes increased. Collection rates fell 9 percentage points, and arrears increased four-fold. Compared with the nonpoor, the poor cut consumption more, the share of households with arrears was higher, and the average size of arrears increased more.
CF, CS			■			■	■	Overall welfare gain, but the government and previously nonpaying customers are worse off. Large gains for both domestic and foreign shareholders as well as employees in their capacity as shareholders.

(continued)

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Chile	EP	T	P	1986	Galal et al. 1994
	EP	W	T	1990	Gómez-Lobo and Contreras 2003
	EP	M	P	1989	Paredes 2003
Chile (Santiago)	EP	WS	R1	1989	Shirley, Xu, and Zuluaga 2002
Colombia	EP	W	T	1994	Gómez-Lobo and Contreras 2003
	EP	M	T	1994	World Bank 2004
Côte d'Ivoire	EP	T	M, P	1990s	Laffont and N'Guessan 2002

Method	Impact							Summary
	E	W	P	Q	A	S	D	
CF, CS			■	■	■		■	Overall welfare gain, with consumers gaining the most mainly through expanded services and unchanged tariffs, although with some deterioration in quality.
DB			■				■	More than 60 percent of subsidies go to households that are above the third decile of the income distribution. Domestic and foreign shareholders, competitors, and the government are better off.
DB			■		■		■	Significant increases in coverage, especially among the poor. No clear trend in prices.
CF, CS, D	■	■	■	■			■	Overall welfare gains with large gains for the government. Consumers gained with price increases offset by increased connection. Employees gained from higher wages. Private shareholders gained.
BI			■				■	All poor households receive some benefit from water subsidy policy because the program is overly generous and gives benefits to almost all households.
B, BI			■		■		■	Cross-subsidy system used to cushion poor households from tariff increases associated with reform is not effective in targeting resources to the poor.
D			■	■	■			Expansion of access, but large regional imbalances remain (for example, more new lines installed in the capital than in the rest of the country). Quality of services is reasonably good but has not met the targets set by the reform. The fall in basket prices is larger than the required fall.

(continued)

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Côte d'Ivoire	EP	T	P	1990	Plane 1999
Côte d'Ivoire (Abidjan)	EP	W	R2	1988	Ménard and Clarke 2000
Egypt	EA	T	P, M, R1	—	Galal 1999
Georgia	EP	E1	P, T	1998	Lampietti, Gonzalez, Wilson, Hamilton, and Vashakmadze 2003
Ghana	EP	T	P	1996	Haggarty, Shirley, and Wallsten, 2003
Guatemala	EP	M	P, R2	1996	Foster and Tré 2003 Foster and Araujo 2004

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Method	Impact							Summary
	E	W	P	Q	A	S	D	
CS	■	■	■	■	■		■	Consumers have been the major beneficiaries of reduced prices. Also reported expansion of services and improvement in quality. Workers reportedly the main losers, with labor force contraction and wage deterioration.
D			■	■	■			Coverage maintained at a high level despite rapid population growth; water and service quality have been good and prices have declined in real terms.
CF, CS	■		■		■	■	■	Consumers gain from reduced prices and expanded provision of services. Workers gain, assuming laid-off workers are compensated, and workers who stay receive shares at a discount. Both foreign and domestic buyers gain. Government breaks even.
B, BI			■		■		■	Improved service quality and the increased supply of clean and subsidized natural gas have offset the potentially negative impact of higher electricity prices.
D					■			Landline telephone penetration and mobile subscription increased dramatically, but the network did not reach the levels the government hoped.
B, BI, WTP, NM			■		■		■	New connections to water, electricity, and sanitation services increased significantly. Most dramatic change in the telecommunication sector. The poor, rural, and indigenous households have doubled their probability of receiving services but in absolute terms are still least likely to receive services.

(continued)

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<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
Guinea (Conakry)	EP	W	P	1989	Ménard and Clarke 2000
Indonesia (Jakarta)	EP	W	R1	1990	Crane 1994
Iran	EA	E1	T	2000	Jensen and Tarr 2003
Malawi	EP	T	P	1993	Clarke, Gebreab, and Mgombelo 2003
Mexico (Mexico City)	EP	W	P	1990s	Haggarty, Brook, and Zuluaga 2002
Mexico	EP	T	P	1989	Galal et al. 1994

Method	Impact							Summary
	E	W	P	Q	A	S	D	
CF, CS			■	■	■		■	Both consumers and the government gained from reform. Although the increase in the number of connections has been slow, it has increased faster than it would have under continued public ownership. Prices have increased, but the quality of both water and service have improved considerably.
B			■					The 1990 deregulation allowing homes with water connection to resell municipal water has led to money saving and increased consumption by former vendor and standpipe customers.
B, BI, CGE			■				■	The analysis assumes that revenues generated by removing subsidies is distributed back to households. Energy pricing reform (removal of subsidies) is estimated to produce large gains in consumer welfare.
D			■		■			Cellular penetration and Internet use expanded dramatically following reform, but prices increased, especially for cellular calls, and fixed-line penetration remains low by regional standards.
D			■	■			■	Mixed effect on quality. With the introduction of metering, the number of low-income consumers receiving a water bill rose, while water bills for high-income consumers fell or stayed the same. Mixed outcome for middle-income consumers.
CF, CS	■		■	■		■	■	Overall welfare gains, but consumers lose from rising prices. High proportion of foreign ownership also suggests that benefits have leaked abroad.

(continued)

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<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
New Zealand	EP	T	R1, P	1987, 1990	Boles de Boer and Evans 1996
Nicaragua	EP	E2	E2	1998	Freije and Rivas 2002
Panama	EA	W	P	1998	Foster, Gómez-Lobo, and Halpern 2000
Peru	EP	T	P	1994	Tóroero, Schroth, and Pascó-Font 2003
Peru (Lima)	EA, EP	WS	P	1990s	Alcázar, Xu, and Zuluaga 2002
Peru	EP	M	P, R1	1990–98	Tóroero and Pascó-Font 2001

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Method	Impact							Summary
	E	W	P	Q	A	S	D	
CS, D	■		■	■			■	Large welfare gains for consumers stemming from price reductions. These reductions transferred producer surplus to consumer surplus. Also reported improvement in quality and reduction in labor force.
CS			■		■		■	The increase in the price of electricity reduced welfare at all expenditure deciles, with larger losses at the top of the distribution. Households that obtained access during the reform period experienced substantial gains in welfare, with larger gains among poorer households.
BI			■					Simulation of alternative subsidy designs to mitigate tariff impacts of proposed concession on the poor.
CS, WTP			■	■	■		■	Privatization brought dramatic improvements in coverage, quality, and technology. Privatization improved total consumer welfare, mainly by increasing access to the service. But price increase negatively affected low- and, especially, very-low-income households.
CF, CS	■		■	■	■	■	■	Overall welfare gains, but workers lose from forced early retirements. Consumers gain from expanded connections net of higher prices. Welfare gains would have been higher with full reform, analyzed as a counterfactual to actual partial reform.
BI, CS			■	■	■		■	Improvement in access for all sectors. But water is still of low quality, electricity reform has led to tariff increase (and consumer surplus has decreased), and prices of phone calls have increased (and consumer surplus has fallen).

(continued)

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<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
Philippines	EP	E2	M	1990–93	Toba 2003
Poland	EA	E1	T	1993	Wallich and Freund 1995
Senegal	EP	T	P	1997	Azam, Dia, and N'Guessan 2002
South Asia (Bangalore, Kathmandu)	EP	W	T	2002	Foster, Pattanayak, and Prokopy 2003
South Korea	EA	E1	P, M	2002	Lee, Lee, and Kim 2004
Spain	EA, EP	M	T	1996–2000	Arocena 2003
Sweden	EA	E2	R1	1996	Andersson and Bergman 1995

Method	Impact							Summary
	E	W	P	Q	A	S	D	
CF, CS	■		■			■	■	Reforms produced net benefit. Consumers and investors are net gainers (most of whom are foreigners), but government loses. Large benefits of avoided costs during power crisis and efficiency gains in generation.
CS, B			■		■		■	Increases in electricity prices hurt the poor more than increases of other energy prices. But the rich consumer absolutely uses more energy than the poor, so raising prices has a progressive effect.
D					■			Both fixed-line and mobile telephone penetration grew significantly.
BI			■					Current rising block tariffs in the water sector fail to deliver subsidies to the poor. Targeting would improve somewhat by use of individual or zonal criteria for subsidization. However, ultimately subsidizing connection may be a better strategy.
CS			■				■	Divestiture focusing on competition would result in overall welfare loss. With respect to welfare distribution, profits would increase dramatically, along with the substantial decrease in residential and commercial consumers' surplus. To protect consumers, options to increase demand elasticities should be implemented before divestiture.
BI			■				■	The poorest households lose from rebalancing in telecom (adverse effect from increase in line rentals, despite falling call prices). Further rebalancing would result in larger welfare losses for the poor.
CS			■					Deregulation is not a sufficient condition for lower prices. To lower prices, the deregulated market must consist of at least five firms of equal size.

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<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
Uganda	EP	T	M	1997–98	Shirley, Tusubira, Gebreab, and Haggarty 2002
Ukraine	EA	E2	T	Ongoing	Dodonov, Opitz, and Pfaffenberger 2004
United Kingdom	EP	T	P	1984	Galal et al. 1994
	EP	M	P, T	1990s	Waddams Price and Hancock 1998
	EP	E2	P, R2	1990	Newbery and Pollitt 1997

*Source:* Authors.

*Note:* — = not available

*Analysis:* EA (ex ante); EP (ex post)

*Sector:* E1 (energy); E2 (electricity); M (multisectoral); T (telecom); W (water and sanitation)

*Reform:* P (privatization); R1 (regulatory reform); R2 (restructuring); T (tariff reform)

Method	Impact							Summary
	E	W	P	Q	A	S	D	
D			■	■	■			Access has expanded, service has improved, and tariffs have fallen.
CV, EV			■				■	Electricity tariff increases up to the level that would cover officially measured costs, as defined by the Ukrainian authorities, would not cause severe social problems. However, further increases up to a level comparable to the average Organisation for Economic Co-operation and Development level lead to significant welfare losses.
CF, CS	■	■	■				■	Overall welfare gain, although British Telecom's competitors lose. Consumers have the largest absolute gain, while domestic and foreign buyers as well as the government also are better off. Substantial layoffs, but severance pay made redundancy voluntary. Employees also bought a substantial number of shares.
CS			■				■	Mixed outcome, with adverse impacts on some household groups, such as pensioners.
CF			■			■	■	Large increase in profits and small decline in real final prices. Shareholders benefit disproportionately more than consumers.

*Method:* B (budget shares); BI (benefit incidence); CF (counterfactual analysis); CGE (computable general equilibrium); CS (consumer surplus); D (descriptive); EV (equivalent variation); NM (nonmonetary dimensions); WTP (willingness to pay)

*Impact:* E (employment); W (wages); P (price); Q (quality); A (access); S (assets); D (distribution, includes disaggregated analysis by quintiles, stakeholders, or winner and loser)



ANNEX

2

## Summary of Cross-Country Studies on the Impact of Utility Reform

**ANNEX 2: Summary of Cross-Country Studies on the Impact of Utility Reform**

<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
23 Organisation for Economic Co-operation and Development countries	EP	T	P, M	1991–97	Boylaud and Nicoletti 2000
21 Developing and transition countries	EP	M	P	1990s	Clarke and Wallsten 2002
17 Countries	EP	T	P	1981–94	D'Souza and Megginson 1999
21 Industrial and developing countries	EP	T	P	1984–97	D'Souza, Bortolotti, Fantini, and Megginson 2000
86 Developing countries	EP	T	P, R1, M	1985–99	Fink, Mattoo, and Rathindran 2003

Method	Impact							Summary
	E	W	P	Q	A	S	D	
F	■			■	■			Insignificant reduction in employment.
D			■	■	■			Privatization and competition lead to significant improvements in mainline penetration. But a comprehensive reform program, involving both policies and the support of an independent regulator, produced the largest gains. The sequence of reform matters: mainline penetration is lower if competition is introduced after privatization, rather than at the same time.
R					■		■	Expanded retail access is likely to lower the industrial price and increase the price differential between industrial customers and household customers. The unbundling of generation and the introduction of a wholesale spot market did not necessarily lower the price and may possibly have resulted in a higher price.
R	■	■			■			Sound regulatory governance has a positive impact on network expansion and efficiency. Openness of markets to competition and divestment of former state-owned operators also contributed positively to better performance. Competition and privatization have greater impact for lower-income countries than for higher-income ones, but regulatory reforms have a smaller impact on lower-income countries.
R	■							Both reforms improve access, but there is no consistent impact on quality. Deregulation associated with lower prices and employment increase; privatization with higher prices and employment decrease.

(continued)

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(Continued)**

<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
10 OECD countries	EP	E2	R1	1987–99	Hattori and Tsutsui 2004
22 Latin American countries	EP	T	R1, P	1980–97	Gutiérrez 2003
Latin American survey	EP	M	P	1990s	Nellis 2003
26 Developing countries	EP	T	R1, P	1994	Petrazzini and Clark 1996
130 Countries	EP	T	P, M	1986–95	Ros 1999
30 African and Latin American countries	EP	T	P, R1, M	1984–97	Wallsten 2000

Method	Impact							Summary
	E	W	P	Q	A	S	D	
R			■				■	Expanded retail access is likely to lower the industrial price and increase the price differential between industrial customers and household customers. The unbundling of generation and the introduction of a wholesale spot market did not necessarily lower the price and may possibly have resulted in a higher price.
R					■			Sound regulatory governance has a positive impact on network expansion and efficiency. Openness of markets to competition and divestment of former state-owned operators also contributed positively to better performance. Competition and privatization have greater impact for lower-income countries than for higher-income ones, but regulatory reforms have a smaller impact on lower-income countries.
D	■	■	■	■	■	■	■	Recent studies conclude that privatization has contributed only slightly to rising unemployment and inequality, and either reduces poverty or has no effect on it. However, the benefits of privatization are spread widely in the medium term, while the costs are large and immediate.
R	■		■	■	■			Both reforms improve access, but there is no consistent impact on quality. Deregulation associated with lower prices and employment increase; privatization with higher prices and employment decrease.
R				■	■			Privatization associated with network expansion (except in lower-income countries) and efficiency. Competition associated with greater efficiency but not network expansion. No discernible impact on quality.
R			■		■			Increased competition associated with increase in access and decrease in cost. Privatization not helpful unless coupled with effective regulation.

(continued)

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<i>Country</i>	<i>Analysis</i>	<i>Sector</i>	<i>Reform</i>	<i>Reform date</i>	<i>Source</i>
51 Developing countries	EP	E2	P, R1, M	1985–2000	Zhang, Parker, and Kirkpatrick 2002
Global survey	EP	M	P	1990s	Birdsall and Nellis 2002

*Source:* Authors.

*Note:* OECD = Organisation for Economic Co-operation and Development.

*Analysis:* EA (ex ante); EP (ex post)

*Sector:* E1 (energy); E2 (electricity); M (multisectoral); T (telecom); W (water and sanitation)

*Reform:* P (privatization); R1 (regulatory reform); R2 (restructuring); T (tariff reform)

Method	Impact							Summary
	E	W	P	Q	A	S	D	
R			■		■			Competition associated with higher service penetration and lower prices for industrial users (no significant effect on residential users), among others. On their own, privatization and regulation have insignificant effects. Together, they lead to greater electricity availability, generation capacity, and labor productivity.
D	■	■	■	■	■	■	■	Most privatization programs appear to have worsened the distribution of assets and income in the short run. This is more evident in transition economies than in Latin America, and less clear for utilities (such as electricity and telecom), where the poor have benefited from greater access, than for banks, oil companies, and other natural resource producers.

*Method:* B (budget shares); BI (benefit incidence); CF (counterfactual analysis); CGE (computable general equilibrium); CS (consumer surplus); D (descriptive); EV (equivalent variation); NM (nonmonetary dimensions); WTP (willingness to pay)

*Impact:* E (employment); W (wages); P (price); Q (quality); A (access); S (assets); D (distribution, includes disaggregated analysis by quintiles, stakeholders, or winner and loser)

