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## Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?

Utility subsidies to consumers of water and electricity services are often justified as a mechanism for making services affordable for the poor. After all, an estimated 1.1 billion people in the developing world lack access to safe water; 2 billion are without electricity, and 2.4 billion without sanitation. But critics object that such subsidies can work against improving quality of service to existing consumers and extending access to unconnected households. Financially strapped utilities are often inefficient, provide low-quality services, and lag behind in expanding networks.

During the 1990s, experts urged that water and electricity services should charge enough to fully cover costs. Households could spend 10–50 percent more on water and electricity without major effects on poverty levels, but in many countries much larger price increases are needed to recover costs. A substantial proportion of the population of lower-income countries may find it difficult to pay the full cost of services.

### How prevalent are utility subsidies?

Consumer utility subsidies for water and electricity services are common in the developing world. Global surveys indicate the majority of electrical utilities and water utilities charge tariffs that often don't even cover operating and maintenance costs (see table 1). Average water tariffs in low-income

countries are a tenth of the level applied in high-income countries, while average electricity tariffs in low-income countries are half that level.

Subsidies provided to utility customers can be a significant drain on the public treasury. The most striking examples come from the countries of the former Soviet Union, and electricity subsidies exceed 1 percent of GDP in India, Mexico and Argentina. Public subsidies for drinking water and sanitation tend to be smaller as a percentage of GDP because total system costs are lower. In India, drinking water subsidies have been estimated at 0.5 percent of GDP. In contrast, proportion of costs recovered through user charges tend to be much lower for water than for electricity.

There are two broad means by which utilities subsidize their customers—consumption subsidies and connection subsidies. Consumption subsidies reduce charges for consuming water or electricity, while connection subsidies are one-time reductions in connection charges. A survey of tariffs in Latin America, Africa, and Asia found that three-quarters of utilities in both sectors include some form of consumption subsidy.

The most common form of targeted subsidy is based on volume of water or electricity consumed. Increasing block tariffs (IBT)—stepped tariffs that charge an increasingly higher price per unit to all consumers as their consumption increases into subsequent blocks—are common. Some utilities (primarily electricity) apply a different kind of quan-

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**Table 1. Most water utilities in the developing world do not recover their full costs**  
Probable degree of cost recovery by water utilities, by country income level and region

Percentage of utilities whose average tariffs appear to be... <sup>a</sup>			
Grouping of water utilities	Too low to cover basic O&M	Enough to cover most O&M	Enough O&M and partial capital
<b>Global</b>	39	30	30
<b>By country income level</b>			
High-income	8	42	50
Upper-middle-income	39	22	39
Lower-middle-income	37	41	22
Low-income	89	9	3
<b>By region</b>			
OECD	6	43	51
Latin America and Caribbean	13	39	48
Middle East and North Africa	58	25	17
East Asia and Pacific	53	32	16
Europe and Central Asia	100	0	0
South Asia	100	0	0

Sources: ADB 2004; ADERASA 2005; GWI 2004; NIUA 1999.

Note: Data are drawn from utilities serving 132 major cities worldwide, broken down geographically as follows: OECD, 47; South Asia, 24; Latin America and Caribbean, 23; East Asia and Pacific, 19; Middle East and North Africa, 12; Europe and Central Asia, 6. The same group of countries is broken down by income group as follows: high-income, 52; upper-middle-income, 18; lower-middle-income, 27; low-income, 35.

O&M = operation and maintenance.

a. Based on GWI 2004 (box 2.4).

tity-based subsidy, termed volume-differentiated tariffs (VDT), composed of two or more different tariffs, the first highly subsidized and the second less or not at all, to which consumers are assigned based on consumption volume.

Another form of targeting uses administrative decisions to determine subsidy eligibility, choosing for example all customers in a particular demographic or employment category (e.g. pensioners or war veterans), those living in a particular neighborhood or region (geographical targeting), or those whose means are determined to fall below a certain level. Geographic targeting is sometimes combined with an IBT or VDT.

The Chilean water subsidy program is a widely cited example of a means-tested consumer utility subsidy, subsidizing between 40 and 70 percent of up to 15 cubic meters of water for poor households. Utilities apply this discount to the water bills of eligible households and are reimbursed by the government.

## How well do subsidies perform?

Recent individual case studies which sought to assess the extent to which subsidies benefit poor households are not directly comparable (differing coverage, methods and metrics). This study addresses this gap by systematically examining targeting performance of a large number of consumer utility subsidies. The sample includes 45 subsidy programs from 27 electrical utilities, and 32 programs from 13 water utilities. Most of the programs involve quantity-based subsidies, which are equally common in water and electricity sectors. There are 12 cases from Latin America, 7 from Eastern Europe, 4 from South Asia, and 4 from Sub-Saharan Africa. No case study material was available for East Asia or the Middle East.

Quantity-based subsidies (ie., through the tariff structure) employed by 80 percent of water and electricity utilities are starkly regressive. Poor households capture only half as much value of the subsidy as they would if subsidies were randomly distributed across the entire population. Many poor

households are excluded from subsidy programs altogether, because they are not connected to the network.

## Measuring subsidy performance

The study constructed a targeting performance indicator ( $\Omega$ ) representing the share of subsidy benefits received by the poor divided by the proportion of the population in poverty. A value of 1.00 for  $\Omega$  implies that distribution of the subsidy across income classes is neutral, with the benefit share going to poor households equal to their share of the population. Neutral targeting means that the subsidy performs no better than a random subsidy that delivers equal benefits to all. A value greater than 1.0 implies that the subsidy distribution is progressive, with the poor receiving a larger share of the total benefits than their share of the total population. A  $\Omega$  value below 1.00 indicates a regressive subsidy.

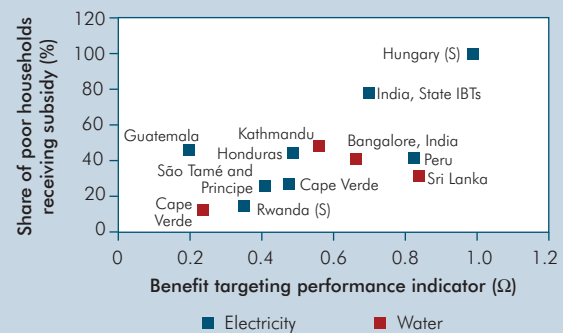
The “poor” in this study are defined as the poorest 40 percent of households. The targeting performance indicator is the product of five factors: rates of access to the utility network, uptake rates among those having access, targeting rates among those with connections, the rate of subsidization enjoyed by those targeted to receive the subsidy, and the quantity of subsidy consumed by recipients.

## Quantity-based subsidies: nearly always regressive

Almost invariably, the nonpoor benefit disproportionately from quantity-based subsidy programs. Only 2 of 26 quantity-based subsidy cases come close to achieving even a *neutral* subsidy distribution; the rest are all regressive or highly regressive (see figure 1). In one water program, the poorest 40 percent of the population received just 10 percent of the benefits. An electricity program in Central America distributed just 8 percent of benefits to the poorest 40 percent of the population.

The effective application of IBTs and VDTs requires households to have functioning meters to measure water and electricity use, which the poor are less likely to have. And, differences in consump-

**Figure 1. Quantity-based subsidies are not effective in targeting the poor**  
A targeting performance indicator of 1.0 indicates an income-neutral subsidy



Sources: Appendices D.1, D.6, E.1, and E.6.  
Note: S=simulated

tion between the poor and the nonpoor—particularly between the poor and the middle class—are less than they are often assumed to be.

Also, various common features of tariff structures fall heaviest on those who consume the least. Fixed charges mean that households that consume small quantities face higher unit prices than larger consumers and that large consumers benefit substantially from subsidization.

An appealing solution to this problem is to modify tariff structures so that non-poor households are transformed from subsidy recipients into net cross-subsidizers, for example by reducing the size of the subsidized first block of an IBT or reducing the subsidy threshold of a VDT, while raising the rate charged in the unsubsidized portions of the tariff to more than average cost.

## Other consumption subsidies: less regressive

Geographical targeting raises  $\Omega$  on average to 0.99—a substantial improvement over quantity-based targeting but still no better than a random distribution of subsidies.<sup>1</sup>

<sup>1</sup> The only exception is categorical targeting (such as discounts for pensioners or veterans), which proved in this study to be regressive in all cases considered.

Means testing has the greatest effect on improving targeting performance, with  $\Omega$  taking a strongly progressive average value of 1.31. However, the gains in targeting accuracy can also exclude a high percentage of intended beneficiaries (low participation rates). Moreover, means-testing systems can be costly to implement and administer if done solely on a sectoral basis. In contrast, in countries with existing means testing systems, the incremental cost of utilizing them to allocate of utility subsidies is very modest.

Service-level targeting is another alternative. Our sample of subsidy cases includes two examples in the water sector—public tap subsidies in Bangalore and in Kathmandu. But subsidy value is relatively small and errors of exclusion are high, because more poor households (in those cities) have private taps than use public taps.

### Connection subsidies: a better way to reach the poor?

Connection subsidies may be more effective in reaching the poor. Our simulations assumed all unconnected households were both offered and accepted subsidized connections. Distribution of benefits from these universal subsidies is progressive. If connection subsidies are further combined with geographic targeting or means testing, simulations suggest that  $\Omega$  could be raised to 1.30 or 1.71, on average respectively.

However, the simulations results are based on the assumption that with subsidies, unconnected households at each income level will connect at the same rate. In practice, that is unlikely, because utilities often face constraints in expanding their networks into all geographic areas and many poor households

face nonfinancial obstacles to connecting (such as not having legal title to the property they occupy).

When only 50 percent of the unconnected poor households connect, benefit targeting becomes regressive. Even so, the targeting performance of the simulated connection subsidies is better than the consumption subsidies.

Also, despite sizable consumption subsidies only 20–30 percent of poor households in the African case studies connected to utility networks even when networks were available, making connection subsidies not progressive there.

### Overcoming the limits of subsidies: an action agenda

Because utility subsidies address only price they are best seen as one part of a package of measures to ensure access to utility services for the poor. Other measures may be more promising:

- Reducing cost of service, through efficiency gains in operating and capital expenditures and by improving revenue collection.
- More frequent billing and elimination of minimum consumption requirements and fixed charges. Other options include prepayment, financing connection costs, and providing devices that help households control consumption.
- Easing legal restrictions that work against expansion of services to the poor, such as technical norms that oblige utilities to use high-cost technologies, legal-tenure requirements that prevent services from being extended to periurban neighborhoods, and regulations restricting services provided by small-scale providers.

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