STATE OF THE UTILITIES

Water, Electricity, and the Poor

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ROOHI ABDULLAH
Consultant, Infrastructure Specialist
UNDESA and World Bank
Outline of the presentation

SUPPLY SIDE

- Utility workers
- Inefficiency
- Government subsidy
- Tariffs below cost
- Inadequate quality of service
- Customers
- Coping costs

DEMAND SIDE

- Cost Recovery
- Current growing energy costs
- Access
- Small-scale Private Service Provider/Alternative Provision
- Subsidies

Source: Foster and Homman 2001
**What are cost recovery levels for tariffs?**

<table>
<thead>
<tr>
<th>Water</th>
<th>Developing countries</th>
<th>Industrialized countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>&lt;US$0.20/m³</td>
<td>Tariff insufficient to cover basic operation and maintenance (O&amp;M) costs</td>
</tr>
<tr>
<td>Tier 2</td>
<td>US$0.20-0.40/m³</td>
<td>Tariff sufficient to cover operation and some maintenance costs</td>
</tr>
<tr>
<td>Tier 3</td>
<td>US$0.40-1.00/m³</td>
<td>Tariff sufficient to cover operation, maintenance, and most investment needs</td>
</tr>
<tr>
<td>Tier 4</td>
<td>&gt;US$1.00/m³</td>
<td>Tariff sufficient to cover full cost of modern water systems in most high-income cities</td>
</tr>
</tbody>
</table>


According to GWI, covering water utilities in 132 major cities revealed that underpricing of water supply is widespread, even in high-income and upper-middle income countries.

- 39% utilities Tier 1 and 30% in Tier 2
- US$0.11/m³ in LIC; US$0.30/m³ in MIC; and US$1.00/m³ in HIC

<table>
<thead>
<tr>
<th>Electricity</th>
<th>Residential customers</th>
<th>Industrial Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>&lt;US$0.04/kWh</td>
<td>Tariff insufficient to cover basic operation and maintenance (O&amp;M) costs</td>
</tr>
<tr>
<td>Tier 2</td>
<td>&gt;US$0.05/kWh</td>
<td>Tariffs likely to be making a significant contribution toward capital costs, in most types of systems</td>
</tr>
<tr>
<td>Tier 3</td>
<td>&gt;US$0.08/kWh</td>
<td>Tariffs likely to be making a significant contribution toward capital costs, in most types of systems</td>
</tr>
</tbody>
</table>

Source: Foster and Yepes 2005.

According to Foster and Yepes, electricity achieves better cost recovery and targeting, and generalized under pricing is less prevalent.

- 15% utilities Tier 1 and 44% in Tier 2
- US$0.05/kWh in LIC; US$0.07 in MIC; and US$0.12 in HIC
Most residential customers are not charged the full cost of the water and electricity service they receive

- Especially in the water supply sector
- And in lower income countries

Average residential tariffs only cover O&M plus some capital costs in:

- 3% of water utilities and 25% of electricity utilities in low-income countries
- 39% of water utilities and 29% of electric utilities in upper middle income countries

<table>
<thead>
<tr>
<th>Country income level</th>
<th>WATER</th>
<th>ELECTRICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TIER 1</td>
<td>TIER 2 &amp; 3</td>
</tr>
<tr>
<td>HIC</td>
<td>Too low to cover basic O&amp;M</td>
<td>Covers O&amp;M and partial capital</td>
</tr>
<tr>
<td>UMIC</td>
<td>8%</td>
<td>50%</td>
</tr>
<tr>
<td>LMIC</td>
<td>39%</td>
<td>39%</td>
</tr>
<tr>
<td>LIC</td>
<td>37%</td>
<td>22%</td>
</tr>
</tbody>
</table>

HIC: High Income Countries
UMIC: Upper Middle Income Countries
LMIC: Lower Middle Income Countries
LIC: Low Income Countries

Based on Komives et al., with support from Roohi Abdullah, 2005.
### Evidence of cost recovery based on region

<table>
<thead>
<tr>
<th>Regions</th>
<th>WATER</th>
<th>ELECTRICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TIER 1</td>
<td>TIER 2 &amp; 3</td>
</tr>
<tr>
<td>OECD</td>
<td>6%</td>
<td>51%</td>
</tr>
<tr>
<td>LAC</td>
<td>13%</td>
<td>48%</td>
</tr>
<tr>
<td>ECA</td>
<td>58%</td>
<td>17%</td>
</tr>
<tr>
<td>EAP</td>
<td>53%</td>
<td>16%</td>
</tr>
<tr>
<td>SSA</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>SAR</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

- Most residential customers are also not charged the full cost of the water and electricity service they receive based on regional analysis:
  - Especially in the **water supply sector**
  - And in **SSA and SAR**

- Average residential tariffs only cover O&M plus some capital costs in:
  - 0% of water and electricity utilities in **SSA and SAR**
  - 51% of water utilities and 83% of electric utilities in **OECD Countries**

Based on Komives et al., with support from Roohi Abdullah, 2005.
Average tariffs by region from the 2006 survey (per m³).

<table>
<thead>
<tr>
<th>Region</th>
<th>Water</th>
<th>Wastewater</th>
<th>Combined</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>$1.47</td>
<td>$1.29</td>
<td>$2.68</td>
<td>5.1%</td>
</tr>
<tr>
<td>North America</td>
<td>$0.99</td>
<td>$1.11</td>
<td>$2.05</td>
<td>6.6%</td>
</tr>
<tr>
<td>Latin America</td>
<td>$1.21</td>
<td>$0.25</td>
<td>$1.25</td>
<td>0.0%</td>
</tr>
<tr>
<td>MENA</td>
<td>$0.60</td>
<td>$0.25</td>
<td>$0.78</td>
<td>0.0%</td>
</tr>
<tr>
<td>Sub Saharan Africa</td>
<td>$0.52</td>
<td>$0.33</td>
<td>$0.74</td>
<td>0.0%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>$0.43</td>
<td>$0.34</td>
<td>$0.69</td>
<td>4.2%</td>
</tr>
<tr>
<td>ECA</td>
<td>$0.18</td>
<td>$0.12</td>
<td>$0.30</td>
<td>3.6%</td>
</tr>
<tr>
<td>World</td>
<td>$0.84</td>
<td>$0.69</td>
<td>$1.42</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

According to GWI:

- Average water tariff around the world grew by 3.8% during 2005-06.
- The global rate of inflation is estimated to be around 5.2% during 2005-06.
- Highest tariff increase was seen in North America. Among the regions Asia Pacific took a lead at 4.2%.
- No change in tariff was seen in LAC, MENA and SSA.
Increasing electricity costs

According to GWI, the energy costs of Water and Wastewater utilities have increased 50-70% over the last year.

According to the IBNET data, more than 50% of the utilities reported that more than 20% of their costs were associated with power consumption in 2004.

According to OFWAT, UK is 15-18%.

Source: www.ib-net.org

Global Water Intelligence, September 2006.
Median electricity costs for water utilities have been steadily increasing since 1995; almost 1% per annum.

During the period 1995-2004: the costs grew almost 9%.

During the period 1995-2005: the costs grew almost 16%.

Appreciating trendline

Author's calculation based on data from www.ib-net.org
Based on IBNET utility data from all countries, **South Asia has the highest** electricity costs in the region, almost 3 times that calculated for developed countries.

Utilities in **East Asia and Pacific and Africa follow**, almost 2 times that calculated for developed countries.

Average for all countries is **22%** and median is **18%**

Author's calculation based on data from www.ib-net.org
Access to utility services

For every 10 people, 2 lack access to a safe water supply, 4 lack access to electricity and 5 have inadequate sanitation.

These statistics translate into an estimated 1.1 billion people without safe water, 2 billion without electricity, and 2.4 billion without sanitation.

Urban and rural difference
Electricity access across income groups

- Fairly large regional differences in electricity access for South Asia and Africa
- Poor have less access to electricity as compared to the non-poor: only 5% and 22% in Africa and South Asia, respectively.
- Africa electricity access almost 50% less than South Asia.

Author’s elaboration based on: Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001 for Africa; and currently undergoing infrastructure review for South Asia – Based on data from 4 countries 1991-2001 for South Asia
Water access across income groups

Water Access in Africa

<table>
<thead>
<tr>
<th>Quintile</th>
<th>Percentage Access</th>
<th>Urban</th>
<th>National</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 0-20%</td>
<td>10%</td>
<td>73%</td>
<td>30%</td>
<td>16%</td>
</tr>
<tr>
<td>Q2 20-40%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3 40-60%</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4 60-80%</td>
<td>40%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5 80-100%</td>
<td>50%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In Quintile 5, the richest population, 50% of the population has access to public tap water, and 40% has access to piped water in the dwelling. The remaining 10% have an opportunity for alternative supply.

Author’s elaboration based on Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001
Comparison of access for water and electricity

Opportunity for Alternative Supply

Percentage / Access

Quintile 1 - 0 - 20% - Poorest
Quintile 2 - 20 - 40% - POOR
Quintile 3 - 40 - 60% - Population
Quintile 4 - 60 - 80% - NON-POOR
Quintile 5 - 80 - 100% - Richest

- Improved water access – 30%
- Electricity – 20%
- Piped in dwelling – 12%

Author's elaboration based on Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001
Approximately 25% countries in the world show documented prevalence of SPSPs in electricity.

Based on estimates, about 7,000 SPSPs of electricity* serve approximately 10-50 million clients worldwide. *(supplier of network services and dealers of solar panels and other HHs generating equipment but excluding battery recharging business)
Small-scale private service providers (SPSPs) - Water and Electricity

- Approximately 45% countries in the world show prevalence of SPSPs in water, electricity, or both (documented and anecdotal)
- Based on estimates, about 7,000 SPSPs of electricity and 10,000 SPSPs serve communities up to 50,000 people around the world (urban, peri-urban or rural)
Small-scale private service providers (SPSPs) - Water price charged

Is this the cost recovery price?

Or THIS

Price of Water by Type of Service Provider

Based on data from 47 countries and 93 locations based on the literature review
Subsidies to utility customers are a salient feature of water and electricity services worldwide, mostly because tariffs are not at cost recovery level.

- Large transfers from general tax revenue, both capital costs and revenue shortfall.
- Less visible form, under pricing of fuel inputs in electricity generation and of electricity and raw water inputs in water production.
- Cross subsidization, fund specific group of consumers.
- Utilities absorb financial loss from subsidies, wearing down capital stock and pushing repair and maintenance off into the future.

As a result, subsidies have in some ways become necessary to sustain utilities financially, both for water and electricity.
Subsidies take many forms

- Consumption or connection subsidies
- General subsidies to all, or subsidies targeted to a subset of consumers
- Most common consumption subsidy is “quantity-based”
  - Usually an increasing block or “stepped” tariff
  - 80% of water utilities and 70% of electricity utilities
Methodology for analysis of distributional incidence of subsidies

- **Systematic comparison of case studies**
  - Nearly 80 existing and simulated subsidies
  - From 13 water utilities and 27 electrical utilities from Asia, Latin America, Africa, and E.E./C.A.

- **Estimation of the financial value of the subsidy:**
  - Avg. cost of water or electricity received – amount paid

- **Benefit targeting indicator:**
  - % of benefits going to poor / % of pop that is poor
  - <1.00 regressive; > 1.00 progressive

- **Determinants of targeting performance**
  - Access rate, connection rate, targeting, subsidy per unit, quantity consumed
Existing quantity-targeted subsidies are regressive

% of poor hhs receiving subsidy vs. benefit targeting performance

- India, State IBT: 0.56
- Cape Verde: 0.48
- Sao Tome: 0.41
- Peru: 0.82
- Honduras: 0.49
- Guatemala: 0.20
- Kathmandu: 0.56
- Bangalore: 0.66
- Sri Lanka: 0.83
- Rwanda (S): 0.35
- Hungary (S): 0.98

Electricity
- Existing quantity
- Targeted subsidies

Water
- Existing quantity
- Targeted subsidies

Share of poor hhs receiving subsidy vs. Benefit targeting performance indicator.
Consumption - Why? (1)

- **Access, connection, and metering**
  - Many poor households are simply not eligible

- **But that is not all...**

- **Targeting:**
  - Quantity consumed is not necessarily a good indicator of poor households
    - Especially in case of water
    - The middle class and poor look very similar
Quantity-targeted subsidies usually provide a greater subsidy per unit to low volume consumers, but... if there is a fixed fee, the smallest volume users pay the highest average price per unit.

Most existing subsidies are general subsidies to all or almost all residential customers.
- Few households pay average cost or cross-subsidize others.
- A smaller subsidy over more units of consumption = a larger total subsidy.

Can quantity-targeted subsidies be improved by tinkering with the tariff structure?
- E.g. reducing the size of the subsidized block of an IBT.
Parting thoughts:
Subsidies as “pro-poor” utility policy

Make or keep services affordable for the poor?
- Only for the connected poor (with meters), who are accurately identified by the targeting mechanism

What about low coverage situations?
- Connection subsidies are most likely to reach the poor, but...
  - There may be other barriers to connections (tenure status, cost of fixtures, billing practices, good alternatives)
  - Connecting more households to a service burdened by “unfunded” consumption subsidies will only further bankrupt utilities
Parting thoughts:

Prices, subsidies, and cost recovery

- There is no easy way around the need to increase levels of cost recovery if service is to be improved and expanded.
  - The removal of existing regressive subsidies is widely unpopular.
  - Improving the targeting of subsidies won’t change that.

- But raising prices or securing alternative sources of subsidies are not the only possible tools:
  - Improving revenue collection
  - Reducing operating and especially capital costs
  - Removing impediments to more flexible service levels, technologies, and modes of provision
Parting thoughts: Implications for the poor

- An electricity tariff increase of 50% will increase the water production costs by 10-20%....if 100% then by 20-40%

- Based on the above, as a result, if HH expenditure increases....
  - Effect on poverty levels would be greater for electricity than water, would be greatest if increase is for both.
  - Water: doubling expenditure would result in 1.1% increase in poverty headcount; Electricity: almost 3% increase in poverty headcount.
  - It would take more than a 100% increase in water or electricity prices to make HHs double their expenditure, more like a price increase of 150-450% would be needed to increase expenditure by 100-300% based on price elasticity
Parting thoughts: Reducing energy costs

- Energy efficiency should be integrated as an integral component of the overall efficiency of service delivery.

- Establish Monitoring and Targeting (M&T) system:
  - Conduct energy survey/audits based on production and operation costs
  - Define energy as an accountable cost center (EACs)
  - Determine data management plan that feeds directly into the production cycle

- World Bank’s ESMAP sponsored an Action Research applying Energy M&T “Best Practices” (extracted from earlier Pilot Assessments) to municipal water operations in Brazil.

  - Current Participants:
    - Aguas do Brasil (ADB) in Petrópolis, state of Rio de Janeiro
    - Empresa Montagens de Sul Americana (EMSA) in three municipalities in the state of Tocantins

  - Other Participant replicating the model:
    - NOVACON is preparing M&T Implementation Plans in various small municipalities of Sao Paulo State

- Also being implemented in Africa.
Thank You

Most of the data presented today, unless otherwise noted, is from K. Komives, V. Foster, J. Halpem and Q. Wodon; with support from R. Abdullah. 2005. Water, electricity, and the poor: who benefits from utility subsidies? World Bank, Washington, DC and author’s contribution to Kariuki and Schwartz, 2005. Small scale private service provider of water supply and electricity: A review of incidence, structure, pricing and operating characteristics. World Bank Policy Research Working Paper 3727. World Bank, Washington, DC. However, data from this source has been updated for this presentation.