STATE OF THE UTILITIES

Water, Electricity, and the Poor

UNHABITAT Energy Expert Group Meeting
Modern Energy Access for Poor Urban Settlements.

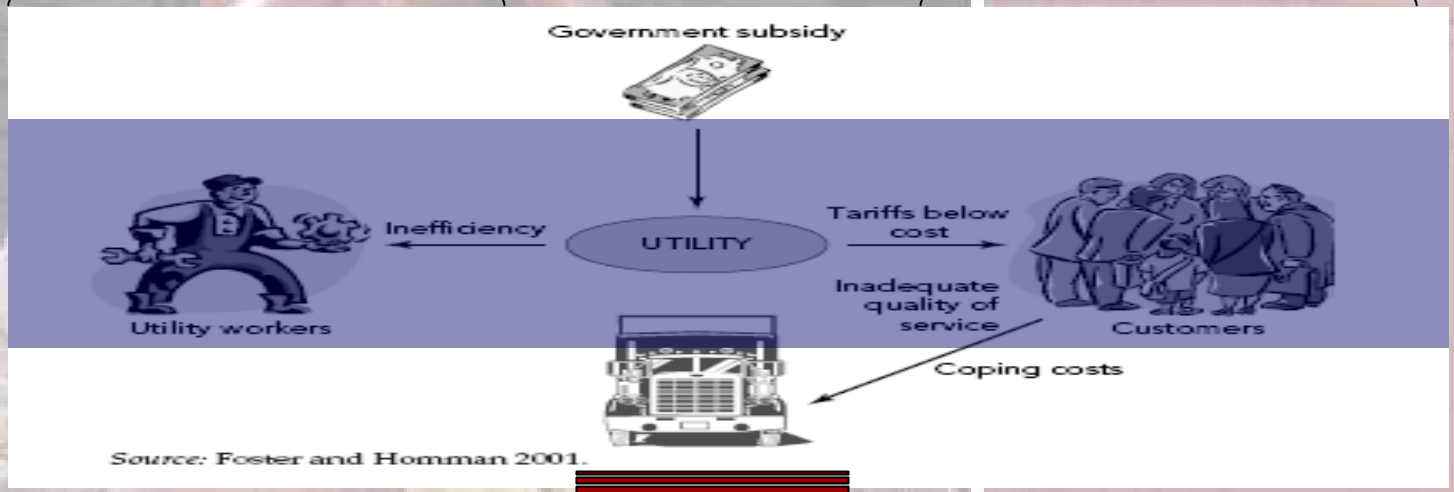
4-6 December 2006, Nairobi, Kenya

ROOHI ABDULLAH
Consultant, Infrastructure Specialist
UNDESA and World Bank

Outline of the presentation

SUPPLY SIDE

DEMAND SIDE



SCOPE OF THE PRESENTATION

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

What are cost recovery levels for tariffs?

	Water	Developing countries	Industrialized countries
Tier 1	<US$0.20/$m^3$	Tariff *insufficient* to cover basic operation and maintenance (O&M) costs	Tariff *insufficient* to cover basic O&M costs
Tier 2	US$0.20-0.40/$m^3$	Tariff *sufficient* to cover operation and some maintenance costs	Tariff *insufficient* to cover basic O&M costs
Tier 3	US$0.40-1.00/$m^3$	Tariff *sufficient* to cover operation, maintenance, and most investment needs	Tariff *sufficient* to cover O&M costs
Tier 4	>US$1.00/$m^3$	Tariff *sufficient* to cover operation, maintenance, and most investment needs in the face of extreme supply shortages	Tariff *sufficient* to cover full cost of modern water systems in most high-income cities

Source: GWI 2004.

	Electricity	Residential customers	Industrial Customers
Tier 1	<US$0.04/kWh	Tariff *insufficient* to cover basic operation and maintenance (O&M) costs	Tariff *insufficient* to cover basic O&M costs
Tier 2	>US$0.05/kWh		Tariffs likely to be making a significant contribution toward capital costs, in most types of systems
Tier 3	>US$0.0.08/kWh	Tariffs likely to be making a significant contribution toward capital costs, in most types of systems	

Source: Foster and Yepes 2005.

- **According to GWI, covering water utilities in 132 major cities revealed that under pricing of water supply is widespread, even in high-income and upper-middle income countries.**
  - 39% utilities Tier 1 and 30% in Tier 2
  - US$0.11/$m^3$ in LIC; US$0.30/$m^3$ in MIC; and US$1.00/$m^3$ in HIC
- **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

Evidence of cost recovery based on income

	WATER		ELECTRICITY	
	TIER 1	TIER 2 & 3	TIER 1	TIER 3
Country income level	Too low to cover basic O&M	Covers O&M and partial capital	Too low to cover basic O&M	Covers O&M and partial capital
HIC	8%	50%	0%	83%
UMIC	39%	39%	0%	29%
LMIC	37%	22%	27%	23%
LIC	89%	3%	31%	25%

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

- **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**

Based on Komives et al., with support from Roohi Abdullah, 2005.

Evidence of cost recovery based on region

	WATER		ELECTRICITY	
	TIER 1	TIER 2 & 3	TIER 1	TIER 3
Regions	Too low to cover basic O&M	Covers O&M and partial capital	Too low to cover basic O&M	Covers O&M and partial capital
OECD	6%	51%	0%	83%
LAC	13%	48%	0%	53%
ECA	58%	17%	31%	31%
EAP	53%	16%	29%	6%
SSA	100%	0%	29%	0%
SAR	100%	0%	33%	0%

- **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 tariff increase

Average tariffs by region from the 2006 survey (per m^3).

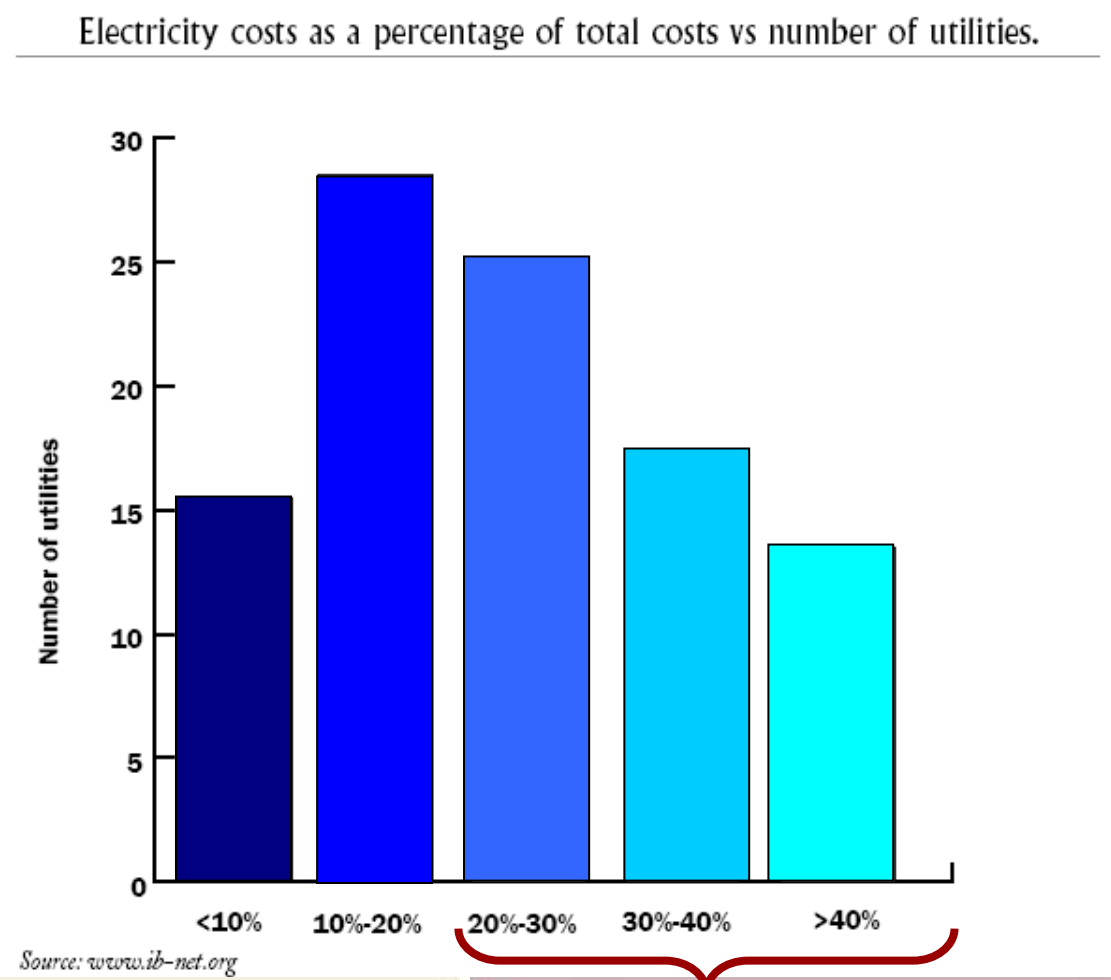
	Water	Wastewater	Combined	Increase
EU	$1.47	$1.29	$2.68	5.1%
North America	$0.99	$1.11	$2.05	6.6%
Latin America	$1.21	$0.25	$1.25	0.0%
MENA	$0.60	$0.25	$0.78	0.0%
Sub Saharan Africa	$0.52	$0.33	$0.74	0.0%
Asia Pacific	$0.43	$0.34	$0.69	4.2%
ECA	$0.18	$0.12	$0.30	3.6%
World	$0.84	$0.69	$1.42	3.8%

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.

Global Water Intelligence, September 2006.

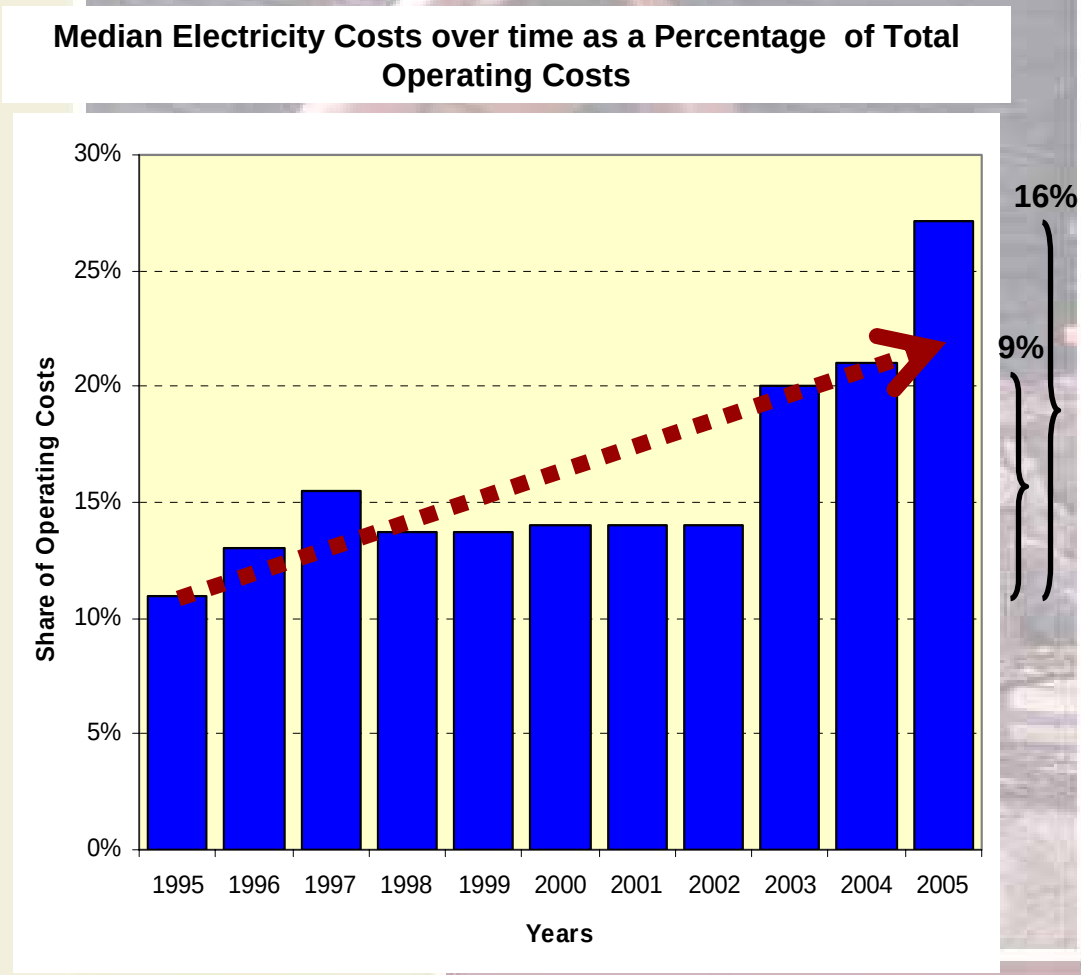
Increasing electricity costs



- 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%

Global Water Intelligence, September 2006.

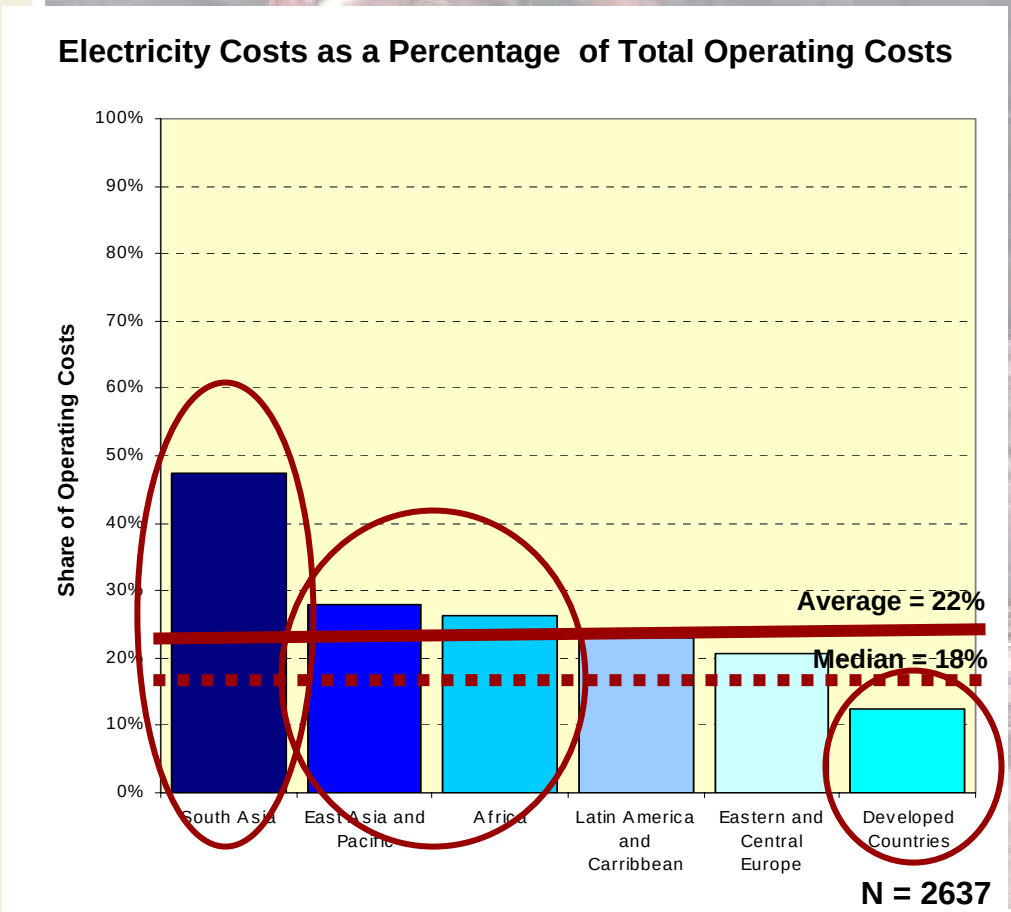
Electricity cost increases over time



- 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

Electricity costs



- 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

Percentage of the Population with Access to Improved Water Supply, Sanitation, and Electricity (and Percentage with a Household Water Connection)

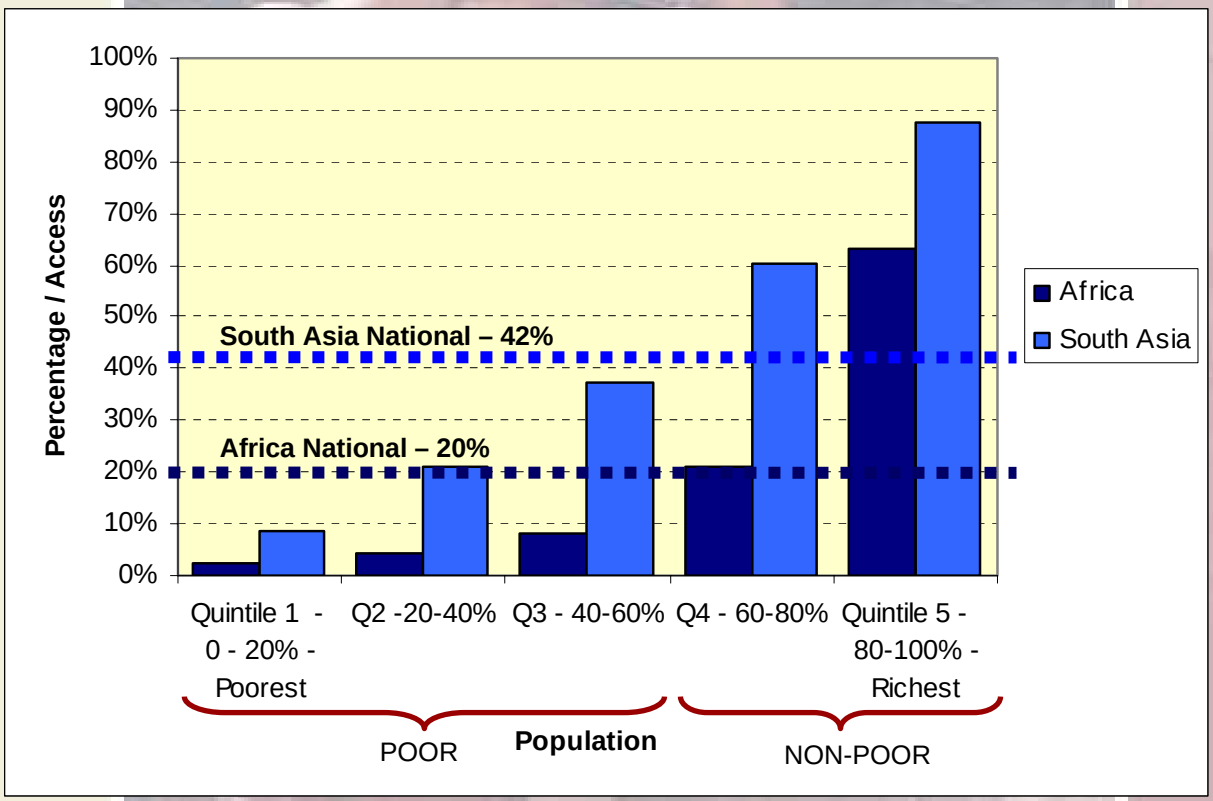
	Water supply[a]		*Sanitation*[a]		*Electricity*[b]	
	Urban	*Rural*	*Urban*	*Rural*	*Urban*	*Rural*
East/Southeast Asia	92 (*70*)	69	71	35	99	81
South Asia	93 (*53*)	80	64	23	68	30
Sub-Saharan Africa	82 (*39*)	46	55	26	51	7
Middle East/North Africa	96 (*92*)	78	90	56	99	77
East Europe/Central Asia	98 (*98*)	78	93	64	N/A	N/A
Latin America	96 (*95*)	69	84	44	98	51
OECD	100 (*100*)	94	100	92	100	98

Sources: IEA 2002; WHO/UNICEF 2004.

Note:
IEA = International Energy Association; OECD = Organisation for Economic Co-operation and Development; WHO = World Health Organization.
a. Water supply and sanitation as of 2002.
b. Electricity as of 2000.

- 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 to an estimated 1.1 billion people without safe water, 2 billion without electricity, and 2.4 billion without sanitation
- Urban and rural difference

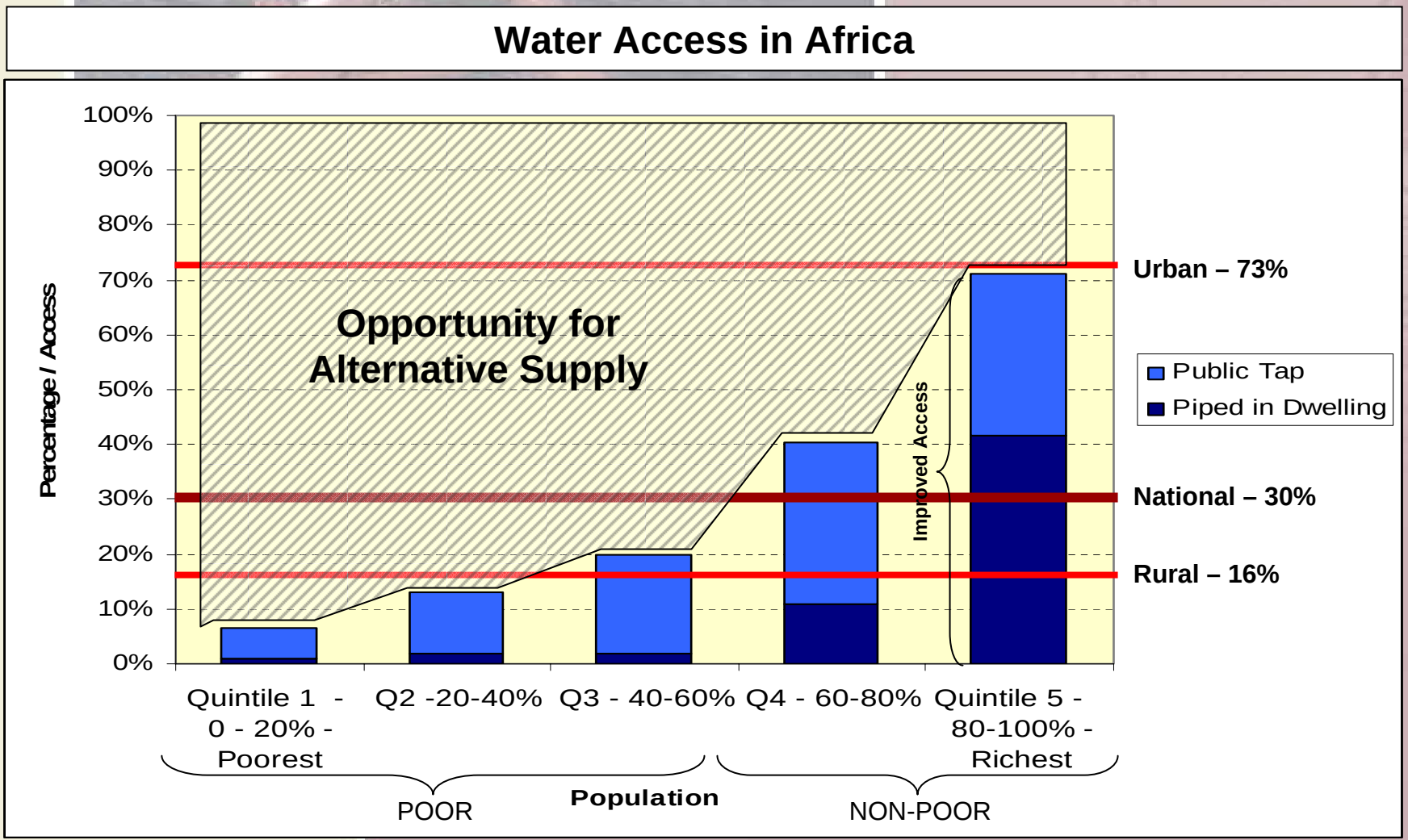
Electricity access across income groups



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

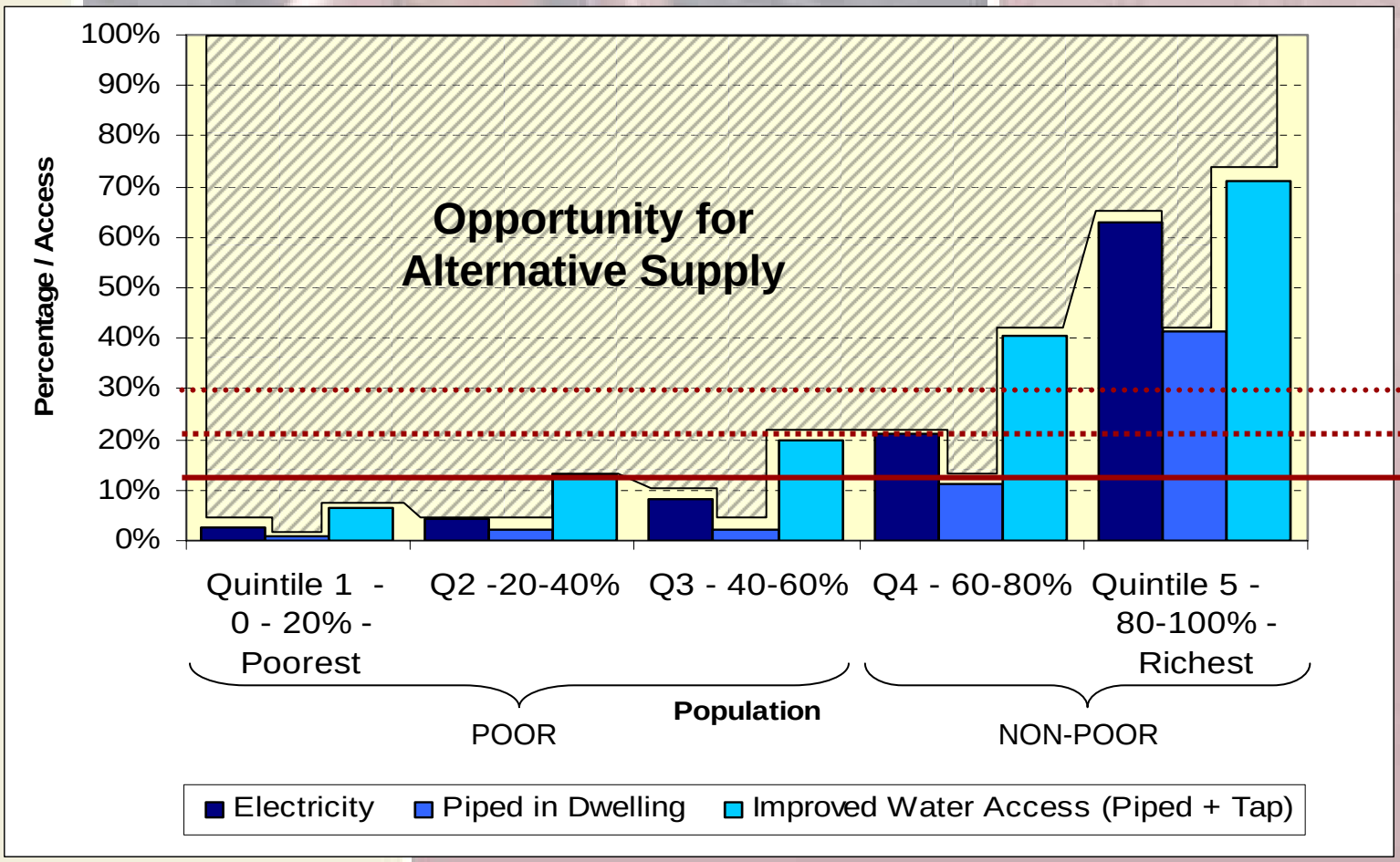
Author's elaboration based on: Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001 for Africa; and currently undergoing infrastructure review for South Asia – Based on data from 4 countries 1991-2001 for South Asia

Water access across income groups



Author's elaboration based on Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001

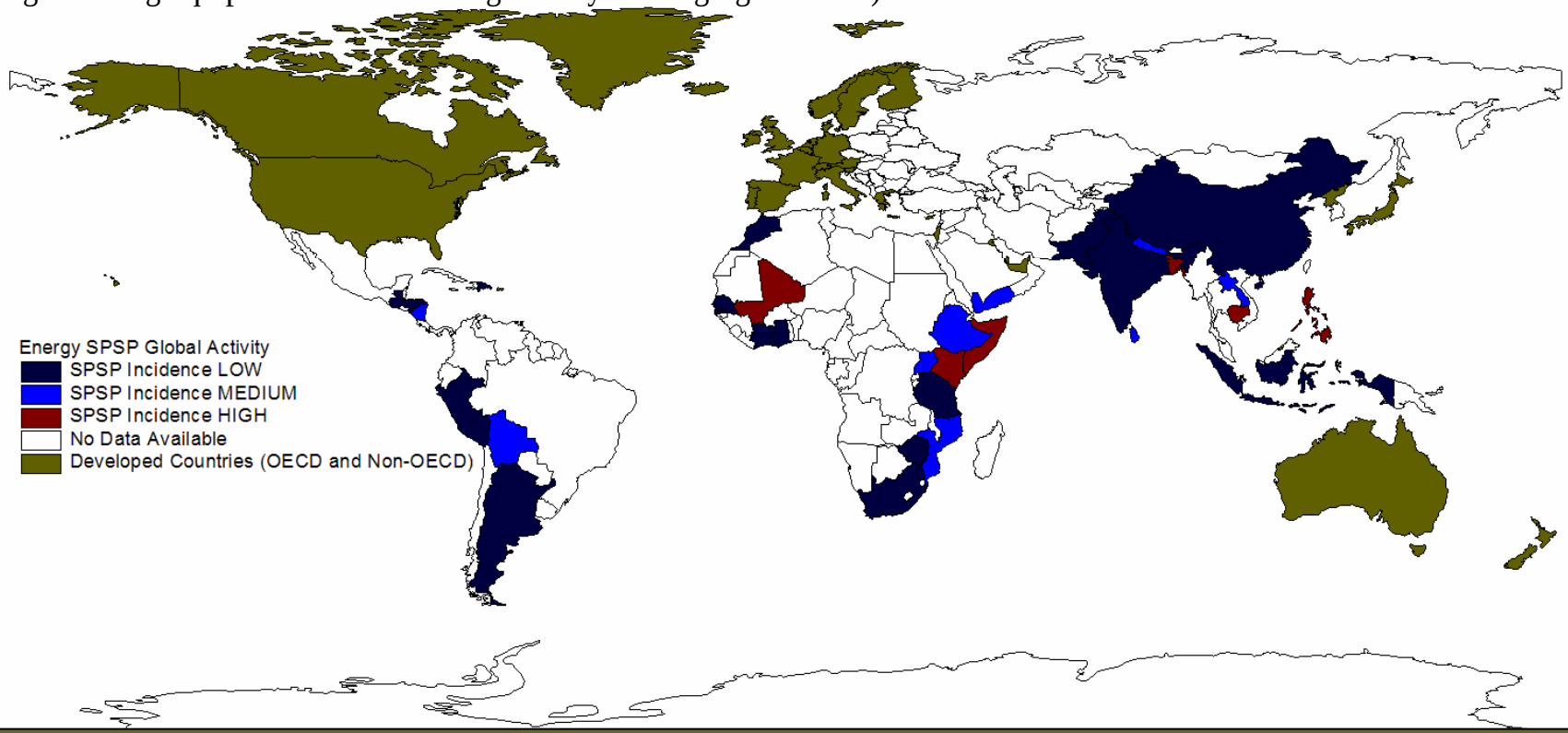
Comparison of access for water and electricity



Author's elaboration based on Diallo and Wodon, 2004 – Based on data from 26 countries 1991-2001

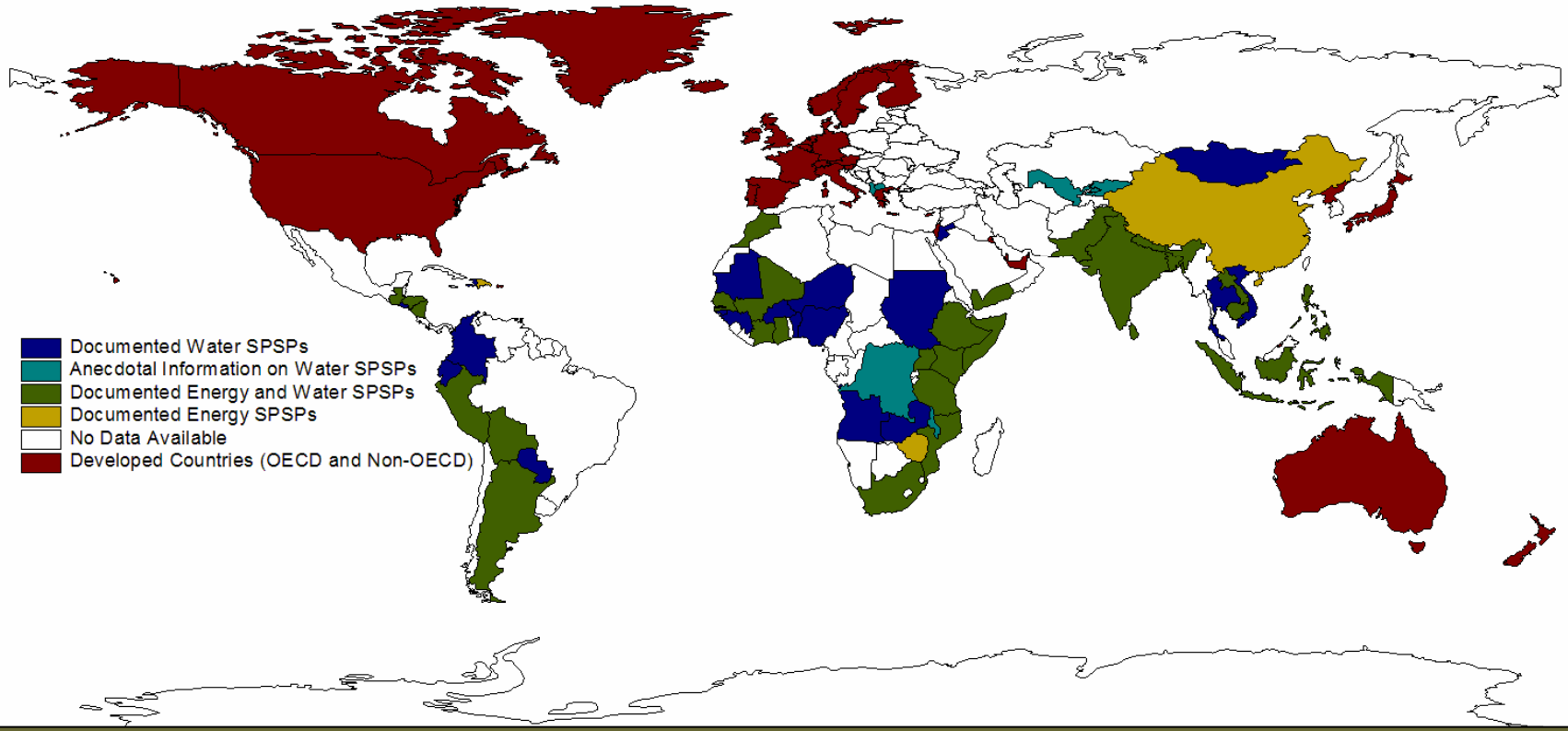
Small-scale private service providers (SPSPs) - Electricity

- 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)

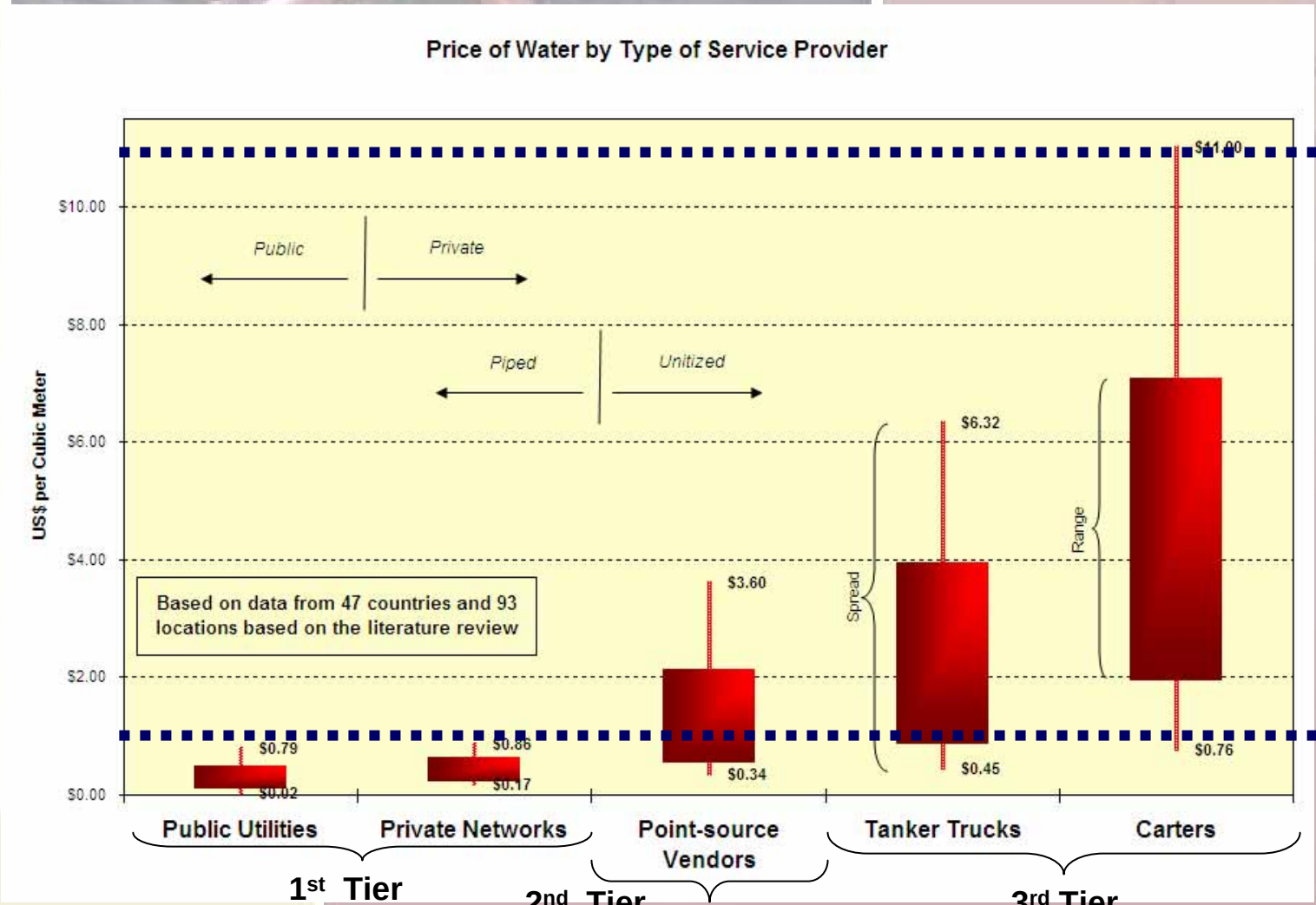


Small-scale private service providers (SPSPs) - Water and Electricity

- 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



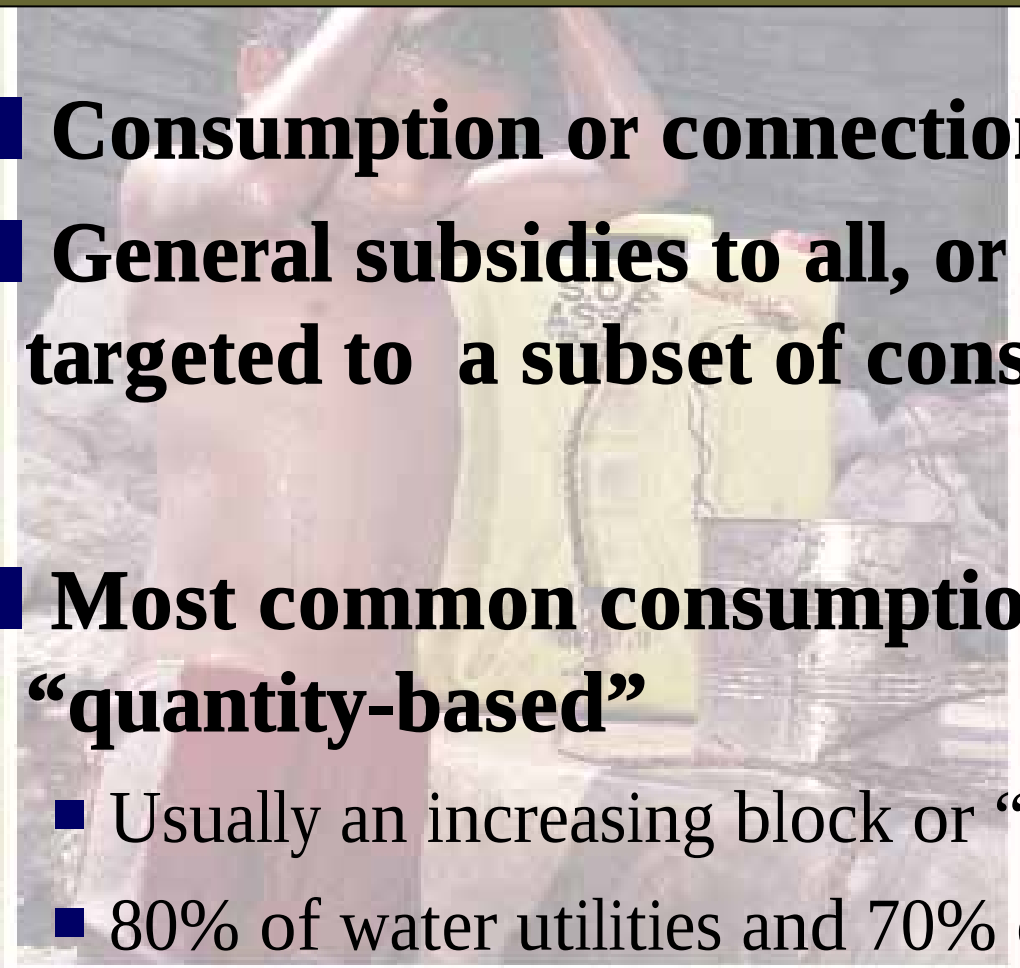
Or THIS

Is this the cost recovery price?

Why subsidies?

- **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



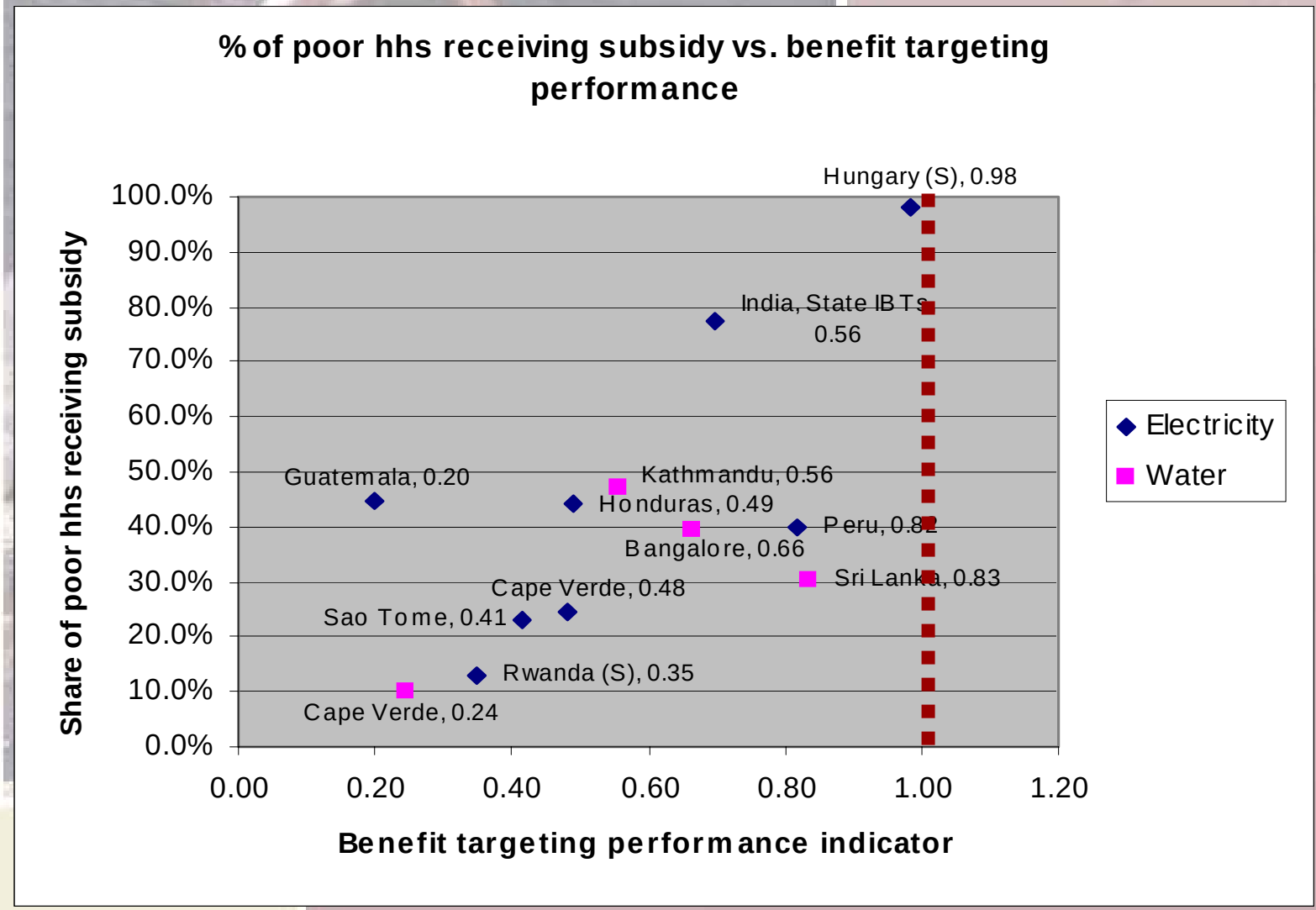
- **Consumption or connection subsidies**
- **General subsidies to all, or subsidies targeted to a subset of consumers**

- **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

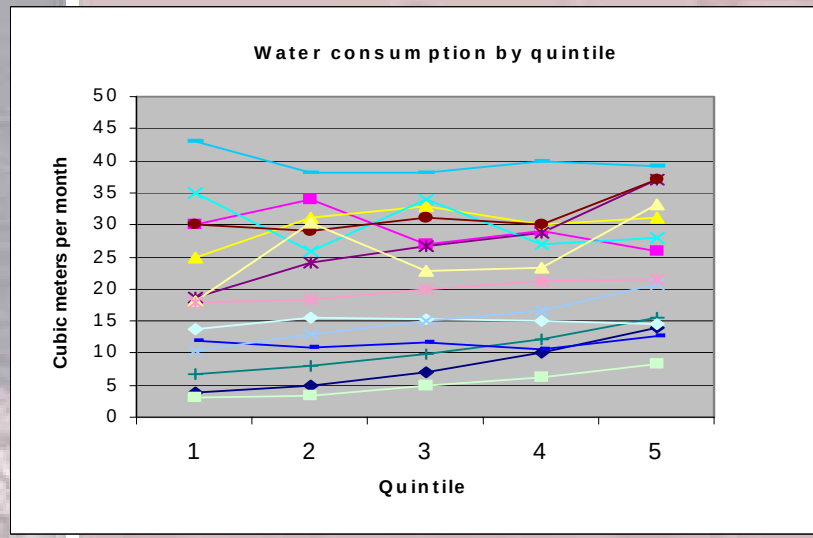


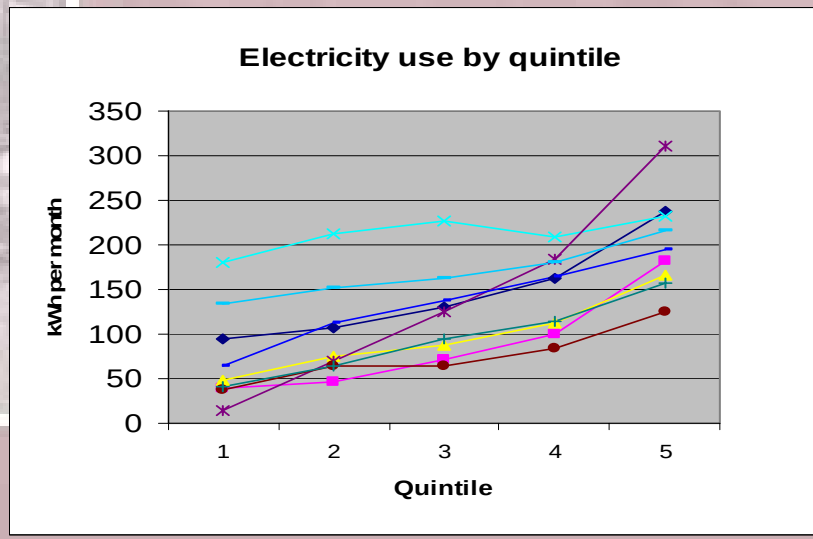
Consumption – Why? (1)

- **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





Consumption subsidies don't work – Why? (2)

- 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

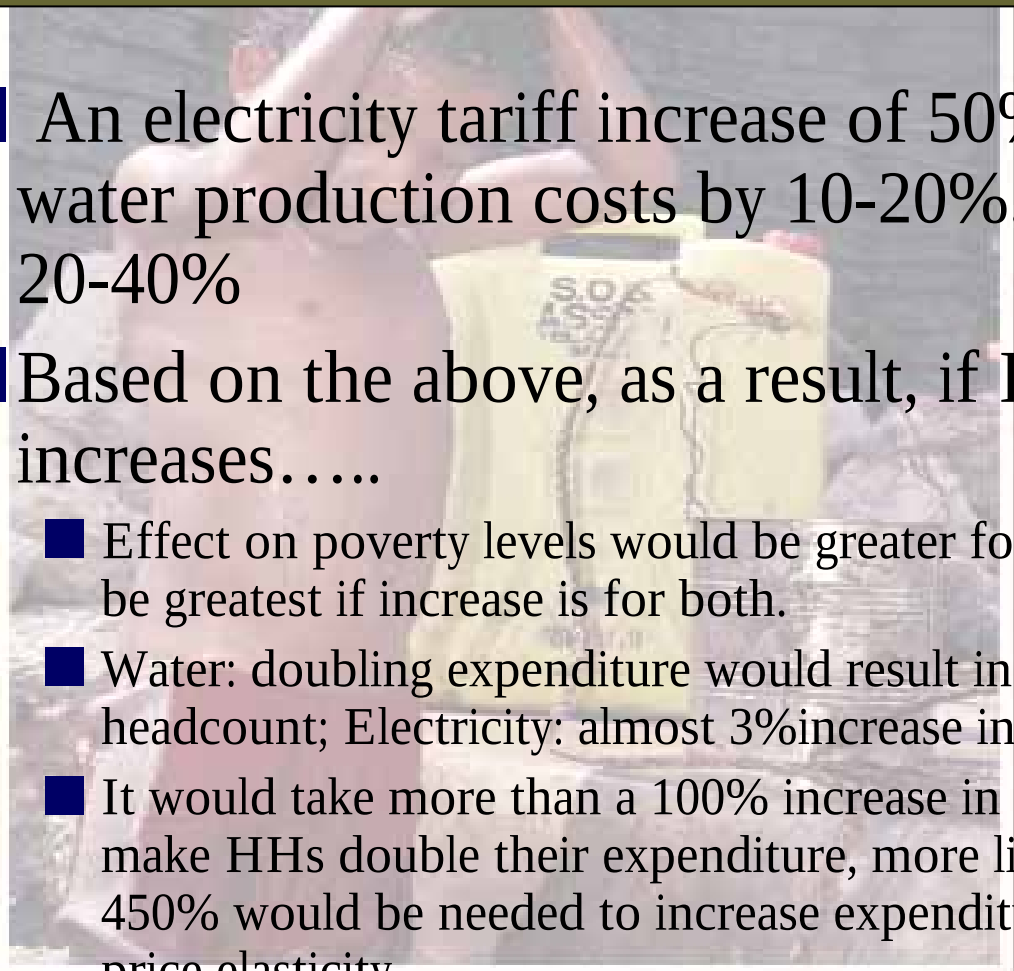
Parting thoughts: Subsidies as "pro-poor" utility policy

- 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

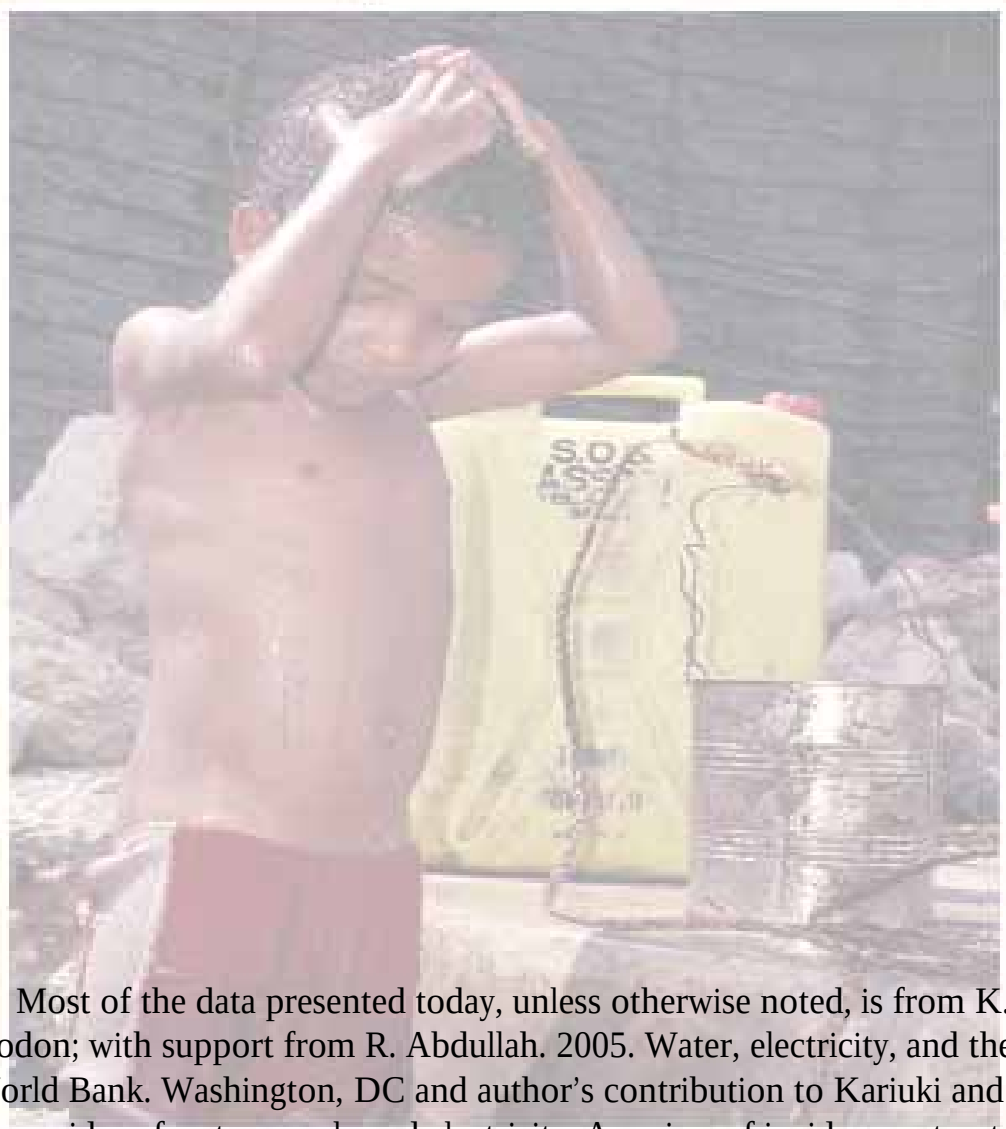
Parting thoughts: Implications for the poor



- 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. Halpern 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