Who Benefits from Utility Subsidies? Consumption and Connection Subsidies in Africa

Quentin Wodon

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Tariffs & Subsidies - Context

- Large subsidies for electricity and water in developing countries (tariffs below cost)
- Use of Inverted Block Tariffs for protecting small customers (ex.: lower tariff/kwh for consumption below 40kwh per month, higher tariff/kwh for additional consumption above 40kwh, etc.)
- Alternative to IBTs is VDT
- Alternative to consumption subsidies is subsidies for network expansion
- Which subsidies are well targeted?

Targeting/benefit incidence measure

- Parameter Ω = share of subsidies in tariff structure received by the poor divided by share of poor in population
- Example: if poverty is at 62% in Rwanda, and the poor get 6% of a subsidy, Ω=0.1
- Objective: Ω as large as possible (if Ω >1, subsidies considered as pro-poor)

Analytical framework

- Five determinants of Ω
- A = access to electricity in neighborhood
- U = take-up of electricity given access
  - → A * U = actual household access rate
- T = share of households with subsidy
- R = rate of subsidization
- Q = quantity of electricity consumed
- C = average cost of production & distribution
  - → R*Q*C = subsidy value among beneficiaries

Analytical framework

- Average benefit among the poor

  Bp = Ap*Up*Tp*Rp*Qp*C

- Average benefit among population

  Bn = An*Un*Tn*Rn*Qn*C

$$\Omega = \left(\frac{A_P}{A_N}\right)\left(\frac{U_P}{U_N}\right)\left(\frac{T_P}{T_N}\right)\left(\frac{R_P}{R_N}\right)\left(\frac{Q_P}{Q_N}\right)$$

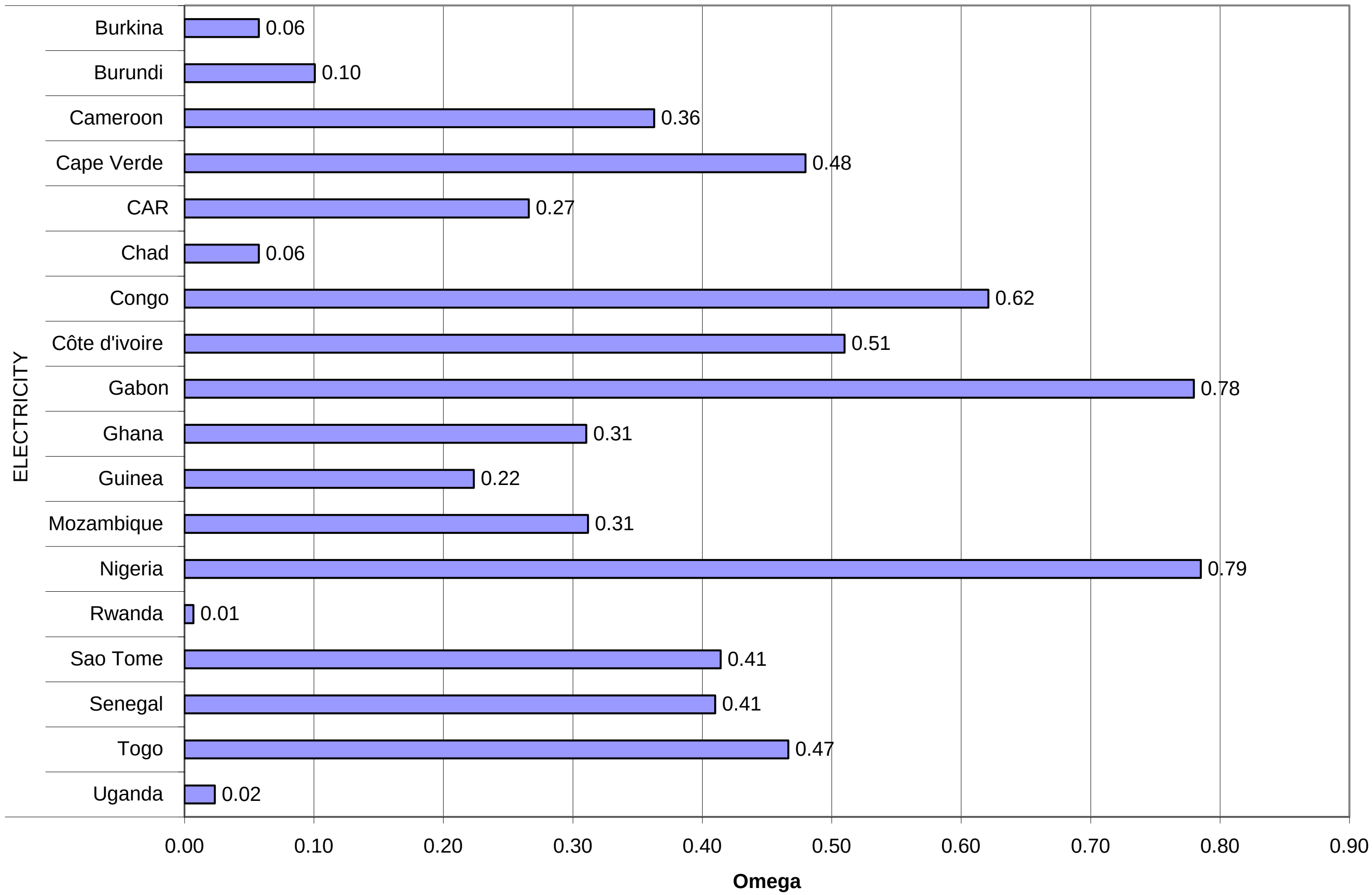
Example – Burkina Faso

- <u>National, electricity</u>
  - $A_p=0.09$, $A_n=0.22$ → A ratio = 0.40
  - $U_p=0.09$, $U_n=0.43$ → U ratio = 0.21
  - $T_p=1.00$, $T_n=1.00$ → T ratio = 1.00
  - $R_p=0.46$, $R_n=0.35$ → R ratio = 1.32
  - $Q_p=21.4$, $Q_n=36.7$ → Q ratio = 0.58

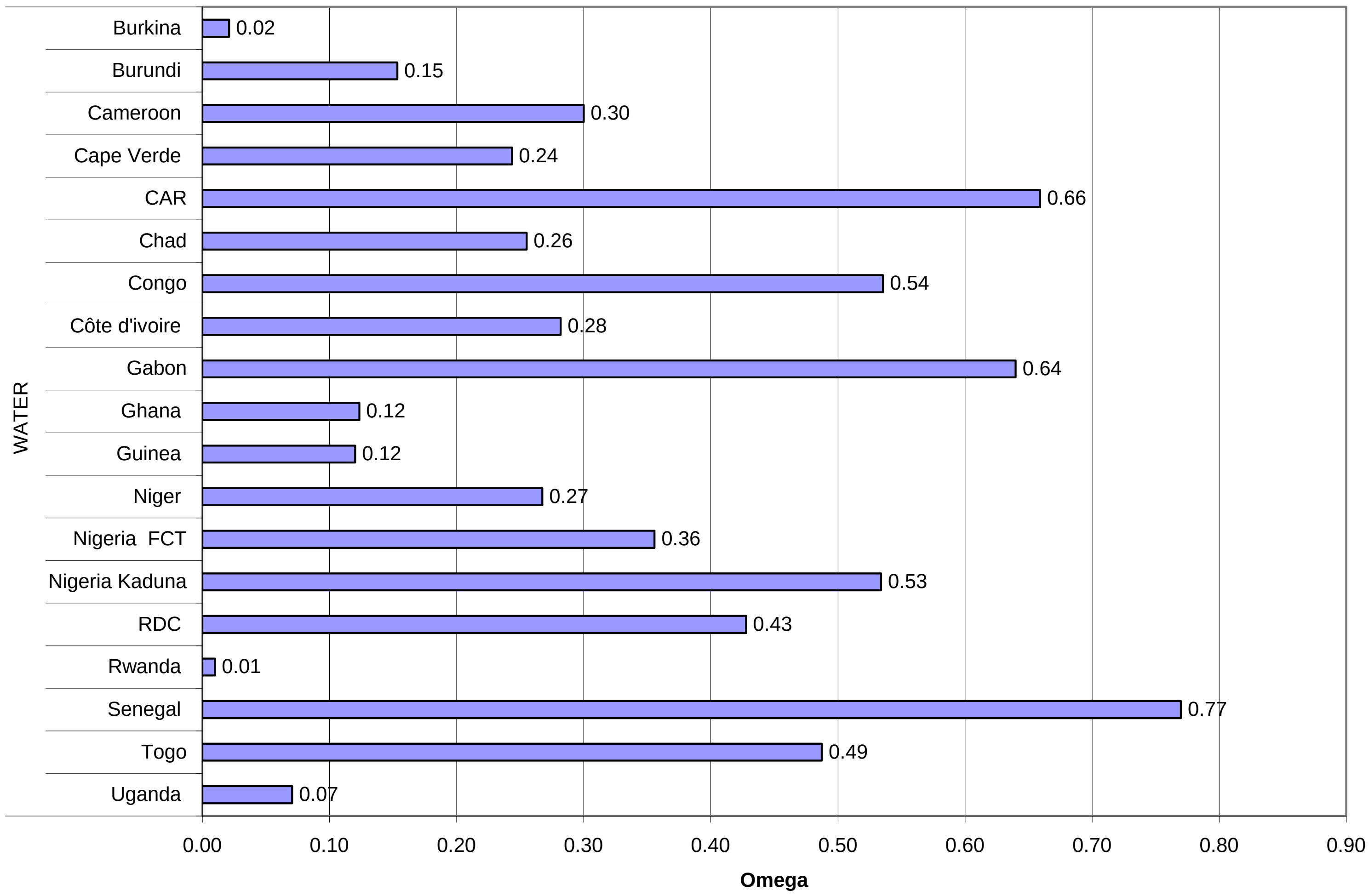
    → $\Omega = 0.06$

    → $\gamma < 0.03$

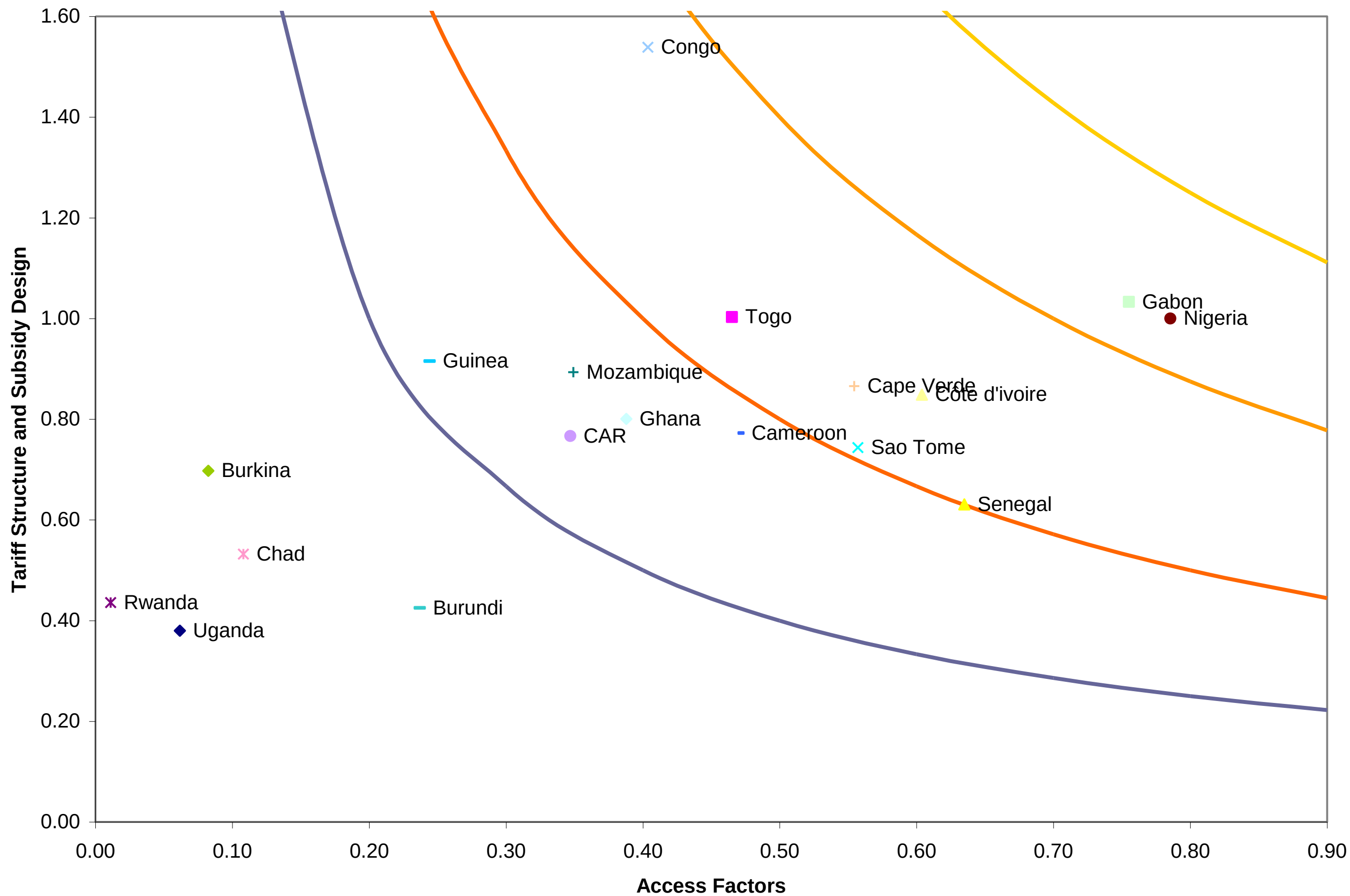
Cross-country data: Ω for electricity



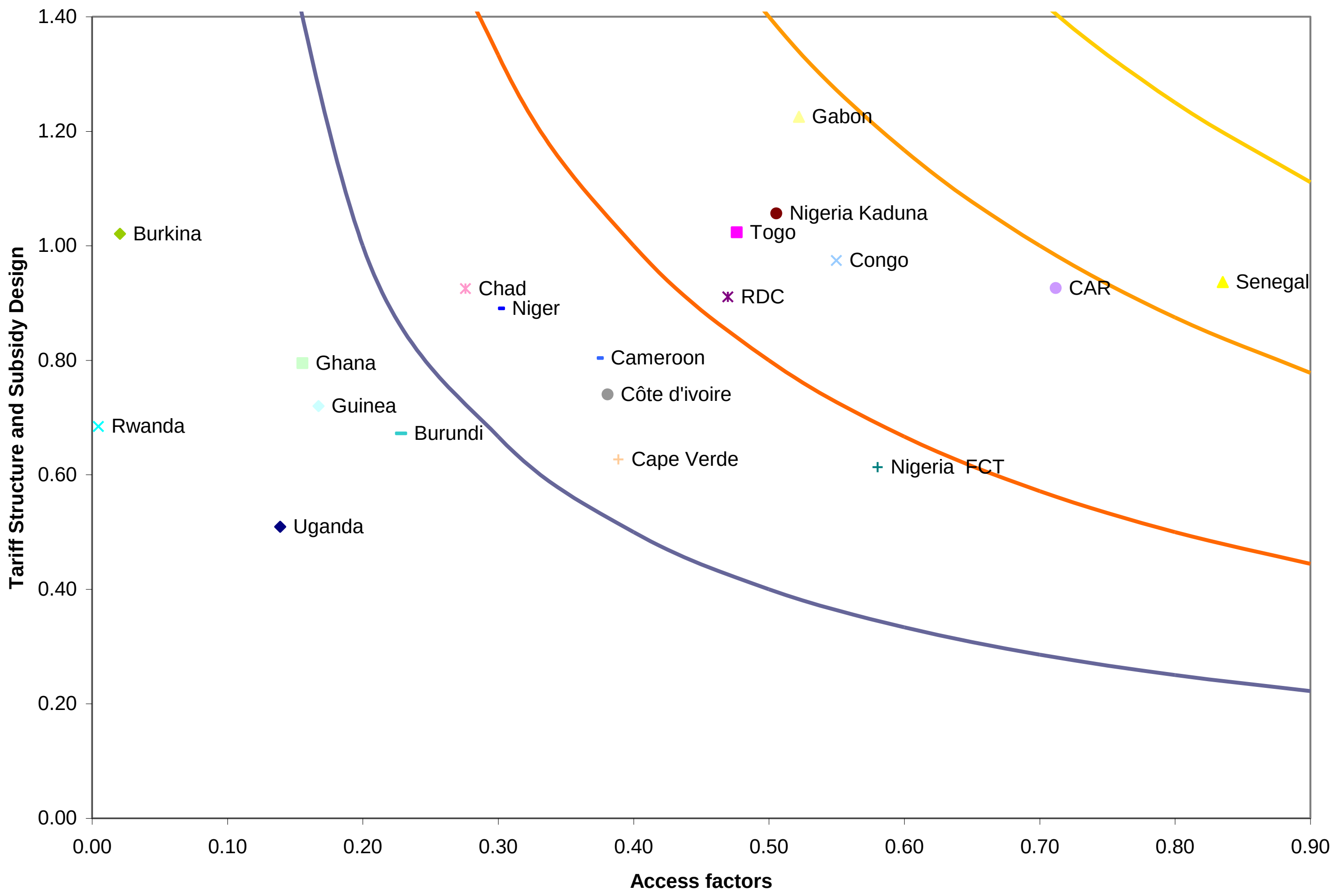
Cross-country data: Ω for water



Cross-country data: Access vs. subsidy design factors - Electricity



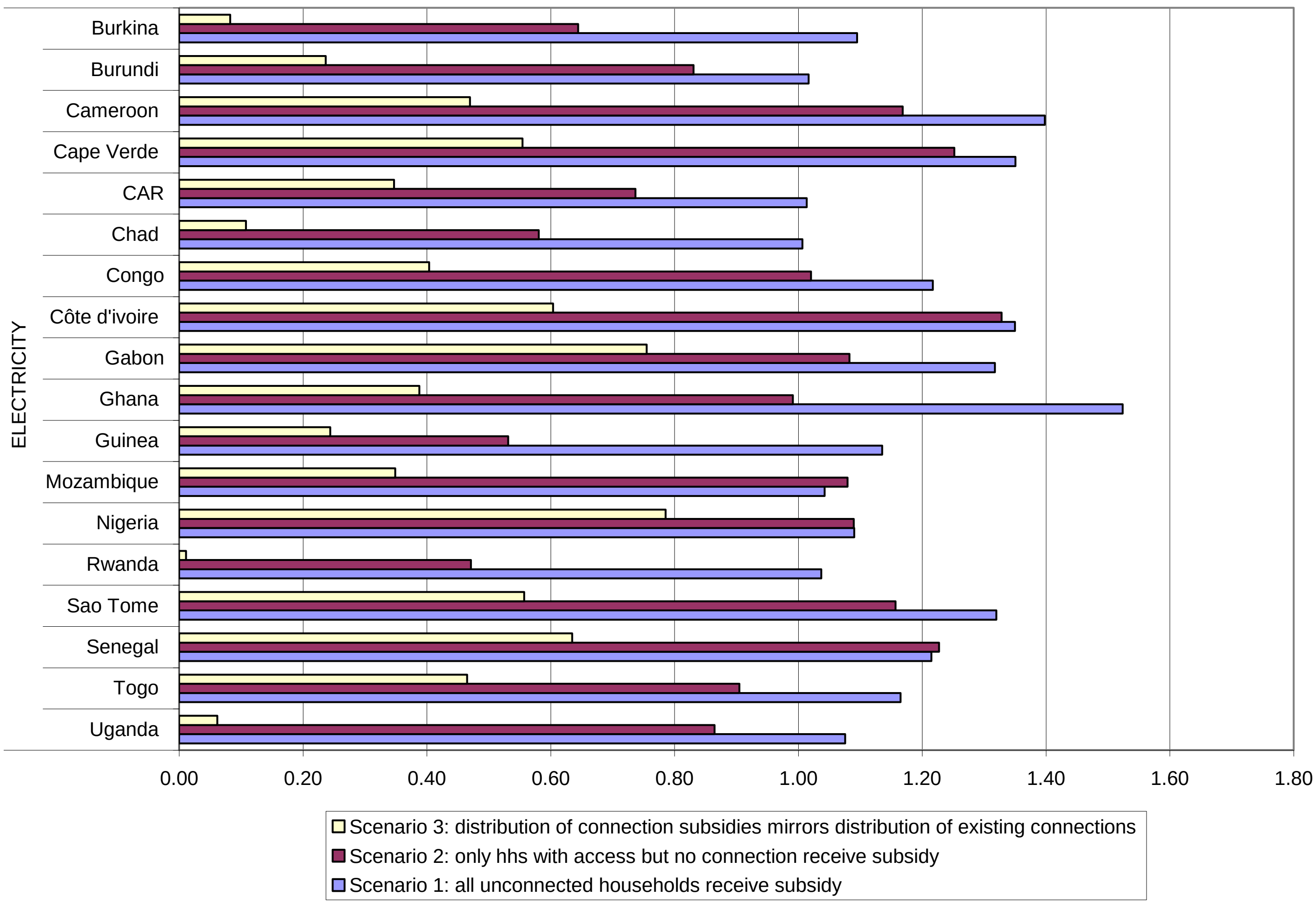
Cross-country data: Access vs. subsidy design factors - Water



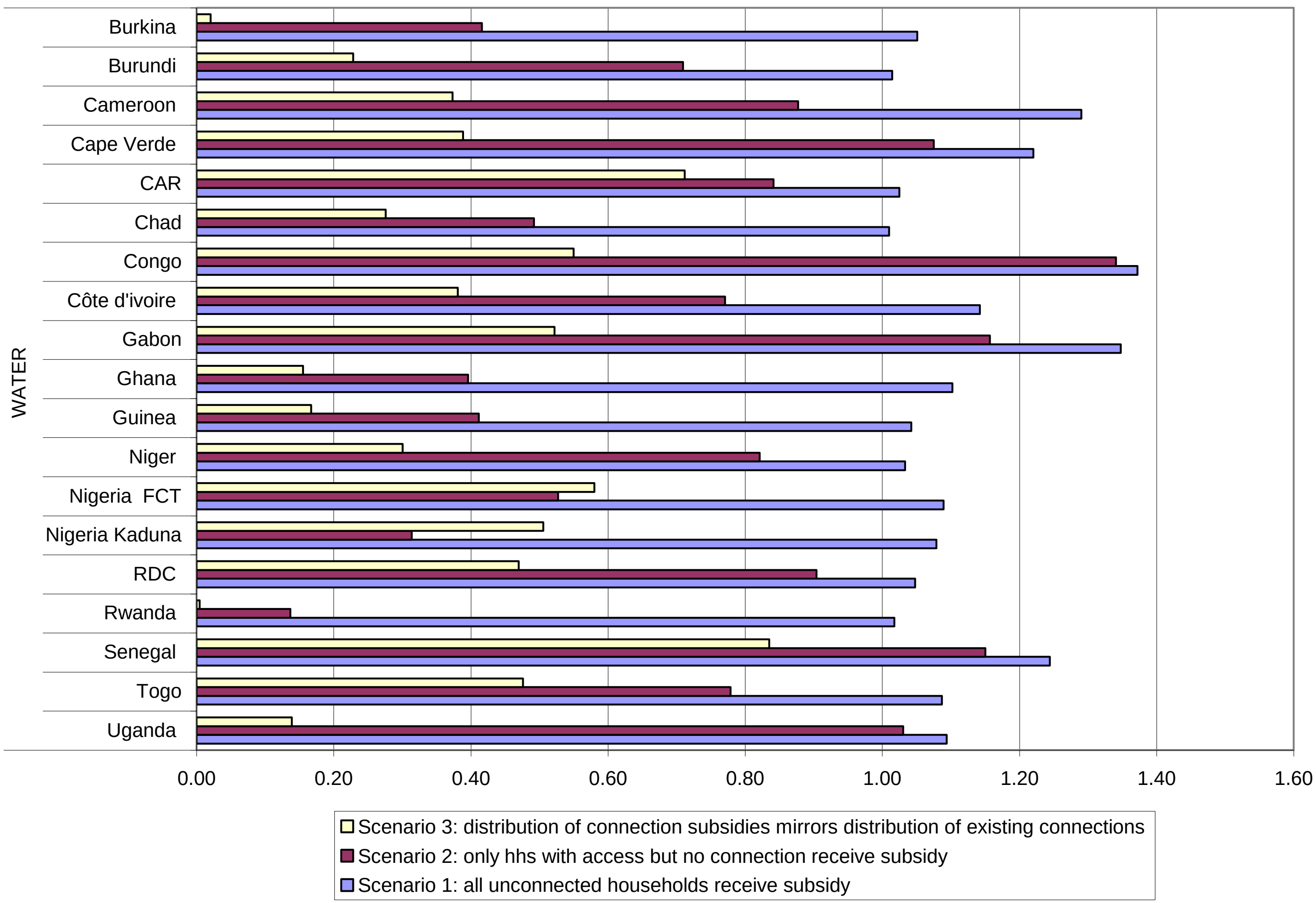
Connection subsidies: simulations

- 1st scenario: Distribution of connection subsidies mirrors distribution of existing connection (least favorable)
- 2nd scenario: Households with access in neighborhood and no connection get subsidy
- 3rd scenario: Connection subsidy randomly allocated to households without connection, even if access in neighborhood is not there (most favorable long term scenario)

Cross-country data: Potential targeting of connection subsidies - Electricity



Cross-country data: Potential targeting of connection subsidies - Water



(Counter-intuitive) Argument in favor of raising utility tariffs for poverty reduction

- Utility consumption subsidies through tariffs are badly targeted vs. other subsidies (educ./health/social prot.)
- Coverage of networks is low, esp. in poor countries
- Impact on poverty of higher tariffs is relatively low because coverage is low and not for the poor
- Utilities loosing money cannot expand networks
- Gain from access to network for the poor is much larger than gain from consumption subsidies (2 reasons: externalities & unit costs – Niger example)
- Despite affordability concerns, willingness to pay studies suggest non-connected households would rather pay higher tariffs and get access

→ Increasing tariffs and using proceeds for investments in capacity and network expansion is probably pro-poor

How to raise tariffs/reduce subsidies in sensible way?

- Lower threshold for "lifeline" bracket in tariff structure (examples: 20kWh, 4-6m3)
- VDT is a useful alternative to IBT - large savings in cost of subsidies (but discontinuity)
- Control of pricing at public fountains (Niger)
- Better cost recovery for pirate connections
- Evaluation of targeting of connection subsidies: many may still not be reaching the poor properly
- Reduction in cost structure and improvement in efficiency & management of utilities