Regulation of Grid and Off-Grid Electrification: Three Observations and Six Principles

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Policy and Regulatory issues for Grid and Off-Grid Electrification
A Working Clinic
ESMAP and the World Bank

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“Investors need confidence. Consumers need protection.”

- Chinese government official
Three observations

Observation 1: Latin American countries are trying to electrify the last 10-20%. More difficult and more costly because it may require more off-grid (decentralized) solutions.

Observation 2: Off-grid electrification uses many technologies and business models plus the need to coordinate tariffs with subsidies.

Observation 3: Traditional regulatory tasks (Appendix-1) must be performed for grid and off-grid electrification in different (and sometimes non-traditional) ways.
Why regulate in a different way?

⇒ **Low demand density:**
  - typical demand <50kWh/month,
  - affordability and liquidity issues,
  - many users are remote and/or dispersed

⇒ **Therefore:**
  - revenues are low,
  - costs are high,
  - low-return, high-risk markets

⇒ Monitoring for remote and/or smaller systems is difficult.

⇒ Other government entities (e.g., Rural Electrification funds) are often *de facto* regulators (at least, initially).
Regulation and Electrification

Three “golden” rules of regulation:
- Benefits of regulation must exceed the costs of regulation
- Regulation is a means to an end, not an end in itself
- What ultimately matters are outcomes – sustainable electrification – not regulatory rules (“performance not processes”)

Views of a villager and an investor (India):
- Villager – “the most expensive electricity is when there is no electricity.”
- Investor – “Unfortunately, the single most common mistake made by my country’s electricity regulators who live comfortably in the capital is that they forget that their rules cost time and money.”
Principle #1 Adopt “light handed” regulation – especially for off grid electrification (continued).

Minimize:

- Number of regulatory requirements/decisions
- Number of government entities making separate (coordinated?) decisions
- Amount of information required for the entities performing electrification

Too Much Unnecessary Regulation is Not Good for a Country (Appendix-2)

“It takes two days to start a business in Australia, but 203 days in Haiti and 215 days in the Democratic Republic of Congo”

- Doing Business 2004, Pg. xxxi

www.rru.worldbank.org
Principle #1 Adopt “light handed” regulation – especially for off grid electrification (continued).

Three questions for regulators:
- Do I really need this information?
- What will I do with it?
- Can I delegate regulatory tasks to other entities?

Goal:
- “Minimum necessary regulation” (Australia)
- “Smart regulation” (US)
- “Seek proportionality (UK)”

How many steps? How much information? How much time?

But will consumers still be protected?
Principle #1 Adopt “light handed” regulation – especially for off grid electrification (continued).

Examples

“Heavy Handed” Regulation:

- **Bolivia 2002**: Rural mini-grid survey – (i) many small operators not registered (reporting requirements too costly, capacity lacking) (ii) proposal to adopt different regulation for 3 ranges, with thresholds at 30kWp and 1MWp; (iii) threshold changed from 500kW installed generation to 500kW peak demand;

- **Philippines 2004**: Proposed program for new mini-grids Appendix – 3 (23 steps?)
**Principle #1** Adopt “light handed” regulation – especially for off grid electrification (continued).

**“Light Handed” Regulation:**

- **Bolivia 2004:** Proposed Medium Term Service contracts for SHS
- **Nicaragua 2004:** New mini-grids regulated by contract and law -> streamline reporting requirements and formal steps

**“Non Existent” Regulation:**

- **Cambodia 2003 (mini-generators):** *de facto* deregulation (Fiona Woolf)
- **Bolivia 2002 (mini-generators):** *de facto* deregulation (Enrique Birhuett)

Should they be “regularized”? How?
**Principle #1** Adopt “light handed” regulation – especially for off grid electrification (continued).

**Recommendation:**
- The electricity law should be (re?-) written to give the regulator explicit authority to vary its regulatory rules and procedures (concessions vs. permits) depending on the nature of the entity that is being regulated (small vs. large, grid vs. off-grid, private vs. community based).
Principle #2 The national or provincial regulator should be allowed (ordered?) to delegate temporarily regulatory tasks to other entities.

**Reality:** The rural electrification agency or rural electrification fund are inevitably *de facto* regulators

**Recommendation:** Make the *de facto* regulatory the *de jure* regulator (at least for off grid electrification)

**Why:**
- A de facto regulator because of the conditions/requirements imposed on the operator to receive subsidies.
- More knowledgeable than the regulator about the operations of electrification providers.
- Better appreciation of the cost implications of imposing regulatory requirements.
- Coordination between different government entities is slow and tends to produce conflicts.
**Principle #2** The national or provincial regulator should be allowed to delegate temporarily regulatory tasks to other entities (continued)

**Examples:**

- Bangladesh Rural Electrification Board – “regulation by the banker”
- Sri Lanka – “Self-regulation by the community”
- Brazil – Electrobras (not ANEEL) approved connection cost requests by discos
- Bolivia (proposed) – Self-reporting plus random audits (Ministry of Services and Public Works)

**How can delegation be implemented?** (Appendix – 4)
Principle #3 Quality of service standards must be realistic, affordable, monitorable and enforced

Realities:
- Quality costs money
- Initial standards (technical and commercial) are often set by the government entity that provides subsidies
- Customers (and politicians) will get angry if the regulators fail to enforce the standards
- The expectation of non-enforcement leads to bad bids (just a lot of “pretty poetry”)

Key Questions (All Technologies):
- Minimum attributes of the components versus performance of the system or both?
- How many quality-of-service parameters?
- How large are the penalties?
- Penalties paid to whom?
Principle #3 Quality of service standards must be realistic, affordable, monitorable and enforced (continued)

Key Questions (Solar Home Systems):
- Who is responsible for non-performance? Operator, customer or God?
- How do you decide?

Examples:
- **Argentina 2000**: Jujuy off-grid concessionaire – (i) response times too short; (ii) responsible - for all SHS battery failures
- **Philippines** – distribution code “lite” for mini-grids?
Principle #4 Whenever possible, use benchmarks rather than actual costs for prices or subsidies

- The Philippines: Regulator is currently using individual cost of service calculations for 119 cooperative (Not workable)
- Bolivia MSCs: Smaller service areas to facilitate yardstick competition (but: Bank procurement rules)
- Benchmarks will always be too easy or too hard (e.g. $650 connection cost subsidy in Guatemala).
- Cost benchmarks are easier for solar home systems than for mini-grids or grid extensions.

Example: Tariff ceiling for generator with a mini-grid

Maximum price based on own technology or next best alternative?
Maximum price with or without a subsidy?
Principle #5 Do not create a “chicken and egg” problem for subsidies and tariffs

**Realities:**
- Potential operators must know both tariff and subsidy levels before they can make investment decisions.
- Government will usually decide on external subsidies.
- Regulator can nullify government granted subsidies with low tariffs.

**Examples:**
- **India:** Low service revenues -> low quality -> low satisfaction -> defaults -> lower service revenues -> ...
- **Argentina:** Provincial tariff subsidies (Ley de Puna) -> de facto user tariffs <willingness to pay
- **Nicaragua:** INE bidding and CNE subsidy contract
**Principle #6** Regulatory obligations (theirs and yours) should be clearly stated and supported by adequate funding

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**Realities:**

- Successful electrification requires a multi-year “regulation by contract.”
- But the regulator may be administering a contract it did not negotiate.
- “Surprise! You have a new obligation.”
- The obligation to serve is usually multi-dimensional. (Appendix-5)

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**Regulation and Unfunded Obligations:**

- **Unpaid Subsidies** – Does the operator still have a connection obligation if the government fails to provide the capital cost subsidies it promised?
- **Incomplete Tariffs** – Does the tariff setting system for distribution enterprises provide automatic adjustments for capital and operating costs of grid extension? Are rural electrification costs included in “normative values” of disco tariffs?
**Principle #6** Regulatory obligations (theirs and yours) should be clearly stated and supported by adequate funding (continued)

➤ **Example: Inadequate or Uncertain Tariffs**

- **Philippines – Inadequate Tariffs:** Tariffs for rural cooperatives do not allow for recovery of capital costs. Outcome: the cooperatives are reluctant to expand their grids.

- **Philippines – Risky Tariff:** regulator can lower the retail sales tariff for new mini-grid operators at the regulator’s discretion during the five year regulatory contract period (proposed).

➤ **Example: Secure Subsidy**

- **Guatemala – Protected Fund:** The fund for grid electrification subsidies ($650/connection) is deposited in an off-shore bank account, not accessible to the government.
## “Regulation”

### Functions

<table>
<thead>
<tr>
<th></th>
<th>Price Regulation</th>
<th>Service Quality Regulation</th>
<th>Competition Regulation</th>
<th>Consumer Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gather information and data</strong></td>
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<tr>
<td>- Get information on current and projected tariff revenues and costs</td>
<td>Obtain information on current service levels</td>
<td>Obtain information on illegal conduct or monopoly behaviour</td>
<td>Conduct customer Surveys</td>
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<tr>
<td>- Get information on willingness-to-pay, for alternative service levels</td>
<td>Carry out technical studies</td>
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<td>Organise call centres to file complaints</td>
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### Tasks

| **Monitor the implementation of existing rules** |                  |                            |                         |                     |
| - Audit financial accounts | Monitor that levels of service are met | Investigate of abuses of monopoly power – predatory practices, etc… | Administrative audit of systems and procedures in place to educate customers, and share information |
| - Ensure that adequate tariffs are charged | Monitor that coverage targets are met |                         |                     |

### Determine rules

| **Define tariff adjustments on basis of performance** |                  | Define or review quality standards | Organise bidding process | Define consumer service standards or requirements |
| - Apply penalties | Adapt existing quality standards to real needs | Rule on competition case following complaint |                         |                     |
| - Tariff reviews, linked to inflation or tariff rebasing | - Adapt existing quality standards |                         |                     |
| - Modify tariff structures and payment methods | - Define or review quality standards | - Rule on competition case following complaint |                     |

### Enforce decisions

| **Require improvements in service quality** |                  | Mandate break-up of monopoly power or changes in access terms |                   |
| - Apply penalties |                         |                     |                     |

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Source: Sophie Trémolet and Lorenzo Bertolini, “Contracting Out Utility Regulation” presentation, September 11, 2003
Poor Countries Regulate Business the Most

More regulation

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<tr>
<th>Income Level</th>
<th>Court-powers-in-bankruptcy index</th>
<th>Entry procedures</th>
<th>Contract procedures</th>
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<td>66</td>
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<td>63</td>
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<td>55</td>
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<td>Upper-middle-income</td>
<td>56</td>
<td>10</td>
<td>53</td>
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<tr>
<td>High-income</td>
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<td>18</td>
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Less regulation

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Note: The indicators for high-income countries are used as benchmarks. The average value of the indicator is shown above each column.

# Regulation of New Mini-Grids In the Philippines*

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<thead>
<tr>
<th>Required Actions and Approvals</th>
<th>Performing Entity</th>
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<tbody>
<tr>
<td>1 Declaration of &quot;waived areas&quot;</td>
<td>DU</td>
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<tr>
<td>2 Publication of a list of all waived areas</td>
<td>DOE</td>
</tr>
<tr>
<td>3 Application to the DOE expressing interest / for accreditation</td>
<td>QTP</td>
</tr>
<tr>
<td>4 Grouping of waived areas based on interest generated</td>
<td>DOE</td>
</tr>
<tr>
<td>5 Accreditation of Qualified Third Parties based on published criteria</td>
<td>DOE</td>
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<tr>
<td>6 Petitioning to the Energy Regulatory Commission for setting of a Socially Acceptable Retail Rate methodology*</td>
<td>DOE via SPUG</td>
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<tr>
<td>IF More than one Qualified Third Party expresses interest</td>
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<tr>
<td>7 Bidding for waived areas in competitive tender</td>
<td>QTP</td>
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<tr>
<td>8 Awarding of the service area to winning Qualified Third Party</td>
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<tr>
<td>9 Signing of Energy Services Contract with the Distribution Utility</td>
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<tr>
<td>10 Endorsement of Energy Services Contract and the True Cost Retail Rate</td>
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*Based on an interpretation of Philippine government proposals and consultant reports as of June 2004
### Regulation of New Mini-Grids In the Philippines* (continued)

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<tr>
<td>13 Delegation of Energy Services Contract-related obligations to DOE</td>
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<tr>
<td>14 Requesting the Energy Regulatory Commission to set a Socially Acceptable Retail Rate for each contracted Qualified Third Party service area*</td>
<td>DOE via SPUG</td>
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<tr>
<td>15 Setting of a Socially Acceptable Retail Rate for each service area</td>
<td>ERC</td>
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<td>16 Determining the corresponding subsidy for each contracted Qualified Third Party service area</td>
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<tr>
<td>17 Inclusion of awarded Qualified Third Party areas and associated subsidies in the Missionary Electrification Development Plan</td>
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<tr>
<td>18 Petitioning to Energy Regulatory Commission for the Missionary Electrification component of the Universal Charge based on Missionary Electrification Development Plan (including subsidy to Qualified Third Parties)</td>
<td>SPUG</td>
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<td>19 Approval of the Missionary Electrification component of the Universal Charge</td>
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<tr>
<td>20 Collection of the Universal Charge</td>
<td>DU &amp; TRANSCO</td>
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<td>21 Administration of Universal Charge funds and the associated mechanism</td>
<td>PSALM</td>
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<tr>
<td>22 Disbursement of funds to Small Power Utilities Group</td>
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<tr>
<td>23 Disbursement of funds to Qualified Third Parties</td>
<td>SPUG</td>
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Appendix – 4
Types of delegation

1. Full Delegation
   • Rural electrification agency decides on tariff and concession terms.
   • No further formal review by the electricity regulator.

2. Agent Delegation
   • National/provincial regulator designates the rural electrification agency as its agent.
   • Rural electrification agency makes recommendations to the regulator.
   • Regulator decides on a “no objection” basis.
Appendix – 5:
Obligation to Serve is Multi-Dimensional

1. Different obligations within a service/concessionaire area:
   - Less than 150 meters – absolute obligation
   - Greater than 150 meters - contingent obligation

2. Customer contributions for connection costs:
   - None (Brazil proposed)
   - Customer contributes but with reimbursement
   - Customer contributes with no reimbursement

3. Static versus dynamic boundaries for service areas

4. Quality of service standards