

Mini-Grids: The Five Big Regulatory/Policy Decisions

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Overview

- **#1—Tariff Setting (R/P)**
- #2—What happens when the big grid arrives in a mini-grid village? (R/P)
- **#3—Licensing and Permits (R)**
- #4—Quality of Service (R)
- #5— Top-down versus bottom up or both (P)

R= Regulatory P=Policy

#1—Tariff Setting

- Which tariff?
 - Retail tariff for village customers (Mini-grids)(Everywhere)
 - Bulk purchase tariff (Small power distributors-SPD) (Cambodia & Nepal)
 - Bulk sales tariff or feed-in tariff (Connected Small power producer-SPP) (Indonesia, Sri Lanka & Nepal)
- Retail tariffs
 - **Must the mini-grid's tariff be the same as the national utility's retail tariff?**
 - Yes-Kenya and Peru. No—Tanzania, Mali. Yes and No—India (Uttar Pradesh)
 - **If “yes”, will the government be willing and able to subsidize private and community owned mini-grids?**
 - **If mini-grid tariffs are allowed to vary, must the regulator give separate, prior approval for the tariffs of each individual mini-grid?**
 - **Myanmar**—“We have 4,000 mini-grids that supply 70% of households in the villages served. This was accomplished without any government tariff regulation. Why should we start regulating tariffs now?”

Main Grid Arrives In A Mini-Grid Village?

- Four possible post-arrival outcomes
 - #1-**Liquidation** (Mali)
 - Compensation negotiated or a pre-specified formula?
 - Compensation for both “hard” and “soft” costs?
 - #2-**Connected SPP** (Sri Lanka & Indonesia) (Coexistence)
 - No longer in retail business
 - Obligation to purchase? At what price? PPA? Connection standards?
 - #3-**SPD** (Coexistence)
 - Buys at wholesale and resells at retail (with or without local backup generation) (Cambodia & Nepal)
 - #4-**SPP + Retail Sales** (Tanzania) (Combines #2 and #3) (Coexistence)
- Will the ministry/regulator allow all of these?
- Background paper: *Mini-Grids And Arrival Of The Main Grid: Cambodia, Sri Lanka and Indonesia* (Chris Greacen today at 1:30 PM) (Workshop binder)

#3--Licensing and Permits

- **License/permit**=Government granted legal right to conduct a business (generation, distribution and sales) at a particular location based on a determination that the applicant has the technical and financial capacity to carry out the business.
- **Key Design Questions**
 - Should mini-grids below a certain size be exempt from licensing? Even if legally exempt, can they voluntarily request a license? (“If I apply for a loan, I need a piece of paper from the government that shows that I have legal status.”)
 - Should licenses be exclusive (a legal monopoly) or non-exclusive?
 - If exclusive, what should be the license term?
 - 15 to 20 years?
 - Until the main grid arrives?
 - Cambodia’s licensing strategy- initially short, but then longer if capital improvements are made.
 - Who should issue licenses? The electricity regulator or ???
 - If a mini-grid is not required to apply for a license, must it still register?
 - For information but not approval purposes?

#4--Quality of Service

- Voluntary Quality Assurance (QA) framework (US Dept of Energy-NREL)
 - **Quality of electric power** (voltage, frequency, harmonic distortion and safety)
 - **Quality of electric service** (availability, capacity, reliability)
 - **Quality of commercial service** (days to interconnect, days to respond to a complaint,...)
- Three key questions
 - Who sets the standards?
 - How are the standards monitored?
 - How are the standards enforced?

#5--"Top down" versus "Bottom up" or both?

- **Top down**=Government initiated (usually with subsidies and a concession document)
 - Type A (Complete)-government specifies location, service level, and technology
 - Type B (Partial)-government specifies location and service level
- **Bottom up**= Private sector or community initiated with or without subsidies
- Observations:
 - Many top-down mini-grid programs in Africa have been terminated for lack of success. (Mali, Cameroon and Senegal)
 - IDCOL (Bangladesh) is having success with privately-owned solar hybrid mini-grids. IDCOL-- top-down, bottom up or a combination?
 - Myanmar and Uttar Pradesh-accept both top-down and bottom up (the two track approach)

Appendix

Further Information

- IRENA, *Policies and regulations for private sector renewable energy mini-grids*, Abu Dhabi, 2016.
(www.irena.org)
- Tenenbaum Greacen, Siyambalapitya and Knuckles, *From The Bottom Up: How Small Power Producers and Mini-Grids Can Deliver Electrification and Renewable Energy in Africa*, World Bank, 2014.
(<https://openknowledge.worldbank.org/handle/10986/16571>)
- USAID, *Practical Guide To The Regulatory Treatment of Mini-Grids*, forthcoming 2017.

Three Definitions of Mini-Grids

- **EUEI-Mini-grid Policy Toolkit**—“mini-grids involve small-scale electricity generation (10kw to 10 MW) which serves a limited number of consumers via a distribution grid that can operate in isolation from national electricity transmission networks and supply relatively concentrated settlements with electricity at grid quality level.”
- **CIGRE** (International Council on Large Electricity Systems (CIGRE)— “..electricity distribution systems containing loads and distributed energy resources (such as distributed generators, storage devices or controllable loads) that can be operate in a controlled, coordinated way *either while connected to the main power network or while islanded.*”
- **International Energy Agency (IEA)** “a set of electricity generators and, possibly, energy storage systems interconnected to a distribution network that supplies the entire electricity demand of a localized group of customers.”

Increased reliability (OECD countries) vs basic/primary power (developing countries)

Three Views on Regulation

- “There you have it—reforms on unprepared ground, and copied from foreign institutions...-nothing but harm.”
Dostoevsky, *Brothers Karamazov*
- “Regulation can provide a fertile ground. But regulation does not make a market.” IFC official, World Bank Group, January 2012
- “The less we have to do with government, the happier we are.” Indian micropower developer, November 2012