

CADMUS

HOMER International
MICROGRID Conference | 8th Annual | #HIMC2020

SIZE MATTERS: MINI-GRID TARIFFS AND UTILITY-SCALE FRAMEWORKS

June 8, 2020

Artie Abal



Presentation Outline

1. Introduction
2. Tariff Approaches
3. Common Issues:
 1. Grant Financing
 2. Grid Arrival
 3. Replacement Costs

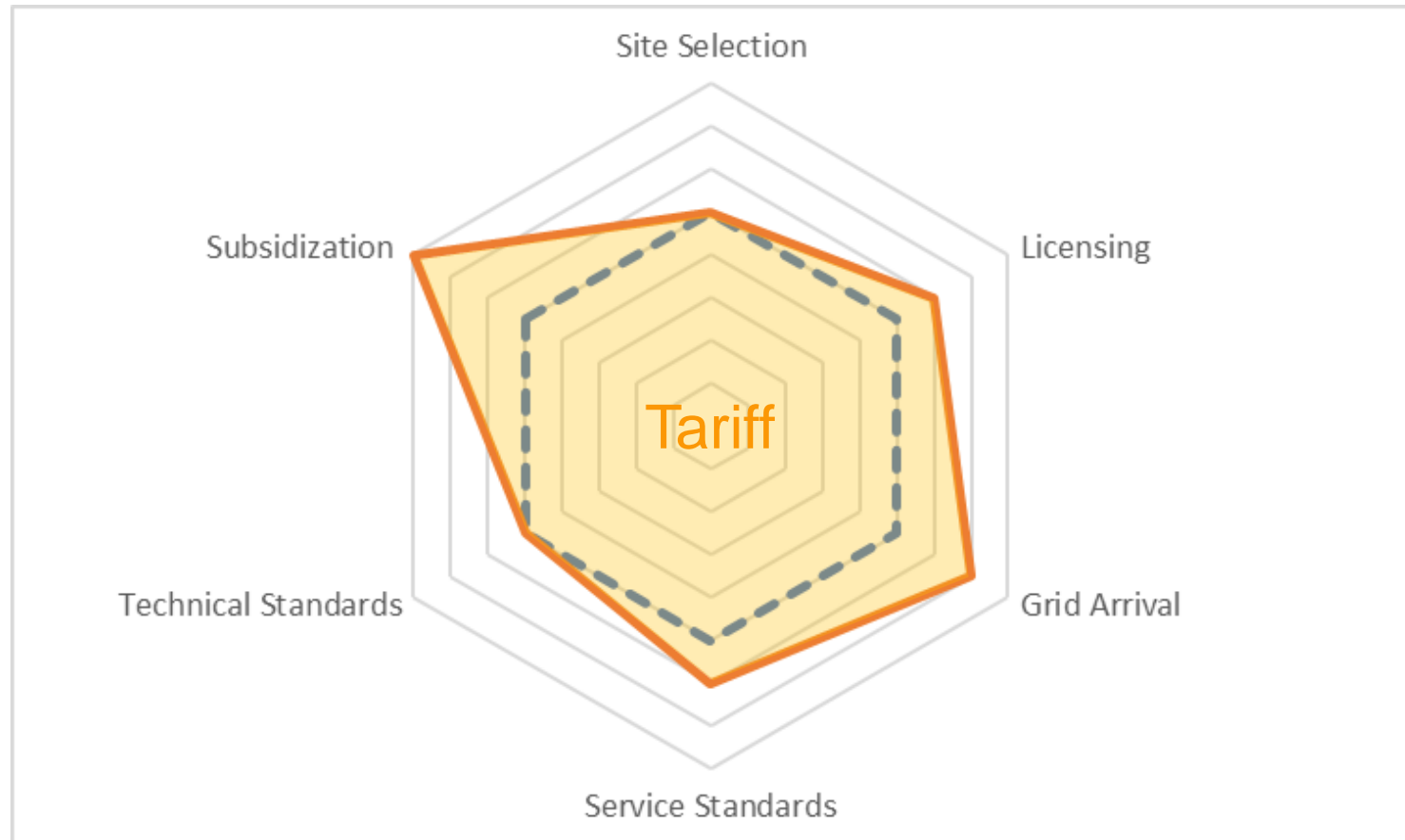
Part 1 Introduction

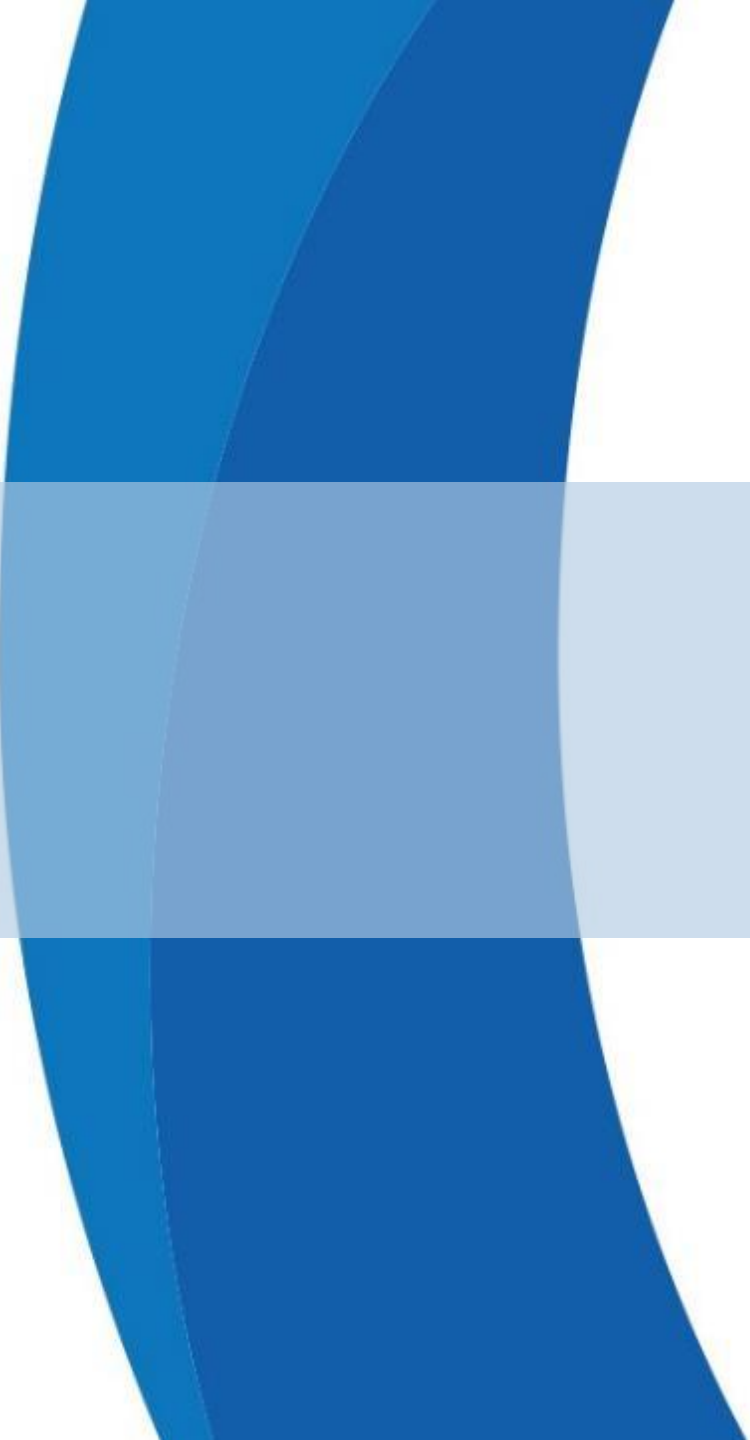
Where does Tariff Setting fit in?

Tariff regulation is one of the critical components of the regulatory framework that supports mini-grid development



More than that, tariffs are where all the issues in a mini-grid ecosystem often come to a head





Part 2 Tariff Approaches

How are tariffs set?

Ultimately, an ideal mini-grid tariff follows the same principles as an ideal utility tariff

- **Sufficiency:** Rates should be designed to yield revenues sufficient to recover utility costs.
- **Fairness:** Rates should be designed so that costs are fairly apportioned among different customers, and “undue discrimination” in rate relationships is avoided.
- **Efficiency:** Rates should provide efficient price signals and discourage wasteful usage.
- **Customer acceptability:** Rates should be affordable, stable, predictable, simple, and easily understandable.

“Cost reflective” tariffs have emerged as the preferred approach in nascent markets

The African Mini-Grid Developers Association (AMDA) calls for regulators to calculate tariffs on the basis of:

“a transparent and equitable tariff calculation model”

*“Tariffs for private mini-grids should take into account **all of the costs of building and operating the mini-grid including a reasonable return...**”*
– AMDA Principles (3)(c)

There are varying approaches to cost-reflectivity

Rwanda

- Developers negotiate a cost-reflective tariff with communities, but authorities have the right to review to ensure fair prices

Uganda

- Cost-reflectivity is set as an express objective under regulations; however, all tariffs must be reviewed by the regulator, which often leads to a departure from cost-reflectivity

Nigeria

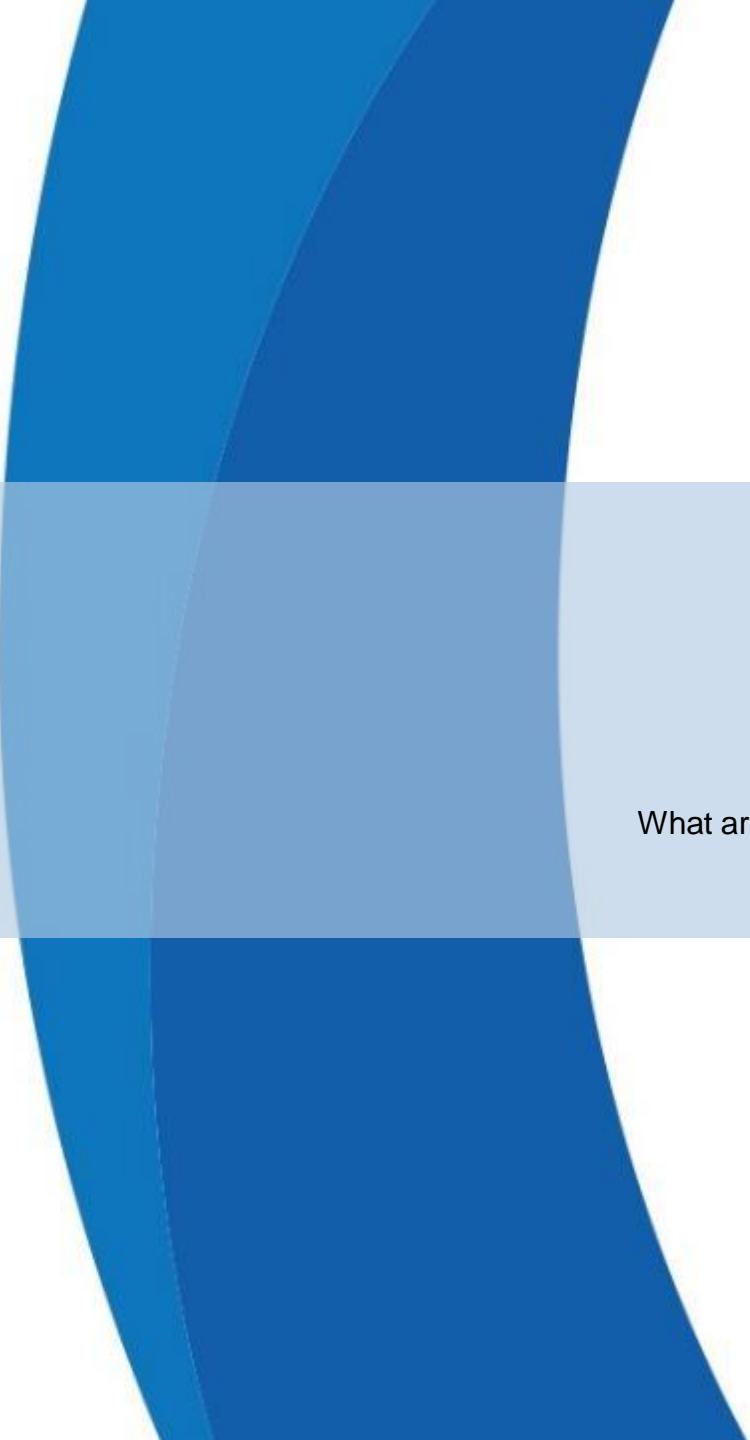
- Nigeria has tailored its Multi Year Tariff Order (MYTO) tool for mini-grids. It is an excel-based tool built on the principles of Rate of Return regulation to determine cost-reflectivity.

Vanuatu

- VREPII Indicative Tariff sets out a methodology in line with Rate of Return Regulation.

Regulators tend to adopt principles of utility scale tariff setting when approaching mini-grids

$$\text{Revenue Requirement} = (\text{Capital Asset Base} \times \text{Cost of Capital}) + \text{Operating Expenditure} + \text{Depreciation} + \text{Taxes}$$



Part 3 Issues

What are some of the issues with applying a utility-scale approach to mini-grid tariffs?

Issue 1: How do you account for an asset if the developer has not paid for it?

Issue 1: How do you account for an asset if the developer has not paid for it?

Issue:

With the swell of support for mini-grids in emerging markets, donors are contributing significant funds to finance the construction of mini-grids.

How should regulators treat grant-financed assets? Should a developer be allowed to earn a return on these assets in the tariff?

Example:

$$\begin{aligned} \text{RR} &= (\text{Capex} \times \text{CostOfCapital}) + \text{Opex} + \text{Depreciation} + \text{Tax} \\ &= (\$1\text{M} \times 6\%) + \dots \end{aligned}$$

Imagine: 90% grant financed

$$= (\$100\text{k} \times 6\%) + \dots$$

- \$60k → \$6k
- On the other hand...does the developer deserve +54k for risk that it did not actually invest?

Issue 1: How do you account for an asset if the developer has not paid for it?

Considerations:

- Customers are paying a fair price under the tariff
- Developers are not dissuaded from applying and obtaining grant finance
- Sum return on investment is not so low that investment is no longer of interest to developers
- Continued performance throughout the operating phase

Approaches:

- Opex payment: subsidy, performance-based incentive, management fee.
- Partial capex discount for concessional finance

Issue 2: How do you set a tariff when you don't know how long the project will last?

Issue 2: How do you set a tariff when you don't know how long a tariff will last?

Issue:

Many standalone mini-grids are designed for interconnection after an uncertain period of time, after which they will be absorbed into the grid or receive different regulatory treatment.

How can a developer/developer have confidence in knowing that it recover its capex and a reasonable project profit when time horizon is uncertain?

Example:

A developer is willing to invest \$1M on the condition that it can recover its Capex plus reasonable profit.

The developer is granted a 10-year license to build and operate a mini-grid, but there are concerns about a nearby grid that might interconnect before the 10 years is up.

Issue 2: How do you set a tariff when you don't know how long a tariff will last?

Considerations:

- Grid arrival/interconnection is both technically, politically *and financially* tense.
- It may not be politically feasible to maintain a cost-reflective off-grid tariff when a lower on-grid tariff is close by.
- Developers might have residual asset value when the grid arrives.

Approaches:

- Advanced depreciation schedule
- Clear regime for compensation upon grid arrival
- Minimum period of exclusivity notwithstanding grid arrival

Issue 3: How do you ensure tariff stability while allowing for replacement costs and capital investment?

Issue 3: How do you ensure tariff stability while allowing for replacement costs and capital investment?

Issue:

Capital replacement and investment can be costly relative to the size of the mini-grid, and these costs would either need to be borne by customers (in the form of a tariff increase) or by the developer.

Is there a way to keep prices stable while ensuring that developers are able to replace assets or invest in additional capital expenditure?

Example:

Developer needs to replace batteries at year 10 but this would involve additional capital investment.

Developer would also like to add to expand the distribution network to new customers, but this would involve additional capital investment.

Issue 3: How do you ensure tariff stability while incentivizing prudent replacement and capital investment?

Considerations:

- Customers often cannot absorb even the slightest price increases
- Developers should be incentivized to expand the network and replace infrastructure prudently
- Developers would need some form of certainty in terms of how these costs would be recovered
- Governments often do not have the means to contribute to capital expenditure

Approaches:

- Establish a replacement fund as a separate component of the tariff, to be held and expended as necessary
- Develop a regulatory approval process for capital expenditure and a cost-sharing mechanism for capital contribution

Key Takeaways

1. **Regulation of mini-grids** in emerging markets continues to be a **complex undertaking** and tariffs are often where the issues come to a head
2. **Utility-scale approaches can offer a degree of guidance.** However, these approaches do not offer perfect solutions.
3. **It is ok (perhaps even necessary) to be thinking outside of the box** when we are dealing with mini-grids, business models and tariff pricing in emerging markets.



Thank You / Q&A