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TECHNICAL REVIEW OF NIGERIA'S 2016 MINI GRID REGULATION

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TECHNICAL REVIEW OF NIGERIA'S 2016 MINI-GRID REGULATIONS

Recommendations by Key Industry Stakeholders[1]

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Mini-grids are becoming an increasingly important component for distributed electricity supply especially for unserved and underserved areas. With support from Heinrich Boll Foundation, Nextier Power convened a technical review of the Draft 2016 Mini-Grid Regulation with key industry stakeholders. This paper documents the questions that should be considered by the Nigerian Electricity Regulatory Commission before finalising the regulations.

PREAMBLE

Mini-grids are becoming increasingly important in Nigeria because expansions of electricity distribution networks are not keeping pace with population growth. Distributed generation (either from fossil fuel generators or from renewable energy sources) is becoming increasingly popular in Nigeria especially in areas where grid extension is not yet economically viable. While most of the generation is still off-grid, there is an increasing need for grid (inter) connection.

Despite the opportunity, Nigeria may not see accelerated investments in mini-grids without regulatory clarity. Investors need to know that their investments would be repaid and will return a profit. Therefore, mini-grid regulatory framework is a pre-requisite for any significant private sector investments. The regulation should provide clarity on licensing and registration, tariff setting, and what should happen when the main grid reaches the mini-grid.

OBJECTIVES

The core objectives[2] of Nigeria's Mini-Grid Regulation (2016) are to:
Objective 1: Accelerate electrification in areas without any existing distribution grid ("Unserved areas") and areas with an existing but poorly electrified or non-functional distribution grid ("Underserved areas"), especially but not limited to rural areas
Objective 2: Promote the engagement of the private sector, communities, non-governmental organisations and other stakeholders in achieving nationwide electrification
Objective 3: Minimize major risks associated with Mini-Grid investments such as sudden tariff changes and stranded mini-grid operator investments
Objective 4: Ease administrative burden on mini-grid operators by streamlining the permit and tariff approval procedures with minimal requirements from Nigerian Electricity Regulatory Commission (NERC)
Objective 5: Ensure utilisation of cost-reflective tariffs to encourage Mini-Grid development.

[1] Heinrich Boell Foundation provided support to Nextier Power to convene a technical review session of the 2016 Mini-Grid Regulations proposed by the Nigeria Electricity Regulatory Commission. The session brought together mini-grid operators, investors, members of the renewable energy association, and key stakeholders in the Nigeria electricity supply market to discuss, analyze, and advocate pragmatic recommendations to improve the 2016 mini-grid regulations.
[2] The objectives of the 2016 Mini-Grid Regulation (as provided in this section) are distilled from the "Preface" section of the document.

KEY PROVISIONS OF THE PROPOSED REGULATION

This section of the Policy Brief will review the main provisions of the 2016 Mini-Grid Regulations and present recommendations (from key industry stakeholders) for consideration by NERC prior to adoption of the document.

I. General Considerations

1. Definition of Mini-Grids: The 2016 Regulation defines Mini-Grids as any electricity supply system with its own 0kW and 1MW of power generation capacity, supplying electricity to more than one customer and which can operate in isolation from or to be connected to a Distribution Licensee's network.

(i) Consideration: While there is no universally accepted definition of mini-grids, there is a convergence of opinion that these are systems capable of generating from 10kW to 10MW, for mini-grids, and 1kW to 10kW, for micro-grids.[3]
Recommendation:
NERC should consider providing clarity on its rationale for choosing this specific definition instead of the more commonly used international standards.

2. National Electrification Plan: The 2016 Mini-Grid Regulation adds to the growing list of draft and approved policies and plans for the renewable energy market in Nigeria.

(i) Consideration: The increased activities in the off-grid renewable energy market (signalled by the increase in policy documents) are encouraging; however, investors need clarity on the approved policies and plans for the sector.
Recommendations:
There is need for an integrated and comprehensive national electrification plan that harmonises the various plans. The national electrification plan should consider the various regions viable for mini-grids. It should delineate the areas that are best served by on-grid distributors. Several factors should be considered in creating this plan including cost effectiveness, natural resource availability, and the infrastructure capacities of the Distribution Licensees (DisCos). Furthermore, the plan should integrate the various resource plans that have been developed by DisCos, government and development agencies in the power sector. The resource should be public and easily accessible.

II. Licensing and Registration

Mini-Grids can be isolated (when they are standalone and not connected to the network of a distribution licensee) or interconnected (when they are connected to the network or a distribution licensee).

Developers of isolated Mini-Grids with distributed power of up to 100kW are advised (not obligated) to register their project and may also choose to apply for a permit. Isolated mini-grids with distributed power of greater than 100kW and generation capacity of up to 1MW are obligated to apply for a permit from NERC.

[3] World Bank Group (2015). *Scaling Up Access to Electricity: Emerging Best Practices for Mini-Grid Regulations* LiveWire 2015/51. Available at the World Bank website. <http://documents.worldbank.org/curated/en/382421468178458482/Scaling-up-access-to-electricity-emerging-best-practices-for-mini-grid-regulation> (Updated Jan. 2015; accessed Oct. 30, 2016)

Developers of interconnected mini-grids are obligated to apply for a permit and to execute a tripartite contract with the community and the Distribution Licensee (DisCo). The Contract will become binding on the three parties after it is approved by NERC.

a. Section 7(1) b: Confirmation of Distribution Licensee's Expansion Plans

Mini-Grid developers are expected to receive the "*confirmation of the Distribution Licencee's expansion plans approved by the Commission (NERC) through the Commission to ensure that the Mini-Grid activities will not interfere with the expansion plans into the designated Unserved Area*".

(i) Consideration: In consideration of Objective #5 of this regulation (as stated above), there is need to clarify that the mini-grid developer does not need to seek the confirmation of the distribution licensee's expansion plan; rather, they have to simply obtain the approval of the Commission?
Recommendation:

Objective 6: The Regulation should clarify the frequency and protocol for the Distribution Licensees to submit their expansion plans to the Commission.

(ii) Consideration: Does the Regulation assume that DisCos will, on their own volition, submit their expansion plans to the Commission?
Recommendations:

Objective 7: The Regulation should clarify the frequency and protocol with which the Distribution Licensees are to submit their expansion plans to the Commission.

(iii) Consideration: An indication of interest in a location (by a mini-grid developer) could be an indication (to the distribution licensee) of the economic viability of the location. How does the regulation protect the investment (Objective #3) of the mini-grid developer considering that the latter must have expended some resources to identify that project location?
Recommendations:

Objective 8: The Distribution Licensee is expected to update the Commission with their expansion plan. The information is to be made available on the Commission's website. Any location that is not included in the plan at the time the mini-grid developer indicates their interest in a location cannot be included in the expansion plan.

(iv) Consideration: How does the Regulation ensure that the Distribution Licensee has the resources to back up its expansion plan and does not deprive a community their inalienable right to power supply that could have been met by a mini-grid developer?
Recommendations:

Objective 9: The Regulation should stipulate stringent penalties for a Distribution Licensee that does not deliver on its published expansion plans.

b. Section 7(1) c: Written consent from the Distribution Licensee

Mini-Grid developers are expected to receive the "*written consent of the Distribution Licensee of the intended area where the operational period of the Mini-Grid Developer will be within the five year expansion plan of the Distribution Licensee*".

(i) Consideration: Why is a written consent required from the Distribution Licensee if their expansion plans have already been submitted to and approved by the Commission? Shouldn't the Commission be the custodian of all expansion plans eliminating the need for written consent from the Distribution Licensee?
Recommendation

Objective 10: Section 7(1) c should clarify that a written consent from the Distribution Licensee is only necessary if a mini-grid developer chooses to develop in a location that is already part of the published expansion plans of a Distribution Licensee.

(ii) Consideration: Why is the duration of the expansion plan for 5 years? Does this mean that the plan should be updated every 5 years?
Recommendation

Objective 11: A geographic location may become viable with changes in economic, social and demographic variables that could change within a 5-year period. The Distribution Licensee should have the right to update and publish their expansion plans as frequent as annually, for instance, at the start of every year.

(iii) Consideration: What are the stipulated timelines for receipt of the written consents from the Distribution Licensees? What is the penalty for a Distribution Licensee that refuses to or delays the release of the written consent?
Recommendation

Objective 12: In the case where a mini-grid developer needs to seek the consent of a Distribution Licensee, the regulation should make it clear that the latter has to respond to the consent request within 30 days. The mini-grid developer may assume consent in the event that the consent is not received within the stipulated period.

c. Section 7(1) c: Duration of the license

Mini-Grid developers are expected to receive the "*written consent of the Distribution Licensee of the intended area where the operational period of the Mini-Grid Developer will be within the five year expansion plan of the Distribution Licensee*".

(i) Consideration: Does this provision assume a 5-year duration for mini-grid licenses? If yes, is it not at variance with the provisions in Annex 12(2)2.2.2 that stipulate a 20-year subsequent period for a Tripartite Contract between interconnected and isolated mini-grids?
Recommendation

Objective 13: The license duration should be at least as long as the duration of a power purchase agreement especially if the mini-grid can sell part of its electricity to the grid. Or the licence duration should be at least as long as the length of the bank loan repayment period plus a period to recover a reasonable return on investments. Furthermore, the license duration should be benchmarked to other African countries, as all of these countries will target the same Africa-focused mini-grid investor.

Objective 14: Given the foregoing, the suggested duration for mini-grid licenses should be between 20 or 25 years. Alternatively, NERC can decide on project-specific licensing periods following an assessment of the financials of each of the mini-grid developers. This will entail full access to the books of the various developers.

d. Section 7(1) g: Prior acquisition of all land and all assets necessary for permit

Mini-Grid developers are expected to ensure that "*all necessary land for construction and installation of all assets has been acquired and all other necessary permits have been granted to the Mini-Grid Developer*".

(i) Consideration: This provision assumes that the investor would have acquired all the land and assets prior to securing the approvals. While the Commission desires to screen out investors who may not have the prerequisite technical and financial capacities, it is important that it does not douse the interest of potential investors. The Commission should balance the need to select credible investors with realistic demands from investors. A number of the investors may need to first secure the approvals to unlock the resources required to acquire the land and other assets. Many of the financial investors may not wish to expend significant resources if there is a risk that the approvals may not be obtained.
Recommendation

Objective 15: The Commission should issue the approval once the investor is able to demonstrate their financial and technical capabilities. For instance, in lieu of full payment for

the land, the Commission may accept evidence of an option on the land and assets. The regulation should require investors to show that they have acquired land rights.

e. Section 17(1): Environmental protection

The regulation provides that "*all Mini-Grid Operators shall comply with the existing environmental legislation*".

(i) Consideration: The regulation does not state explicitly if an Environmental Impact Assessment (EIA) is necessary for all scales of mini-grid operations especially considering the cost of these studies.
Recommendation:

Objective 16: Comprehensive EIA may dissuade investments for the smaller mini-grid project (up to 100kW). Nevertheless, to safeguard against environmental hazards (such as improper solar battery disposal), mini-grids regulations should required the developers to register with the Federal Ministry of Environment. Furthermore, the government should stipulate and enforce the product standards for the various components used in the mini-grids (batteries, panels, wires, etc.) and enforce a disposal programme that safeguards the environment.

f. Section 10(2): Approval of the Tripartite Contract within 30 days of receipt

The Regulation stipulates "*The Commission shall issue a Permit pursuant to S. 7 or S. 8 above or approve a Tripartite Contract pursuant to S. 9 above to an applicant within a maximum period of 30 days from the date of receipt of complete documentation*".

(i) Consideration: This Regulation does not contain any stipulations (or penalties) to ensure the Commission meets the 30-day timeline.
Recommendation:

Objective 17: The regulation should stipulate that if a response is not received from the Commission within the prescribed 30 day period, the integrated mini-grid developer should deem the tripartite contract approved

III. Tariffs

The 2016 Mini-Grid Regulation stipulates the use of the Multi-Year Tariff Order (MYTO) as the basis for calculating retail electricity tariffs. Interconnected mini-grid operators shall pay the Distribution Licensee a usage charge agreed upon by both parties and approved by the Commission. The usage charge shall cater for reduction of financial losses of the Distribution Licensee and the requirements for low cost distribution grids in high electricity demand areas of mini-grid operator. In a case where both parties (mini-grid operator and the Distribution Licensee) are unable to agree on a usage charge, tariff methodology described in Annex 8 shall apply.

a. Section 20 (3): Determination of Tariffs and Other Charges (Retail Tariffs)

The Regulation stipulates, "*For Mini-Grid Permit Holders, retail tariffs and other charges are determined using the MYTO methodology included in Annex 15 and approved by the Commission …*". This provision raises a number of questions for consideration including:

(i) Consideration: Are the tariffs truly cost reflective?
Recommendation:
Electricity supply through the main grid is almost always cheaper than through mini-grids. There is also a disparity on the costs amongst mini-grid providers. For instance, a multi-megawatt hydropower mini-grid project serving thousands of households will generally have lower costs than a smaller solar or diesel power mini-grid project serving hundreds of households. Therefore, the process for deciding the tariffs should be sensitive to the variables for location, fuel source, generation and distribution capacity, number of customers, etc.

(ii) Consideration: What is the experience of other countries that used formulas to set tariffs especially as it relates to investor interest and innovation?
Recommendation:
While MYTO formulas provide an objective basis for the calculation of tariffs, emerging best practices[4] suggest that these formulaic approaches are overly complicated especially for the small-scale mini-grid developers and this can discourage investments.

(iii) Consideration: What is the regulation guiding the tariff structure? Should the mini-grid operator be allowed to propose a tariff structure appropriate for the project: flat rate, energy charge, demand charge, pre-pay, post-pay, and so forth?
Recommendation:
Best practices (recommended by the World Bank) suggest that developers should be allowed to propose retail tariffs and tariff structures that are best suited for their investments; subject to approval by the regulatory commission. The tariff structures may include flat rate, energy charge, demand charge, pre-pay, post-pay, etc.

Industry stakeholders in the Nigeria electricity supply market recommend that mini-grid developers and operators should be allowed to propose a tariff structure with consultation and input from the Commission. This should be an open-book process where the developer will be open and transparent with all their costs and expected profit margins, and an indication that the tariff and tariff structure is acceptable to the community.

However, there is need to guard against the risks of political interference in the tariff determination process. Therefore, MYTO should be sacrosanct in the cases where it is to be used to determine tariffs. There is also need to clarify the MYTO model to be used in the calculations.

b. Section 13(7): Inspection of accounts for the purpose of adjustment of tariffs and ascertaining depreciated value (Request by Mini-Grid Operator)

The Regulation stipulates in 13(7), "*In case of the Mini-Grid Permit Holder asking for an inspection of accounts with the Commission, the Mini-Grid Permit Holder shall pay a flat fee of 200 NGN per customer connected to its Mini-Grid to the Commission*".

(i) Consideration: There is no clarity as to how this amount is computed and whether it is too high or too low.
Recommendation
The Commission should provide clarity on how it decided on the proposed fee. This clarity will minimise (or eliminate) any future disputes in cases when there is need to adjust the figure due to changes in economic factors.

c. Section 13(8): Inspection of accounts for the purpose of adjustment of tariffs and ascertaining depreciated value (Request by Community)

(i) Consideration: There is no clarity as to why the Commission should pay the Community a fee in a situation where the latter requests the former to inspect the accounts.
Recommendation
The Commission should provide the rationale for this provision. Furthermore, the Commission should place a cap on the frequency of such requests to prevent abuse or excessive payments due to frequent requests from their host community.

[4] World Bank Group (2015). *Scaling Up Access to Electricity: Emerging Best Practices for Mini-Grid Regulations* LiveWire 2015/51. Available at the World Bank website. <http://documents.worldbank.org/curated/en/382421468178458482/Scaling-up-access-to-electricity-emerging-best-practices-for-mini-grid-regulation> (Updated Jan. 2015; accessed Oct. 30, 2016)

d. Section 20 (2): Determination of Tariffs and Other Usage Charges (Dispute Resolution Methodology)

The Regulation stipulates that interconnected mini-grid operators shall pay the Distribution Licensee a usage charge that shall be agreed upon between both parties and the Commission. However, "*Where the Interconnected Mini-Grid Operator and the Distribution Licensee are unable to agree on the usage charges, the methodology described in Annex 8 shall be applied as a guideline"*.

(i) Consideration: Does Annex 8 provide clarity on the methodology for calculating usage charges for interconnected min-grids or could it lead to disputes?
Recommendation:

Objective 18: The Regulation should be more explicit (preferably with a formula) on how the usage charges should be determined. Lack of clarity will result in disputes. Furthermore, Annex 8 should provide clarity on how disputes should be resolved in a cost and time efficient manner.

IV. Reconciling the Grids

The Regulation stipulates, in S.21(5), that a Distribution Licensee has the right to integrate a community and its mini-grid into its distribution network. In a scenario where a Distribution Licensee extends its main grid (network) to an area covered by an isolated mini-grid operator, the latter shall have two options: (1) convert to an interconnected mini-grid [S.19(2)a], or (2) transfer all the assets it does not want to remove from the mini-grid system to former in return for compensation [S.19(2)b].

In the event that the mini-grid operator chooses the transfer option, the compensation will equal the remaining depreciated value of the assets plus prior 12 months revenue [S.19(2)b.(i) and (ii)]. In a case where the system setup has changed since the latest tariff definition, mini-grid permit holder shall initiate an inspection of accounts to determine depreciated value [S.19(2)b.(iii)]. However, in the interim, payment shall be made based on the latest tariff definition while the difference shall be paid after the compensation is determined following the inspection.

(i) Consideration: Is the regulations broad enough to accommodate all potential operating scenarios for when the main grid expands into the mini-grid territory?
Recommendation:
The World Bank mini-grid best practices outline five possible scenarios for reconciling the main grid and the mini-grid. Nigeria's 2016 Mini-Grid Regulations should address these potential scenarios that include:

- Full service: The mini-grid may continue as a full service grid with its own generation and distribution business while purchasing electricity from the main grid to meet peak load and then sell surplus electricity back to the grid.
- Distribution-only: The mini-grid stops generating electricity and instead purchases electricity at wholesale prices from the main grid for resale through its distribution network to the Community.
- Generation-only: The mini-grid stops distributing electricity but continues to generate and sell electricity to the national grid.
- Sell assets: The mini-grid sells its assets to the main grid (as stipulated in Nigeria's 2016 Mini-Grid Regulations).
- Move assets: The mini-grid abandons the site and moves assets to another location (as stipulated in Nigeria's 2016 Mini-Grid Regulations).

(ii) Consideration: S.19(6) stipulates that a "*Registered Mini-Grid Operator has to de-commission and remove all its assets and equipment within 2 months after the*

Distribution Licensee has started supplying electricity to the area. The Registered Mini-Grid Operator shall not be entitled to any refund or compensation".
Recommendation
While this provision can be considered to be fair given that the *registered* mini-grid operators are subjected to less stringent permit requirements, there is need for the Commission to clarify the rationale for this position to defuse the potential communication challenges that may position the regulation as supporting *appropriation* of mini-grid assets.

(iii) Consideration: How fair is the compensation mechanism? Does payment of depreciated value and prior 12 months revenue cover costs and expected profit margin?
Recommendation:
The proposed compensation does not prevent the Distribution Licensee from using the mini-grid developer to prove the economic viability of a location before moving in to pay the remainder of the depreciated value and the prior 12 months revenue. It may be cost effective for the Distribution Licensee to wait for the mini-grid developer to expend resources on market studies and market development, acquire assets, prove the concept, and then the former will move in an pay the compensation.

The Commission should consider the use of a standard valuation methodology for calculating the value of the assets and future cash flows. For instance, discounted cash flow analysis, comparable transaction methods, multiples method, market valuation, or a combination of methodologies. The use of depreciated value and prior 12 months revenue may dissuade investments in the sector especially as the mini-grid developers can either invest in the power sector or in other sectors that offer greater returns.

The Regulation should stipulate that for the above listed recommendation to be applicable, mini-grids with permits must be built to Technical Codes and Standards for safe and reliable grid interconnection. Furthermore, the Regulation should specify what should happen during the transition period, and whether mini-grid developers can charge differentiated or uniform tariffs.

(iv) Consideration: What happens if a community opts for a mini-grid instead of connecting to the Distribution Licensee's network?
Recommendation:
The Regulation should include provision for a situation whereby a community wants to remain with a mini-grid operator as opposed to the Distribution Licensee. In this case, the Commission should adjudicate in such a way that the rights of the Community are respected while compensating the Distribution Licensee for their investments.

CONCLUSION

The Draft 2016 Mini-Grid Regulation lays the groundwork to the emerging frontier in Nigeria's electricity supply industry. Given the current state of grid power in Nigeria, an alternative is needed to provide electricity to the over 100 million Nigerians who do not have access to grid power. Mini grids have revolutionised other smaller countries in Africa, Asia, and South America and there are promises and lessons to be learned from those experiences.

These recommendations have been made in good faith and in sole consideration of the progress and development of Nigeria's electricity supply industry. The Nigerian Electricity Regulatory Commission is invited to consider the recommendations in this same vein.

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