REPP
managed by camco clean energy

REAN
RENEWABLE ENERGY ASSOCIATION OF NIGERIA

AMDA

Future-proofing the expanding market: Recommendations for improving the bankability of the mini-grid regulatory framework in Nigeria

Multi-stakeholder position paper

December 2022

Image source: GVE Projects Ltd

Introduction

Over the last few years, **mini-grids have played a key role in implementing Nigeria's energy access and sustainable energy goals**. They are now widely acknowledged as an integral component of the country's energy ecosystem, delivering sustainable and reliable electricity access to nearly 27 thousand household living in areas that, until now, were out of reach of – or unreliably served by – the main grid infrastructure.[1]

In 2016, two significant developments took place in the Nigerian energy sector. First, the Rural Electrification Agency (REA) released the Rural Electrification Strategy and Implementation Plan (RESIP), which acknowledged mini-grids' role in closing the energy access gap and improving supply. In the same year, the Nigerian Electricity Regulatory Commission (NERC) approved comprehensive mini-grid regulations – **NERC Regulation for Mini-grids 2016** (from here onwards referred to as 'NERC mini-grid regulations') – covering a broad set of issues, from mini-grid licensing to quality standards and tariff design. These and related policy and regulatory developments have **served as a significant breakthrough,** which has firmly established Nigeria as one of the leading mini-grid markets in Africa – an achievement that was celebrated in the first *Mini-grid State of the Market* report and the recent ESMAP market report.[2]

Energy sector **policies, regulations, and governance need to evolve together with the rapidly growing sector**. Six years since NERC's mini-grid regulations and RESIP came into place, and with the Nigeria Electrification Programme (NEP) implementation now well underway and continuously scaling up, it is time to take stock of what has worked so far and what requires further improvement or updating to ensure the bankability of the sector's regulatory and policy frameworks and their practical implementation. This is critical for the successful and timely implementation of the NEP targets. Following a growth period that has seen the number of installations nearly triple over the past six years and as large-scale sector support programmes become fully operational, the sector is ready to scale up. However, the remaining lack of clarity on several policy and regulatory aspects and their implementation have maintained the pre-existing risk for mini-grid developers and their financiers, raising the cost of capital and holding back the pace of sector growth.

NERC acknowledges the need for a review and update of the current regulatory framework and in September 2022 initiated an official review of the 2016 mini-grid regulations through an open consultation process. As a result, stakeholders were invited to provide feedback on the Consultation

[1] 26,815 electricity connections were supported through the Nigeria Electrification Programme, according to the Rural Electrification Agency data.

[2] Ibid. and ESMAP 2022.

Paper on Proposed Review of Regulations for Mini-grids 2016 (from here onwards, referred to as 'The NERC consultation paper'). Based on the feedback received, NERC will draft an update to the regulations, which it aims to present for the Government of Nigeria's approval in January 2023.

Signatories to this paper have actively participated in the ongoing NERC mini-grid regulation review process. This position paper aims to discuss further **the identified gaps/lack of clarity – regulatory and policy – which are slowing down the scaling of the mini-grid sector in Nigeria and to propose ways for further improvement**. It has been developed jointly by key stakeholders – developers, financiers, and industry associations – driving Nigeria's mini-grid sector's growth. The initiative has been led by the UK Government-funded Renewable Energy Performance Platform (REPP), managed by Camco, the Renewable Energy Association of Nigeria (REAN), and the Africa Mini-grid Developers Association (AMDA), with early support from its former local representative – the Clean Technology Hub. The initial version of the paper was submitted to NERC and other key public sector stakeholders in July 2021. This updated version considers market developments over the past year and the NERC consultation.

The recommendations are based on several years of collective experience in developing, financing, and operating mini-grids in Nigeria. These have provided invaluable information on how the current mini-grid enabling framework works. It is hoped that these recommendations are used to inform the review and revision of the existing mini-grid policy and regulatory framework and the processes related to their implementation to help ensure that they **fully support access to finance for a rapid scaling up of the sector.**

Signatories

Key contributors: The development of this position paper has benefited from particularly valuable comments, feedback and support provided by Ieva Indriunaite (Camco), Pacifique Niyonkuru (AMDA), Salamatu Baba Tunzwang (REAN), Ayo Ademilua (REAN/A4&T), Segun Adaju (Consistent Energy), Lande Abudu (REA, formerly REAN), Anthony Ezeamama and Dolapo Kukoyi (Detail Commercial Solicitors), Ivie Ehanmo (GEP Law), Ifeoma Malo (Clean Technology Hub), Talatu Tarfa (previously Clean Technology Hub), Ifeanyi Orajaka and Chike Jude Emedosi (GVE), William Brent, Mary Queen Damisa, Olu Aruike and Zita Ohikere (Husk Power Systems), Sa'ad Kamal-deen (Konexa), Olusegun Odunayia and Oluwatobi Soyombo (Havenhill Synergy), Grace Perkins (formerly Renewvia), Bolade Soremekun (Rubitec Solar), AJ Grosenbaugh and Chucks Obonodi (PowerGen), Adaobi Oniwinde (AllOn), Wiebe Boer (previously AllOn), Humphrey Wireko (CrossBoundary Energy Access), Paul Adebo and George Ogbonnaya (FCMB).

We would also like to thank the team at United States Agency for International Development (USAID)'s Power Africa – Nigeria Power Sector Program (PA-NPSP) for their input.

Abbreviations

AMDA	Africa Mini-grid Developers Association
Art.	Article – refers to articles in the NERC Regulation for Mini-grids 2016
Ch.	Chapter – refers to Chapters in the NERC Regulation for Mini-grids 2016
DisCo	Distribution Company
ESMAP	Energy Sector Management Assistance Programme
FCDO	Foreign, Commonwealth and Development Office (UK)
GIS	Geographic Information System
IEP	Integrated Energy Plan
IRP	Integrated Resource Plan
MYTO	Multi-Year Tariff Order
NBET	Nigeria Bulk Electricity Trading Plc
NEP	Nigeria Electrification Programme
NERC	Nigeria Energy Regulatory Commission
NESI	Nigeria Energy Supply Industry
PIP	(DisCo) Performance Improvement Plan
REA	Rural Electrification Agency
REAN	Renewable Energy Association of Nigeria
REPP	Renewable Energy Performance Platform
RESIP	Rural Electrification Strategy and Implementation Plan
SEforAll	Sustainable Energy for All
SPD	Small Power Distributor
SPP	Small Power Producer model
SPV	Special Purpose Vehicle

Issues and recommendations – an overview

This paper focuses on regulatory and policy aspects in six technical areas: 1) national electrification planning; 2) permitting of isolated and interconnected mini-grids; 3) Tripartite Contracts for interconnected mini-grids; 4) arrival of the main grid; 5) tariff-related considerations; and 6) transfer of mini-grid project legal documentation. This section provides an overview of the key issues discussed, and recommendations proposed to address them.

1. National electrification planning

Key issues

- Lack of transparency and predictability of grid extension planning
- Challenges related to obtaining a Distribution Company (DisCo)'s approval of a proposed mini-grid site
- Lack of information on the envisaged interconnected mini-grid sites

Summary of recommendations

Recommendations focus on increasing the transparency, timeliness, and coherence of grid extension planning. This would be achieved through a stronger role played by government institutions in enforcing the timely updating of the DisCo distribution network expansion planning and increased information on the provisional interconnected mini-grid sites, as well as using the planning outlined in these documents as a basis for the design of a national level Integrated Resource Plan (IRP), which integrates DisCo network extension plans and sets out a clear national-level vision for sector development.

Jump to the section

2. Permitting of mini-grids

Key issues

- The limitation of mini-grid generation capacity for permitted mini-grids
- Lack of clarity on the assessment of the installed total generation capacity for hybrid mini-grid systems
- Duration of mini-grid permits

- An absence of regulatory provisions for portfolio mini-grid applications
- The importance of efficient processes and effective digital solutions

Summary of recommendations

Recommendations include a suggestion for an increase of the current 1MW capacity threshold for mini-grids to 3MW to scale up energy access efforts and support economic activity. In addition to this, the paper calls for greater clarity in calculating the total installed generation capacity for hybrid mini-grid systems. Recommendations include an important focus on extending the duration of mini-grid permits to be better aligned with the typical tenor of project financing. Recommendations also focus on the importance of laying out provisions allowing portfolio applications for isolated and inter-connected mini-grids. Finally, the need for further improvements to the efficiency of permitting processes (including the online permit application system) is discussed.

Jump to the section

3. Contracting and approval of interconnected mini-grids

Key issues

- Lack of provisions for the eventuality of a change of DisCo ownership
- The need for further clarity on the regulatory treatment of interconnected mini-grids operated by DisCo distribution franchisees
- The need for further clarification of the rights, duties, and obligations of connected communities, including the right to termination
- Lack of legal clarity regarding the issuing of permits for interconnected mini-grids

Summary of recommendations

Recommendations focus on the need for further clarification on the provisions for the eventuality of a change of DisCo ownership and other aspects critical to the Tripartite Contract's bankability, such as the change in law provisions and the valuation methodology for any DisCo's assets that would be transferred. The mini-grid regulations should be more explicit on the rights, related conditions, and the associated compensation mechanisms for the termination of the Tripartite Contract triggered by the connected community. Further legal clarity is sought on the issuance of a permit for interconnected mini-grids upon the regulatory approval of the Tripartite Contract. Additional clarification is also sought on the applicable provisions where a mini-grid developer is operating in the area, which is being handed over to a new distribution franchisee.

Jump to the section

4. The arrival of the main grid

Key issues

- A limited selection of possible ownership and business models following the extension of the main distribution grid to a mini-grid site
- Lack of full clarity of the provisions for compensation for transferred assets
- The importance of further clarity on the process of conversion/asset transfer

Summary of recommendations

Recommendations propose that the ownership options available to an isolated mini-grid operator following the extension of DisCo's distribution network to their area of operation should be broadened. A strong emphasis is placed on the need for more transparency and clarity in the decision-making process and, where relevant, the eventual (partial) asset transfer and the calculation of the compensation for transferred assets. A standard approach for asset transfer valuation should be established, and the compensation should allow the developer to repay the debt amount and equity with a return. It is critical to ensure that all regulatory and contractual aspects are resolved, and all financial liabilities settled before the utility enters the area.

Jump to the section

5. Tariff-related provisions

Key issues

- Ensuring the application of cost-reflective tariffs
- Enabling portfolio tariff applications
- The use of differentiated tariffs
- Tariff adjustment conditions and process

Summary of recommendations

While the cost-reflective nature of the current Multi-Year Tariff Order calculations and the possibility of applying differentiated tariffs are acknowledged, this paper notes that these aspects could be more explicit in the main body of the NERC mini-grid regulations. Recommendations also focus on the need for further clarity on the process and timeline for tariff design for isolated mini-grids being interconnected in DisCo's distribution network, as well as for the tariff review inputs and process, and the enforcement of assessment outcomes. In line with the proposal for portfolio permit applications, recommendations in this section suggest that portfolio tariff applications should be allowed.

Jump to the section

6. Transfer of mini-grid permit and business

Key issues

- Lack of clarity regarding the permission and process of transfer of mini-grid permits and businesses.

Summary of recommendations

It is proposed that NERC mini-grid regulations should include provisions on the procedure for the transfer of mini-grid permit and business and the consequential transfer/novation of the project documentation (Tripartite Agreements, Community Agreements and Customer Contracts) from the original entity to another entity or a special purpose vehicle (SPV). The provisions should detail conditions for such transfer, documentation required to obtain NERC approval for the transfer, as well as any fees payable to facilitate this process.

Jump to the section

A way forward

This position paper has been developed to assess the efficacy of Nigeria's current mini-grid policy and regulatory frameworks. It presents developer and funder recommendations on what is required to improve the frameworks' bankability further and provide a strong grounding for scaling up the sector to the level necessary to ensure the successful achievement of the country's ambitious national electrification, climate, and sustainable development targets.

The paper has been designed to facilitate further engagement with key government stakeholders and will be shared with NERC as a further submission to its ongoing regulatory review process. The expectation of those involved in developing this paper is that it will help inform the NERC review process and will provide a strong basis for a further constructive conversation among public and private sector stakeholders, and the design of the required regulatory, policy, and governance solutions.

1. National electrification planning

Relevance and good practice

Mini-grid developers and investors rely on the clarity of the planned extension of the main power grid to select suitable project locations. Therefore, communicating national-level electrification plans in a timely and transparent manner and ensuring that grid development is in line with these plans can strongly impact the acceleration of mini-grid growth in a country.

International good practice suggests that **a national electrification plan should delineate areas that the grid and off-grid projects are best placed to target.** The plan should be developed using modern technologies, such as the Geographic Information System-based spatial planning software and consider real-life data-based consumption projections to estimate load profiles. **The plan should be ambitious but realistic, aiming to strike a balance between the level of service provided and the associated costs**. The planning should be based on a minimum 10 to 15-year period, which would be aligned with project finance timelines applied by mini-grid lenders and investors. While designing the plan, it is important to consider the financing capabilities of the national utility/transmission and distribution network manager. Where site exclusivity is applied, information about reserved sites should also be publicly available.

Status quo

Mini-grids' role in Nigeria's national electrification planning has been fully acknowledged, with specific capacity/connection targets outlined in the RESIP released by the REA in 2016. However, the **implementation of these clear policy targets is currently hampered by the limited information available on the potential areas for mini-grid development**.

In the Nigerian context, distribution network expansion planning falls under the responsibility of distribution licensees known as Distribution Companies (DisCos). DisCos are required to share the five-year distribution network expansion plans with NERC, supported by their Performance Improvement Plans (PIPs), and in line with the Regulation for Investment in the Electricity Networks (2015). However, **no document currently integrates all individual DisCo network expansion plans into a national-level electrification planning document.** In addition, the federal and state governments are planning new network expansion programmes, which further increases the complexity of national network expansion planning.

Clear and transparent plans for network expansion are needed across Nigeria. **While officially DisCos are required to submit revised network expansion plans every five years, there appears to be no clear timeframe regulating the submission, review, NERC approval, and monitoring of**

adherence to these plans. Currently, many DisCos do not adhere to this requirement. The NERC Guidelines for the Preparation of Performance Improvement Plans by DisCos include a recommendation that a PIP should be a "publicly facing document"; however, this is not the case with the network expansion plans. To date, the network extension plans of DisCos have not been made publicly available. Transparency ensures coordination between the multiple entities working to achieve universal electrification, eliminating duplication by agencies, companies, and donors in developing the same areas. This clarity and transparency are essential in leveraging private investment for mini-grid and utility-scale projects.

The current NERC mini-grid regulations require developers of isolated mini-grids to confirm that a proposed project would not interfere with the DisCo expansion plans approved by NERC (Chapter (Ch.III, 7.1.b). If the proposed mini-grid site is within DisCo's five-year expansion plan, written consent from DisCo for the proposed mini-grid location must be provided to NERC with the application (Ch.III, 7.1.c.). Since the extension plans are not publicly available, mini-grid developers need to request information about potential site availability from NERC or the respective DisCo on a case-by-case basis, which is inefficient and increases project development costs and end-user tariffs. **The lack of publicly available plans has the added effect of incentivising DisCos to reject sites due to a change in their perception of site viability once a private developer for mini-grid development proposes that site.**

In early 2022, the Nigeria Integrated Energy Planning (IEP) Tool was launched by the Federal Government of Nigeria in collaboration with Sustainable Energy for All (SEforALL) with support from The Rockefeller Foundation. This is a very welcome initiative that will inform sector development. However, while the planning tool provides crucial information for project development, it does not outline the Government's priorities. In a separate initiative, the Government, supported by the UK Foreign, Commonwealth, and Development Office (FCDO), has also embarked on developing a National Integrated Resource Plan (IRP), which is expected to include distribution plans. This would be the first attempt to provide full clarity over national electrification planning, which private sector stakeholders need. Yet the development of the IRP will take time, and, regarding electrification planning, the process will depend on the same inputs from DisCos that are currently unavailable. Hence, the uncertainty regarding national electrification planning and grid extension remains in the short term.

The lack of up-to-date publicly available information about grid extension planning across the country creates a significant level of uncertainty for citizens, companies, investors, and the Nigerian Government, ultimately slowing down the pace of electrification. Therefore, NERC should continue to ensure that DisCos deliver on their obligation to publish distribution network plans and make them publicly accessible. Furthermore, in the medium term, the development of the IRP, which would integrate distribution extension planning and would be informed a national-level grid extension and off-grid electricity supply plan by the outputs of the IEP, is required to support the current enabling framework, thus further strengthening its bankability.

Recommendations

1.1 A clear and uniform timeline should be applied to all DisCos for the development of the distribution network extension plans. In addition, finalised DisCo network extension plans should be made publicly available and easily accessible on the NERC website within a defined timeframe, together with DisCo PIPs.

1.2 DisCo network extension plans should delineate the areas where the DisCo network would be extended. They should also include the identified potential locations for interconnected mini-grids, which would fast-track the development process.

1.3 The regulations should ensure that DisCos are incentivised to comply with the requirements related to electrification planning. For example, penalties applied to DisCos that fail to submit their updated planning documents by the deadline should be clearly stated and designed to prevent such behaviour effectively. In addition, NERC should monitor annually DisCo adherence to network planning submitted to the Regulator.

1.4 In cases of a prolonged delay in submitting the network extension plan, the area should – after a defined period – be opened to mini-grid developers in consideration of the primary objective of increasing energy access. Therefore, this area cannot be included in DisCo's submitted network expansion plans.

1.5 Priority should be given to developing the Integrated Resource Plan, which integrates DisCo network extension plans and sets out a clear national-level vision for sector development.

2. Permitting of mini-grids

Relevance and good practice

The licencing/permitting process allows regulators to review proposed projects against a set of defined criteria to ensure their project safety, reliability, and pricing and thus protect consumers. **For the private sector-driven mini-grid market to scale, however, the permitting process must be efficient, practical, transparent and predictable**.[3] This is a fine balancing act. Given the smaller scale of mini-grid projects, they cannot receive the same regulatory treatment as grid-connected generation projects. A way to improve the efficiency of the process would be by introducing more light-touch regulations for smaller-scale mini-grid projects. Another option is to develop a process that would allow issuing a single licence/permit for multiple specified sites. **Enabling 'portfolio' applications could considerably improve the turnaround times** for issuing mini-grid permits/licences.[4] For financiers, the duration of project permits and licences is also particularly important and should be aligned with project financing terms.

Status quo

Permitting isolated mini-grids[5]

The current NERC mini-grid regulations outline how to obtain a registration/permit for isolated mini-grids. Nevertheless, there are several areas for improvement.

The requirement to seek information from the DisCo on whether a proposed mini-grid site is within its five-year expansion plan is a considerable bottleneck in the current process for obtaining a mini-grid permit. As discussed in Section 1, eliminating this requirement through more transparent grid extension planning and a more robust engagement of the NERC would considerably improve the swiftness of the permitting process.

The NERC consultation paper proposes including a time frame (four weeks) for DisCos to confirm site availability. Failing which a confirmation or consent would be deemed to have been provided by the DisCo. While this does not fully address the issue, it is a welcome interim measure that should be implemented.

[3] SE4All 2020.

[4] AMDA 2020.

[5] Aspects related to the contracting and approval of interconnected mini-grid applications are discussed in more detail in Section 3.

Issues relevant to all mini-grid types

Another aspect that considerably slows down mini-grid development in the current market is the lengthy review and approval processes at NERC. Some developers have benefitted from the fast-track option enabled for the grantees under the REA's Nigeria Electrification Programme (NEP), which improves the efficiency of permit applications. However, this is not available to mini-grid projects being developed outside of the NEP. In addition, while the NERC mini-grid regulations indicate that NERC shall issue a permit or approve a Tripartite Contract within 30 days (Art. 10(2)), these processes often take longer.

The current regulations envision that a registration, permit, or Tripartite Contract approval application should be undertaken for each project. There are currently no provisions for portfolio applications for mini-grids (although sometimes portfolio permitting of isolated mini-grids is allowed in practice). In its consultation paper, NERC has proposed integrating the portfolio permit application approach in the mini-grid regulations – if successfully implemented, this will positively affect sector development.

Portfolio applications are essential for sector scale-up as they reduce the time and resources required to secure mini-grid permits. For developers, this is particularly helpful in cases where mini-grids are financed using a project finance approach for a portfolio of mini-grid sites – an approach that is likely to be widely applied in the future as more development finance institutions and other types of financiers come into the sector looking for larger projects to match their financing instruments. Based on the Government's estimates, 12,000 mini-grids need to be developed in the next eight years to ensure the national electrification targets. This translates to almost 2,000 mini-grid permit applications a year, which would need to be reviewed by NERC. Portfolio applications that provide a single license to developers in a geographic area or for a cumulative amount of installed capacity will support a faster, more efficient process for regulating mini-grids. It is encouraging to see the importance of portfolio permit applications acknowledged in the NERC consultation paper for both isolated and inter-connected mini-grids – the proposed amendments, incorporating further feedback received during the ongoing stakeholder consultations, should be integrated into the updated NERC mini-grid regulations.

Under current law and mini-grid regulations, any generation above the 1MW capacity threshold is considered an Independent Power Producer and must be licensed. However, **the 1MW capacity threshold for mini-grids is relatively low to accommodate larger mini-grids, isolated or interconnected, which could serve larger communities and productive energy users.**

Nigeria is home to the largest population on the continent and among the highest demand per electricity customer. The current 1MW cap on generation capacity is similar to the caps in other markets, such as Kenya and Sierra Leone. In these countries, such a cap can provide sufficient power for mini-grid communities, but in a country as large and vibrant as Nigeria, the cap presents challenges in adequately serving customers' needs, particularly in large and interconnected communities. Extending the current generation capacity threshold to 3MW would enable developers to address customers' needs and support local economic development in line with national policy priorities.

Further clarity is also required for the process of confirming installed generation capacity for hybrid mini-grid systems. These systems utilise multiple generation components, but not

simultaneously. Rather, the systems are powered by a primary generation source, with a back-up as support (such as solar PV + battery + diesel genset back-up). The current regulations do not provide a clear methodology for the confirmation of the total generation capacity which creates regulatory uncertainty.

While the NERC 2016 regulations do not stipulate the duration of the mini-grid permit, **the duration stipulated in the template permit used by NERC is only five years**. With project financing being used increasingly often to finance mini-grid projects in Nigeria, it is important from a financier's perspective that project documentation, including all permits and licences, is aligned with the tenor of financing agreements, which is typically 10 years for project finance.

Recommendations

2.1. NERC should implement the time limit for DisCos to confirm site availability. If not met, the site in question should be deemed available for isolated mini-grid development (as proposed in the NERC consultation paper).

2.2. NERC should ensure that permits are reviewed and issued, and that Tripartite Contracts are reviewed within 30 days, as stated in the NERC mini-grid regulations. In addition, NERC should work with developers to identify the necessary improvements to the online permit application systems, which could improve the efficiency of the process.

2.3. NERC mini-grid regulations should include provisions for a portfolio permitting approach for mini-grids (inter-connected and isolated) in line with the proposed amendment in the NERC consultation paper and integrate further feedback received during the ongoing stakeholder consultations.

2.4. The 1MW capacity threshold for mini-grids should be increased to 3MW to accommodate the larger mini-grids, isolated or interconnected, that could serve larger communities and more productive users.[6]

2.5. The regulations should provide a clear methodology/sample calculations for establishing the total generation capacity of various mini-grid project types to avoid ambiguity in interpretation.

2.6. The duration of mini-grid permits should be extended to a minimum of 10 years.

[6] As an alternative or interim measure, NERC could provide mini-grid developers with a clear pathway towards securing licenses for systems greater than 1MW in the event that a community requires higher capacity or an existing system needs to be expanded to meet growing demand.

3. Contracting and approval of interconnected mini-grids

Relevance and good practice

Regulatory provisions for developing interconnected (under-grid) mini-grids are becoming increasingly important, especially since the market is growing quickly with the support of several recent government and donor initiatives. While the concept of an interconnected mini-grid is not new, **innovative business and ownership models are currently being tested in the Nigerian energy market**, with mini-grid developers and DisCos developing new collaborations. Regulations should evolve accordingly. **It is important to strike a balance in developing a supportive regulatory environment while allowing the flexibility for experimentation required in a nascent market**.

Status quo

The current NERC mini-grid regulations introduce the concept of a Tripartite Contract between a mini-grid operator, a DisCo, and the affected community to develop an interconnected mini-grid. **The template for the Tripartite Contract, included in Annex 11 of the current regulations, is a helpful start and allows the right degree of flexibility for innovation. However, several aspects included in the template would not be considered bankable by mini-grid lenders.** While it is understood that use of the template is optional, with parties having the choice of drafting bespoke agreements if preferred, it should be considered that the template provides guidance and sets the standards for the industry. As such, it plays an important role in market development.

The first aspect refers to the lack of provisions to cover the eventuality of a change in law and the approach to any compensation as may be required. The risk of change of ownership of the DisCo is also not currently addressed but could have significant implications for the sustainability of the interconnected mini-grid project (as well as the partial asset transfer options of isolated mini-grids if these are included in the regulatory provisions). While this can be addressed at a contractual level, it is important to have certainty over the principle that all contracts would be transferred to the new owner.

The template does not outline the connected community's rights, duties, and obligations. While the community is treated as a party to the agreement, the contract does not outline the circumstances and the processes related to the community's right to terminate the agreement. The termination provisions outlined under Articles (Art.) 14.1 and 14.2 (Ch. IV) of the NERC mini-grid regulations state that the contract could be terminated only by the DisCo or the mini-grid developer. The request from the connected community to end the contract is an eventuality that could occur, and which could have devastating effects on the mini-grid developer and the financiers.

Any provisions outlining the community's rights to the termination of the contract should clearly outline the limited conditions (including the share of the customers supporting the decision) which could legitimately trigger such action and the process of pursuing it to ensure the security and protection of investments. In addition, the permissible grounds for termination should be linked to the agreement's content – i.e., the agreed level and conditions of service.

Article 14.3 on the 'consequences of termination' outlines a provision for compensation to the mini-grid developer if a DisCo terminates the contract. However, **the regulations currently do not provide any compensation guarantees in a situation where the termination of the agreement is triggered by the connected community, which increases the project risk and thus could impede the developer's access to finance**. Such a regulatory gap could also lead to a situation whereby the DisCo would aim to indirectly trigger the termination of the contract, using the connected community as a proxy. This further reiterates the importance of limiting the community's rights to contract termination based on performance issues on the part of the mini-grid operator. It is also essential to ensure that due process is followed in such instances – provisions for such an eventuality should be included in the template Tripartite Contract and mirror those applied in case the DisCo terminates the contract, including the arbitration process to ensure a just and fair outcome for all parties.

The regulations require the developer to submit the signed Tripartite Contract it has entered into with the DisCo and the connected community for NERC's approval (Ch. III, 9). However, **there is no explicit mention in the regulations that the mini-grid developer will be issued a permit upon the approval of its Tripartite Contract by NERC.** This is particularly important because the interconnected mini-grid developer is expected to comply with the obligations imposed on a permit holder under regulations. It is noted that in response to this NERC has, in its consultation paper, proposed to clarify regulatory provisions to ensure that the permit is issued upon approval of a Tripartite Contract, which would address the current gap.

As mentioned above, **while the NERC Mini-grid Regulation indicates that NERC shall approve a Tripartite Contract within 30 days (Art. 10(2)), these processes often take longer.**

The existing regulatory provisions should be updated to ensure they capture the interaction between the mini-grid market segment and the operation of innovative business models such as distribution franchising, whereby a DisCo authorises a third party (a franchisee) to provide electric distribution utility services on its behalf in a selected area within the DisCo's area of supply. The franchisee may add generation capacity to the network through interconnected or isolated mini-grids (or both) to serve diverse communities in the assigned geographical area.

The regulation of this market segment is informed by the NERC Guidelines on Distribution Franchising (2020) – a welcome development for the nascent sector. However, the guidelines do not provide the detail required to ensure that there is no over-regulation of mini-grids (both isolated and interconnected) developed by distribution franchisees. In addition to this, while the guidelines indicate that the procurement of additional generation capacity would be regulated by applicable existing orders, regulations, and guidelines (it is understood that in the case of mini-grids, this would be the NERC mini-grid regulations), they do not specify what would happen in cases where a mini-grid developer is operating in the area which is being handed over to a new distribution franchisee.

Recommendations

3.1 NERC should clarify that in the case of a change of DisCo ownership, all rights, obligations, and duties of a DisCo with regards to mini-grid developers, as per the provisions of the mini-grid regulations, would remain binding on the new owners. This should be included in the Tripartite Contract template (Annex 11).

3.2 The NERC mini-grid regulations (Art. 9) should address the questions of the rights, related conditions, and the associated compensation mechanisms for the termination of the Tripartite Contract triggered by the connected community.

3.3 The Tripartite Contract template (Annex 11) should detail the rights, duties, and obligations of all three parties, including the connected community. In addition, it should specify what could trigger the community's right to terminate the contract, limiting it to the non-performance by the mini-grid operator of its service obligations as outlined in the Contract. The template should also outline the process for claiming termination rights by the affected community, which should be aligned with those in case of termination by the DisCo (Art. 14.1 of Annex 11) – in particular, the notice and cure period of a minimum 30 days – and should include an independent assessment of the situation.

3.4 The template for the Tripartite Contract (Annex 11) should include a clause on the change in law provisions to ensure the bankability of the agreement.

3.5 The Tripartite Contract negotiations should be based on an accurate valuation methodology for any DisCo's assets that would be transferred.

3.6 NERC should seek to clarify the applicable regulatory provisions in case a mini-grid developer is operating in the area, which is being handed over to a new distribution franchisee.

3.7 The NERC mini-grid regulations (Ch.III, 10.2.) should state explicitly that the mini-grid developer will be issued a permit upon the approval of its Tripartite Contract by NERC, as proposed in the NERC consultation paper.

3.8 NERC should ensure that Tripartite Contracts are reviewed within 30 days, as stated in the NERC mini-grid regulations.

4. The arrival of the main grid

Relevance and good practice

The risk of an uncompensated mini-grid site encroachment by the expanding main electricity grid is a significant deterrent to investors and lenders. On the other hand, in a well-designed regulatory environment, grid arrival at an isolated mini-grid site would not necessarily be considered a deterrent, since it would present alternative opportunities for the mini-grid operator to retain the business and continue to earn a certain level of income by selling the electricity produced to the national grid.

For a regulatory framework to be considered bankable, a clear and transparent approach to ownership, and fair compensation provisions for any lost revenue following connection to the national grid are required to ensure private sector confidence to invest in mini-grids.[7] This is particularly important now as the number of actors involved in the sector is increasing with the new distribution franchisees. Therefore, mini-grid regulations should outline the mechanisms and methodologies to determine a fair value for compensation and establish appropriate dispute resolution mechanisms.

Several ownership and business models can be envisioned for the future of isolated mini-grids once the main grid reaches their area of operation. These include models whereby:

- The mini-grid operator retains only the generation assets, thus becoming a Small Power Producer (SPP);
- The mini-grid operator retains the distribution assets, becoming a Small Power Distributor (SPD);
- The mini-grid operator retains both the generation and distribution assets, in which case the mini-grid operator can buy electricity from the grid, to be distributed to the community, and sell the excess electricity from its generation assets to the utility; and
- Alternative options are whereby the mini-grid developer sells its assets to the utility or moves them to a different location.[8]

A critical consideration for all these options is ensuring that the mini-grid developer does not incur significant uncompensated financial losses. To mitigate the risk for project developers – as well as for investors and lenders – in cases of asset transfer, the compensation structure should ensure that developers can repay the outstanding debt to their lenders and pay indemnity to their equity

[7] IRENA 2018.

[8] Tenenbaum et al. 2014.

investors. The compensation should therefore cover the development costs and be based on the depreciated value of generation and distribution assets and the net present value of lost future cash flows (to be determined on a case-by-case basis, depending on the tariff structure). The methodology for estimating the compensation (e.g., asset depreciation) is a key consideration. It is also important to ensure that the legal, regulatory, and contractual framework accommodates the asset transfer eventuality.

In the case where a mini-grid operator chooses to continue to operate on the site, it will need to obtain a new tariff and generation and distribution agreements, which would need to be considered bankable by project lenders. Therefore, ensuring that all regulatory and contractual aspects are resolved, and all financial liabilities settled before the utility enters the area, is critical.

Status quo

Ownership and business models. Article 19 (Ch. IV) of the current NERC mini-grid regulations outlines two options available to isolated mini-grids operated under a permit once the distribution licensee's network is extended to their area of operation: (1) the isolated mini-grid operators can choose to convert to an interconnected mini-grid operator or (2) transfer all assets to the DisCo. Alternative models are not considered, such as the SPP or SPD model.

Compensation for transferred assets. In the case of asset transfer, the NERC mini-grid regulations contain certain provisions for compensation to mini-grid permit holders. The compensation includes the remaining depreciated value of assets, as defined during the tariff definition by NERC, and the equivalent annual revenue, based on the 12 months prior to the date of connection of the mini-grid to the distribution network (Ch.IV, 19.2.b.).[9]

In the case where a DisCo extends its distribution network within the first five years of the commissioning of the affected mini-grid, the asset definition includes construction and development costs but does not provide sufficient detail on what would be acknowledged as such costs. In project finance terminology, compensation would typically be calculated based on 'total project costs' or 'actual project costs'. It is implied in the current regulations that construction and development costs would be excluded from the asset definition for mini-grids older than five years upon the arrival of the main grid. It is also unclear from the current regulations as to how the revenue compensation would be calculated for recently built mini-grids that will not have operated for 12 months upon grid arrival.

While NERC is said to have determined a depreciation schedule, it has not yet been published.[10] This uncertainty further increases the level of risk for project developers and funders.

The process of conversion/asset transfer. The current regulations provide little clarity regarding the timeline and process of isolated mini-grid conversion/ownership transfer in the case of grid encroachment. For example, the regulations do not indicate the minimum notice period or the time

[9] It should be noted that there is a discrepancy between the main body of the regulations and the information included in Annex 14 containing the template asset handover document and compensation confirmation sheet. While the main regulations (Ch.IV, 19.2. b.i.) envision that the compensation should include the size of revenue of the last 12 months prior to the grid's arrival, the annex suggests that only 50% of this amount would be compensated.

[10] SEforAll 2020.

available to the isolated permitted mini-grid developer to decide whether to interconnect the mini-grid or transfer the assets to the DisCo following the announcement by the DisCo of its intention to extend the distribution network to the isolated mini-grid operating area. A minimum notice period must be set and adhered to, to ensure effective information sharing and negotiations.

Currently, the DisCo is also not officially required to provide the relevant technical and operational information related to the functioning of its distribution grid,[11] which would inform the mini-grid operator's decision. Furthermore, in the conversion to an interconnected mini-grid, the regulations do not stipulate whether additional/new permit applications would need to be submitted nor the duration of such a process.

The current regulations indicate that in the case where the asset transfer option is selected, the assets would only be handed over after the compensation is received (Ch.IV, 19.2.(b.i&ii). This is an essential safeguard if the DisCo does not have the financial resources to pay the required compensation upfront. However, the regulations do not provide further detail on how such a situation would be managed, which increases the risk to the mini-grid operator that transfers asset ownership.

The interests and expectations of the customers to receive the same level of service should also be considered.

Compensation for registered mini-grids. The operators of registered mini-grids are required, on request of the DisCo, to decommission and remove all of its assets and equipment within two months after the DisCo has started supplying electricity to the area. In this case, the registered mini-grid operator is not entitled to any refund or compensation (Ch. IV, 19.6). The lack of compensation for registered mini-grids has driven most developers to seek permits for their projects, regardless of the generation capacity. This suggests that the underlying purpose of the simplified procedure for small-scale mini-grids is not working well in practice.

Recommendations

4.1 NERC should consider expanding the choice of ownership options available to an isolated mini-grid operator following the extension of the DisCo's distribution network to their area of operation. In addition, the current Article 19.2.b. of the NERC mini-grid regulations should be broadened to allow for alternative options, such as partial asset transfer (as agreed between the DisCo and the mini-grid developer) without being too prescriptive and thus stifling innovation in the sector.

4.2 Appropriate compensation should be ensured for any full or partial asset transfer which would occur if one of the envisioned ownership and business models is pursued. In addition, asset transfer considerations must be accommodated into the broader legal, regulatory, and contractual framework in the Nigeria Energy Supply Industry (NESI).

4.3 The regulations should more clearly specify the duration of the decision-making and negotiation period between the mini-grid operator and the DisCo following the announcement

[11] This is only a requirement envisaged for the period after the Tripartite Contract is signed (Annex 11).

regarding the extension of the main distribution network to the site served by a mini-grid. It is recommended that the notice period should be 12 months. During this period, the DisCo should be obliged to provide all required information to the mini-grid operator to enable them to make an informed decision regarding the future of the isolated mini-grid. This should include information on the capacity and reliability of the DisCo's distribution network.

4.4 When assessing the proposed new arrangement (asset transfer or other), NERC should consider the customers' interests. For example, suppose it is assessed that the DisCo would not be able to maintain the supply level at the time. In that case, the mini-grid operator should be permitted to continue business as usual.

4.5 The termination fee should allow the developer to repay the debt amount and equity with an appropriate return. NERC should develop a standard approach for asset transfer valuations which should cover total project costs and clarify how the depreciation of assets would be defined in the case of asset transfer. The methodology should be developed in consultation with the mini-grid community. Based on the current market characteristics, it is suggested that the depreciation should be defined as 10 years for generation assets and 25 years for distribution assets.

4.6 The current provision, whereby construction and development costs are only included in the definition of assets where a DisCo extends its distribution network within the first five years of the commissioning of the affected mini-grid, should be extended to 10 years.

4.7 The NERC mini-grid regulations should clearly state who will carry out the asset valuation for an asset transfer or compensation. A third-party assessment is recommended.

4.8 The NERC mini-grid regulations should explicitly outline that if a DisCo cannot pay the full amount required for the transfer of assets upfront, it should not be allowed to reclaim the area under any circumstances. This is unless the NERC permit for the developer is repealed for valid reasons outlined in the regulations or 15 years have elapsed. During this period, the mini-grid should be allowed to operate under business-as-usual conditions. The pending asset buyout process should not influence NERC’s decision to renew the operating license for the isolated mini-grid, in line with the procedure outlined in the mini-grid regulations.

5. Tariff-related provisions

Relevance and good practice

The key aspect in supporting the development of a private sector-driven mini-grid market is to ensure that developers, operators, lenders and investors are able to recover investment costs within a reasonable timeframe and at a margin of return on investment that is in line with the level of risk applicable to the project.[12] **The ability to apply a cost-reflective tariff is the most straightforward approach to ensuring the mini-grid project's viability and 'bankability'**. In cases where the application of cost-reflective tariffs is not allowed, a certain level of subsidy is required to ensure that developers, investors, and lenders are able to recover their investment.

From the private sector perspective, a high-level commitment to cost-reflective tariffs is insufficient to ensure their effective implementation – mini-grid regulations should clearly outline the methodology, process, and timeline of tariff approval for all categories of mini-grids. Detailed, well-defined, and transparent tariff calculation and approval processes increase the protection and lower the risk faced by mini-grid developers and investors.[13]

Differentiated tariffs can address the limited affordability to pay and encourage productive uses of energy, thus laying the ground for sustainable economic development and contributing to the Government's policy objectives. This includes applying a different tariff to specific consumer groups, using a combination of a fixed charge and a consumption-based tariff and/or differentiating tariffs based on the time of day when the electricity is used. The decision to apply a differentiated tariff should be based on site-specific characteristics and informed by up-to-date information.

Once a tariff has been negotiated and approved, it should not be changed for any reason outside of the agreed provisions for tariff review, as this would create a significant risk to the project's viability. The few exceptional factors that can instigate a tariff review include inflation and changes in currency exchange rates, as well as a change in the cost of diesel (for hybrid mini-grids). In some countries, regulations allow a tariff review upon an official request of a predetermined proportion of consumers; however, the fact that tariffs in nearby villages or urban areas are lower is not commonly considered grounds for review.[14]

[12] IRENA 2016.

[13] Ibid.

[14] IRENA 2018.

Status quo

Tariff setting. The tariff for mini-grid permit holders is set using the Multi-Year Tariff Order (MYTO) calculation model (NERC mini-grid regulations, Ch.V, 20.3.), while registered mini-grid operators can set the tariff using the MYTO tool or by an agreement between the mini-grid operator and the community (Ch.V, 20.4.). The core principles and inputs of the tariff calculation are therefore not explicitly stated within the NERC mini-grid regulations. However, Article 13.3. (Ch.III), which outlines provisions for the inspection of accounts as part of a tariff review and refers to the application of a tariff that reflects 'actual costs'. The current MYTO methodology allows the application of a cost-reflective tariff for mini-grid-supplied electricity. It is acknowledged that this has been effectively applied in practice to date. However, a **more explicit commitment to applying the principles of cost-reflective tariffs, if outlined in the regulations, would further strengthen investor confidence**.

It is also **important to ensure that the inflation and currency exchange rate fluctuations (FX changes) are considered in the setting and review of the tariffs.** Unfortunately, the current MYTO model does not seem to consider FX changes.

The current NERC mini-grid regulations do not explicitly address the subject of differentiated tariffs. However, the updated MYTO methodology allows different tariffs for different end-user groups, which is a welcome development.

An interconnected mini-grid operator would agree to a service charge with the DisCo, which would have to be approved by NERC (Ch.V, 20.1.). According to the NERC mini-grid regulations (Ch.III, 9.1.b.), the proposed retail tariff is calculated using the MYTO methodology, agreed upon by the mini-grid developer, the DisCo, and the connected community and approved by NERC. **However, it is unclear how this approach would be applied to those mini-grids shifting from an isolated to an interconnected status.**

Tariff adjustment. Article 13 (Ch.III) outlines provisions for the inspection of accounts for tariff adjustment and the assessment of the depreciation of assets. The regulations require the mini-grid operator to provide updated reports to NERC at least once every two years. **It is assumed that the MYTO model used for the initial tariff calculation would also be used for the tariff review and that all parameters could be adjusted if required.** This includes the possibility of adjusting debt service expenses; depending on the arrangement, debt service can be higher in later years compared to lower payments initially to accommodate the pick-up in demand in the first few years.

If the NERC representative confirms that the actual costs incurred – or revenue earned – deviate from the information stated at the time of the permit application, a tariff adjustment "may be approved". In that case, the new tariff would be applied within 30 days.

While the stipulated period of application of the adjusted tariff is a welcome measure, **the lack of specification of the duration of the accounts' review can lead to significant delays, thus increasing the risk of financial loss to the mini-grid developer.** Furthermore, the provision that the tariff and the calculation of the depreciated value 'may be adjusted' (13.3.b.) does not sufficiently clarify the decision-making process behind it.

A tariff review can also be initiated by the mini-grid operator or the community, in which case the respective initiating party would be required to pay NERC a flat fee of NGN 200 per customer connected to the (permitted) mini-grid in question (Ch.III, 13.7. and 13.8.). As in the case of the standard tariff review, there is no specification as to the possible duration of the review process.

There is no specific reference to interconnected mini-grids under Article 13 (Ch.III). However, Annex 11 of the NERC mini-grid regulations, which contains the template for the Tripartite Contract, includes a provision that the agreed tariff can be adjusted 'according to the procedures mentioned in the NERC mini-grid regulations' (Annex 11, 12.3.). The template agreement also envisages that NERC may inspect accounts for adjusting tariffs initiated by the community, the mini-grid operator, or NERC itself. However, the process's frequency, timing, or duration are not specified.

Recommendations

5.1 The mini-grid regulations should clearly outline the process and timeline for tariff design for isolated mini-grids interconnected in a DisCo's distribution network.

5.2 The mini-grid regulations should enable portfolio tariff applications, as proposed in the consultation paper.

5.3 The NERC mini-grid regulations should clearly outline the envisaged duration and the decision-making process of tariff reviews for both isolated and interconnected mini-grids. Regulations should also outline the implications of non-implementation of a tariff review's findings or instances where the tariff review process does not occur.

5.4 Tariff revision provisions in the NERC mini-grid regulations (Article 13.3.) should consider any significant FX changes.

5.5 The NERC mini-grid regulations (Article 13.3.b.) should indicate clearly that the tariffs will be adjusted if the assessment concludes that there are grounds for an adjustment.

6. Transfer of mini-grid permit and business

Relevance and good practice

Mini-grid development is a dynamic and evolving business in Nigeria and many other countries in Africa. In this regard, mini-grid developers, investors, and financiers continue to test innovative business and financing models that drive efficiency in the operation of their mini-grid projects. Facilitating this **innovation in some instances may require the transfer of mini-grid permit and business and the consequential transfer/novation of the project documentation (Tripartite Agreements, Community Agreements and Customer Contracts) from the original entity to another entity or a special purpose vehicle (SPV)** with a view of taking advantage of the capital, better management, or the technical skills of the owners of the other entity or SPV amongst other reasons.

Status quo

The current NERC mini-grid regulations do not contain provisions on the transfer of mini-grid permit and business, as well as the corresponding project legal documents from one entity to another, thus creating room for regulatory uncertainty. Furthermore, the Terms and Conditions outlined in NERC's mini-grid permit template contain conflicting information on this aspect, with condition number 12 indicating that mini-grid permits are not transferrable while at the same time requesting that NERC is informed of any assignment or transfer of businesses to third parties.

In the absence of clear provisions for the transfer of mini-grid permit and business, NERC has been allowing the assignment/transfer to take place in practice, yet without a uniform application of this process. **The lack of uniform rules on transfer of mini-grids in the current regulations has created a regulatory uncertainty such that applications are considered on a case-by-case basis and the documentation requested by NERC to approve a transfer in one transaction may be different in another transaction depending on the characteristics of each transaction.** NERC typically requires the entity making the transfer to make a formal application to NERC, supported with the following documents:

1. Corporate Affairs Commission incorporation documents of the transferee company;
2. Board resolution of the permit holder/transferor company approving the transfer;
3. Board resolution of the transferee company accepting the transfer; and
4. Submission of the original mini-grid permits and certificates.

In addition to this, NERC may request further documentation to be submitted to prove the technical capability/capacity of the transferee entity to operate the mini-grid projects in question. The criteria of

NERC's assessment have not been made public, which creates possibility for bias in the decision-making process.

Recommendations

6.1 NERC mini-grid regulations should include provisions on the procedure for the transfer mini-grid permit and business and the consequential transfer/novation of the project documentation (Tripartite Agreements, Community Agreements and Customer Contracts) from the original entity to another entity or a special purpose vehicle (SPV). The provisions should detail conditions for such transfer, documentation required to obtain NERC approval for the transfer, as well as any fees payable to facilitate this process.

References

Government documents

NERC (2022). Consultation Paper on Proposed Review of Regulations for Mini-grids 2016. National Electricity Regulatory Commission, Abuja.

NERC (2020). Guidelines on Distribution Franchising in the Nigerian Electricity Supply Industry. Document no. NERC/GL/1/2020. National Electricity Regulatory Commission, Abuja.

NERC (2019). Consultation Paper on developing a Regulatory Framework for Electricity Distribution Franchising in Nigeria. National Electricity Regulatory Commission, Abuja.

NERC. Guidelines for the Preparation of Performance Improvement Plans by DisCos. National Electricity Regulatory Commission, Abuja.

NERC (2016). Mini-grid Regulations. National Electricity Regulatory Commission, Abuja.

NERC (2015). Regulation for Investment in the Electricity Networks. National Electricity Regulatory Commission, Abuja.

REA (2016). Rural Electrification Strategy and Implementation Plan. Nigeria Rural Electrification Agency, Abuja.

Reports

AMDA (2020). Benchmarking Africa's Mini-grids.

Energy Sector Management Assistance Program (ESMAP). 2022. Mini Grids for Half a Billion People: Market Outlook and Handbook for Decision Makers. Washington, DC: World Bank.

Franz, M., Peterschmidt, N., Rohrer, M., Kondev, B. (2014). Mini-grid policy toolkit: Policy and business frameworks for successful mini-grid roll-outs. EUEI-PDF/GIZ: Eschborn.

Graber, S., Mong, P., and Sherwood, J. (2018). Under the Grid: Improving the Economics and Reliability of Rural Electricity Service with Undergrid Minigrids. Rocky Mountain Institute.

Graber, S., Adesua, O., Agbaegbu, C., Malo, I., and Sherwood, J. (2019). Electrifying the Underserved: Collaborative Business Models for Developing Minigrids Under the Grid. Rocky Mountain Institute.

IRENA (2018). Policies and regulations for renewable energy mini-grids. International Renewable Energy Agency, Abu Dhabi.

IRENA (2016). Policies and regulations for private sector renewable energy mini-grids. International Renewable Energy Agency, Abu Dhabi.

SE4All (2020). State of the Global Mini-grids Market Report 2020. Sustainable Energy for All.

Tenenbaum, B., Greacen, C., Siyambalapitiya, T., Knuckles, J. (2014). From the Bottom Up How Small Power Producers and Mini-Grids Can Deliver Electrification and Renewable Energy in Africa. World Bank, Washington DC.

USAID (2017). A practical guide to the regulatory treatment of mini-grids. National Association of Regulatory Utility Commissioners (NARUC), Washington DC.