

REPORT

Rethinking Net Billing: Why Nigeria's Prosumer Framework Falls Short of Ending Residential Generator Dependence

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Abstract

Nigeria’s persistent electricity deficit has entrenched widespread reliance on petrol and diesel generators in residential areas, with significant economic, environmental, and public health consequences. Recent reforms, particularly the Draft Net Billing Regulations 2025 issued under the Electricity Act 2023, signal a shift toward enabling prosumer participation through distributed renewable energy systems. This policy brief evaluates whether the emerging net billing framework can catalyze residential solar adoption and reduce generator dependence.

While the regulation establishes a formal mechanism for grid-connected prosumers, it remains structurally limited in achieving widespread residential uptake. High entry thresholds, weak financial incentives, and complex administrative requirements constrain participation primarily to commercial users. The brief argues that without targeted reforms, the framework risks enabling a narrow market segment while leaving the broader residential energy challenge unresolved.

1. Introduction

Nigeria's national power grid has become a symbol of the country's energy crisis.[1] Despite being Africa's largest economy, Nigeria struggles with persistent blackouts stemming from repeated grid failures, paralyzing households, businesses, and industries. In recent years, grid collapses have become almost routine, with the entire nation experiencing multiple incidents annually, undermining hopes of a stable and reliable power supply. Despite an installed capacity exceeding 13,000 MW, available generation remains far below demand (at 3200 MW, or 3.2 GW), forcing households to rely heavily on petrol and diesel generators. This has created a parallel energy system that is costly, inefficient, and environmentally harmful.[2]

Small-scale residential prosumer models are not only operational but central to the European Union's energy transition, providing a useful benchmark for evaluating Nigeria's emerging framework. Under the Electricity Directive (EU) 2019/944,[3] households are recognized as "renewable self-consumers" and "active customers," with rights to generate, consume, store, and sell electricity individually or collectively. These provisions have enabled widespread deployment of small-scale (1–10 kW) rooftop solar systems through mechanisms such as feed-in tariffs, net billing, and collective self-consumption, supported by simplified administrative procedures and predictable compensation schemes.[4] In contrast, Nigeria's current regulatory trajectory, characterized by higher entry thresholds and more complex compliance requirements, suggests that regulatory design, rather than technological feasibility, remains the primary constraint to scaling residential prosumer participation.

In response to long standing challenges in the electricity sector, reforms under the Electricity Act (EA) 2023 have sought to decentralize the market and create space for distributed energy solutions. A key development is the introduction of the Draft Net Billing Regulations 2025[5] by the Nigerian Electricity

Regulatory Commission (NERC), which establishes a framework for integrating renewable energy systems at the customer level. The regulation enables electricity users to generate power for self-consumption while exporting excess energy to the grid under a credit-based compensation mechanism.

This development marks an important institutional shift from earlier policy approaches that focused primarily on rural electrification through mini-grids and standalone systems. However, the critical policy question is no longer whether a prosumer framework is needed, but whether the current net billing regime is sufficiently designed to drive widespread residential adoption and reduce dependence on fossil fuel generators. This policy brief argues that, while the Net Billing Regulations represent a significant step forward, they fall short of addressing the structural barriers that limit residential participation, thereby constraining their effectiveness in achieving a meaningful transition away from generator-based electricity supply.

2. Structural Problem: A Generator-Dependent Residential Market

Due to the unreliable electricity supply from the national grid, Nigerians spend an estimated NGN five (5) trillion (US$14 billion) annually on the generation of power using small petrol or diesel generators that are both expensive and release harmful emissions into the environment. There are about 20 GW of small diesel-powered generators in daily operation in Nigeria, five times the capacity of the on-grid generation supply. As a measure of the scale of the use of generators, research has found that backup power generation in Nigeria produces carbon dioxide emissions equivalent to 60% of its annual electricity sector emissions.[6] Theses emissions pose negative challenges such as air and noise pollution as well as economic impacts for households in residential areas.

Nigeria has the largest potential off-grid electrification market in Africa.[6] Mini grids and Solar Home Systems (SHS) have emerged as one of the key solutions to electrify rural areas, to meet the growing demand and as a cost-effective solution

to reliable energy. The Regulation divides mini grids into two: Isolated Mini-grid (capacity < 1MW) and Interconnected Mini-grid (capacity up to 1MW). In urban areas, SHS are less common since many households still have access to grid power (albeit unreliable), and diesel generators remain prevalent. In middle-income urban neighborhoods, some households adopt solar as backup power or for cost savings, but penetration remains lower than in rural settings.[7]

Mini grids and SHS deployment in Nigeria are concentrated in off-grid rural communities, where grid electricity is unavailable or highly unreliable. Although successful in rural areas largely due to their standalone nature, they have not gained much traction with grid integration. In urban settings, where generator use is highest, uptake is limited due to lack of grid-integrated prosumer frameworks (historically), weak financial incentives for solar investment, and regulatory focus on mini-grids rather than residential systems. This creates a structural gap: urban households remain locked into generator dependence despite the availability of cleaner alternatives.

3. Net Billing as a Policy Response

Prosumers are active energy users who both consume and produce energy from renewable energy sources (RES). Prosumers may be households, businesses or communities whose primary business is not energy generation. Different models have been proposed for prosumers. The underlisted are specifically applicable to solar home systems.[8][9]

Implicit Demand Flexibility (IDF): Prosumers adjust consumption patterns in response to price signals embedded in electricity tariffs (like time-of-use tariffs or dynamic tariffs). There's no formal market participation and no direct remuneration, but prosumers reduce their bills by shifting usage to off-peak, lower-cost periods. It is the simplest and most accessible form of flexibility for prosumers, requiring no additional contracts or intermediaries. This provides a passive model of participation where cost savings are realized by shifting load.

Explicit Demand Flexibility (EDF): Prosumers actively modify consumption or generation in response to market signals and are remunerated for providing flexibility to the grid. Under this model, households sign up to reduce demand during peak periods in exchange for payments. This is typically mediated through contracts with aggregators, distribution companies (DisCos), or Transmission System Operators (TSos).

Self-Consumption and Collective Self-Consumption:

- Self-Consumption: Prosumers install rooftop PV (or other renewable generation) and use the electricity themselves, reducing their dependence on the grid. Surplus energy can be compensated through net metering-like schemes or sold at agreed tariffs (not full retail price) to the grid or retailer.

- Collective Self-Consumption: A group of prosumers (e.g., apartment dwellers, energy communities) share a renewable installation and split the output proportionally. The concept of collective self-consumption is often framed as 'local energy sharing.

The draft Net Billing Regulations define "Prosumer" as a 'user within the supply area of a Distribution Licensee who has a commissioned Net Billing Arrangement with the Distribution Licensee.'[10] The Draft Net Billing Regulations establishes a formal framework for prosumer participation by enabling customers to export excess renewable energy and receive compensation through a credit-based billing system.[11] The regulation defines a "Net Billing Arrangement" as a mechanism through which exported energy is credited against electricity consumption over a billing period.[12] It also introduces a structured commercial framework, including billing formulas where energy exported and consumed are calculated separately and netted to determine the final payable amount.[13] Importantly, the regulation clarifies that the tariff for injected energy may differ from the retail tariff, reinforcing a net billing (rather than net metering) model.[14]

4. Regulatory Gap Analysis

Entry thresholds and market access: The regulation applies only to systems with a minimum installed capacity of 50 kW, rising to 5 MW per user[15] which effectively excludes small-scale residential systems. In contrast, EU regulations are deliberately designed to accommodate household-scale installations, with no restrictive minimum thresholds imposed on participation.

This distinction is not merely technical but structural. By lowering barriers to entry, EU frameworks enable mass participation of households, thereby scaling distributed generation organically. Nigeria's threshold, by comparison, positions prosumer participation as a commercial or industrial activity, disconnecting the policy from the segment most affected by generator dependence.

Compensation mechanisms and investment incentives: The incentive structure embedded within Nigeria's net billing framework is structured primarily toward protecting utility revenues rather than maximizing prosumer participation. Under the Draft Net Billing Regulations Nigeria 2025, exported electricity is compensated at a tariff below the retail price and credited against future consumption,[16] limiting the financial returns available to residential users. This contrasts with the European experience, where early compensation models such as net metering and feed in tariffs were deliberately designed to accelerate prosumer uptake by offering strong and predictable investment incentives. Evidence from the European Parliamentary Research Service indicates that prosumers in the EU can reduce electricity bills through self-consumption while selling excess energy to the grid, although this has introduced challenges for traditional utilities due to reduced electricity sales.[17] As prosumer penetration increased, EU frameworks began to rebalance incentives through market-based mechanisms, including feed-in premiums and tariff reforms, to address utility revenue erosion and cross-subsidy concerns.

In contrast, Nigeria's approach reflects a precautionary regulatory stance that prioritizes grid stability and DisCo financial viability from the outset, but in doing so weakens the economic case for small-scale solar adoption. The result is

a structurally constrained incentive environment that is unlikely to drive widespread residential participation without complementary measures to enhance financial attractiveness.

Administrative and Technical Complexity: Participation in the net billing framework requires a multi-step approval process, including application submission, technical feasibility studies, regulatory certification, and inspection by relevant authorities.[18] These requirements, while necessary for system integrity, impose significant transaction costs that are impractical for small scale residential users.

Equity and Inclusion Gaps: The framework does not include explicit provisions to support low income households or vulnerable groups. As a result, participation is likely to be skewed toward higher-income users with the financial capacity to invest in solar systems, thereby reinforcing existing inequalities in energy access.

5. Policy Implications and Recommendations

The Net Billing Regulations represent a foundational step in enabling prosumer participation. However, their current design limits their effectiveness in addressing residential generator dependence. Instead, they risk creating a prosumer market concentrated among larger, commercially viable users. To align the framework with residential energy transition goals, NERC should:

1. Introduce a small-scale prosumer category: remove capacity thresholds participation requirements for households.
2. Adopt hybrid compensation mechanisms: introduce partial net metering or preferential tariffs for small-scale systems.
3. Simplify administrative procedures: streamline approval processes and reduce compliance burdens for residential users.
4. Introduce targeted incentives: provide subsidies, concessional financing, and genderinclusive participation mechanisms.
5. Align tariff structures with distributed generation: introduce fixed network

charges to ensure DisCo cost recovery while enabling prosumer growth

6. Conclusions

The Draft Net Billing Regulations Nigeria 2025 marks a critical step in enabling prosumer participation in Nigeria's electricity market. However, its current design limits its effectiveness in addressing residential generator dependence. To achieve this, Nigeria must transition from a grid protection model of prosumer regulation to a market-expansion model, where accessibility, incentives, and inclusivity are central design principles.

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[10] Draft Net Billing Regulations, p 6, (definition section)

[11] ibid s3, p 4

[12] ibid Page 6

[13] ibid, pp 14–15 (Billing formulas and calculations)

[14] ibid, p 5 (Injected Energy Tariff definition)

[15] ibid, s 5, p 7

[16] ibid, s 10, p 14; s 11, p 15

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[18] Draft Net Billing Regulations, s 7, pp 8–11

About IAP

Integrated Africa Power (IAP) is a multi-unit enterprise specialized in energy and infrastructure development on the African continent. We seek to solve Africa's energy deficits, through integrated systems solutions, resource pooling and cross-border cooperation. Our approach is based on our philosophies of tailored suitability, cost-effectiveness, sustainability and energy-development linkages.

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