LEGAL AND REGULATORY FRAMEWORK AND OPPORTUNITIES FOR OFF-GRID POWER GENERATION IN NIGERIA

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Detail Commercial Solicitors
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OUTLINE

✓ On-grid power generation

✓ Off-grid potential

✓ Challenges with off-grid generation

✓ Way forward

✓ Questions
On-grid Power Generation
On-grid Power Generation

Source: NCC Daily operation report

Access to Electricity - ~ 55% (~ 78% in urban areas; <40% in rural areas)

<table>
<thead>
<tr>
<th>Fact sheet as of 2\textsuperscript{nd} October, 2017</th>
<th>Megawatts (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Generation Capacity</td>
<td>~13,400</td>
</tr>
<tr>
<td>Available Generation Capacity</td>
<td>7046.8</td>
</tr>
<tr>
<td>Units on Bar Capability at peak</td>
<td>4746.8</td>
</tr>
<tr>
<td>Peak Generation to date</td>
<td>5074.7</td>
</tr>
</tbody>
</table>
On-grid Power Generation

CURRENT ISSUES WITH ON-GRID POWER GENERATION

➢ Lack of cost reflective tariffs
  ➢ Liquidity issues – disincentive for investment
  ➢ Aversion to tariff adjustments – Consumer groups, MAN’s petition, Toluwani Adebiyi case etc.

➢ Significant shortfall
  ➢ Over N450bn tariff shortfall (between Feb 2015 and Dec 2016)
  ➢ Sector will require about $1.5 billion annually for the next 5 years to achieve viability

➢ Foreign exchange issues
  ➢ indexed at N198/$1 in MYTO; as compared to ~N367/$1 in the parallel market

➢ Electricity theft
  ➢ Lack of specific legislation on electricity theft
  ➢ E.g. Port Harcourt Disco estimates losing up to N238 billion monthly to electricity theft
On-grid Power Generation

➢ Transmission issues

➢ High technical losses; Funding issues; infrastructure issues;

*Transmission System Collapse report (2017)*

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Collapse</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Partial Collapse</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

➢ Gas Issues

➢ Gas pricing ($2.50/MMBtu gas price; $0.80 transport price); gas flaring; infrastructure issues; pipeline vandalism; uncertainty as to fiscal framework under PIB

➢ Non-bankability of commercial agreements

➢ Partial operation of TEM-8 out of 11 Vesting Contracts activated; activation of PPAs – no NBET bank guarantees (NBET Trust Deed); GSA – not effective; GTA – Effective, not yet activated

➢ Disco Issues

➢ Infrastructure issues; Metering Gap; Operational challenges; Funding capex requirements
Off-grid Potential
Off-grid Potential

Current Off-grid generation profile as approved by NERC

- Approved off-grid electricity generation capacity is 433.37MW
- Approved capacity for embedded electricity generation is 133MW.

Rural Electrification

- An estimated average of US$2 billion dollars is required annually until 2030, to achieve 100% penetration rate of rural electrification in Nigeria.
- REA goal is to increase access to electricity to 75% by 2020 and 90% by 2030
- Rural electrification fund to come on stream by the end of 2017 with N2billion
<table>
<thead>
<tr>
<th>S/N</th>
<th>REGULATION</th>
<th>HIGHLIGHTS – OFF GRID PERSPECTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>▪ Possibility of selling excess power, subject to NERC’s approval</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Predictability and stability of Power Supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Fewer regulatory hurdles</td>
</tr>
<tr>
<td>2.</td>
<td>Embedded Power Generation, (2012)</td>
<td>Generation unit directly connected to and evacuated through a distribution network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Possibility of selling excess power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Reduced losses and reduced cost of transmission infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Ability to negotiate tariff, subject to NERC’s approval</td>
</tr>
<tr>
<td>3.</td>
<td>NERC Independent Electricity Distribution Network Regulations (2012)</td>
<td>Distribution network which may be Isolated off-grid Rural; Isolated off-grid Urban; Embedded IEDN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Guarantees wider access to electricity in areas unserved by Discos, or areas underserved by Discos</td>
</tr>
</tbody>
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### Off-grid Potential – Key legislations and highlights

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| 4.  | NERC Renewable Energy Feed-in-Tariff Regulations (2015) | Provides for minimum guaranteed price per unit of electricity produced, with a view to ensuring recoupment of investment  
▪ Wind, small hydro, bio mass and solar are eligible  
▪ Covers 1-30MW (depending on the type of renewable being utilized), unless through solicited bids, as approved by NERC  
▪ Guaranteed market - 50% by Discos through embedded generation; remaining 50% by NBET  
▪ Commitment to maximum cap of 2000MW by 2020  
▪ Simplified licensing process |
| 5.  | NERC Mini Grid Regulations, (2017) | Regulation to accelerate electrification in unserved and underserved areas  
▪ May be interconnected or isolated mini-grids  
▪ Permit is optional for Mini Grids with distributed power of 100kw and below; Simplified process  
▪ Permit compulsory for distributed power of over 100kw, and generation capacity up to (and not more than) 1MW  
▪ Tariffs to be higher than Disco retail tariffs  
▪ Standardized template Agreements  
▪ Compensation Mechanism for operators with Mini grid Permits |
## Off-grid Potential – Key legislations and highlights

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<td>6.</td>
<td>Ministerial directive on Eligible customers (2017)</td>
<td>4 categories of end users can buy directly from Gencos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ End users whose consumption is no less than 2MW/hr connected to 11kV or 33kV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ End users connected to 132kV or 330kV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ End users with consumption over 2MW/hr every month, connected to a 33kV line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ End users with consumption over 2MW/hr for 1 month and connected to the meter of a Genco</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Increased liquidity for the generation companies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Increased investment in distribution infrastructure</td>
</tr>
</tbody>
</table>
Off-grid potential

Available Opportunities

➢ Powering of government facilities

➢ Public Private Partnerships with state governments

➢ Potential to grow industrial clusters and small cottage industries

➢ Opportunity to power residential premises and clusters

➢ Rural electrification
  ➢ Opportunity to use mini-grids and stand alone systems to power rural areas

➢ Captive power generation for industries
  ➢ Lafarge, Flour Mills, Tower Aluminum, Cadbury
Off-grid potential

- **Opportunity to expand and refurbish distribution networks**
  - Independent Electricity Distribution Networks
  - Expansion of Disco networks through embedded generation and interconnected mini-grid

- **Opportunity to explore renewables**
  - **Solar:** Nigeria has an estimated 485.1 million MWh/day of solar; 6.2 hours of daily sunlight;
  - **Biomass:** Waste, woods, plants, agricultural products, converted to energy;
  - **Wind:** Northern Nigeria, especially Katsina possesses highest average wind speed at 5.12 meter per second, annually
Examples of common off-grid stand alone solutions

➢ MTN Lumos Mobile (Nigeria)

Lumos Mobile is also a pay-as-you-go smart solar service (SHS) that allows customers access solar power under an affordable payment plan via mobile phone.

➢ Arnergy SRS (Nigeria)

The Arnergy SRS is a Solar Rental System that allows consumers install affordable solar panels and pay on a daily or monthly basis for only the power they consume. It is designed for communities in rural areas and so, their payments structure is flexible.
Examples of common off-grid technologies

➢ **Azuri PayGo Solar Home System (Nigeria)**

Azuri is a Pay-as-you-go solar home system which enables customers in rural area’s access to electricity. The system has the capacity to power four LED bulbs providing up to 8 hours of lighting, a radio and a USB port with charging cables for mobile phones.
Challenges with Off-Grid Generation
Challenges with Off-Grid power generation

➢ Regulatory Framework
  ➢ Uncertainty and lack of clarity in the off-grid legal framework
  ➢ No regulation specifically covering Off-grid IPP generation (save for mainly Captive, Mini Grid and Embedded regulations)
  ➢ Unclear whether isolated urban IEDNs can exist within a DISCOs franchise area;
  ➢ Unclear whether a captive generator can easily convert its permit to embedded generation license/generation license to sell excess power
  ➢ Substantial discretion with the regulator

➢ Resistance or objections from existing monopolies
  ➢ How does NERC balance the interest of the developers and existing monopolies

➢ Technology Gap and lack of skilled man power
  ➢ In terms of operating and maintaining renewable technologies, especially solar

➢ Off-taker credibility
  ➢ Major issue with off-grid solutions

➢ Access to financing
  ➢ High cost of capital; Procurement of long term financing
Way Forward
Way Forward

➢ Certainty in regulatory framework for off-grid power generation

➢ Development of human capacity and technological know-how

➢ Increased incentives, including government support, tax incentives and reliefs to encourage investment

➢ Issuance of Electricity Theft Legislation

➢ More participation of State Government in off-grid projects

➢ Active creation of energy efficiency awareness and customer responsibility

➢ NERC’s provision of interim permit for captive generators to sell excess power; to avoid stranded power

➢ Government’s facilitation of funding for off-grid projects

➢ Prompt establishment of Rural Electrification Fund
THANK YOU
QUESTIONS