



## *Scoping Study Executive Summary*

# Niger Delta Electricity Value Chain



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*The Niger Delta Partnership Initiative, NDPI, engaged DAI's Extractives Group to conduct this study of the electricity value chain in the Niger Delta, which included support from the Stakeholder Democracy Network NGO. Work was completed between October 2014 and January 2015 in Nigeria, the United States, and the United Kingdom. It culminated in a synthesis workshop held on January 26-27, 2015 in London.*

## Executive Summary

Nigeria has experienced an average 8 percent GDP growth over the last decade.<sup>1</sup> It is the largest exporter of oil in Africa and holds the continent's largest proven reserves of natural gas.<sup>2</sup> However, an estimated 100 million Nigerians (or approximately 65 percent of the population) do not have access to electricity.<sup>3</sup> In other words, they are neither connected to the national grid nor own a means of generating power themselves. As a result, households and businesses must forego electricity consumption or rely on forms of self-generation which are nearly always more costly than reliable grid energy. The result is an estimated at \$80 billion USD cost to the economy per annum (with some estimates of loss as high as \$250 billion annum).<sup>4</sup>

Improved access to dependable electricity for industry, business, micro-enterprises, and households, coupled with other enabling factors, increases economic growth, generates meaningful employment and entrepreneurial opportunity, and produces an overarching higher quality of life as measured by the United Nations' Human Development Index.<sup>5</sup> The Nigerian energy sector is therefore directly linked to one of the Niger Delta Partnership Initiative's (NDPI's) primary goals—to promote market-driven expansion of pro-poor economic opportunities in the Niger Delta.<sup>6</sup> Given the potential positive impact that improved access to electricity would have on its stakeholders in cities and rural environments alike, NDPI and its Nigerian partner, the Foundation for Partnership Initiatives in the Niger Delta (PIND), have partnered with DAI's Extractives Group to deliver a Scoping Study that establishes a reliable foundation of information on the current market dynamics of the power sector in the Niger Delta. The core objective of this analysis is to identify opportunities (if any) for NDPI and PIND to engage in this sector and help bridge the gap that is currently a strong impediment to private sector market growth and productivity. Depending on the information uncovered, this analysis could inform and put finer shape to subsequent PIND-driven activities.

Despite internal and external pressures for large-scale reform and investment in the power sector in Nigeria, power supply continues to be significantly inadequate relative to the country's economic growth potential. This is true throughout the country and in particular the Niger Delta. Despite the recent privatization efforts and some of the successes that are starting to bear fruit (new external private investment in the Azura Independent Power Project as an example), progress remains slow and frustrations amongst the private sector high.

### *ON AND OFF GRID ELECTRICITY IN THE NIGER DELTA*

Even as market reforms have occurred over the last ten years, the national grid remains dominated by the public sector. Transmission remains in the domain of the public sector through the Transmission Company of Nigeria, and distribution has not yet shifted to the Transitional

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<sup>1</sup> World Bank, 2014

<sup>2</sup> US EIA, 2012

<sup>3</sup> World Bank, 2014, USAID, 2014

<sup>4</sup> CSL Stockbrokers, 2014

<sup>5</sup> UNDP, 2014

<sup>6</sup> NDPI, 2014

Electricity Market (TEM) stage of Nigeria's ongoing privatization process. Distribution is challenged by poor levels of collections and inconsistent (and sometimes non-existent) metering. As such, financial losses for companies and public sector entities are common and payment risk a constant shadow limiting deeper private sector investment at all levels of the production-to-consumption value chain. The political economy of the sector is equally complex and results in disappointing levels of progress as measured against the stated government goals. This is especially true now as Nigeria heads into the 2015 election period which is expected to further delay much-needed sector investment and reform. Multilateral development partners, bilateral donors, and large institutional investors such as banks and infrastructure funds and operators, will continue to play key roles in the development of the infrastructure and emerging market mechanisms in the formal on grid power context.

Off grid segments of the sector supplement power supply to a material extent in Nigeria in general and the Niger Delta in particular. Most estimates agree that off grid generated power is equal or greater to on grid actual power supply at peak times. A significant degree of this off grid electricity is self-generated from costly, loud, and inefficient small and medium diesel generators. They are also inefficient in providing power to an aggregate number of off grid consumers. Non-diesel alternative off grid power generation solutions exist yet have not produced the expected results regarding scalability and commercial viability. Limited information on the precise cost build up in the off grid value chain restrains the ability to identify exact opportunities. However, due to the diversity in which commercial, residential, community, and other electricity off-taker groups rely on off grid alternatives to unreliable grid power, there are some contexts in which NDPI, PIND, and other partners can further explore means to foster or catalyze improvements in reliable and quality electricity access.

One particular segment that the report identifies that could present opportunities for greater investment, new business models, or commercially viable electricity provision are clusters of existing economic activity that are geographically isolated from the national grid, and which will likely remain so into the foreseeable future. Under such circumstances, off grid solutions such as a micro-grid that distributes electricity from a generation plant < 1 MW or a regulated independent electricity distribution network may be commercially feasible.

#### *SCOPING STUDY OUTLINE AND GOALS*

The report explores the following topic areas separated into five sections covering Nigeria and the Niger Delta states specifically: an overview of power sector actors, electricity supply and demand, the on grid electricity value chain, the off grid electricity value chain, and conclusions for NDPI and PIND moving forward in this context.

The goals of this study are to inform future potential NDPI and PIND programming in the Niger Delta power sector through investigating, analyzing, and drawing conclusions on the sector's fundamental dynamics in relation to the national grid and formal privatization context, off grid solutions, and self-generation. Where might there be opportunities for new approaches, business models, or commercially viable investment that will improve electricity access and help establish a greater foundation for pro-poor economic growth in the Niger Delta.

#### *POTENTIAL ENGAGEMENT AREAS FOR NDPI/PIND NEXT STEPS*

Below we set out conclusions and recommendations for potential follow on engagements within the segments identified by the scoping study:

**Segment 1: Areas of economic activity that lack power and will remain isolated from the electricity grid for the foreseeable future (as long as 20-25 years).** Such self-generation dependant business and residential geographic clusters, would provide potentially attractive and commercially viable business models to improve electricity access. They would display a strong pattern of economic activity, growth, and existing commercial demand for electricity.

**Segment 2: Areas of economic activity that are connected to the national grid but who are under-served.** Some customers may be economically indifferent to electricity loss or not interested in alternatives; while other off-takers suffer significant economic loss and are willing to consider alternatives. A commercially viable business model could be developed if appropriate parameters suggest that it would provide affordable electricity for off-takers (relative to their own economic contexts), which would also entail investment recovery and a reasonable return from the investing entity.

**Segment 3:** Three cluster groups fall into this segment that are not likely to be attractive targets for pilot electricity investment activities. **They are on grid customers with good electricity access, electricity off-takers in the proximity to IOC operations, and isolated communities currently without any direct access to electricity.** In differing ways, each group presents a number of barriers to commercial entry, technical and other risk factors, and/or significant regulatory complexities.

As clusters of economic activity are identified geographically, the DAI team recommends the following areas of research and analysis to advance NDPI's decision-making process for future activities:

1. **Cluster Selection:** initial analysis on potential clusters and working to select specific clusters for studying according to key criteria.
2. **Political Economy Analysis (PEA):** establishing a reliable understanding of the political-economy related to the power sector in the Niger Delta with a focus on mapping the stakeholders involved in the provision, transmission, distribution and consumption of electricity in the proximity of our selected clusters.
3. **Cluster Mapping:** completing a cluster-specific GIS mapping overlay (augmenting with existing open source GIS map data) to visually display the proximity of focus clusters relative to existing and planned on grid systems.
4. **Cluster Power Demand Analysis:** carrying-out surveys within each sector to understand the access, provision, cost, consumption and demand for electricity; and to get a clearer view of the business activity in each cluster (e.g. firm size, growth, sector, female-owned/managed businesses).
5. **Additional supporting sector analyses:** this component will include a brief study of three areas: (a) financing mechanisms and existing local financing options for model off-grid investments; (b) review of the existing regulatory and institutional environment for the Niger Delta and with details specific to each cluster; and (c) overview of possible technological solutions that may be applicable for these clusters (solar, gas, diesel, etc.). Case studies would examine existing off grid electricity projects in the Niger Delta.

This work is now underway as of May 2015, with further information dissemination to key partners, stakeholders, and other interested parties.

# Acknowledgements

During this scoping study on the electricity value chain in the Niger Delta, the DAI and SDN team interviewed more than fifty individuals from across the on and off grid electricity value chains; representing major companies, Nigerian government institutions, international donors, private sector companies, and local communities. The analysis also benefitted from high levels of technical guidance and participation from NDPI, Partnership Initiatives in the Niger Delta (PIND) senior management, Chevron Gas (based in Houston, Texas), and the PIND Economic Development Center team in Nigeria.

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