SPARKING A SPREAD?
REGULATORY EFFORTS TO STIMULATE INDEPENDENT POWER IN NIGERIA

KEITH D. LARSON[1]

ABSTRACT

Nigeria suffers from an inadequate supply of reliable electric generating capacity that is exacerbated by the relative absence of independent power projects. This article discusses the evolution of Nigeria's electric power industry and the recent regulatory initiatives designed to reduce government ownership and stimulate private investment in the context of severe power shortages. While well-structured regulatory reforms promise to eventually transform Nigeria's power sector into a profitable and competitive, privately-owned industry, certain significant barriers continue to impede the proliferation of independent power in Nigeria. Industry-wide, government-led structural programs that prioritize the fair and timely payment for the generation of electric power should support increased private investment in Nigeria's power sector, attract third-party financing and accelerate sector growth.

1. Mr. Larson is a partner resident in the Washington, D.C. office of Hogan & Hartson LLP. The views expressed in this article are those of the author alone. They do not reflect the views of Hogan & Hartson LLP, or any of its individual partners, counsel, associates or clients.

I. INTRODUCTION

Plagued by insufficient maintenance, poor transmission and distribution networks, inadequate revenue collection, corruption and vandalism, Nigeria's electric power industry has historically been incapable of meeting the needs of Africa's largest and most populous nation.[2] Recent surveys estimate that Nigeria's power sector operates at approximately fifty percent of its installed capacity, and seasonal variations affecting the country's hydroelectric power facilities typically reduce that percentage further.[3] Where available, electricity service is erratic, and those who can afford a privately installed generator rely on it to sustain continuous electricity supply.[4]

Ironically, the country's most reliable source of generation – independent power – is also its smallest.[5] Given that many of the prerequisites for a successful independent power project exist in Nigeria, the country's inability to attract independent power producers and other project developers may not be easily understood. Indeed, Nigeria's demand for electricity significantly exceeds current supply, particularly in the larger cities of Lagos, Port Harcourt and Kaduna. The country's population, already the world's ninth largest, is expected to grow substantially over the next several decades, triggering demand for additional electric power.[6] Unlike other emerging market economies

2. Yemie Adeoye & Gabriel Abatan, *Nigeria: Power Generation – 7,250 MW to Come Through JV-LOC, IPPs*, VANGUARD (Lagos), Mar. 6, 2007, at 3. Nigeria has a population of approximately 135 million people. CENTRAL INTELLIGENCE AGENCY, THE WORLD FACT BOOK, *available at* https://www.cia.gov/library/publications/the-world-factbook/geos/ni.html (last visited July 25, 2007).

3. BUREAU OF PUB. ENTERPRISES, POWER IN NIGERIA 3 (2006), *available at* http://www.bpeng.org/NR/rdonlyres/80D919EC-2540-4E0F-A7A2-892989CC977A/0/PowerinNigeria.pdf; Patrick Ugeh, *Blackout to Worsen as Power Generation Drops*, THIS DAY (Nigeria), Feb. 11, 2008, at 3.

4. *See generally* CHINUA ACHEBE, THE TROUBLE WITH NIGERIA 20 (1983). A common demand of underprivileged groups in Nigeria is a private generator. THE SHELL PETROLEUM DEV. CO. OF NIGERIA LTD., SHELL NIGERIA ANNUAL REPORT 2006 9 (2007), *available at* http://www.shell.com/static/nigeria/ downloads/pdfs/2006_shell_nigeria_report.pdf.

5. *See* Table 1 *infra*. *See also* Press Release, Netherlands Dev. Fin. Co. (FMO), Int'l Fin. for Nigerian Energy Facility (2004), http://www.fmo.nl/en/recent/pressitem.php?id=34.

6. Nigeria's population is expected to grow to over 220 million people by 2030. POPULATION

which lack natural resources or a natural port to import fuel stocks, Nigeria has vast untapped natural gas resources (as well as coal and hydro resources) with which to supply electric generating facilities.[7] While power projects are capital intensive, foreign banks and financial institutions have not been categorically adverse to Nigerian project financings[8] and could therefore feasibly consider lending to privately-owned Nigerian power projects as well.

To meet current demand forecasts, Nigeria needs to develop and commission 15,000-20,000 megawatts (MW) of reliable power generation over the next several years.[9] Regrettably, the federal government's past practice of developing power stations has proven neither efficient nor productive,[10] and President Umaru Musa Yar'Adua has publicly expressed that the federal government will cease using funds in Nigeria's behemoth excess crude oil account to fund power generation investments.[11] In 2005, key regulatory reforms were enacted in part to increase the scope of private investment in the power sector; recognizing the critical role that independent power projects could play in achieving this target. However, while a solid foundation of electricity deregulation may provide some stability, it is doubtful that the 2005 reforms alone can achieve the intended results. As discussed herein, additional structural initiatives are required to spark the spread[12] of a sustainable and financeable privately-owned independent power industry in Nigeria.

DIV. OF THE DEP'T OF ECON. AND SOCIAL AFFAIRS OF THE U.N. SECRETARIAT, WORLD POPULATION PROSPECTS: THE 2006 REVISION AND WORLD URBANIZATION PROSPECTS: THE 2005 REVISION, *available at* http://esa.un.org/unpp/p2k0data.asp.

7. Nigeria has the tenth largest proven gas reserves in the world. INT'L BANK FOR RECONSTRUCTION AND DEV., PROJECT APPRAISAL DOCUMENT FOR A NATIONAL ENERGY DEVELOPMENT PROJECT 30 (2005), *available at* http://www.worldbank.org (select "documents" in pull-down search menu and search "Nigeria—National Energy Development Project"; select Report No. 32164).

8. *See*, *e.g.*, Netherlands Dev. Fin. Co. (FMO), *supra* note 5 (detailing project financing of AES barge generation project); Frederic Blanc-Brude, *Is Nigeria Liquid*, 65 INFRASTRUCTURE J. 17-22 (2003) (describing project financing of two liquefied natural gas processing trains); Onvebuchi Ezigbo & Kingsley Nwezeh, *Austria to Invest $5bln in Nigeria's Energy Sector*, THIS DAY (Nigeria) (Dec. 21, 2005), *available at* http://www.thisdayonline.com/nview.php?id=36289 (last visited July 25, 2007) (describing non-recourse bank financing for satellite oil field development).

9. Olusola Bello, *Nigeria needs N1.9trn for power generation*, BUS. DAY, May 8, 2007, at 16.

10. Estimates of the amount spent on the country's power sector during the eight-year reign of President Obassanjo range from $10 billion to $16 billion, epitomizing what the Chairman of the House Committee on Power and Steel, Ndudi Elumelu, has described as "the classic mystery in Nigeria's development whereby the more you spend on power, the less electricity you get." Stanley Nkwazema, *Power Sector: Obassanjo Spent $16bn, Not $10bn – Bankole*, THIS DAY (Nigeria), Feb. 7, 2008, at 4.

11. *Nigerian Gov't to Stop Funding Power Plants*, THE GUARDIAN (Nov. 2, 2007), *available at* http://www.ngrguardiannews.com/ArchiveIndex07_html?pdate=021107 (last visited Mar. 3, 2008).

12. The term "spark spread" describes the positive difference between the price of electricity in a given market and the cost (typically reflected in the price of natural gas) required to generate such electricity. The existence of a spark spread implies that the sale of electricity from electric generation facilities producing electricity for sale is profitable.

This article discusses the challenges facing the Nigerian electricity sector and reviews some suggested structural improvements designed to attract new independent power projects and other private investment. Part II provides an overview of the electricity sector in Nigeria and examines its evolving regulatory framework. The key post-reform obstacles to independent power development in Nigeria are examined in Part III. Part IV discusses some proposed, industry-wide enhancements that could potentially accelerate private investment in Nigeria's power sector, while Part V offers some conclusions regarding the future development of Nigerian power.

II. BACKGROUND

A. History of Electric Power in Nigeria

The earliest power generation facilities in Nigeria were constructed in the late 1920s, with several additional projects developed and owned by various political subdivisions of the federal government throughout the 1950s and 1960s, after Nigeria gained independence from Britain.[13] A modest transmission network followed, linking some of the initial, large hydroelectric facilities to major load centers. As the country began to develop its petroleum-based economy, generation growth remained relatively slow, and Nigeria commissioned only three generating facilities between 1970 and 1990.[14] Most recently, the federal government embarked on a plan to construct several large facilities across the country in order to rapidly add 2,000-3,000 MW of new capacity;[15] in what could be coincidental timing, a few such facilities were commissioned just prior to the end of former President Olusegun Obasanjo's administration in May 2007.[16] A number of additional government-sponsored projects remain under development or in construction.

For reasons described in this article, there are few independent or privately-owned power projects in Nigeria. In the late 1990s, Enron

13. BUREAU OF PUB. ENTERPRISES, *supra* note 3, at 1-2. Nigeria formally gained independence on October 1, 1960. HELEN CHAPIN METZ, ED., NIGERIA: A COUNTRY STUDY 20 (1991), available at http://countrystudies.us/nigeria/36.htm.

14. *See* Table 1 *infra* note 22.

15. Press Release, Gen. Elec. Co., GE Energy to Supply 18 Gas Turbines, Services for Nigerian Projects Totaling 2000 Megawatts (Dec. 13, 2005), *available at* http://www.genewscenter.com/Content/Detail.asp?ReleaseID=1753&NewsAreaID=2&MenuSearchCategoryID=. The timing of the government's decision to simultaneously construct so many facilities may not have been ideal, as prices for the construction of power plants have been relatively high due to the ascending cost of certain raw materials. *See 'Sticker Shock' for Power Projects as Materials Soar, Cost is Uncertain*, INT'L HERALD TRIB., July 11, 2007, at 8. Presumably, Nigeria will be seeking to recover high capital costs when efforts to privatize the generating facilities commence.

16. Luka Binniyat, *FG Awards Contract for 2,600 MW Mambilla Hydropower Station*, VANGUARD (Lagos), Mar. 6, 2007, at 2.

developed an offshore project consisting of barge-mounted gas-fired turbines to provide an emergency supply of electricity to Lagos. This project was subsequently acquired by a joint venture controlled by subsidiaries of The AES Corporation.[17] Another, significantly smaller emergency power unit serving the capital city of Abuja was privately developed and is owned by a joint venture between Geometric Power Limited and Renatech International Limited.[18] Most recently, the international oil companies operating in Nigeria through exploration and production joint ventures[19] have commenced development of their own independent power projects in the interest of reducing gas flaring and assisting the federal government in its policy of electrification.[20] While several such projects are under development, to date only one such project has been commissioned.[21] A table displaying the nation's current generating portfolio, as well as the projects under construction and development, appears in Appendix 1.[22]

From a regulatory perspective, the cornerstone of the Nigerian power sector has historically been the Nigerian Electric Power Authority (NEPA), whose fundamental mismanagement of the nation's electric power assets and its own budget are well documented.[23] NEPA was created by statute in 1972 through the merger of two predecessor state-

17. U.S. ENERGY INFO. ADMIN., INDEP. POWER PROJECTS IN NIGERIA (2003), *available at* http://www.eia.doe.gov/emeu/cabs/nigeria_ipp.html.

18. Emeka Uwadibue, *New Independent Power Station to Begin Production in Nigeria*, THE GUARDIAN, Oct. 28, 2001, at 7.

19. All foreign oil companies who explore for and extract petroleum resources in Nigeria operate through an unincorporated production joint venture with the Nigerian National Petroleum Corporation (NNPC), a corporation wholly-owned by the Nigerian government. NNPC owns at least 55.0% of each such production joint venture.

20. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 9.

21. Press Release, Eni S.p.A., Eni Announces the Inauguration of the Okpai Power Plant in Nigeria (Apr. 1, 2005), *available at* http://www.eni.it/en_IT/media/press-releases/2005/04/Eni_announces_the_inauguration_01.04.2005.shtml. As of May 2007, the Shell-led Afam VI power project had not been funded by the government. THE SHELL PETROLEUM DEV. CO. OF NIGERIA LTD., *supra* note 4, at 7.

22. *See Major Power Generation Project for Nigeria*, AFR. REV. OF BUS. AND TECH. (Feb. 1, 2006); Binniyat, *supra* note 16; U.S. ENERGY INFO. ADMIN., *supra* note 16; BUREAU OF PUB. ENTERPRISES, *supra* note 3, at 1-2. Excludes the decommissioned Oji coal-fired power station (1956), the 15 MW emergency power station in Abuja, and several smaller isolated diesel-fired generating units. Independent power projects are identified with an asterisk. Design capacities for projects under development are estimates. The Afam V project is subject to a rehabilitate, operate and transfer arrangement and is pending private acquisition. Press Release, The Shell Petroleum Dev. Co. of Nigeria Ltd., Afam: MOU Signed for Power Projects (July 2003), *available at* http://www.shell.com/home/content/nigeria/news_and_library/press_releases/2003/afam_mou_2307_0955.html.

23. William Wallis, *Power: Cleansing Mismanagement and Corruption from the State-run Electricity Authority is Proving to be a Daunting Task*, FIN. TIMES, Mar. 30, 2001, at D2. *See also Power to the People (Advertising Supplement)*, WASH. TIMES, Sept. 30, 1999, *available at* http://www.internationalspecialreports.com/ africa/99/nigeria/29.html (quoting the former Nigerian Minister of Power and Steel who described NEPA as an enterprise in which "no sane man . . . would buy shares"). The acronym "NEPA" has been redefined in popular Nigerian culture as "Never Expect Power Always." *Id.*

owned agencies responsible for developing alternate sources of electric power – the Electricity Corporation of Nigeria and the Niger Dams Authority.[24] Under its enabling legislation, NEPA was charged with managing the generation, transmission and distribution of all electric power in Nigeria. While NEPA continued to slowly carry out its mandate by developing and commissioning new generating facilities, it made virtually no improvements or expansions to the country's transmission and distribution system and conducted little maintenance on its existing assets. Accordingly, most of the older power plants described as "Completed" in Table 1 do not generate, and indeed in some cases have never generated, a quantity of electric energy anywhere close to their respective installed capacities.[25]

Several factors contributed to NEPA's inability to preserve and maintain the nation's power assets. Most importantly, NEPA's financial resources were perpetually inadequate to service its obligations; its federally-allocated budget barely sustained the wage and pension obligations owed to its 35,000-40,000 employees.[26] Power sold by it was paid for at less than cost-reflective rates or simply not collected for, meaning that NEPA's fixed and variable costs of operation exceeded its revenues. With no financial resources to spare, NEPA chose not to incur the additional costs necessary to proactively maintain, repair and upgrade existing generating and transmission assets. Former President Obassanjo replaced NEPA's entire senior management in 2001, but by then the sector's performance had deteriorated to such an extent that leadership changes alone could not rectify Nigeria's ailing power sector. Reform of the entire sector would be essential to restore generating capacity and access to electricity to respectable levels.

B. Recent Regulatory Developments

Nigerian power sector reform began in earnest in 1999, with the launching of certain rehabilitate, operate and transfer tenders designed to encourage private sector rehabilitation of existing generating assets. In March 2001, a National Electric Power Policy (NEPP) developed by the country's National Council on Privatization was formally adopted by the federal government.[27] The NEPP memorialized the federal government's objective to facilitate a three-step transformation in the power sector, consisting of: (i) a transition phase where state-owned assets are vertically

24. National Electric Power Authority Act, (1990) Cap 256, §16 (NEPA Act).

25. Binniyat, *supra* note 16.

26. Wallis, *supra* note 23. It has since been revealed that NEPA (now PHCN) owes its employees' pension fund approximately N107 billion. *PHCN Debt-Ridden, Owes N113 Billion*, THIS DAY (Nigeria), Aug. 5, 2007, at 6.

27. BUREAU OF PUB. ENTERPRISES, POWER SECTOR REFORMS 1 (2006), *available at* http://www.bpeng.org/docs/Power%20Sector%20Reforms.pdf.

and horizontally unbundled and privatized, (ii) a medium-term environment where generation, transmission and distribution companies buy and sell power through bilateral contracts on economic terms, and (iii) a competitive market for generation and distribution with open access to transmission, transparent wholesale power sales and customer choice of energy provider.[28] The Electric Sector Power Reform Act (the Act) was enacted in March 2005 to, among other things, codify the goals of the NEPP. The Act addresses all aspects of the power sector in Nigeria and is therefore critical in evaluating the conditions for independent power in Nigeria.[29]

At the outset, the Act expressly repealed the NEPA Act and outlined the process and general timetable for the unbundling and dissolution of NEPA. Under Part I of the Act, NEPA's assets, liabilities, employees, rights and obligations are to be immediately transferred to an intermediate state-owned holding company, whose own existence is statutorily limited to eighteen months.[30] Within eight months of such transfer, the Act requires that the Ministry of Finance and the Bureau of Public Enterprises (BPE) will have established "successor" companies for the various functional groups of NEPA – generation, distribution and transmission.[31] Not later than one year from the date of initial transfer, the Ministry of Finance and the BPE are required to have transferred all assets, liabilities, employees, rights and obligations of the intermediate holding company to the various successor companies.[32] Any transfer order issued by the National Council on Privatization allocating assets and liabilities to one or more successor companies may be subsequently amended within one year of the date of order.[33] According to the Act, none of the foregoing transfers should constitute a breach of or force majeure event under any contract, or result in any change to the terms and conditions of any transaction entered into by NEPA prior to such transfer, thereby preventing challenges to any pre-existing contractual arrangements between NEPA and independent power producers.[34]

28. FED. REP. OF NIGERIA, NATIONAL ELECTRIC POWER POLICY (2000), *available at* http://www.bpeng.org (select "Companies and Industries" tab at top; select "Policy and Legal Framework" under "Power" on the left; link will be on the right).

29. Independent power producers feature prominently in the Act and are specifically addressed as a class of persons in several key provisions. *See*, *e.g.*, Electric Power Sector Reform Act, Government Notice No. 59 (2004) 91:24 O.G., C658 §§ 25, 26, 64. Under the Act, an "independent power producer" is loosely defined as any entity other than a successor company of NEPA that is involved in power generation. *Id*. § 64(3)(b).

30. *Id*. §§ 1-7.

31. *Id*. § 9.

32. *Id*. § 11.

33. *Id*. § 18. Presumably, the government's efforts to privatize such successor companies would be adversely impacted so long as the assets and liabilities of such companies remain subject to unilateral adjustment.

34. *Id*. § 16.

Part II of the Act addresses the licensing framework for electric power generation and defines the classes of suppliers and customers permitted to buy and sell electric energy. The primary purchaser of electric power – at least during the transition to a competitive market – is a state-owned "trading licensee" or market operator, who assumes existing offtake obligations under all long-term power offtake agreements[35] and is authorized to make new bulk power purchases from independent power producers.[36] However, the Act envisions that all of the power purchase agreements to which the trading licensee becomes a party will eventually be novated or assigned to successor companies that are, in turn, privatized. To emphasize this point, once the Minister of Power and Steel[37] declares the Nigerian power market to be competitive pursuant to the Act, the trading licensee is prohibited from entering into any new contracts for the bulk purchase or sale of electricity.[38]

Independent power producers are also permitted under Part II of the Act to sell electricity to individual distribution companies and "eligible customers."[39] Eligible customers are identified as a class or classes of customers designated by the Minister of Power and Steel as entitled to purchase electric energy directly from independent power producers or successor generation companies, but the Act provides no guidance on what characteristics would distinguish an "eligible" customer from any other.[40] Subsequent regulations are expected to address this matter in further detail, and presumably such customers would, as in other countries, be characterized by a sufficient level of minimum electricity demand (e.g., 1.0 MW) that would clearly separate them from ordinary retail customers.

Nigeria's newest power sector regulator is the Nigerian Electricity Regulatory Commission (NERC), established under Part III of the Act. The NERC is an autonomous electric regulatory commission consisting of seven commissioners chosen and appointed by the President from seven different regional areas of Nigeria.[41] Each commissioner's term is five years and he/she is entitled to serve a maximum of two terms.[42] The NERC's primary mandate consists of promoting and preserving a

35. Long-term power purchase or offtake agreements require the power offtaker to purchase (typically whether or not such power is actually dispatched by the power offtaker) a certain quantity of electricity and electric capacity over a multi-year term.

36. Electric Power Sector Reform Act (2005) § 26 (Nigeria).

37. The Act provides for this and other determinations under the Act to be made by the Minister of Power and Steel or such other minister as the President may designate. *Id.* § 24(3).

38. *Id.* § 26.

39. *Id.* § 26(e).

40. *Id.* § 101.

41. *Id.* § 35.

42. *Id.* § 36. As an exception, the first commissioners appointed under the Act (other than the Chairman) were given four year terms. *Id.*

competitive electricity market, maximizing access to electricity service, and ensuring an adequate, safe and secure supply of electricity. The NERC is also responsible for issuing generating licenses to independent power producers (among others), most of which carry a maximum term of ten years,[43] developing standards and procedures to govern relations with retail customers, and monitoring sector competitiveness. Finally, and perhaps most importantly, the NERC is in charge of setting the nation's regulated electricity tariff. In this respect, it must "ensure that the prices charged by [independent power producers] are fair to consumers and are sufficient to allow the [independent power producers] to finance their activities and to allow for reasonable earnings for efficient operation." This statutory language is presumably intended to offer independent power producers and other private investors, as well as their financiers, some comfort to invest in Nigeria.[44]

Subsequent sections of the Act introduce additional elements to the national energy policy (albeit less important to independent power producers), including provisions (i) offering the federal government greater authority to access and acquire privately-held land for new generating and transmission facilities and (ii) creating a power consumer assistance fund which subsidizes electricity service for underprivileged customers.[45] The Act also establishes the Rural Electrification Agency, a seven member commission formed to set national policy regarding grid expansion, renewable energy and other initiatives for expanding the reach of electricity service in Nigeria.[46] Part XII of the Act preserves all tariffs, contractual arrangements, licenses and permits existing, entered into or received prior to the date of the Act.[47]

Supported by a $172 million loan from the International Development Association, the arm of the World Bank dedicated to assisting the world's poorest nations, Nigeria promptly began implementing the reforms described in the Act.[48] Successor companies into which NEPA's operations will be unbundled have been formed, including six generating companies, eleven regional distribution companies (some with more robust customer bases than others), and a transmission company

43. Under the Act, the NERC may issue a twenty year license if such issuance would in its opinion serve the public interest. *Id*. § 71(10).

44. *Id*. § 33(1)(d). The Act reiterates this point in section 76(2)(a), stating that tariff methodologies will "allow a licensee that operates efficiently to recover the full cost of its business activities, including a reasonable return on the capital invested in the business." *Id*. § 76(2)(a).

45. *Id*. §§ 78, 84(4).

46. *Id*. § 89.

47. *Id*. § 99.

48. Press Release, World Bank Group, Nigeria: Nat'l Energy Dev. Project (June 28, 2005), *available at* http://go.worldbank.org/NN1I1I0EU0.

providing open access to the national electric grid.[49] On April 13, 2005, the BPE announced the identity of the intermediate holding company designated under the Act as Power Holding Company of Nigeria (PHCN). PHCN's board of directors was inaugurated on May 31, 2005.[50] Most recently, the NERC was formally established on November 1, 2005.[51]

III. ISSUES IMPEDING INDEPENDENT POWER INVESTMENT

Setting aside the security concerns against which all Nigerian investments must be evaluated,[52] several structural barriers threaten to impede the sustainable development of independent power in Nigeria despite the regulatory accomplishments described in Part II.

A. Illiquidity

The development of independent power projects in Nigeria is perhaps hindered most by the simple reality that the sale of electric energy in Nigeria is, with rare exception, a loss-making enterprise. At six Naira (or approximately five cents) per kilowatt per hour, electricity tariffs paid by Nigerian consumers remain very low by international standards and are not cost-reflective, meaning that the cost of generating electricity exceeds the amount that can be recovered from the rate-paying customer for such electricity.[53] While the Act mandates tariff reform, no new methodologies have been adopted since the promulgation of the Act, and President Yar'Adua has indicated that the electricity tariff is unlikely to be increased until stable power supply is achieved.[54] If and when tariff reform proceeds, it remains to be seen how the NERC, in structuring a tariff, will address the Act's apparent prerequisite of "efficient operations" for an independent power producer to recover of a

49. Ransome E. Owan, Chairman and CEO of NERC, Remarks at the Nigerian Power Sector Investment Forum (Nov. 28, 2006), *available at* http://www.cpcstrans.com/files/bidders/Market%20Reforms%20&%20Investment%20in%20Nigeria_Chairman-NERC%202006%2011.pdf.

50. Atiku Abubakar, Nigerian Vice President, Remarks at the Inauguration of the Board of Directors of PHCN (May 31, 2005), available at http://www.nigeriafirst.org/article_4112.shtml.

51. *See* Owan, *supra* note 49.

52. *See, e.g.,* Hector Igbikiowubo, Emma Amaize & Emma Arubi, *Vandals Threaten Power Supply, Shut NNPC/Agip Okpai IPP*, VANGUARD (Lagos), Mar. 25, 2005, at 4 (describing attack on a transmission line servicing Okpai I power plant); Emma Amaize, *Angry Villagers Shut Down Ughelli Power Station*, VANGUARD (Lagos), July 27, 2005, at 14 (describing attack on Ughelli power station); Dan Udoh, *Gangs Grab 19 in Attacks on Nigeria Oil Delta*, THE STANDARD (Hong Kong), at 7 (describing gunfight and kidnapping of contractors constructing the Afam VI power station).

53. Wallis, *supra* note 23.

54. President Yar'Adua's position directly contrasts with that of the Minister of State for Energy (Power), who was instructed to redact a prior public assertion that electricity tariffs would be increased. Juliana Taiwo, *No Plan to Hike Electricity Tariff*, THIS DAY (Nigeria), Feb. 22, 2008, at 3.

reasonable return on its investment.[55] Naturally, the uncertainty created by prolonged tariff reform and pending rule-making complicates the process of calculating and negotiating the price of power under long-term power purchase agreements.

Additionally, not all power transmitted through Nigeria's transmission lines reaches its ultimate consumers or is paid for when received. As a result, the sector as a whole collects and generates insufficient funds to support payments to power generators.[56] Assuming transmission losses were eliminated and collection efforts improved – each a significant challenge in its own right – the entire sector would nevertheless be incapable of supporting its own operations based on power sale revenues under the current tariff regime.[57] For independent power projects – which are structured and financed on the basis of recovering their capital cost, operating expenses and return on investment through power offtake payments – the instability perpetuated by low electricity tariffs threatens the viability of project development and financing. To the extent that the transition to a competitive power market is delayed or does not fully transpire, sector illiquidity will continue to discourage both the development and private financing of independent power projects and the privatization of successor generation companies. Unfortunately, neither the NEPP nor the Act provides any guidance or solution with which to address this inadequacy.

B. Bureaucracy

The Act introduced a clear regulatory framework under which to implement much needed reforms of the Nigerian power sector, and yet no less than four federal agencies continue to exert some degree of influence and control over electric regulatory policy in Nigeria.[58] The BPE was recently established under the Public Enterprises (Privatization and Commercialization) Act to manage the privatization of state-owned enterprises such as the successor companies of NEPA envisioned under the Act.[59] As the price that privatized power plants may command relies on the underlying economics of their power sales arrangements, the BPE ultimately plays a part in influencing domestic energy policy. The

55. Clearly, the Nigerian government does not wish to encourage or reward inefficient power generation, but a power plant's efficient operation, as measured by kilowatts evacuated into the grid, is not entirely dependent on the independent power producer's design, construction or operation of the power plant. External factors such as transmission constraints, lack of dependable fuel supply and vandalism can interrupt delivery of electric energy to Nigeria's consumers and contribute to overall system inefficiency.

56. PHCN is reported to be in arrears on its payment obligations under power purchase agreements with at least two independent power producers. *See supra* note 26.

57. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 8-9.

58. The NERC's position is that it is the only sector regulator. *See* Owan, *supra* note 49, at 3.

59. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 6.

Ministry of Power and Steel, which historically supervised NEPA, now controls several critical determinations under the Act, including the classification of "eligible customers" and the declaration of adequate competition in the Nigerian power sector. The critical task of tariff reform is managed by the NERC, while PHCN negotiates the other material terms of post-reform long term power offtake agreements.

Other participants also influence the process. Pursuant to the Act, the National Council on Privatization manages the timing of transitioning NEPA from a state-owned utility to a series of unbundled generation, transmission and distribution successor entities.[60] Various presidential task-forces and special advisory committees on power instituted during the Obasanjo administration continue to engage stakeholders on key reform issues. Although untested, the Rural Electrification Agency's mandate could feasibly intersect with those of the NERC and PHCN. Finally, as the governmental entity which partially owns PHCN, reviews and approves the financial commitments of state-owned enterprises under joint ventures and power offtake arrangements, and ultimately acts as guarantor for the federal government's commitments, the Ministry of Finance also wields significant influence over the sector.

This Balkanization of electric regulatory authority in Nigeria may, at a minimum, create redundancy in function, or worse, confusion, potentially discouraging new entrants from investing in the Nigerian power sector. Independent power producers and acquirers of state-owned successor companies might assume they are required to navigate several channels of government for formal and informal approvals of pending projects, even if their respective contracts are purely bilateral.[61] In addition, the vaguely-defined, multi-phase transition of long-term power offtake obligations from NEPA to various successor entities mandated under the Act could cause prospective independent power producers and their lenders to await the outcome of that transition prior to incurring significant development expenses or entering into binding, long-term agreements. To the extent one or more of the several agencies tasked with implementing power sector reform espouse differing views on the optimal means of achieving the nation's targets, or simply fail to coordinate their efforts effectively, the pace of reform and therefore the investment climate in Nigeria may suffer. Indeed, recent pronouncements from the federal government highlighting gas, coal, wind, solar and even nuclear facilities as possible contributors to Nigeria's generation goals suggests a divergence of opinions and lack of focus at

60. Electric Sector Power Reform Act (2005), §§ 1, 9, 11 (Nigeria).

61. For example, the NERC has indicated it intends to review all power purchase agreements. *See* Owan, *supra* note 49, at 17.

the highest levels of government.[62]

C. Infrastructure

Nigeria urgently requires not only thousands of megawatts of new generating capacity, but also massive upgrades to its transmission network and distribution system; only forty percent of the Nigerian population currently has access to electricity.[63] The existing grid is poorly designed on a radial system with long transmission distances and little redundancy, and a forced outage at one large generating facility can potentially de-stabilize the entire regional grid surrounding it.[64] There is no central dispatch center or systems in place with which to manage the grid.[65] Unreliable metering, pilferage, transmission line losses and poor collection efforts[66] by the state-owned distribution companies contribute to the situation of undersupply. Excluding less-developed or remote portions of the country which are likely to only be served through rural electrification projects, transmitting electricity to three-fourths of the population is estimated to require an investment of over $10 billion.[67]

Efforts to restore the nation's transmission and distribution system have begun, with hundreds of projects underway or in development.[68] The World Bank has recently supported development of the transmission system through funding substation extensions and capacity upgrades, the installation of reactive power equipment at certain key interconnections, the provision of bulk metering equipment and restringing of transmission lines, and the development and implementation of nationwide billing and accounting systems for the invoicing of electric power.[69] Although work is not complete, with World Bank oversight and relatively low technological risk, upgrades to the transmission network have a reasonable chance of success. Nevertheless, a substandard transmission and distribution system clearly threatens the revenue stream that an independent power producer might otherwise earn from its power offtaker, insofar as the offtaker is not properly compensated for the

62. Josephine Lohor, *Yar'Adua Canvasses Nuclear Power for Electricity*, THIS DAY (Nigeria), July 24, 2007, at 2. One may question Nigeria's interest in diversifying its generation base in the interests of the environment when there are tremendous natural gas resources to supply relatively clean gas-fired generating facilities and when substantial volumes of associated gas continue to be flared. *See* INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7.

63. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 7.

64. *See* Owan, *supra* note 49; ; INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 28-29.

65. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 28-29.

66. The government has been unwilling to disconnect non-paying customers, recognizing such efforts are unlikely to prove popular with Nigerians who have not witnessed reliable service.

67. *See* INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 6, at 7.

68. *Id.* at 29; Adeoye & Abatan, *supra* note 1.

69. *See* World Bank Group, *supra* note 48.

electricity it purchases from the independent power producer. This remains true even under circumstances where the power producer contractually assumes no transmission risk.

Finally, although Nigeria has vast natural gas resources, substantial investment in the gas transportation network and in other production facilities is in some cases required before those resources can be processed and shipped to fuel gas-fired power generation. None of the upstream joint ventures is presently investing in any such infrastructure, perhaps due to a lack of funding from NNPC.[70] As such, independent power developers must carefully consider plant siting and load growth issues in the context of existing gas supply and transmission networks.

D. Credit

Independent power, as a business model, depends heavily on the availability of capital from banks, bondholders and other providers of debt and equity finance. Those lenders and investors in turn rely on the adequacy of and the credit behind the independent power project's revenues in forming their lending and investment decisions. As discussed earlier in Part III of this article, electricity prices in Nigeria do not currently reflect the cost of generation, and therefore successful projects require guarantees, credit support, subsidies or other government incentives (such as tax incentives that yield a net positive economic recovery to the independent power producer) that support sustained profitability.[71] However, although the Nigerian government has considered establishing a compensatory fund similar to the "Petroleum Equalisation Fund"[72] that would subsidize the generation of electricity through additional, government-supported payments to independent power producers,[73] it has for political and budgetary reasons thus far been reluctant to offer any long-term credit support to power producers.[74]

70. *Nigeria: Gas Shortage Threatens Nationwide Power Supply*, THE GUARDIAN, Dec. 12, 2007. At least one international oil company has hinted that NNPC is not funding its joint venture commitments as required for future gas developments. *Yar'Adua, Shell MD to Meet in Switzerland on Friday*, NIGERIAN TRIB. (Jan. 24, 2008), available at http://www.tribune.com.ng/24012008/news/news5.html (last visited Mar. 3, 2008).

71. INT'L BANK FOR RECONSTRUCTION AND DEV., *supra* note 7, at 10; Wallis, *supra* note 23.

72. The Petroleum Equalisation Fund is a governmental agency created by statute which assesses a levy on the pump price of gasoline with which to compensate marketers of petroleum products as necessary to ensure that the transportation costs of such products remain uniform throughout the country. Komolafe Rasheed, *Independent Petroleum Marketers and Future Challenges*, NIGERIAN TRIB. (Oct. 9, 2007), *available at* http://www.tribune.com.ng/09102007/eog.html (last visited Mar. 3, 2008).

73. Patrick Ugeh, *NERC May Get Electricity Equalisation Fund*, THIS DAY (Nigeria), Feb. 18, 2008, at 4.

74. The provision of federal government guarantees to independent power producers is complicated in part by the Nigerian government's majority ownership, through NNPC, of all of the exploration and production joint ventures in Nigeria charged with developing independent power projects. To the extent those joint ventures seek to recover a return on investment

Unconditional and irrevocable government guarantees of power offtake obligations would of course address many of the structural risks associated with an investment in Nigerian private power, but there are valid arguments why the Nigerian government should avoid making such commitments. First, the financial commitments under a single, long-term power purchase agreement for a large generating facility can exceed two billion dollars, and thus it is unlikely that the federal government could support each and every project; to the extent certain power offtake contracts cannot be guaranteed, the federal government could open itself up to claims that it is favoring one or more power producers over others. Second, because they are expected to cover all or a substantial portion of the term of the underlying power purchase agreement (which in many cases last 15-25 years), government offtake guarantees are long-term commitments of the national treasury that may complicate budgetary planning and/or be viewed unfavorably by external investors and rating agencies. Tariff subsidies paid by the federal government (which attempt to make generators whole for inadequate power prices) are not memorialized in direct contractual obligations of the Ministry of Finance, and therefore represent perhaps a more flexible alternative to guarantees. Nevertheless, they may be equally difficult to unwind once project developers and lenders begin to rely on such support for long-term financings.

IV. POTENTIAL STRUCTURE TO SUPPORT INDEPENDENT POWER PROJECTS

Despite all of the positive elements present in Nigeria which could support the development and financing of independent power in Nigeria, the risks identified in Part III unfortunately cannot without further structural improvements be properly allocated or mitigated during the current period of significant market transition. Indeed, it would be unrealistic to expect private developers and financiers to gamble on the rapid transformation of the Nigerian power sector from mismanaged and insolvent federal utility to a coordinated and profitable system of public and private sector participants throughout the value chain of generation, transmission and distribution.[75] As such, the Nigerian government must

through their respective power offtake arrangements, the federal government would in providing any credit support to those joint ventures effectively guarantee a return on investment to a state-owned agency – a result that is not only inefficient but is also presumably inconsistent with government policy.

75. The expectation that regulatory reforms can be quickly implemented to accelerate development of the power sector seems contradictory with at least some public statements of relevant officials. *Nigeria to Build Four Independent Power Plants*, THIS DAY (Nigeria) (Sept. 5, 2002), *vailable at* http://www.gasandoil.com/ GOC/news/nta24050.htm (last visited July 25, 2007) (quoting former Managing Director of PHCN: "It must be appreciated that the long period of neglect of the sector has made the funding requirements needed to revive the sector more

explore and promote alternative structures to support obligations owed to independent power producers until the transition to a competitive and profitable power sector is complete.

A. Payment Security Structure

For so long as the combination of electricity tariffs and government support are substantially insufficient to support private investment in power generation, Nigeria should adopt a fair and transparent structure that prioritizes the application of power sector revenues to compensate independent power producers for electricity generation. By implementing strict controls on the utilization of revenues earned from industrial and retail power sales through collateral security arrangements, the government can offer independent power producers a more reliable revenue stream on which to finance their respective investments. Like traditional, limited recourse project financings which capture, secure and apportion the revenues of the relevant enterprise to support the timely repayment of its debt, revenues associated with power sales to end-consumers in Nigeria could be directed into secured accounts managed by an independent agent for the benefit of independent power producers and private owners of successor generation companies. Once under control of the third party agent, funds could be disbursed to sector beneficiaries in a pre-agreed preferential order and/or used to create cash reserve accounts that support the future payment for electric power.

Although part of a larger regulatory initiative, the foregoing arrangement could be contractually based in a master agreement among the existing independent power producers and other privately owned generating companies (including owners of successor generation companies), the market operator and the agent bank. Each generator of electric power and the market operator would appoint the agent bank as its representative to administer and disburse sector cash flows through one or more secured collection accounts held with the agent bank. The market operator would consequently agree to direct all monies payable to it from the sale of electric power – including, importantly, any amounts paid by the federal government to subsidize less than cost-reflective tariffs – into the secured collection accounts. As invoices for power sales are issued by independent power producers to the market operator, amounts received in the secured collection accounts (representing revenues from the ultimate sale of the electricity to end-consumers) would be re-directed to settle those invoices pro rata among all existing beneficiaries, with the balance transferred to the market operator. Any

colossal and that resuscitation of the sector back to the desired level of providing predictable and stable power will take some time.").

remaining balance could be distributed freely by the market operator to cover its own costs and pay for transmission and distribution services. Most importantly, however, the independent power producers would be paid first, thereby directing the risk of any shortfall in sector revenues towards more highly-regulated and government-controlled portions of the value chain.

To bridge the periods of temporary sector illiquidity, each existing long-term power offtake agreement between the market operator and an independent power producer or successor generation company would be secured by an escrow account with the agent bank. The market operator would establish in each such escrow account a cash reserve to provide payment security to each independent power producer or successor generation company with respect to (i) amounts invoiced and pending payment, (ii) amounts to be invoiced during the cure period associated with any non-payment, and (iii) unmitigated operating costs associated with the beneficiary's continued performance during any period of non-payment (at least until the independent power producer or successor generation company is contractually entitled to suspend deliveries of electric power for non-payment).[76] To the extent that sector cash flows are insufficient to settle all current invoices for power sales in a given month, any of the independent power producer beneficiaries would be entitled to draw on the escrow reserve account relating to its power offtake agreement to settle the unpaid balance.[77] However, since under the terms of the proposed security arrangement sector cash flows should be distributed ratably among all beneficiaries, it is likely that all of their respective escrow reserves would be simultaneously drawn to satisfy their respective payment shortfalls.[78]

Once an escrow reserve account is drawn down, the market operator would be obligated to restore the balance of such reserve account to its required amount in subsequent months by applying monies received in the secured collection account.[79] In the event that sector cash flows are chronically insufficient such that the escrow reserve accounts are either empty or continually under-funded through repeated draws, the power

76. Given customary payment terms and remedies, a reserve of between six and twelve months of power sales revenues, assuming an average daily contracted maximum power output, might be expected.

77. An independent power producer may need to negotiate with its offtaker whether the shortfall in monthly receipts in the secured collection account constitutes "non-payment" by the offtaker and whether the offtaker would then be permitted a period of time to cure such "non-payment" before the escrow reserve is drawn.

78. The ratable treatment of independent power producers should avoid creating any impression that the government is favoring any single independent power producer over any other.

79. Typically, independent power producers would expect payment of current invoices prior to replenishing the escrow reserve accounts.

sector would by definition be in distress. Under such circumstances, independent power producers and their lenders must have access to some form of federal government support in order to continue to invest in and support Nigerian power projects.

Several alternative government support arrangements have been discussed above, including individual government guaranties and government subsidies. The least burdensome and most cost-effective solution for the federal government to fulfill this requirement might be for it to deliver a sovereign guarantee or procure the delivery of a revolving letter of credit, entitling the beneficiaries to draw on such security instrument to replenish the escrow reserve accounts in the event of a prolonged delinquency. If issued directly to the agent bank, individual independent power producers need not suffer the reputational risk associated with drawing on the sovereign guarantee or letter of credit. The terms and conditions of any federal government support need not be memorialized in the underlying master security agreement so long as the beneficiaries or their agent bank have a direct right of enforcement against the government instrument. However, any such government support would necessarily be limited in time and amount; otherwise, the government would through its agreement to replenish the escrow reserve accounts effectively guarantee all payment obligations of the power offtaker under every long-term power offtake agreement where sector cash flows are perpetually insufficient.[80]

B. Challenges

Efficient, sector-wide coordination is perhaps the most significant challenge presented by the above-described structure. For example, the market operator would need to ensure that payments owed to it from distribution companies and eligible customers are paid directly to the secured collection account, and independent power producers and their lenders may ultimately insist on contractual privity between the secured parties and the distribution companies or eligible customers to enforce such arrangements.[81] To benefit from the security structure, newly established independent power producers and acquirers of privatized government generating facilities would be required to contractually accede to the master security arrangements and, to the extent necessary, conform the terms of their respective long-term offtake agreements to

80. From the federal government's perspective, this scenario is no better than the federal government providing each independent power producer with an irrevocable guarantee of all power purchase agreement obligations.

81. In a traditional project financing, revenues of the debtor arising from the sale of electric power are paid into a secured collection account and the account holder or agent for the secured lenders will have direct contractual rights to enforce the obligations of third parties to make payments directly to such account.

the characteristics and design of the security structure.[82] The federal government would also need to support measures which either transition to or exclude from the industry-wide platform those pre-existing independent power projects which are currently subject to alternative government-support arrangements or otherwise benefit from more favorable credit enhancements.[83] Lastly, the security structure should accommodate direct sales by independent power producers to eligible customers and distribution companies to the extent that payments from such counterparties for electric power would not otherwise be handled through the market operator.

Adopting a structure which prioritizes payment for electric generation also implies that the NERC would need to carefully moderate the introduction of new generating capacity. In other words, even with a robust security structure, the federal government cannot permit independent power generation to grow without limitation until all of the principle components of the power sector (i.e., generation, distribution and transmission) sustain some degree of profitability. Objective criteria should be established, such as measuring the frequency and amount by which all amounts received in the secured collection account regularly exceed amounts payable under long-term power offtake agreements, to test the sector's capacity to support new generation before new market entrants could rely on the payment security structure.[84]

The mechanics associated with administering a payment security program for independent power would require careful planning. For instance, all invoices and correspondence between the distribution companies, eligible customers, independent power producers, successor generation companies and the market operator would be sent to the agent bank, who must reconcile invoices and disputed payment notices to process payments to the beneficiaries and account for all monies received and distributed. The agent bank would also be required to undertake repeated currency conversion transactions (at a cost to the market operator) to the extent that sector revenues are collected in Naira and offtake obligations are paid in U.S. dollars or other foreign currencies. All of the foregoing impose further cost and complexity on the structure.

Finally, while the payment security structure represents a significant credit enhancement and potential political risk mitigant for project

82. For example, provisions relating to the issuance and payment of invoices would be common in offtake agreements.

83. The Okpai I independent power project benefits from an existing security arrangement whereby NNPC guarantees the offtake obligations of NEPA through its cash call obligations under the Nigerian Agip Oil Company/NNPC joint venture. *Nigeria Signs Power Purchase Agreement with Agip*, VANGUARD (Lagos), July 26, 2001, at 5.

84. Given Nigeria's dire need for new generating capacity, placing contractual limits on sector growth may not be politically sustainable.

lenders, it ultimately may not secure all of the revenues of an independent power project. There may, for example, be certain discrete contractual obligations which are too large to be supported by monthly sector cash flows.[85] In addition, it is doubtful that the federal government would have the resources, let alone the desire, to provide an unlimited sovereign guarantee of all power offtake obligations through indefinitely supporting the escrow reserve accounts; most probably that commitment would be limited in time and amount and expire once a competitive electricity market takes hold in Nigeria. As such, the developer of an independent power project will need to evaluate the risk that a portion of its power offtake payments are not recovered, and perhaps seek additional credit enhancements from third party guarantee providers or risk insurers.[86]

C. Benefits

Despite the limitations described above, the payment security framework should for several reasons nevertheless be attractive to the federal government, independent power producers, private owners of successor generation companies and their respective lenders. First, it relies primarily on cash flows generated by the power sector (and reserves created with such cash flows) and not directly on government credit support. To the extent the power sector is functioning efficiently, with stable transmission, cost-reflective tariffs and successful collections, these cash flows should be sufficient to secure the offtake revenues of independent power producers. Because the federal government's support of the escrow reserve accounts is triggered only once the sector has insufficient funds to settle current invoices, the payment security structure creates a useful incentive for the federal government to establish and maintain an economically robust power sector, and strikes an appropriate balance between private sector initiative and public sector support.

The system also offers a degree of independence from the federal government, as funds are separately collected, managed and distributed by a third party agent bank. Independent power producers and their lenders may therefore derive some comfort in the transparency of cash flows and the enforceability of the agreements against the market operator and agent bank (which may itself be a reputable international

85. Examples include (i) payments which adjust the price of power to compensate the independent power producer for any change in law and (ii) termination payments payable by the offtaker under a build-operate-transfer arrangement, where on transfer the offtaker pays a lump sum representing the unreimbursed value of the power plant.

86. The participation of an independent power producer in the industry-wide security framework would not, by itself, preclude that independent power producer from obtaining additional credit enhancements, such as political risk insurance, from third parties.

financial institution), while the government relieves itself from the burden of administering multiple, project-specific payment guarantees under numerous power offtake agreements. As a system-wide solution with ratable application of funds among the beneficiaries, it should avoid selective payment defaults against particular independent power producers and create an open forum in which to address shortfalls across market participants. It should also survive political and regulatory challenges alleging that it favors one class of power producers or investors over any other, as it secures (with limited exceptions) the entire private power generation industry.

The payment security structure also provides a framework for consistent and stable growth. As power purchase agreements which benefit from the escrow security contain many common terms, one might expect a degree of standardization in the industry such that individually negotiated power purchase agreements become relatively consistent with each other. By regulating the admission of new participants, the federal government encourages "first movers," but avoids overbuild conditions that could jeopardize the economic stability of the power sector. Finally, unlike a traditional irrevocable sovereign guaranty, the federal government could hopefully withdraw its credit support once all investors in the electric power supply chain (e.g., independent power producers, gas suppliers, gas transporters, and transmission and distribution companies) are able to recover the full costs of their business activities, plus a reasonable return on the capital invested, and thereby avoid a perpetual constraint on the national treasury.

V. CONCLUSION

In less than three years, Nigeria will reach the fiftieth anniversary of its independence from Britain, and the absence of safe, reliable and sufficient electricity may prove to have been one of the biggest failures in its first half-century. While necessary reforms and related legislation have been enacted, thousands of new megawatts are still required and many challenges to sector growth remain.[87] The federal government's initiatives to rapidly commission new generating capacity on its own are laudable, but come at great cost and seem to ignore its abysmal maintenance record. Independent power projects present an alternative and highly efficient means of increasing the nation's electricity supply,

87. Nigeria's domestic gas sector will soon undergo its own reform aimed at reducing flaring of associated gas and increasing the volume and reliability of supply of natural gas to domestic consumers, including power plants. *See*, *e.g.*, F.M. Kupolokun, Group Managing Director of NNPC, Remarks at the Baker Institute Energy Forum (May 2, 2006), *available at* http://www.rice.edu/energy/publications/docs/NIGERIA_FutureGlobalGas _Speech.pdf. A review of such reforms is outside the scope of this article.

but depend upon a stable source of revenues to meet their capital costs, service external debt and generate sufficient economic returns. Until tariffs become cost-reflective, Nigerians will not witness the transition to a profitable and deregulated power sector without further regulatory initiatives. Any bridge to that destination will depend on industry-wide, government-led structural programs that prioritize the fair and timely payment for the generation of electric power. If implemented correctly, such programs could make Nigeria a leader in attracting independent power developers to Africa's developing economies.

APPENDIX 1

TABLE 1: ELECTRIC GENERATING FACILITIES IN NIGERIA[88]

Name	Design Capacity (MW)	Type of Generation	Year Completed
Completed			
Afam I-IV	969	Thermal (Gas/Oil)	1960s
Afam V	276	Thermal (Gas)	2002
Delta VI	600	Thermal (Gas)	1991
Ebute*	300	Thermal (Gas)	2003
Egbin	1,320	Thermal (Gas)	1987
Geregu	414	Thermal (Gas)	2007
Ijora	40	Thermal (Gas)	1956
Jebba	540	Hydro	1985
Kainji	760	Hydro	1968
Okpai I*	480	Thermal (Gas)	2005
Ogorode	720	Thermal (Gas)	1978
Omoku	150	Thermal (Gas)	2006
Omotosho	335	Thermal (Gas)	2007
Papalonto	335	Thermal (Gas)	2007
Shiroro	600	Hydro	1990
Ughelli	600	Thermal (Gas)	1991
Under Construction			
Afam VI*	642	Thermal (Gas)	N/A
Calabar	561	Thermal (Gas)	N/A
Egbema	338	Thermal (Gas)	N/A
Eyaen	451	Thermal (Gas)	N/A
Gbarain	225	Thermal (Gas)	N/A
Ibom*	188	Thermal (Gas)	N/A
Ihovbor	230	Thermal (Gas)	N/A
Mambilla	2,600	Hydro	N/A
Sapele	451	Thermal (Gas)	N/A
Zungeru	950	Hydro	N/A
Planned or Under Development			
Aba*	130	Thermal (Gas)	N/A
Ajaokuta	110	Thermal (Gas)	N/A
Alaoji	504	Thermal (Gas)	N/A
Bonny River*	388	Thermal (Gas)	N/A
Delta*	600	Thermal (Gas)	N/A
Ijede*	780	Thermal (Gas)	N/A
Minaj	115	Thermal (Coal)	N/A
Obite	450	Thermal (Gas)	N/A
Okpai II*	450	Thermal (Gas)	N/A
Sapele	1,020	Thermal (Gas)	N/A

88. *See Major Power Generation Project for Nigeria*, AFR. REV. OF BUS. AND TECH. (Feb. 1, 2006); Binniyat, *supra* note 16; U.S. ENERGY INFO. ADMIN., *supra* note 16; BUREAU OF PUB. ENTERPRISES, *supra* note 3, at 1-2. Excludes the decommissioned Oji coal-fired power station (1956), the 15 MW emergency power station in Abuja, and several smaller isolated diesel-fired generating units. Independent power projects are identified with an asterisk. Design capacities for projects under development are estimates. The Afam V project is subject to a rehabilitate, operate and transfer arrangement and is pending private acquisition. Press Release, The Shell Petroleum Dev. Co. of Nigeria Ltd., Afam: MOU Signed for Power Projects (July 2003), *available at* http://www.shell.com/home/content/nigeria/news_and_library/press_releases/2003/afam_mou_2307_0955.html.