

Energy Sector: The Panacea for Business Development in Nigeria

Dr. Nwabisi, Paul Nnaemeka¹, Dr. Anekwe Rita Ifeoma², Nwatu Ifeanyichukwu³

¹Nnamdi Azikiwe University

²Nnamdi Azikiwe University

³Akanu Ibiam Federal Polytechnic Unwana, Ebonyi State.

Abstract: *The study examined the effect of Energy Sector on Business Development in Nigeria but specifically seeks to determine the influence of gas supply on industrial production and to examine the extent to which the use of obsolete electricity generation equipment affect business development of south eastern zone with particular reference to SMEs. Data were sourced from various publications of Central Bank of Nigeria, National Bureau of Statistics, National MSME Survey report 2013 of SMEDAN. Ordinary Least Square (OLS) technique and questionnaire were used in the research. The study revealed that there is relationship between obsolete electricity generation equipment and business development. It was therefore, recommended that the Federal Government should provide adequate energy infrastructure for a reliable and efficient supply by granting more licences to qualified private investors, providing energy efficiency policies in the area of power*

Keywords: *gas supply, electricity generation, energy sector, business development.*

1.1 Background of the Study:

Recently the energy sector has been associated with increased participation of private sector involvement. Fifty-five licences have been issued to private entities since the year 2000. Out of this, about twenty small private driven energy generation plants are operational, while nine are under construction. With the privatization of Power Holding Company of Nigeria (PHCN) and National Integrated Power Projects (NIPP) assets, there are few generation companies operating in Nigeria. One of the challenges faced in generation is insufficient investment over the past decade. According to the National Integrated Infrastructure Master Plan (2015), the National Integrated Power Project (NIPP) plants are insufficient compared to the overall need. Generation and Distribution in the energy sector have been privatised. This development has started to yield much needed investment in generation assets (NIIMP, NPC, 2015).

The economic progress and business development in emerging economies have been underpinned to the crucial enabling role played by the energy sector. The energy sector significantly influences the vibrancy and sustainability of the entire economy ranging from job creation to resource efficiency. Energy sector's impact on the business development is great and has an input into nearly every good and service in the economy (Voser, 2011). Put simply, Energy Sub-Sector influences the functionality and performance of business Sub-Sector. Development is understood to include other important and related attributes such as, more equality of opportunity, political freedom and civil liberties. The overall goal of development is to increase the economic, political, and civil rights of all people across gender, ethnic groups, religions, races, regions, and countries (World Bank, 1991). It is widely accepted that there is a strong correlation between business development and the availability of electricity. Inadequate and poor access to electricity in Nigeria has been a major impediment to Nigeria's business development and economic growth. Small and Medium Enterprises have always been adjudged as the engines of economic growth but their performance is grossly dismal due to inadequate energy supply. Researchers have identified the increase in energy use as a vital component of emerging economies. Morimoto and Hope (2001) opined that a crucial factor that supports business development and economic growth in developing countries is the presence of adequate and regular energy supply. In order to ensure an appropriate recovery of the socio-economic process within the framework of effective economic system, business development, enhancing structures, patterns and evolution of production, allocation and efficient utilization of resources should be of top most priority. A nation that hopes to experience economic growth and development should be ready to ensure adequate and regular energy supply. Is Nigeria ready for this developmental take-off?

1.1 Statement of the problem

The Nigerian energy sector is characterized by numerous other problems particularly in the area of low power generation, transmission and distribution. The constraints have created a gap between demand for and supply of electricity, low local content in both technological and human resources input remains a major problem in the sector. In addition to this, the increase in gas production necessary to supply the planned gas power stations and develop other gas-based industries and petrochemicals are yet to be stabilized. The inability of the energy sector to effectively meet the demand for energy consumption in the Country and most especially the South Eastern Zone of Nigeria has its genesis from these problems which among others include but are not restricted to poor generation capacity relative to installed capacity, inadequate supply, obsolete Technological power plant, fluctuation in water levels powering the hydro plants, vandalization of existing power infrastructure, Gas supply constraints, inadequate maintenance of equipments coupled with Transmission, Distribution capacity that are constantly inadequate; in wheeling and distributing generated

power with high transmission losses equally constitute problems. The inability of Businesses to access the needed energy supplies for business development constitute an impediment to business expansion and survival in Nigeria. The current status of electricity supply in Nigeria reflects a situation of supply crisis in which industrial growth, business development and socio-economic activities are kept below the potential of the economy.

1.3 Objectives of the Study

The study specifically *seeks*:

- 1) To determine the influence of gas supply on industrial production of the South Eastern zone of Nigeria.
- 2) To examine the extent to which the use of obsolete Electricity Generation Equipment affect Business Development of South Eastern Zone of Nigeria with particular reference to Small and Medium Enterprise (SME).

1.4 Research Questions

- 1) What is the influence of the gas supply on industrial production of the South Eastern zone of Nigeria?
- 2) To what extent does obsolete Electricity Generation Equipment affect Business Development of South Eastern Zone of Nigeria with particular reference to Small and Medium Enterprise (SME)?

1.5 Research Hypotheses

Ho1: *Gas supply does not significantly inhibit activities of industrial production in the South Eastern zone of Nigeria.*

Ho2: *There is no significant effect of obsolete Electricity Generation Equipment on the Business Development of South Eastern Zone of Nigeria.*

2.0 REVIEW OF RELATED LITERATURE

2.1 Theoretical framework

Social System Theory (Talcott Parsons, 1979). In his social system theory of management and structural functionalism viewed an economy as a social system that interact together (the integrative function of the social system) in order to achieve a specific goal. He stated that social structures constrain choices and ultimately determines all social actions. This theory is related to Igor Ansoff (1965) theory that was centred on synergy which underscores the need for the whole system to interact and operate together for greater efficiency. His theory concentrated with a simple aim of producing a resource-allocation pattern that will offer the best potential for meeting the firm's objective. The system theory considers the energy sector as an integrated entity that should be for both public and private participation.

2.2 Energy Supply, Industrial Production and Technological Advancement

In Nigeria there are so many industries, sea ports, oil deposit and oil companies; and energy supply is considered as essential and key element of modern industrialization in Nigeria where most of their activities notably are driven by power in every aspect like iron-welding that has increased dominance of electricity usage. Industrialization is the transformation of a society from an agricultural based society to that of the manufacturing of goods and services; this could bring about inventions that stem much expansion, as well as new technologies.

Nigerian Energy Regulatory Commission (NERC) scored the eleven (11) Distribution companies (Discos) and other Generation companies (Gencos) low, mostly for their poor data submission. Abdullah, (2016), believed that the Discos under performed as their average 55 percent Aggregate Technical Commercial & Collection (AT&C) losses was unacceptable as only 17 per cent was projected in the Multi Year Tariff Order (MYTO). He expressed that their customers' metering level had fluctuated from 46 percent to about 44 per cent which he stated may be due to wrong data submission to NERC, variation in the number of customers and meter installation statistics. The Generation companies (Gencos) had their electricity output go down from 70 per cent earlier in 2005 to less than 65 per cent with more stranded (unused) power. NERC also frowned at the Transmission Company of Nigeria's (TCN) non-submission of its six months performance between January and June of 2015. He expressed the need to improve the performance in the sector by making sure that the licensees' live up to their responsibilities. Bello (2016) stated that the 11 electricity distribution companies made commitment of metering about 1,640,411 customers have so far been metered between January and October 2016. The Distribution Companies blamed their inability to make substantial progress as regards metering their customer to high foreign exchange rate, and that the present tariff they have are not cost reflective as they are being regulated.

Generation

To meet the Vision 2020, Government has set a generating target of 40,000MW. To attain this projected increase in capacity will require large investments which may be beyond the resources available to Government. In view of this, private sector participation will be necessary to achieve this growth. Government is therefore encouraging International Oil Companies (IOCs) operating in the country to embark on Independent Power Producers [IPPs], as part of the reform. The IPPs will not only boost electricity supply but also provide necessary infrastructural support for business and economic growth that would guarantee additional revenue to the participating IOCs. To encourage private participation in this process, Government should put in place the following:

- A cost reflective tariff to guarantee return on investment
- A credit enhancement programme and incentives
- Fuel availability

Transmission

Investment is required in the Transmission network. The Government's target to raise transmission capacity from 330 kilovolt to 700kv is being aggressively pursued as it has made investments of US\$3.5 billion for construction of a 700 kv super transmission grid that would enable power generation companies to transmit more than 6000MW of electricity. This transmission grid is to be retained by Federal Government of Nigeria [FGN] and managed via a management contract. It is imperative that new investments are pushed forward as rapidly as possible. To that end, the Transmission Company of Nigeria (TCN) management contractor will be responsible for significant investments in the expansion, reliability and stability of the network infrastructure.

Distribution

The distribution network has to grow at the rate of at least 6% each year in order to meet the anticipated electricity demand of the nation by 2020, however, the current average growth rate per annum is less than 1 percent due to limited investments in new networks. Investments in distribution networks are usually ploughed into replacements of damaged equipment (transformers, switchgear, etc), instead of going into new constructions for expansion and upgrades. The immediate distribution target of the Government is to:-

- Increase the capability of the distribution network by roughly 20%
- Reduce aggregate distribution losses (technical and non-technical) by at least 5%
- Secure a noticeable increase in the average number of hours of electricity supplied to consumers.

2.3 Energy-Power Reform in Nigeria

Reform in the Nigerian Energy-Power becomes imperative and expedient when National Electricity Power Authority (NEPA) started manifesting inability or inabilities to achieve its goals and obligations to the citizens due to various factors like quality output/service and being eaten up by corruption. It is in this respect that the need to attract private sector investment becomes expedient in order to find way[s] forward and also to reposition the organisation. The enactment of the Electricity Power Sector Reform Act was in 2005 was passed to reposition it and the ongoing reform kicked started thereafter. This is because it has become a global trend and it helps to remove gross inefficiencies, dependence on government for funding, among other lapses. From January to August, 2015, Nigeria has 12.5GW of installed capacity, but less than average of 3.9 GW is operational in 2015; 3.2 GW in 2016. Overall, only about 15 per cent of installed capacity is distributed to end users, resulting in a huge shortage of electricity supply across the country (ERGP, 2017).

The Nigerian energy sector is characterized by numerous Challenges particularly with area of power generation, transmission and distribution. This was widely acknowledged and it created gap between demand for and supply of electricity. The reform is expected to reduce costs through efficient supply of energy, introduction modern technology, opening the nation to foreign expertise in the areas of energy technology. This will enhance and led to improve, reliable and steady power supply (World Bank, 2008). The involvement of private investors will help to ease government of some direct financial and governance thereby concentrating on providing enabling environment for the investment to thrive.

The Energy restructure enables countries regulatory Commission to undertake course(s) where they share experiences on how to make their energy sector vibrant. This kind of engagement strengthens regulatory institutions including wider economic benefits for improved productivity. The major factor driving reform in Nigeria is to improve the quality and reliability of electricity supply that negatively affects the domestic and economic lives of the people. The influence of this on the behaviour of both the energy and economy is also addressed using this model. An enormous number of bilateral economic and business interactions fit this generic principal-agent framework. For example, a firm owner designing a compensation scheme that causes the manager to maximize the value of the owner's assets subject to the constraint that the firm manager will take actions to maximize her payoff given the scheme is in place and the fact that it must provide a higher payoff to the manager than she could receive elsewhere. This modelling framework is also useful for understanding the incentives for firm behaviour in a market environment. A competitive market is another possible way to compensate a firm for the actions that it takes. Viewed from this perspective, markets are simply another regulatory mechanism for compensating a firm for the actions it takes. It is well known that profit-maximizing firms participating in a competitive market have a strong incentive to produce their output in a technically and allocative efficient manner (Wolak, 1999). However, it is also known that profit-maximizing firms have no unilateral incentive to pass on these minimum productions cost in the price they charge to consumers. It is when competition among firms is sufficiently fierce that this will occur.

2.4 Market Design for Electricity

The Nigerian market is expected to evolve through the following stages:

Pre-Transitional Stage: This is characterized by inadequate and unreliable supply of electricity.

Transitional Stage: This is characterised by demand exceeding supply; all trading is made through contracts; the conditions and prices of vesting contracts are not freely negotiated; there are transparent and competitive mechanisms for entering in the market (new PPAs).

Medium Term Stage: This stage is characterized by competition to enter into the market to supply demand; contracts can be negotiated freely and power can be traded like a commodity (financial contracts); there is a centralised merit order dispatch (energy at least cost is dispatched first) by the System Operator, where Generators must submit the dispatch nomination (availability, constraints, costs/prices) to be used in the security constrained economic (least cost) dispatch. At this stage, the Nigerian Energy Sector should be on an irreversible path to self-sustaining mode, equivalent to Telecom sector operation today.

Long Term Stage: This stage is similar to the medium term stage but characterized by more competition and greater freedom by eligible consumers to choose their suppliers/distributor.

2.5 Energy Policy for Nigeria

In order to ensure optimal, adequate, reliable and secure supply of energy to the country, and its efficient utilization in the country, it is essential to put in place a co-ordinated, coherent and comprehensive energy policy. In Nigeria, over-dependence in oil has slowed down the development of alternative fuels. The Energy Commission of Nigeria has recognised the need for diversification to achieve a wider energy supply mix in order to ensure greater energy security for the nation. Sambo (2008) acknowledged that adoption of energy efficiency and conservation of energy would help mitigate the supply challenge in the country.

2.6 Energy sector and Micro, Small and Medium Enterprises (MSMEs)

Micro, Small and Medium Enterprises (MSMEs) are very crucial to economic growth and general welfare. They have been acknowledged to be the engines of economic growth and business development in the areas of employment, wealth creation, poverty alleviation, and food security. In terms of number of enterprises, about 95 per cent of firms in the organised manufacturing sector are SMEs (Anudu 2013). Infrastructure development has become imperative in order to increase energy supply and for this to happen there is need to massively invest in procurement or production of new infrastructure. However, the exorbitant cost of undertaking such projects has proved to be a barrier.

Industrial production measures these output of the overall productive activities of the industrial sectors (Awosipe, 2003). This sector is one of the major energy consuming sectors and inadequate supply of energy would contribute to low industrial capacity utilization. The sector is involved in the use of machines to manufacture or convert raw materials into finished goods for sale to businesses or for export. Export promotes manufacturing sub-sector, business development, economic growth of nations and increased foreign exchange earnings. Import is bringing in of goods/services from a foreign country for use, sale or re-export. Importation of goods and services stimulate business relationships, develop and enhance infrastructural production designs. Chukuezi, (2009) stressed that the high rate of industrial growth of any country is a function of the amount of energy available in that country and the extent to which this energy is used. These inestimable roles that energy plays in human and business development probably underscored the Millennium Declaration. Energy services interface in basic survival activities to increasing productivity. Energy supply is one of the most important sectors in the industrial economy, and it requires continues investment in the area of maintenance for the plants and replacement when obsolete.

3.1 Methodology

The research design adopted for this study is the *ex post facto* design being a suitable technique for time order assessment of variables using time series data from the periods 1990 – 2016. The study used Primary data (collected through the use of administered questionnaire) and Secondary data sourced from the Central Bank of Nigeria (CBN) statistical bulletin, National Bureau of Statistics (NBS) publications, the population of the study is one thousand, eight hundred and eighty-four (1,884) businesses across the five (5) States of the South East zone. Taro Yamani formula was used to determine the sample size. $n = \frac{N}{1 + N(e)^2}$

$$n = \frac{N}{1 + N(e)^2}$$

where,

n	=	Sample Size	=	?
N	=	Population Size	=	1884
e	=	error margin	=	5 % or 0.05

Therefore substituting the population figure into this formula using 5% margin of error we have: $n = \frac{1884}{1 + 1884(0.05)^2}$

$$n = \frac{1884}{1 + 1884(0.0025)}$$

$$n = \frac{1884}{1 + 1884(0.0025)}$$

$$n = \frac{1884}{1 + 4.7}$$

$$n = \frac{1884}{5.71}$$

$$n = 329.95 \approx 330$$

Cronbach's alpha is the most common measure of internal consistency ("reliability"). It was chosen due to the presence of multiple Likert questions in the questionnaire that form a scale and wished to determine if the scale is reliable. the Cronbach's alpha is **0.7527**, which indicates a high level of internal consistency for our scale with this specific sampled of study.

Table 3.1: Reliability Test of the instrument

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.7160653	0.752716839	3

3.2 Model Specification

Industrial Production equation:

The equation determines the influence of gas supply on industrial production of south eastern zone of Nigeria.

$$INDP = f(ENES, CAPU, TECH, INVT, EXCHR, MANU) e_t \quad (v)$$

$$INDP = c_0 + c_1LENES + c_2LCAPU + c_3LTECH + c_4LINVT + c_5LECHR + c_6LMANU \quad (vi)$$

where:

- $c_0 - c_1$ = parameter estimates/parameter structures
- e_t = stochastic error
- $LINDP$ = Log of Industrial Production
- Lc_1LENES = Log of Energy supply
- Lc_2LCAPU = Log of Capacity Utilization
- Lc_3LTECH = Log of Technology
- Lc_4LINVT = Log of Investment
- Lc_5LECHR = Log of Exchange Rate
- Lc_6LMANU = Log of Manufacturing

4.0 DATA PRESENTATION AND ANALYSIS

Table 4.1: Regression Result: Gas Supply and Industrial Production

Method of Estimation = Ordinary Least Squares

Dependent Variable:	INDP		
Current Sample:	1990 – 2016		
Number of Observations:	27		
Mean of dep. Var.	= 9,555138	<i>LM het. Test</i>	= 3.11649 [.078]
Std. dev. of dep. Var.	= 1.64374	<i>Durbin – Watson</i>	= 1.09514 [.000, .045]
Sum of squared residuals	=13.3457	<i>Jarque – Bera test</i>	= 2.60401 [.272]
Variance of residuals	= .513296	<i>Ramsey's RESET2</i>	= 8.02300 [.009]
Std. error o regression	= .716447	<i>F (zero slopes)</i>	= 27.4355 [.000]
R-squared:	= 905060	<i>Schwarz B.I.C</i>	= 41.8106
Adjusted R-squared	= .810023	<i>log likelihood</i>	= -31.4134

Variable	Estimated Coefficient	Standard Error	t-statistics	P-value
ΔC	14.5633	3.338629	4.30066	[.000]
ΔLENE	-582913	.283081	-2.05918	[.050]
ΔLCAPU	.645296	.048714	1.929842	[.361]

Δ LTECH	.83083E-02	.424216R-02	-2617434	[.542]
Δ LINVT	4.336741	.124438	-2.52025	[.141]
Δ LEXCHR	.861513	.184599	4.66695	[.000]
Δ LMANU	-641324	.241782	1.998562	[0.006]

Source: Gret – L Package (2022)

Table 4.2 Sample Size Allocation Schedule

Serial (a)	Business Sector of S.E. (b)	Sample size (c)
1	Manufacturing	84
2	Mining & Quarrying	35
3	Accommodation & Food Service	34
4	Agriculture	28
5	Construction	24
6	Transport & Storage	34
7	Information & Communication	19
8	Education	16
9	Administrative & Support Services	12
10	Art. Entertainment & Recreation	10
11	Water Supply, Sewage, Waste Management & Remediation	8
12	Other Services	26
Total		330

Source: Fieldwork Survey Report, (2022)

Table 4.2 is table which shows the allocation questionnaire where manufacturing was allocated 84, mining & quarrying 35, accommodation & food services 34, agriculture 28, construction 24, transportation & storage 34, information & communication 19, education 16, administrative & support services 12, art, entertainment & recreation 10, water supply, sewage, waste management 8 and other services 26 making a total number of 330 questionnaires allocated.

Table 4.3 Obsolete Electricity Generation Equipment and Business Development

Serial (a)	Business Sector of S. E (b)	SA (c)	A (d)	D (e)	SD (f)	NI (g)	Total
1	Manufacturing	53	37	6	3	1	100
2	Mining & Quarrying	25	19	37	14	5	100
3	Accommodation & Food Service	47	32	11	7	3	100
4	Agriculture	18	12	37	21	12	100
5	Construction	30	21	27	19	3	100
6	Transport & Storage	28	26	30	15	1	100
7	Information & Communication	51	34	7	6	2	100
8	Education	20	15	38	20	7	100
9	Administrative & Support Services	38	29	18	11	4	100
10	Art. Entertainment & Recreation	49	37	10	3	1	100

11	Water Supply, Sewage, Waste Management & Remediation	37	39	13	8	3	100
12	Other Services	41	26	19	8	6	100

Source: *Fieldwork Survey Report, (2022)*

Table 4.3 and figure 4.2 are the respondents' response to the questionnaire in respect of the business sectors like manufacturing, mining & quarrying, accommodation & food services among other services. Under manufacturing sector 53 per cent strongly agree, 37 per cent agree, 6 per cent disagree, 3 per cent strongly disagree, 1 per cent no idea. On the mining & quarrying 25 per cent strongly agree, 19 per cent agree, 37 per cent disagree, 14 per cent strongly disagree, 5 per cent no idea. Manufacturing has the highest number of respondents that strongly agree, followed by art, entertainment & recreation, accommodation & food services and other services. While management and remediation has the highest number of disagree, followed by manufacturing and art, entertainment & recreation; and agriculture recorded the least by having 12 per cent disagree. And it ran through strongly disagree, and no idea.

5.0 SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

Regressed gas supply to Industrial Production, the result reveals that the coefficient of estimated constant term is statistically significant and better at 0.1 per cent which implies a functional relationship between the energy supply and industrial production. Similarly, the findings indicate that technology, Exchange Rate, and capacity utilization would foster business development in its aggregate because of their high level of significance in industrial production.

The results of the analysis also reveal that inability to access energy supply constitutes impediments to the business growth, expansion and performances of SMEs in the Zone. The findings are line with that of Berisha-Namani (2009). That there is relationship between obsolete electricity generation equipment and the performances of SMEs' various sub-sectors (manufacturing, information & communication, Art, Entertainment & Recreation, etc). That obsolete electricity generation equipment adversely affects the successful operations of SMEs and business development of the south eastern zone.

The recommend that there should be adequate supply of 'gas to power' supply of energy demand to the industrial production sub-sector of the economy in order to enhance their maximum output, which ultimately would encourage Foreign Direct Investment (FDI) into the Country. There is need for government to open up other frontiers of ensuring that electricity generation in the SMEs in the South Eastern Zone are sustained in order to open up other externalities as it is the fulcrum of industrialization. In addition to ensuring that technology innovation in energy infrastructure that ensure steady and stable electricity supply in SMEs are encouraged, because it is critical in creating employment, increase competitiveness through the application of e-business, e-commerce through internet usage, among others.

References

- Abdullah, M. (2016). Nigerian Electricity Regulatory Commission (NERC) Scores electricity firms, Business publications, *Daily Trust*, March 24:17
- Anudu, O. (2013). Tapping great growth potentials from SMEs. *Business Day*, October:31
- Awosipe, CO (2003). Power Demanded But Not Supplied: The Agonizing Roles of Emergency Power Supply and Transmission System Inadequacy. University of Lagos Press. Inaugural Lecture Series.
- Bello, H. (2016), Power: 51 Transmission constraints cause poor supply in Abuja, 30 others, a communiqué issued the spokesman to the Minister of Power, Works and Housing, in *Daily Trust*, 14, July: 22.
- Chukuezi, C. O. (2009). Gender and renewable energy in rural Nigeria. *International NGO Journal* 4(7): 33-336
- Morimoto, R. & Hope, C. (2001). The impact of Electricity Supply on Economic Growth in Sri Lanka. The Judge Institute of Management Studies, Trumpington Street, Cambridge CB21AG
- Parsons, T., (1951). *The Social System*, New York, Free Press, HM51 P35
- Sambo, A. S., (2008). Paper presented at the "National Workshop on the Participation of State Governments in the Power Sector: Matching Supply with Demand", 29 July, Ladi Kwali Hall, Sheraton Hotel and Towers, Abuja
- Voser, P. (2012). Role of energy in economy growth: Royal Dutch Shell, World Economic Forum Publications.
- World Bank (2008) 'Kenya: Accelerating and Sustaining Inclusive Growth', Report No. 42844-KE, Washington DC.
- Wolak, F. A. (1999). Designing Competitive Wholesale Electricity Markets for Latin American Countries, Inter-American Development Bank 1300 New York Avenue, N.W., retrieved from: <http://citeseerx.ist.psu.edu/viewdoc/download>