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ENERGY SECURITY, CHINA'S STRATEGY: A GUIDE FOR NIGERIA

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ABSTRACT: *Energy Security has returned to the top of the international agenda in ways not seen since the oil embargoes of the 1970s. Energy security has emerged as a major object of the energy policy agenda and policy makers have engaged in a wide ranging debate over how best to address future energy requirements. Industrial powers like the United States are willing to devote considerable military, political, diplomatic, and economic means to access energy resources around the world. But they are no longer alone in this endeavour. Increasingly, industrializing states like China and India are willing to devote comparable resources to secure sufficient energy supplies to sustain their fast growing economy. In this work - Energy Security, China's Strategy: a Guide for Nigeria, using a secondary data in a qualitative analysis has undertaken a comprehensive review of Energy security, looking at the global quest for energy, China's energy security strategy, energy security from Nigeria's perspective and the examples that the strategy can provide for Nigeria. We have identified three key areas of china's strategy which equally provides lessons for Nigeria i.e. China has a credible and an efficient energy policy in place, Self-reliance and self-sufficiency in oil and other resources which they took great pride in, that could take care of their domestic needs and establishment of strategic oil reserves.*

KEYWORDS: energy security, China, Nigeria, energy security strategy, policy, security of supply.

INTRODUCTION

The oil shocks in the 1970s demonstrated how vulnerable the world's economy was to supply interruptions and price volatility. In addition, the recent increases in energy prices, a steady rise in global energy demand, instability in energy producing regions and the threat of terrorist strikes against energy infrastructure have significantly led to a growing concern over energy security. Any energy infrastructure— oil, coal or natural gas—is often vulnerable to disruption by insufficient supply, accident or malice. Terrorism, technical mishap, or natural disasters that damage the energy system could be nearly as devastating as a sizeable war. Inadequate financial resources also increase vulnerability or insecurity by limiting supply, transmission, and reliability while increasing prices of energy imports adversely affect the macroeconomic balance of payments, contribute to inflationary pressures, and displace other consumption and investment because short-term demand is inelastic (Cabalu and Alfonso, 2013: 14).

Energy is of utmost importance as most modern activity relies on it (OECD/IEA, 2010:46). It underpins national security, economic prosperity, and global stability (Martin and Harrje, 2005:97). Energy is the vital ingredient in the world economy (Larson, 2004: 10*).* It is also the lifeblood of modern nations and is a mainstay of high standards of living, sophisticated economies and national security (Garman, 2004:16). For Fannon (2020) he asserts that "we are living in a period of unprecedented energy transformations in both energy supply and demand patterns. These transformations present both great opportunities and real energy security risks". Energy is indispensable to modern human existence (Buss, Adjaye, Goldstein and Picard, 2011: 108). Energy is also a finite global commodity, demand and supply for which affects us all both in terms of the costs of running our nations, firms and households, and in terms of the environment that surrounds us (Rosen and Houser, 2007: 4).Today, Energy is at the heart of every economic, environmental and developmental issue. The world needs clean, efficient and reliable energy services to meet its long-term needs for economic growth and development. Developing countries need to expand access to reliable and modern energy services to alleviate poverty and increase productivity, to enhance competitiveness and economic growth (UNIDO, 2008: 6).Secured energy supplies are crucial for citizens' wellbeing and are essential for businesses and social services to function efficiently (Wilson and Dobreva, 2019).

Therefore, the energy sector constitutes one of the most important areas of global economic activity (Buss et al, 2011: 108). Energy is important in supporting productive activities in both the formal and informal sectors (UNIDO, 2008: 9). Indeed, energy has powered and sustained much of the spectacular levels of growth experienced by the industrialized North during the Twentieth Century, especially in the post – World War II era (Buss et al, 2011: 108). An important challenge in that respect is the possible depletion of natural resources. Indeed, future scenarios by the International Energy Agency predict that the global demand for primary energy sources will increase by 36% between 2008 and 2035(OECD/IEA, 2010:46). As global demand for energy continues to rise – especially in rapidly industrialising and developing economies - energy security concerns become ever more important. To provide solid economic growth and to maintain levels of economic performance, energy must be readily available, affordable and able to provide a reliable source of power without vulnerability to long- or short-term disruptions. Interruption of energy supplies can cause major financial losses and create havoc in economic centres, as well as potential damage to the health and wellbeing of the population (World Coal Association, 2014).

Securing the supply of vital resources has been a preoccupation of human collectives from time immemorial. Since the advent of the modern nation-state, securing supplies of vital resources has increasingly become a cornerstone of national policies (PARES, 1998: 1). The strategically critical function of the energy industry in the national economy and for all essential state functions (defence, communications and health care , for example) have turned the industry into an increasingly privileged target for cyber attack (Barichella, 2018). Energy did not emerge as a resource necessitating policy attention until the later part of the 19th century and early part of the 20th century. Today, phenomenal political (Diplomatic), economic, and military effort is expended to secure energy resources (PARES, 1998: 1). Effectively functioning energy sector is a backbone of the economy of every modern state. Therefore threats to energy sector may have direct or indirect impact on state's economy and national security. Growing deficit and prices of

traditional energy resources and the need to take into account climate change requirements make impact to energy security (OECD, 2007: 253). Energy is vital to our quality of life: we need it for heat, transport, and to power our homes and businesses. Our comfort and prosperity depend on energy security (Davey, 2012: 3).

Energy plays indeed a fundamental role for the smooth functioning of all economies but even more in the developed ones. Modern states rely on energy "to implement key political goals related to the economy at large", which are directly or indirectly linked to almost every aspect of social life. To put it simply, modern life understood in broad economic, political and social terms would be impossible without a considerable amount of energy, particularly from fossil fuels. Given its central role in the economy, energy is closely linked to economic growth (Metais, 2013: 8). Energy consumption has grown dramatically since 1950s, from about 10 Million barrels a day to nearly 80 Million. Given the development trajectory of industrial and industrializing countries, energy consumption levels are expected to continue their spectacular growth into the foreseeable future (Buss et al, 2011: 108). As achieve levels of growth, they also develop higher levels of energy dependency. Virtually all industrial countries consume more energy than they produce. The smooth functioning of their economies, in particular, is contingent upon the availability of plentiful cheap energy (Buss et al, 2011: 108).

Global energy demand continues to increase rapidly, driven by growing demand in the U.S. and expanding economies in China, India, and other countries in Asia. Coupled with soaring prices for crude and the political uncertainties in many oil-producing countries (Sankar et al, ND : Es 1), The rise of China and India as major global economic powers, the continued growth in U.S. energy demand and instability in key oil-exporting regions are dramatically affecting international energy markets. Prospects for stable production are increasingly linked to internal political issues and the regional ambitions of major suppliers. These dynamics will affect the global balance of power, as energy security is becoming a more important factor in countries' national security and economic development calculations (Downs, 2006: 1). Energy security is central to ensuring that the UK remains an attractive place to live and do business (Davey, 2012:3).

Africa's importance as an energy supplier to world markets has grown consistently since the end of the Cold War. Alongside other oil-rich regions outside the Middle East, such as Latin America and Central Asia, Africa—and especially the West African states of which Nigeria and Angola—is seen as an increasingly attractive prize both by major energy-importing states and by transnational energy corporation (Raphael and Stokes, 2011: 903). The United States has led the way in developing a broad global energy security strategy centred on a push to diversify the supply of energy—and of oil in particular— away from the Persian Gulf. West Africa plays an important part in this strategy, and the US has emerged over the last decade to stand now as one of the key players in African energy politics (Raphael and Stokes, 2011: 903). Oil released onto international markets from West Africa forms an important element of overall global supply. Proven oil reserves in states in the region, orientated around the Gulf of Guinea, together amount to over 58 billion barrels of oil—exceeding the reserves proven to lie around the Caspian Basin, equivalent in size to deposits in the US and Canada, and equivalent also to the entire stock of Western Europe and the Asia–Pacific region combined (Raphael and Stokes, 2011: 903).

China's national ambitions in each country are narrowly focused on economic ties (Meidan, 2019). Beijing has been greatly enhancing the depth of its engagement with oil-rich states in the region. Two-way trade between China and Africa has mushroomed from less than US$1 billion in 2000 to a conservative estimate of over US$110 billion in 2011. Investment in the African energy sector is the key focus of Beijing's strategy (Raphael and Stokes, 2011: 912). Disruptions to long term security of supply can be caused by inadequate investments in production and transmission infrastructure, lack of supply diversity and import dependency (Cabalu and Alfonso, 2013: 13).
The focus of this work is to critically appraise the Energy Security given its centrality in the global economic calculus. It is divided into various segments. From the introduction it examines the concept of energy security, undertook a comprehensive review of literature, scrutinizes the Global Quest for Energy Security, glean through China's Strategy on energy security, looked at Energy Security in Nigeria's perspective and the examples Nigeria could draw from China and then the conclusion.

ENERGY SECURITY: THE CONCEPT

The terms "energy security" and "security of supply" are used interchangeably in the policy documents (Lilliestam and Patt, 2012). Supply security or security of supply is used when we talk about energy security. A sure supply is a regular and continuous flow of energy with an affordable price, starting from the primary energy production and until the final consumer. Supply security concerns the access to primary resources, production, processing, transport and distribution (Marin, n.d.: 2). The current model of energy security, which was born of the 1973 crisis, focuses primarily on how to handle any disruption of oil supplies from producing countries. Today, the concept of energy security needs to be expanded to include the protection of the entire energy supply chain and infrastructure (Yergin, 2006: 78). Since World War II, the term has been used to refer to the ability of nations to secure supplies of fuels, primarily fossil fuels. In particular, energy security has meant securing reliable access to crude oil and petroleum fuels at reasonable prices, and development of capabilities to stave off and weather oil "crises" (Pares, 1998:1).

Nations differ in how they define energy security (OECD, 2007: 7). To some extent, the meaning of Energy security is more than sustainability, competitiveness and secure supply. It is a multidimensional concept, including external as well as internal action. Economic, political and security measures have to be applied in combination to generate the essential synergies (Baumann, 2008: 4). They are a multitude of definitions of energy security. They can be characterized according to the sources of risk, the scope of the impacts, and the severity filters in the form of the speed, size, sustention, spread, singularity and sureness of impacts (Winzer, 2011: 1).

One way of defining energy security is by delineating different types of risks, often including longer term aspects. A commonly cited approach is the four As of energy security (APERC, 2007; Kruyt *et al.*, 2009 quoted in Jewel, 2011: 9) — availability (geological), accessibility (geopolitical), affordability (economic) and acceptability (environmental and social) — which includes concerns related to long-term depletion of fossil-fuel reserves and environmental aspects of energy security. Energy security is the ability of an economy to guarantee the availability of energy resource supply in a sustainable and timely manner with the energy price being at a level that will not adversely affect the economic performance of the economy" (Intharak et al. 2007

quoted in Winzer, 2011: 1). Energy security depends on what a nation is accustomed to. When a nation is accustomed to low or stable prices, events or circumstances that result in high or volatile prices are viewed as threats to energy security. This may be because changes in fuel prices can impose costs on customers who have invested in equipment or structures that are optimal with continuation of past energy price patterns. If demand is highly inelastic, higher or volatile energy prices can force consumers to cut back other forms of consumption in order to meet budget constraints (OECD, 2007: 7).

Energy security is a complex issue and any definition must be flexible (Department of Energy and Climate Change, 2012: 5). There is no perfect definition of energy security. When discussing energy security the Government is primarily concerned about ensuring that consumers have access to the energy services they need (physical security) at prices that avoid excessive volatility (price security) (Department of Energy and Climate Change, 2012: 5). By one measure, energy security is the ability of households and businesses to accommodate disruptions of supply in energy markets (Stocking and Costantino, 2012: 1). Energy security means different things to different people at different times. For decades, energy security was concerned with the physical supply of oil. It now encompasses natural gas and electricity and extends along the supply chain. The concept now includes the price and not just the physical availability of these fuels. Energy exporters concentrate on security of demand, that is, on stable revenues, and energy resources and export facilities are often under political control. Energy users seek reliable supplies at affordable prices, with developing countries also concerned about the balance of payments effects of energy price changes (OECD, 2007: 18). Energy security is about vulnerability to disruption. Political turmoil, armed conflict, terrorism, piracy, natural disasters, nationalism and geopolitical rivalry threaten, to varying degrees, to interrupt the everyday trade in oil, natural gas, coal and electricity (OECD, 2007: 18). Energy Security means energy essential for the lives of the people and industrial activities is stably secured in terms of both quantities and prices (OECD, 2007: 147). The United States antitrust agencies define energy security as ensuring a reliable and plentiful supply of energy provided in an efficient manner.

Energy Security entails: the availability of energy resources that are diverse, sustainable in quantities, affordable in prices, supports economic growth, assists in poverty alleviation measures, does not harm the environment and that takes note of shocks and disruptions (Maren, Agontu and Mangai, 2013: 1). In principle, energy security may include security of supply as well as security of demand. The security of supply aspects has received far broader attention. From the economic perspective, security of supply can be conceived as a public good, just as national security. In the field of marketable goods, security of supply means the constant availability of goods on the market, i.e. the avoidance of supply disruptions. In energy forms that are not grid bound, such as petroleum, energy security means strategic oil storage available in crisis times. In grid bound energy forms such as gas or electricity, the energy security is more often called public service and it means the availability of gas or power at all times and all places (OECD, 2007: 205). Thus, energy security does not only entails sufficient energy reserve or potentials but also its availability, accessibility and affordability (Maren, Agontu and Mangai, 2013: 1).

Risk and uncertainty form the basis for any definition of energy security (OECD, 2007: 21). Secure energy means that the risks of interruption to energy supply, are low (Department of

Energy & Climate Change (DECC) 2009). Fannon (2020: v) argued that there remain real energy security risks, however. Countries around the world must still diversify their energy sources, suppliers, and routes to reduce vulnerability to shocks and political manipulation. In 2040, the world will require 31 percent more energy than we produce today. Yet malign actors are using market distorting tactics (including subsidies, intellectual property theft, and the threat of market closure) to dominate supply chains, and inhibit countries' sovereign rights to develop their own energy resources and determine their own energy supply mix, and wield energy supply as a political weapon. Supply disruptions, either at production or during the course of transport or storage, are the main sources of risk. Price spikes can result from supply disruptions. Beyond that, there is no consensus on whether the price level during nonemergency periods is relevant for energy security. Third, there is likely a psychological aspect to energy security. Energy security may prove to be impossible to define precisely (OECD, 2007: 21). If energy security is about the risk and uncertainty of supply disruptions, then producers and consumers have similar interests. Producing countries are often heavily dependent on revenues from the sale of gas and oil for their state budgets and indeed for their broader economies (OECD, 2007: 21). Heightened energy insecurity has been the principal driver for improved energy efficiency, more indigenous production of fossil fuels, renewable energy sources, and, in some cases, nuclear power (OECD, 2007: 21).

The 2002 energy bill (Lilliestam and Patt, 2012: 18) defines energy security as "a broad concept that, besides from the purely physical aspects of access to energy, comprises secure functioning of markets and secure transformation of primary energy to refined energy carriers and the supply of customer-specific energy services to the final consumers". The term can be used to describe the reliability of supplies, the resilience of the supply infrastructure against attacks or natural disasters, the supply of 'affordable' energy and the extent of national self-sufficiency (House of Commons, 2011). Security of energy supply is the resilience of the energy system to unique and unforeseeable events that threaten the physical integrity of energy flows or that lead to discontinuous energy price rises, independent of economic fundamentals (OECD, 2010:3).
Owing to a review of security of supply literature, we found that the common concept behind all energy security definitions is the absence of, protection from or adaptability to threats that are caused by or have an impact on the energy supply chain.

LITERATURE REVIEW

The field of energy security that has evolved as a result of the global competition over energy resources now focuses mainly on the effects of supply disruption on the global political economy. The energy security preoccupation for most countries has centred on ways to manage and if at all possible avoid the consequences of oil shocks produced by world events (Buss et al, 2011: 110). Energy Security has returned to the top of the international agenda in ways not seen since the oil embargoes of the 1970s. The Russian government, when for the first time hosting the G8 (the group of eight industrialized nations) in St. Petersburg in July 2006, put energy security at the centre stage giving it an international prominence not seen in recent years. Rising global energy prices, growing demands for energy in China, conflicts in Africa and the Middle East, and natural disasters constraining an already tight oil supply are making it difficult to avoid the issue of energy security (Nuttall and Manz, n.d.: 3). Energy security has emerged as a major object of the

energy policy agenda and policy makers have engaged in a wide ranging debate over how best to address future energy requirements. Along with this emergence, energy markets have moved towards strengthening regional co-operation and energy supplies and sources have become more diversified (Cabalu and Alfonso, 2013: 13).

Historically, energy security was primarily associated with oil supply. While oil supply remains a key issue, the increasing complexity of energy systems requires systematic and rigorous understanding of a wider range of vulnerabilities (Jewel, 2011: 7). Disruptions can affect other fuel sources (*e.g.* droughts causing a drop in hydroelectricity availability), infrastructure (*e.g.* technical failures affecting pipelines or power plants), or end-use sectors (*e.g.* sudden surges in demand for heat or electricity during extreme weather events). Thus, analysis of a country's oil import dependency, suppliers and emergency stocks is no longer sufficient for understanding its energy security situation (Jewel, 2011: 7). Energy security has three faces. The first involves limiting vulnerability to disruption given rising dependence on imported oil from an unstable Middle East. The second, broader face is, over time, the provision of adequate supply for rising demand at reasonable prices – in effect, the reasonable smooth functioning over time of the international energy system. The third face of Energy security is the energy – related environmental challenge (Martin, Imai and Steeg, 1996: 4)

Jansen et al. (2004 Quoted in Cabalu and Alfonso, 2013: 16) studied the energy supply security issue in the European Union by constructing four long-term energy security indicators based on the Shannon diversity index applied to eight primary energy supply sources (coal, oil, gas, modern and traditional biofuels, nuclear, renewables and hydropower). Energy is the "hinge" of the world economy and its security cannot be taken for granted. The energy security paradigm is evolving into a new form – based on a far more complex integration of economies, energy infrastructure and political alliances (World Economic Forum, 2006: 26). As such, any study on energy can no longer be limited solely to a discussion of supply and demand in the energy world market, but must also seek to examine international energy security from geopolitical and geo-economics perspectives(Xuetang, 2006:2). Here, major powers have invested a lot of time, money, and effort together with diplomatic and military muscle to win control over major foreign stockpiles and transits of energy. In this context, major oil and gas-importers like the U.S., Europe, China, and India are paying close attention to the Central Eurasia (CEA) region, particularly Kazakhstan, Turkmenistan, Iran and Azerbaijan, whereas other regional powers like Russia are striving to retain influence over these strategic resources (Xuetang, 2006:2).

Industrial powers like the United States are willing to devote considerable military, political, diplomatic, and economic means to access energy resources around the world. But they are no longer alone in this endeavour. Increasingly, industrializing states like China and India are willing to devote comparable resources to secure sufficient energy supplies to sustain their fast growing economy (Buss et al, 2011: 110). Notwithstanding the current contraction in oil demand due to the global economic down turn, and effect of lockdown as a result of Covid 19 pandemic, global energy consumption is expected to grow by more than 50% in the first quarter of this century – from an estimated, 447.3 quadrillion British Thermal Units (Btus) per year in 2004 to 651.8 quadrillion Btus per year by 2025. Oil and natural Gas are expected to be in particularly high demand. By 2025 global oil consumption is projected to rise to 57%, from 157 to 245 quadrillion

Btus, while gas consumption is projected to have a 68% growth rate, from 93 to 157 quadrillion Btus (Buss et al, 2011: 111).

In technologically advanced societies—modern societies— the removal of "energy" is the removal of communications, food and water production and movement, manufacturing, human survivability (and/or productivity) conditions, and human and product mobility. Interference with any aspect of the neural network of energy/communications/ computerization renders the society helpless (Copley, 2011: 13). The European Union's prosperity and security hinges on a stable and abundant supply of energy. The fact that citizens in most Member States have not had to experience any lasting disruption of their energy supply since the oil crises of the 1970s' is a testimony of the success of the Member States and the EU in guaranteeing this. For most citizens, energy is available "on tap", it is ubiquitous and un-intrusive (European Commission, 2014: 2).It is tempting to take it for granted that UK consumers have access to the electricity, gas and oil they need to keep their lights on, their homes warm and their transport moving (Department of Energy and Climate Change, 2012: 5).

Buss et al, (2011: 110) in their own analysis contends that:

> *It is unlikely, even taking into account the massive investments in the energy sector around the world, that the oil and gas industry will be able to produce and deliver sufficient energy to meet global demand. The ensuing shortages, coupled with concomitant rising energy prices, will place unbearable pressure on the global economy faced with these economic realities, states – both industrial and industrializing are expected to use a variety of power resources to ensure uninterrupted flows of energy into their respective economies. Given this cold reality of limited global supplies, discord and confrontation between countries over energy is a real possibility. In other words, energy will occupy an increasingly central role in most states' national security calculus, with important implications for how those same states operate on the world stage.*

Large urban gatherings of people (and the world's population is now preponderantly urban) cease to be viable within days, or at best weeks, of a sustained interruption of electric impulses; even the delivery of combustible fuels for mobility are now dependent on this interactive network. On the other hand, modern life, as it has developed over the past 120 years, is feasible because of this patchwork evolution of interactive networks. This is modern society's greatest strength *and its greatest vulnerability*, given the potential for sudden, sharp, and catastrophic interruption (Copley, 2011: 13). Nevertheless, in the winters of 2006 and 2009, temporary disruptions of gas supplies strongly hit EU citizens in some of the eastern Member States. This was a stark "wake up call" pointing to the need for a common European energy policy. Since then, a lot has been done in order to strengthen the EU's energy security in terms of gas supplies and to reduce the number of Member States that are exclusively dependent on one single supplier. Yet despite all the achievements in strengthening its infrastructure and diversifying its suppliers, the EU remains vulnerable to external energy shocks (European Commission, 2014: 2).

Historically, energy security focused primarily on concerns about oil disruption in the oil-producing world. Today, news about any energy disruption – electric power black-outs in Europe or North America, political and social conflict in Latin America, hurricanes in the Gulf of Mexico,

terrorist activities in Iraq or threats such as a confrontation over Iran's nuclear programme – insurgency, terrorism, piracy, resources and cyber attack which has engulf Africa moves around the globe with lightning speed. The impact is immediate and felt by companies, suppliers, consumers and market traders – and in the balance of payments, revenues and government expenditures (World Economic Forum, 2006: 4).

However, in recent years there have been serious power failures in several countries including parts of the US and India caused by system and human error, and significant disruptions to gas flows to Europe for geopolitical reasons. Storms, floods and industrial action can also threaten energy supplies (Department of Energy and Climate Change, 2012: 5). Today, the EU imports 53% of the energy it consumes. Energy import dependency relates to crude oil (almost 90%), to natural gas (66%), and to a lesser extent to solid fuels (42%) as well as nuclear fuel (40%). Energy security of supply concerns every Member State, even if some are more vulnerable than the other. The most pressing energy security of supply issue is the strong dependence from a single external supplier (European Commission, 2014: 2).
Ruminating over the Significance and the viability of energy Copley (2011: 13) lucidly and analytically revealed that:

> *The reality now is that, in the past decade of this staggeringly rapid transformation of human society—120 or so years out of some six-million years of modern mankind— the cementing of the energy/communications/computerization matrix into human viability has rendered meaningless a focus merely on the raw components of energy. In other words, just as the "bronze age" was not about bronze itself, but about what bronze implements could achieve, so the ages of coal and petroleum have passed astern of us. We are in an integrative phase in which bronze, and iron, and coal, and petroleum — and whatever else — are now but old building blocks, not important for themselves, but merely representing the fact that such a material substance represents the kind of tool required to achieve the outcome required of human society.*

Furthermore, at international level, new security of supply instruments could be envisaged with key strategic partners. Pooling a minimal part of existing security stocks in a virtual common capacity reserve – for instance under the IEA – could allow for rapid response in the case of a limited disruption (European Commission, 2014: 5). Every nation faces some energy security risk. For nations that consume substantial quantities of natural gas, the sources of supply risk vary greatly. Nations with sufficient domestic supply to meet domestic consumption focus on disruptions of internal production or of transportation facilities. For nations with few domestic sources of supply, additional sources of risk include the foreign policies or internal political instability of supplying nations (OECD, 2007: 7). The keys to energy security, however defined, are diversity of supply and investment. Investment can provide increase resilience, e.g., through spare capacity, surge capacity and emergency stocks. Other keys are to recognise the interdependence of markets and market participants and ensure timely information exchange (OECD, 2007: 48). The five traditional elements of energy security – demand centres, supply sources, geopolitics, market structures and institutions – have all changed over the past 30 years. So has technology (World Economic Forum, 2006: 7).

The issue of energy security is certainly not restricted to oil. The electric power blackout that struck the US Northeast in August 2003, and the power cuts that occurred in Europe and in Moscow, demonstrated the vulnerability of complex transmission systems. High natural gas prices in the United States are evidence of a tightly-balanced gas market that leaves consumers vulnerable to supply disruptions or weather-driven increases in demand (World Economic Forum, 2006: 7). Oil has been a global commodity for many decades, delivered across borders via pipeline, by rail and by tanker trucks and ships. As mentioned above, natural gas is also increasingly becoming a global commodity. International pipelines already transport natural gas from North Africa to Europe, from Russia to Europe, from Canada to the United States, from Bolivia to Brazil and eventually from Russia to Asian markets, while natural gas movements by liquefied Natural Gas (LNG) tankers also continue to grow. These emerging transport links offer opportunities for cooperation during energy emergencies, but also provide additional risks to economies that are so interdependent (World Economic Forum, 2006: 22).

High costs and unreliable electricity service constrain economic activity in many countries: for example, 97 percent of firms in Nigeria, 73 percent in Bangladesh, 36 percent in Honduras and 33 percent in the Philippines identify poor electricity service to be a severe obstacle to business operation and growth. Higher productivity, enhanced competitiveness and better growth prospects in developing countries are contingent on low-cost reliable electricity service. The electricity sector's ability to deliver improved service is, however, constrained by poor resource utilization, low asset yields and commercial and technical inefficiency with system losses ranging from 15 percent to 45 percent of electricity distributed (UNIDO, 2008: 7). The sector in which security of supply issues pose themselves with the greatest insistence is the power sector. The need to balance supply and demand in power markets where electricity is non storable and demand inelastic has always demanded close coordination between suppliers and the operators of electricity transmission grids (OECD, 2010: 3)

Energy supply security is a classic example of an externality, i.e. of an issue that affects the wellbeing of individuals and society but which markets alone are not providing at adequate levels. Being a negative externality, energy supply risk constitutes a policy issue. This means private individuals cannot cover themselves for such risks due to their informational complexity and unquantifiable nature (OECD, 2010: 3).

ENERGY SECURITY: THE GLOBAL QUEST

Globally, the quest for sustainable development has heightened today more than ever before. There are increasing awareness and concern for sustained economic development and growth (Oyedepo, 2014: 256). Globally also, more than 1.6 billion people live without access to electricity and 2.4 billion people are without modern energy services for cooking and heating (CREDC, 2007: 6). The quest for energy will create new economic and strategic challenges as well as alter geopolitical relations. The outcome of these developments will depend on policy choices made by the key players (Jaffe, 2004: 14). The importance of energy in the economic, social and political development of every nation cannot be over emphasized. Transportation, industrial activities, communication, health, and education are some of the areas where energy cannot be substituted. Improvement in standard of living is manifested in rise in food production,

increased industrial output, the provision of efficient transportation and telecommunication, adequate shelter, improved health care delivery and other human services; each of these requires increased energy consumption (Oyedepo, 2014: 256).

Thus, future energy requirement is expected to grow with increase in standard of living, industrialization and other socio-economic factors. However, inadequate supply of energy restricts socio-economic activities, constrains economic growth and adversely affects the quality of life (Oseni, 2011 quoted in Oyedepo, 2014: 256). This means that energy security for all must be managed carefully lest other pathologies spread into deliberations in the energy area (Jaffe, 2004: 14). The challenge of energy security will grow more urgent in the years ahead, because the scale of the global trade in energy will grow substantially as world markets become more integrated (Yergin, 2006: 78). China, India, Brazil and other developing countries already account for an increasing share of the demand for energy – and this demand will continue to rise. Global demand for natural gas was less than 40 trillion cubic feet (tcf) in 1974. Today, thanks to the introduction of combined cycle gas turbines into the electric power sector and increased use of natural gas for home heating, natural gas demand globally is nearly 90 tcf (World Economic Forum, 2006: 4).
By 1973, when the first oil shock rocked the global economy, the United States imported about 36% of its Petroleum needs. The current level is 59% (in 2007). The USA produced 8.5 Million barrels per day (b/d). This figure is expected to rise to 70% in twenty years. Expectedly to continue meeting its energy needs, the USA is aggressively seeking ways to achieve increased production around the world (Buss et al, 2011: 69). Mimicking the experience of industrialized countries, China's economic development is being fuelled by Oil. Over the past fifteen years, China's demand for Oil has increased by 7.5% annually. Given China's relative size, its industrialization will continue to consume significant qualities of the available worldwide supply of Oil (Buss et al, 2011: 69).

Currently, every day some 40 million barrels of oil cross oceans on tankers; by 2021, that number could jump to 67 million (Yergin, 2006: 78). We have witnessed the evolution of energy markets and technologies— such as the transforming uranium and thorium reactor prospects—over the past decade. We have seen the sudden surge in Eurasian (and for that matter, to a degree, African) oil and gas pipelines resembling the evolution of synaptic links in a growing human brain. The Eurasian Continent's pipeline and power line linkages, coupled with fossil fuel- powered land, sea, and air infrastructural growth, are spreading like a visible flood from the Pacific to the Atlantic (Copley, 2011: 13).

According to US energy information Administration (EIA) projections total World Oil production – "reference case" (the long term projection of the availability of Oil) – was expected to grow from 76. 6 Million B/d in 2002 to 113.2 Million b/d in 2025(Buss, 2011:109). In 2006 production was 85. 24 B/d after which it flattened out between 2007 and 2008 and declined slightly thereafter as a result of the 2008 – 2010 recession. Under a "high price" condition, production will grow from 76.6 Million B/d in 2002 to 102.4 Million B/d in 2025. Under a "low Oil price" condition, production will grow from 76.6 Million B/d in 2025 (Buss, 2011:109). Oil consumption is also expected to register even more significant growth. Under the EIA's "reference case", between 2005 and 2030, total world Oil consumption is expected to grow from 20.7 Million B/d to 22.3

Million B/d. China's consumption would increase from 8.8 million B/d to 15.7 Million B/d (Buss, 2011:109).

Currently, more than a quarter of the world's population has no access to electricity and two-fifths are forced to rely mainly on traditional biomass — firewood and animal waste — to meet basic cooking and heating needs. About 80 percent of these populations are located in India and sub-Saharan Africa. Four out of five people lacking modern energy services live in rural areas. Indoor air pollution from traditional biomass energy is responsible for the premature death of over two million women and children a year worldwide from respiratory infections, according to the World Health Organization (WHO) (Jaffe, 2004: 15). Two main characteristics give fossil fuels a geopolitical dimension. They are highly concentrated in a few regions in the world and they are non-renewable. 80% of the world's oil is located in nine countries representing only 5% of the world's population, whereas 80% of the world's gas resources are found in 13 countries. The Middle East alone possesses 62% of oil and 45% of proven gas reserves (Metais, 2013: 8).

Two-thirds of the world's known oil reserves are in the Middle East (Larson, 2004: 10). The entire fabric of Continental Eurasian society, linking East Asia with the Atlantic-Mediterranean European states, is beginning to feed from that interactive arterial energy/logistical system. In geographic scope, this is unrivalled. In terms of systems complexity and human integration, it will move in the same direction as the compactly interdependent energy-social system in the North-Eastern, North American Continent. Therefore, increasingly, it is becoming impossible to separate out "energy"—the electrical carrier force — from the computing and communications interactivity which literally enables society to function (Copley, 2011: 13). According to World Energy Outlook 2011, in 2009, of the 1.3 billion global populations without access to electricity, about 449 million live in Bangladesh, India and Pakistan. While energy policies geared towards efficient use of energy may help curb demand, it is clear that maintaining growth rates, as developing economies undergo structural changes and strive to meet welfare objectives will necessitate increase in energy use (ESCAP, 2013: 9).

The main sources of primary energy consumed in the OECD area are oil, gas, coal and uranium. Different countries and different sectors use substantially different mixes. For example, transport uses a much higher proportion of oil products than do most other sectors. As for gas, the main countries with gas deposits are Russia (30.5% of the world total gas reserves), Iran (14.8%), Qatar (9.2%), Saudi Arabia (4.1%), United Arab Emirates (3.9%), United States (3.4%), Algeria (2. 9%), Venezuela (2.7%) with the remaining 28.5% split among a number of countries (OECD, 2007: 19). Gas and oil reserves (Oil reserves are slightly less concentrated: Saudi Arabia (21. 6% of total world oil reserves), Canada (14.8%), Iraq (9.3%), United Arab Emirates (8.1%), Kuwait (8.0%), Iran (7.4%), Venezuela (6.4%), Russia (4.9%), with the remaining 19.5% shared among other countries(OECD, 2007: 19). According to the BP Statistical Review of World Energy (2004), proven oil reserves of the five Caspian littoral states total 216.4 billion barrels, while total gas reserves are estimated at 2819.2 trillion cubic feet. In terms of percentages, the five Caspian littoral states have about 18.8 percent of the world's total proven oil reserves and 45 percent of the world's total proven gas reserves (Amineh and Houweling, 2005). We see interesting prospects for expanded oil and gas production in the Caspian region, Russia, West Africa, and North and

South America, as well as the promise of increased oil and gas production in the Middle East (Larson 2004: 10).

Coal and uranium present fewer concerns and are distant from most consumers, thus giving rise to transport costs and risks. Transport costs help to limit the geographic scope of markets, Transporting gas by ship in the form of liquefied natural gas (LNG) costs far more than transporting oil by ship and transporting gas by pipeline. Thus, currently there is in general a worldwide oil market but regional gas markets (OECD, 2007: 19). The IEA predicts that, by 2010, 30% of gas imports into OECD countries will be supplied from non- OECD countries via LNG. Dependence on imports from non-OECD countries in 2010 will vary between regions, from less than 10% in North America to 48% in Europe and 63% for Asia-Pacific (IEA 2006 :13 cited in OECD, 2007: 20). Russia, the world's largest gas exporter and reserves holder, exports exclusively via pipelines. Eighty percent of Russian gas exports to Europe transit Ukraine. Indonesia was the largest exporter of LNG before 2006, but Qatar now is. The vast majority of LNG goes to Japan and Korea (Indonesia supplies a quarter of Japanese and Korean demand). Spain, with two-thirds of demand satisfied by LNG, is the third largest LNG importer (IEA 2006 14 OECD, 2007: 20).

Ultimate gas consumers are industrial, commercial and residential/household users the proportions vary from region to region. Industrial users use gas for heating, melting, and for on-site electricity generation. Some industrial users can switch fuels. Commercial and residential users use gas for heating, cooking, hot water and cooling. Commercial and residential demand can be several times higher in winter than in summer. These users usually cannot switch fuels in the short run but may do so over the long run as they replace worn equipment. Commercial and residential consumers are generally not exposed to short term changes in market prices. In some countries, industrial users are exposed to short term changes in market prices and are therefore able to vary quantity consumed in reaction to those changes; in other countries industrial users, too, are insulated from price changes (OECD, 2007: 21).

Electricity generation accounts for 60% of recent gas demand growth. Gas-fired generation is expected to continue to grow. Gas is seen as cleaner than, e.g., coal, and far faster and easier to get approved and built than other types of generation. This growth has itself reduced the flexibility of gas demand for electricity generation since the increasing share of gas generators in the generation portfolio makes it increasingly difficult to make short-term switches to other fuels (OECD, 2007: 21). The continuous availability and affordability of energy and, in particular, electricity supply is an indispensable condition for the working of a well-functioning modern society. This is especially true for advanced industrial or post-industrial societies, where electricity provides the services essential for production, communication and exchange (OECD 2010: 3)

Without new policy interventions, IEA (2010) points out that about one billion people will still lack access to electricity by the year 2030 and the challenges pose by available financing options are as great as the problem of energy access itself. While the rate of rural electrification and indeed access has increased globally in recent times, the number of people without access to energy worldwide has not declined significantly in absolute term (Ohiare and Soile, 2012:7). This implies that supply is rising faster than demand and is not unconnected with financial, technical

and skilled human resource constraints. The economic and infrastructural disparities between the rural and urban communities of most developing countries, coupled with the responsibilities and policy objectives of their governments to provide basic societal needs and infrastructure, ensure social equity and eradicate poverty, have been the major drivers of rural energy projects. However, despite these economic and social benefits, there is a considerable degree of contention about the financial viability of rural electrification (Ohiare and Soile, 2012:7).

The world must find and develop more reliable supplies of oil, gas and electricity at prices that permit sustained economic growth. Unfortunately, it is almost an axiom in the petroleum business that oil and gas are most often found in countries with challenging political regimes or difficult physical geography (Larson, 2004:10). Global oil reserves are concentrated in a volatile region of the world, with 60% of reserves in the Persian Gulf region (Leiby, 2007: 3). On the supply side of the energy equation, the continuous fighting and rising ethnic and sectarian tension in Iraq, and the diplomatic confrontation over Iran's nuclear programme, have intensified concern over the stability of supplies from the Persian Gulf. On the demand side, China's and India's skyrocketing energy consumption and their efforts to secure supplies have intensified global competition over scarce hydrocarbon resources. These changes in the landscape of the global energy market, in conjunction with diminishing refinery capacity, shrinking spare capacity and a low level of investment, have driven oil and natural gas prices higher (Bahgat, 2006: 961).
In a detailed and clearly enunciated position, Buss et al, (2011, 109) affirm that:

> *Without abundant supplies of energy, even the most advanced industrial economies, cannot sustain socially acceptable levels of economic growth and social welfare. This reality was first bluntly exposed by the Oil shocks of the 1970s, which reverberated throughout the global economy and exposed the energy vulnerability of modern societies. Since then, most industrial countries - as well as those with such aspirations – have regarded energy security as a vital requirement to sustain economic growth and thus ensure their ability to deliver the quality of life expected, and often demanded by the citizens. Therefore, these societies have all sought to secure reliable energy supplies. The result has been a high- stakes global competition to control energy sources, especially Oil. As this competition intensifies as a result of ever increasing domestic demands, the potential for discord among key consuming nations rises in tandem*

A country's position on the spectrum of energy production and consumption determines its energy interests vis-à-vis others, and defines its interactions in the international energy domain. The increasing pressure on inequitably distributed, scarce resources has the potential to lead to inter-state conflict and internal ferment (ESCAP, 2013: 9). At the same time, however, it is agreed that the inherent nature of energy as a resource calls for international cooperation – between energy surplus and deficient countries, technology developers, manufacturers, emerging markets, service providers (Buss et al, 2011, 109). Countries, if they choose to cooperate, can harness complementarities, effectively use available resources, and build cross-country energy capacities. This prospect holds out a range of opportunities for countries (ESCAP, 2013: 9).

In an ideal world, security of energy supply would not equate to energy independence or self sufficiency. Free and global energy trade through smoothly functioning competitive markets

would guarantee timely delivery of all necessary energy resources. Most countries are relying at least partially on the international trade of energy and will continue to do so. What is important in this case is not so much the security of the single shipment but rather the security of the system in which both producers and consumers have a stake (OECD, 2010: 5). Historical facts have established that industrialisation and growth rate of any country depend on energy available in that country, and the extent to which this energy is utilised. In view of the significant role energy plays in national development any country that wants to be reckoned with in the comity of nations in terms of technological development must have robust energy base for sustainable development. The energy base should be able to meet the present and the future energy needs of the nation (Maren, Agontu and Mangai, 2013: 1).

ENERGY SECURITY: CHINA'S STRATEGY

Energy security is a quite complex notion. Contrary to most of the other traded goods, it entails in itself a strategic dimension (Metais, 2013: 8). Energy is a strategic issue for two main reasons. On the one hand, energy can be considered as strategic because it is at the core of the way of living of modern societies and has played a crucial role in their evolution. On the other hand, energy also becomes a security issue because it is undergoing a process of 'securitization' (energy security create a political reality and are followed by concrete political decisions, and is aimed at getting a specific political issue accepted as a security problem) (Metais, 2013: 8).The strategic dimension of energy seems to have become obvious when trends towards an increasing consumption of fossil fuels and thus a dependence on these energy sources started to be perceived as a challenge by the West. The 1973 oil crisis and the subsequent OPEC oil embargo put the economic models of several Western countries at risk and triggered strategic reflexions around energy supplies, hence the introduction of strategic oil reserve.

The global strategic petroleum reserves (GSPR) are stockpiles of crude oil maintained by nations and by private industries as a hedge against potential future energy crises. Global strategic petroleum reserves are maintained as a defence against any event that critically decreases or disrupts future oil production. These can include any physical or economic actions that disrupt any part of the production process, from exploration and development through refining (Chen, 2021). The US Strategic Petroleum Reserve currently holds 726-million barrels, the Japanese strategic stock position is 583-million barrels, and the People's Republic of China (PRC) currently has 272-million barrels of strategic stocks, with a plan to take that to 685- million barrels by 2020/1 (Archibald, 2011: 100). In the oil business, proven oil reserves are an estimate of the amount of crude oil that is available for extraction. By definition, this oil is available for production, unlike proven oil reserves. The interconnected nature of the global oil markets makes a disruption in any given area likely to affect prices across boundaries. In the event of a major disruption due to political upheaval or natural disaster, countries holding reserves could increase the available supply of oil by releasing some portion of their reserves. That replaces the lost supply and moderates any sudden price surge (Chen, 2021).

Projected sharp increases in energy use by the developing world, particularly developing Asia, combined with rising U.S. oil and gas demand could strain global energy systems and environmental conditions. As a result, the diplomatic, strategic, and trading focus of certain Asian

states (Most especially, China) may shift, leading to a strengthening of economic and political ties among individual Asian states, major Middle Eastern oil-exporting countries, and African oil states (Jaffe, 2004: 13). Asia, which is understood to mean Central Asia, Northeast Asia, South Asia and Southwest Asia, is as a whole set for a period of economic, population and urban expansion (Len, 2007: 156). Explosive growth in Asia is expected to contribute significantly to the rise in use of energy by the developing world and have the greatest impact on world oil use, thus playing the largest role in shifting oil geopolitical trends. In developing Asian countries, where an average annual growth rate of 3 percent is projected for energy use as compared with a 1.7 percent for the entire global economy, energy demand is expected to more than double in the next two decades (Jaffe, 2004: 13). This will mean higher energy consumption in the years to come, especially in China and India (Len, 2007: 156).

China has various and abundant natural endowments, such as minerals, metals, and petroleum among other natural resources; it is not a resource-poor country. Self-reliance and self-sufficiency based on these resources were the basic principles of China's energy policy both before and after the founding of the People's Republic of China in 1949 (Jian, 2011: 4). Hitherto, Breakthroughs in developing domestic oil resources freed China from its dependence on foreign oil in the mid-1960s, and ushered in an arena of oil self-sufficiency that China took great pride in. Indeed, its oil production grew so rapidly that China later on exported oil, reaching a peak of 6.21 million tons in 1985. However, all this was changed in the early 1990s when China became a net importer of petroleum in 1993(Pan, 2008: 62). Between 2000 and 2005, China was responsible for about one quarter of the growth in world oil demand, but only accounted for less than 8 percent of global consumption. However, imports are projected to account for 60–80 percent of China's oil consumption by 2020/1 (Downs, 2006: 1). The new round hyper economic growth is more energy-intensive. Rapid development of real estate, massive construction of infrastructure and the boom in automobile consumption all lead to a sharp increase of energy consumption (He and Qin, 2006:96).

Energy is a key strategic issue for China's economic development, social stability, and national security. As such, China sees energy shortages as one of the biggest potential threats (Liu, 2006: 4). China has made its own energy strategy, whose basic content is to change the irrational energy structure, to strengthen the production and import of oil and gas and to ensure the China's increasing demand for oil and gas. China's energy strategy includes both domestic energy strategy and foreign energy strategy, which correspond to and coordinate with each other (Yishan, ND: 2). Following this development, China has been adjusting its energy policy and energy development strategy since the mid -1990s, and implementing a strategy for overseas energy development in which the Middle East plays a more and more important role. Compared with Central Asia, Latin America, Southeast Asia and West Africa, the Middle East is still the major source for China's overseas energy cooperation and development (Pan, 2008: 62).

China's blistering economic growth has made access to adequate energy supplies an increasingly important priority. It is the world's second largest consumer and third largest producer of primary energy. From 2000 to 2005, China's energy consumption rose by 60 percent, accounting for almost half of the growth in world energy consumption. The country is able to meet more than 90 percent of its overall energy needs with domestic supplies—largely because of abundant coal

reserves and a coal-based economy (Downs, 2006: 1). Beijing will adhere to the policy of meeting its energy needs mainly through domestic supply. On the other hand, China will take an active part in energy cooperation with other countries on the basis of mutual benefit. China is ready to strengthen dialogue and cooperation on energy with other countries to ensure global energy security and stability (Liu, 2006:2). However, it imports almost half of the oil it consumes (Downs, 2006: 1). China is grappling with its new role as a major importer of oil. The country's loss of self sufficiency, substantial increases in the volume and cost of its oil imports after the turn of the century, and its emergence as an important factor in the world oil market and accompanying international scrutiny all caught China's leaders by surprise. For the past decade, Beijing has been struggling to cope with the domestic and foreign consequences of rapid demand growth (Downs, 2006: 1).

Talking about china's strategy, Downs, (2006: 1) further, poignantly observed that:

> *The Chinese government's efforts to meet China's energy requirements are in a state of flux as it faces policy and management challenges. The energy crisis of 2003–04— when widespread electricity shortages plagued the country and oil demand surged by 850,000 bpd—highlighted the deficiencies in China's energy policymaking apparatus, which is characterized by ineffective institutions and strong vested interests. Poor coordination of the conflicting objectives of different components of the bureaucracy and tensions between the government and the state-owned energy companies has hindered development of a comprehensive national energy strategy. Recent attempts to craft a more effective bureaucracy and policies are part of a larger effort to balance market and administrative mechanisms, supply expansion and demand moderation, and the interests of the government and companies in managing the country's energy challenges.*

Lending credence to the argument Khan (2008:1) contends that, China faces at least two pressing sets of energy policy challenges. The first is a problem of short-run efficiency and therefore relates to the immediate need to improve management and coordination of the nation's energy supply. During the last five years economic growth has been more than 8 per cent per annum (which must have gone higher by now). At the same time, energy demand grew by about 15 percent annually while oil imports grew at 30 percent per year. In today's China, electrical power shortages are widespread, and transport bottlenecks constrain the ability of the industry to move both coal and oil to where they are needed. There are also longer-term energy policy challenges. These concern the continuing inability of China's government to formulate a coherent energy policy which could provide the basis for the effective management of the energy sector and its environmental consequences for the next fifty years and beyond. The changes in China's energy security policy over the past several decades have corresponded with China's development and changes in geopolitical power at the regional and global levels. Strongly influenced by China's general strategy toward the outside world, China's energy security policy has been formed, developed, and transformed through several periods in the past few decades (Jian, 2011: 4).

The sharp increase in China oil imports and serious electricity shortages in recent 5 years have focused China's attention on its energy strategy. The energy sector now becomes a bottleneck for China's economic growth and the energy strategy has to find a balance between China's energy consumption and demand to maintain stable economic growth (He and Qin, 2006:99). Rapid

economic growth poses energy demand challenges. Major energy resources located in turbulent and volatile regions (such as the Persian Gulf and Central Asia), vulnerable sea lanes with two chokepoints from the Persian Gulf to Northeast Asia (the Straits of Hormuz and the Straits of Malacca), and pipelines crossing several insecure borders have shaped China's growing sense of energy insecurity (Liu, 2006: 2). Geographically, China's future oil and natural gas imports depend heavily on the Persian Gulf, Africa, and Latin America for maritime shipping and on Central Asia and Russia for its overland pipeline system. With more and more dependence on imported energy resources, China's fast growing economy is increasingly exposed to the potential risks of global and regional energy supply disruptions (Liu, 2006: 2).

Jian (2011: 15) revealed that China's energy security policy has evolved through four major stages. They are:

> *The first stage, from 1949-1993, can be called the self-sufficiency, self-reliance period. During this period, China undertook strong measures to establish and safeguard its sovereignty. As foreign interaction would have invited outside interference therefore, energy security policy mainly depended on domestic production with very little role for foreign policy. During the second stage, from 1993-2005, the main slogan was "go abroad." China's oil self-sufficiency ended in 1993 and it started to import oil from abroad. The national oil companies (NOCs) started to learn how to play in the global energy market via foreign direct investment. The third stage, from 2006 to the present, can be called the "outward investment" period. The fourth stage of China's energy security policy began with the global financial crisis in 2008, which gave China an opportunity to utilize its large foreign currency reserve and further expand its investments in the global market.*

The International Energy Agency's World Energy Outlook for 2004 through to 2030, indicates that Energy consumption in Northeast Asia is expected to amount to 3.5 Billion Tonnes of Oil equivalent by 2030, a rise around 1.5 Billion Tonnes over the next twenty five years. China is mainly responsible for this projected increase in Energy consumption (Len, 2007: 156). China's rapid growth and increase in overall energy demand continue to affect energy markets. Some analysts estimate that China could account for as much as one-third of the world's marginal increase in oil demand in the coming years (Larson, 2004: 10).

In what look like a reflection Pan (2008) gave a compendium of events that culminated in the China's quest for energy. He revealed that:

> *The change from an oil exporter to a net oil importer occurred mainly because of China's fast growing consumption. From 1978 to 2000, total energy consumption in China more than doubled, increasing from 57,144 tce (tons of cola equivalent) to 128,000 tce. China's oil consumption has mostly assumed a proportion of around 20% of its total energy consumption and also jumped correspondingly. The turning point came in 1993, when China imported a net total of 9.91 million tons of crude oil and refined oil products. The imports in 1994 and 1995 dropped somewhat respectively to 3.30 and 8.75 million tons. After 1995, oil imports increased very fast. By 2000, China's imported petroleum amounted to 70 million tons, nearly 1/3 of its total oil consumption of 220 million tons. By 2003, its imported petroleum had amounted to 90 million tons. In 2007, China imported*

> *163 million tons of crude oil, more than 40% of its total oil consumption, making another historical record. China has now surpassed Japan as the second largest energy consuming country, next only to the United States. It is expected that by 2010, China may import 180 to 200 million tons of crude oil, over half of its total consumption.*

With regard to energy, we can already see that sustaining and protecting the neural networks of interactive electricity/communications/ computerization is a priority with direct impact on the non-negotiable strategic outcome of societal survival (Copley, 2011:14). "The immediate and direct strategic linkages between energy, food, water, social stability, and strategic power are now more profound and global than ever before, thanks to emerging technology and the globalization of markets and trends (Copley, 2008)." Commodities and products are tactical; what is done with them determines strategic outcomes - Oil, gas, internal combustion engines etc (Copley, 2011:14). The rising Economic and Strategic power of the People's Republic of China (PRC) is clearly the key dynamic of Indo- Pacific and Eurasian geopolitics for the coming decade, and the PRC's focus on fossil fuels as an integral component and priority of this grand strategy will drive both energy markets and security issues for much of the world in the coming decade and more (Bodansky, 2011: 115). The Chinese government has worked hard to prevent energy from becoming a bottleneck undermining vibrant growth and social stability. China is committed to cultivating a new economic growth mode featuring low input, low energy consumption, low pollution, and high efficiency (Liu, 2006:1).

Pan (2008: 63) provides explanation for the need of China's strategic energy outlook and the centrality of Energy in China's public policy. He argued that:

> *With the country's growing dependence on oil imports, high oil prices have harmed China's economic development and have even had a negative impact on social life in China. First, high oil prices have reduced China's export revenues, diminished its economic growth rate, accelerated the inflation rate, and increased China's foreign-currency payment. Second, as an indirect result, production costs have risen; hampering China's export-oriented light industry, which in the long run could inflict considerable harm on China's competitiveness. Third, the economic decline in other parts of the world has reduced demands for China's products. Fourth, high oil prices have led to the inflation of prices for a number of related products, producing a serious impact on the daily life of the Chinese people. For example, the rise in transportation costs has pushed up the jump in the prices of public and private transportation, aviation, tourism, catering, construction and real estate as well as daily necessities. The burden of expenditures on the Chinese households has definitely become significantly heavier.*

General Chi Haotian, Peoples Republic of China's (PRC) Chief of General Staff in 1987-92 and Minister of Defence in 1993-2003 in the series of secret lectures he delivered to the Chinese High Command in 2003-04, at the peak of his power (cited in Bodansky, 2011: 122). Chi's main point was that there was an historic transformation of the PRC's global posture. He argued that "if we refer to the 19th Century as the British Century, and the 20th century as the American Century, then the 21st Century will be the Chinese Century. ...We must greet the arrival of the Chinese Century by raising high the banner of national revitalization." To become a global power, the PRC must reassert itself politically and militarily. In this context, Chi articulated the urgent imperative

for the PRC to surge and take control over the energy and mineral resources crucial to its economic development, as well as the worldwide transportation routes. Energy development thus becomes a key component of China's national strategy (Pan, 2008: 64). Hence, China's growing energy dependence has become a major concern for both economic and national security policymakers in the country (Khan, 2008: ii)

In the face of challenges to its energy security, China has been making adjustments in its energy policy and energy development strategy since mid-1990s, and implementing a strategy for overseas energy development. The adjustments are reflected in the following five areas out lined by Pan (2008: 64): (a) Energy production in the western part is encouraged while that in the eastern part stabilizes. (b) Energy consumption structure is remodelled. In China's energy mix, the proportion of coal is to decrease from its current level of 65-69%, while those of oil, gas, hydropower and nuclear power will increase from their current levels of respectively 20-25%, 3%, 6% and 1%. It is expected that by 2021, coal will take up 54%, with oil expanding to 27%, gas to 9.8%, and hydro and nuclear power to 9.1% (c) A national energy reserve system is constructed. The strategic energy stockpiling will not only control the national economic loss caused by any sudden break in its energy supply, but also help to stabilize the market when energy prices go up suddenly. (d). Energy saving becomes one of the top priorities. The Chinese government is taking various measures to change the situation, such as promulgating "Renewable Energy Act", revising "Coal Act", enforcing energy-conservation criteria for buildings, turning petrol engines in vehicles into diesel engines, popularizing coal-based gas hybridization technology, working out energy-saving criteria for newly manufactured vehicles, closing down excessive energy consuming facilities, etc (e) Emphasis is laid on active energy development overseas. While sticking to the principle of mainly relying on domestic energy resources, China has embarked on the road of developing oil and gas overseas, expecting to diversify its energy import channels. This is of great importance to China (Pan 2008: 64).

A key objective of China's overseas energy development strategy is to ensure the diversification of oil and gas imports and their transportation routes. To achieve this objective, it is necessary to go beyond the mere purchase of energy products by directly engaging in the international markets of energy development and transportation (Pan, 2008: 65). The centrepiece of the current strategy seems to be an ambitious scheme of investment in overseas oil projects together with continuing domestic exploration. The state-owned oil companies of China are the key players in both arenas (Khan, 2008: 7). Starting from the 1990s, Chinese enterprises began to make their presence in the international market of energy investment and development felt (Pan, 2008: 65). China National Petroleum Corporation (CNPC), China National Offshore Oil Corporation (CNOOC) as well as China National Petrochemical Corporation (SINOPEC), as leading Chinese companies operating in the world energy market, have invested in dozens of major energy projects around the world. On the whole, the overseas operations of Chinese companies are oriented towards five directions: Middle East, Central Asia-Siberia, Indonesia-Australia, Africa, and Latin America. Especially, remarkable achievements have been made in projects in Kazakhstan, Sudan, Venezuela, Indonesia, Australia, and Iran (Pan, 2008: 65).

In a vivid and more explicit account, According to the U.S. Energy Information Administration (2012:8 cited in Duarte, 2012: 6) who in turn draw largely from other sources) affirm that: "the

Middle East remains the largest oil supplier to China, although African countries, particularly Angola, have come to occupy an increasingly important place in the context of China's oil imports in recent years". In 2011, "the Middle East provided 2.6 million barrels per day (51%)", with emphasis on other regions that export to China (stand out) Africa represents (with) 1.2 million barrels per day (24%), the Asia-Pacific region 173 000 barrels per day (3%), and 1.1 million barrels per day (22 %) coming from other countries. In turn, states like Iran, Oman, Yemen, Sudan, Congo, Russia and Kazakhstan are also worthy of attention, (among other) as China´s trading partners in oil supply. In 2011, "the Chinese state oil companies operated in over 30 countries, making acquisitions of oil assets (oil extraction from deposits that [China] had acquired) in at least 20 countries" (LEE, 2012:84 still quoted in Duarte, 2012: 6). 2010 data show that 23% of offshore Chinese oil-equity activity occurred in Kazakhstan, 15% in Sudan and Venezuela, 14% in Angola, 5% in Syria, 4% in Russia, and 3% in Tunisia. In turn, Nigeria, Indonesia, Peru, Ecuador, Oman, Colombia, Canada, Yemen, Cameroon, Gabon, Iraq, Azerbaijan and Uzbekistan make up the remaining 20 percent (Duarte, 2012: 6).

Chinese acquisitions have grown exponentially over the last decade. In 2004, for instance, the Chinese state oil corporation Sinopec signed an agreement with Gabon's Bongo administration which would allow the company to explore for oil and build a refinery, in order to supply Beijing directly with 20,000 bpd. Likewise, China reached an agreement with Angola for the direct provision of 10,000 bpd of oil, in exchange for US$2 billion in economic aid (Raphael and Stokes, 2011: 912). Agreements were also reached with the regime in oil-rich Chad. Most significantly, Chinese oil companies have struck large deals in Nigeria, buying major stakes in offshore and onshore fields, and gaining the go-ahead to build refineries and pipelines while buying up foreign companies involved in the extractive industry. For example, Sinopec acquired Addax, a Swiss-based oil and gas explorer, for US$7.2 billion in 2009: to date, one of the largest acquisitions in the industry's history (Raphael and Stokes, 2011: 912). Indeed, since 1993 - when China became a net oil importer - the Chinese have been investing in a sophisticated 'black gold' diplomacy that enables them to acquire ever-growing amounts of oil so as to meet their energy needs (Duarte, 2012: 6).

Chinese strategy in this respect is driven by deep concerns in Beijing over the rapidly expanding Chinese economy, the consequent increases in oil demand within China, and the strategic control of the Persian Gulf held by its competitor (and potential future rival), the United States. Annual oil consumption in China is set to more than double by 2030, by which point it is forecast to outstrip the US as the leading energy consumer (Raphael and Stokes, 2011: 913). Moreover, relatively static levels of Chinese domestic production will ensure that this extra oil will need to be imported. Chinese leaders will need to acquire an additional 8.6 million bpd from foreign sources by 2030, almost quadrupling the amount of oil imports required. And while the structure of the current oil market allows Chinese needs to be met alongside those of every other consumer (the US included), there is a sense of deep concern in Beijing about the sheer degree of American dominance over Persian Gulf oil, and the consequent ability of Washington to control the flow of oil during any potential future disruption in Sino-American relations. (Raphael and Stokes, 2011: 913).

Chinese planners are, to a certain extent, acting in oil-rich regions across the world—including Africa—to secure influence with key producers, and in many instances to conclude bilateral deals that enable oil to be traded outside the global marketplace. Instead of purchasing this oil via the market, and therefore paying the market rate, China has increasingly entered into negotiations with oil-rich states over the price of a set amount of oil, or over the rights to explore for, extract and directly repatriate specific reserves. As such, American and Chinese strategies in West Africa are seemingly at loggerheads, with each power seeking to control significant aspects of oil production and exportation in the region (Raphael and Stokes, 2011: 913).

Also instructive is the PRC's approach to energy security. Based on its 2010 domestic supply and demand trajectories, the PRC would be importing, or otherwise substituting, 10-million barrels a day by the end of the decade, which is not that much less than the 2010 US import rate of 14-million barrels per day. The PRC has begun a Coal-To-Liquids (CTL) plant build in response, with three Fischer-Tropsch plants and one liquefaction plant commissioned and three Fischer-Tropsch plants under construction, for total planned production in excess of 600,000 barrels a day, signifying an increasing incorporation of CTL into its supply strategy (Archibald, 2011: 106).

Beijing Energy security strategy centres around the China's investment in overseas oil exploration and development projects, interest in transnational oil pipelines, plans for a strategic petroleum reserve, expansion of refineries to process crude supplies from the Middle East, development of the natural gas industry, and gradual opening of onshore drilling areas to foreign oil companies (Khan, 2008: 1). China's oil strategy is driven by economic benefits based on the principle of mutual trust and equality. China's oil expansion strategy mainly gives prominence to economic presence, not the presence of political alignment, military forces, or military threat (Xuetang, 2006: 136). China has realized the issue of energy security and tried to diversify its oil imports. The current investment by China in Africa, Latin American and Central Asia has not only occurred for economic reasons, but also for reasons of energy security. China's oil imports from United Arab Emirates, Iraq and Kuwait and other countries with rich oil resources are relatively low, but that its imports from Sudan, Angola and Oman have increased substantially. This indicates that China is seeking access to energy resources in countries where developed countries, in particular US companies, have less investment. However, some of these states are classified by the USA as "rogue states" (He and Qin, 2006:102).

China has started to formulate plans for the strategic oil reserves and construction of some oil reserve facilities. This is one of the most important strategic measures for guarding against energy supply disruptions, ensuring sustainable energy supply, and stabilizing the oil market (Liu, 2006: 7). Since the adoption of the plan of building its own national Special Petroleum (Oil) Reserves (SPRs), China has shown some effort and progress in implementing this project. China's official expectation is to build its emergency stockpiles for 90 days equivalent of domestic consumption. General consensus among international oil experts and economists is that the establishment of SPRs is one of the most important means for a country to enhance energy security. SPRs are considered the most effective way to prevent the political use of oil as a weapon and to minimize the impact of supply disruption (Zhang, 2006: 22). China's final decision on building its SPRs, despite all objections, is a positive and strategic move towards a long-term goal of increased oil

security. Similar to the massive pipeline construction, SPRs building is an expensive project for the government as well as for oil companies and other stakeholders (Zhang, 2006: 22).
Contributing to the debate on SPRs (Liu, 2006: 7) maintained that:

> *China's strategic oil reserve system will build from the experiences of developed countries. Accordingly, China has decided to establish a four-tier oil reserve system. The first tier is the national strategic oil reserve system, whose objective is to ensure energy security when oil supply is disrupted by unexpected events and political turbulences in oil producing areas of the world. The other three tiers are commercial reserves of the three petroleum corporations, reserves of big oil consumers, and other reserves in the society. China's current strategic oil reserve is far from satisfactory, with planned reserves of 15 million tons. However, according to a statistical report on China's oil consumption in 2002, 15 million tons of oil reserve is only sufficient for about 20 days of domestic oil consumption. In developed countries with established strategic oil reserves such as the United States, Japan, Germany, and France, their reserves will be able to last 158 days, 161 days, 117 days, and 96 days, respectively. As for the scale of China's oil reserve, opinions vary whether it should be equivalent to 90 days of oil consumption or perhaps as much as 120 days. To meet this challenge, China's national strategic oil reserve base construction is in full swing. The bases of such oil reserve will be located in China's east coastal areas, including Guangdong, Zhejiang, Shandong, and Liaoning provinces. Additionally, the Xinjiang, Shaanxi-Gansu-Ningxia, Sichuan-Chongqing, and Qinghai oil fields will become China's top four reserve oil fields. Zhenhai base in Zhejiang's Ningbo City has built up 16 storage tanks in 2005, while the other three bases in Zhoushan, Dalian, and Huangdao have entered the stage of infrastructure construction.*

China has joined most of the industrialized world today as a net oil importer that needs to maintain an outward-looking energy policy focus. Establishing a coherent and comprehensive energy strategy is crucial for the deepening of China's market-oriented economic reforms and bringing out future social and political changes that can be based on economic growth. In such critical moment of development, China's inexperience of handling its foreign oil dependency can be costly both economically and politically (Zhang, 2006: 26). To meet these challenges, China has created the State Energy Leading Group, led by Premier Wen Jiabao. Its major tasks include research on China's energy strategy, key energy development and saving policies, energy security and external cooperation. The Chinese government has also established a team to draft the Energy Law, which will formulate long-term energy strategy, regulating all the aspects of China's energy exploration, production, consumption, and international cooperation. The Energy Law will be conducive to building a conservation-oriented and environment-friendly economy by optimizing energy structures and implementing clean production (Liu, 2006: 4).

China will promote both energy development and energy conservation, giving top priority to energy conservation. In recent years, a preliminary energy supply mix has begun to take shape, with coal as the principal fuel; electricity as the core; and utilizing the full development of oil, natural gas, and renewable energies. China's strategic goal is to reduce the use of energy per unit of GDP by 20 percent by 2010 (and beyond) and also improve energy conservation and efficiency,

while cultivating a new economic growth mode to achieve sustainable development (Liu, 2006: 4).

Pointing to her continued commitment to a sustainable and continuous energy security (Liu, 2006: 4) revealed that:

> *According to China's Eleventh Five-Year Plan (2006-2010), China will try to meet its energy demand mainly with domestic supplies, as mentioned, utilizing coal as the main source of energy. China's traditional domestic energy use is dominated by coal, accounting for two-thirds of its total energy consumption. Beyond China's proven coal reserves of more than 114.5 billion tons, energy resource exploitation and construction in its western regions has reached a new historical stage. Statistics demonstrate that Inner Mongolia and Shaanxi may contribute as much as 235.2 billion tons and 166.3 billion tons in coal reserves, respectively, ranking second and third in the country. Thirteen counties and districts at the borders of Shaanxi, Shanxi, and Inner Mongolia possess 60 percent of China's total proven coal reserves.*

The 12th five year plan (FYP) reflects China's pledge to have 15 percent of its energy come from non-fossil fuels by 2020 (from 8.3 percent in 2009 to approximately 11 percent by 2015). The plan includes a cap on domestic coal production, China's largest energy source and a major contributor to the country's environmental problems. The plan also contains significant support for nuclear and hydropower development with wind power seeing a threefold expansion in capacity. Domestic natural gas consumption will double over the 12th FYP (APCO, 2010: 6).

ENERGY SECURITY IN NIGERIA

The importance of energy availability in the economic growth, social and political development of every nation (Nigeria not left out) cannot be overemphasized. Affordable and reliable energy availability is the precondition for sustainable development. Sustainable development calls for an efficient, reliable and decentralized energy economy, based on local and clean energy sources, in which the price paid by the consumer will reflect the real cost of energy products to the economy. There is clear evidence that Nigeria is blessed with abundant resources of fossil fuels as well as renewable energy resources (Oyedepo, 2014: 255). Energy is the mainstay of Nigeria's economic growth and development. It plays a significant role in the nation's international diplomacy and it serves as a tradable commodity for earning the national income which is used to support government development programmes. It also serves as an input into the production of goods and services in the nation's industry, transport, agriculture, health and education sectors, as well as an instrument for politics, security and diplomacy (Sambo, 2009:15). Nigeria is endowed with enormous energy resources, non-renewable and renewable but most of its economic activities are oil and gas based which is finite and environmentally unfriendly (Maren, Agontu and Mangai, 2013: 1). Renewable energy sources, in contrast to fossil fuels, are environmentally friendly, ubiquitous, self-replenishing, infinite, and consequently considered world-wide as the way of the future (Sesan, 2008: 2).

Energy resources are generally defined as anything that can be used as a source of energy. They are basically classified into two main groups, namely, conventional or non-renewable and

renewable energy resources. Non-renewable energy resources are coal, oil and gas while renewable energies include wind, ocean wave and tides, solar, biomass, hydro, geothermal (heat of the earth). They are renewable because they are regularly replenished by nature (Maren, Agontu and Mangai, 2013: 1). They can be regenerated naturally (Efurumibe, Asiegbu and Onuu, 2014: 73). Nigeria, as in many developing countries, providing energy to rural and urban areas has proved to be a great challenge. Nigeria as a large oil and gas economy poses an uneven playing field for renewable energy resources (Efurumibe, 2013: 12).

Energy, and in particular, oil and gas, has continued to contribute over 70% of Nigeria's Federal revenue. National developmental programmes, and security, depend largely on these revenue earnings. Energy, especially crude oil, has over the past five years contributed an average of about 25% to Nigeria's Gross Domestic Product (GDP), representing the highest contributor after crop production. The contribution of energy to GDP is expected to be higher when we take into account renewable energy utilization, which constitutes about 90% of the energy used by the rural population (Sambo, 2009:15). The impacts of oil and gas exploitation in Nigeria are well known and documented (CEE Bankwatch Network, et al, 2011: 4). Oil and gas account for about 80% of government revenues, 90-95% of export revenues, and over 90% of foreign exchange earnings. Also, about 64% of the nation's electricity generation comes from oil and gas, and our transportation system is completely dependent on oil and gas (Maren, Agontu and Mangai, 2013: 1). Commercial production of oil in the country started in 1958 in the Niger delta, a vast coastal wetland area in the Southeast of the country that is one of the ten most important wetland and coastal marine ecosystems in the world. The Delta's oil fields are drilled and exploited almost exclusively by major multinational oil companies from the US and Europe, with a small Chinese presence (CEE Bankwatch Network, et al, 2011: 4).

Nigeria was the first country in Sub-Saharan Africa to export oil. About 2 million barrels of oil are exported daily from the oil rich Niger Delta and the seas onshore. However, the oil revenues accruing to the Nigerian government and the billions of dollars in profits made by the oil corporations that have operated in Nigeria for over 40 years have delivered little in terms of local development to the over 31 million people that live in the Delta, and to the (over 160 million) majority of the Nigerian people (CEE Bankwatch Network, et al, 2011: 14).
Lending credence to the argument on energy security in Nigeria Sambo (2009:15) poignantly asserts that:

> *The energy sub-sector, especially petroleum, continues to maintain its prominence as the single most important source of government revenue and foreign exchange earner. Petroleum contributed an average of 25.24% to the GDP between 2002 and 2006. However, despite the fortunes of the oil sector, other sectors of the economy are declining. For example, consumption of electricity actually declined by 13.4% between 2002 and 2006 even though the overall or total electricity consumption showed a marginal increase of 1.8% from 5.63GWh in 2002 to 7.47GWh in 2006. Only about 40% of households in Nigeria are connected to the national grid. There is high-energy loss due to the physical deterioration of the transmission and distribution facilities, an inadequate metering system and an increase in the incidence of power theft through illegal connections. Other problems of the power sector include manpower constraints and inadequate support*

facilities, the high cost of electricity production, inadequate basic industries to service the power sector, poor billing systems, poor settlements of bills by consumers and low available capacity, about 40% out of the installed capacity of about 6,000MW. Inadequate funding prevented targeted growth in the sector. Production activities in the solid minerals sub-sector were generally on decline. The situation in the rural areas of the country is that most end users depend on fuelwood. Fuelwood is used by over 60% of Nigerians living in the rural areas. Nigeria consumes over 50 million metric tonnes of fuel wood annually, a rate, which exceeds the replenishment rate through various afforestation programmes. The rural areas, which are generally inaccessible due to absence of good road networks, have little access to conventional energy such as electricity and petroleum products. Petroleum products such as kerosene and gasoline are purchased in the rural areas at prices 150% in excess of their official pump prices. The daily needs of the rural populace for heat energy are, therefore, met almost entirely from fuelwood.

The Nigerian economy can be divided into industrial, transport, commercial, agriculture and household sectors. The household sector accounts for the largest share of energy use in the country – about 65 percent. This is largely due to the low level of development in all the other sectors (Sesan, 2008: 3). The major energy-consuming activities in Nigerian households are cooking, lighting and use of electrical appliances – in that order. Cooking accounts for a staggering 91 percent of household energy consumption, lighting uses up 6 percent and the remaining 3 percent can be attributed to the use of basic electrical appliances such as televisions and pressing irons. The major household energy carriers are fuel wood, kerosene, electricity and liquefied petroleum gas (LPG). Fuel wood is the most widely used, supplying over 80 percent of household energy, while less than 20 percent is supplied by the other sources and complemented by small quantities of coal and charcoal. Energy consumption per capita in Nigeria is very small – about one-sixth of the energy consumed in developed countries (Sesan, 2008: 3).

Nigerian energy sector is often characterised by unstable fuel supply and prices fluctuations, epileptic electricity power supply to just about 40 percent of the population of the country (Parimal, Arpit and Shashank, 2010), environmental polluting, and imports more than 85 per cent of her refined petroleum products because of low refining capacity (Federal Ministry of Power and Steel (FMPS), 2006, Amanze-Nwachuku, 2012). In 2011, the European Commission listed Nigeria as one of a number of countries that are considered of "strategic" importance for the EU's "energy security" (EC Communication: 2011). European and US corporations have been signing new contracts for the development of new oil and gas fields in Nigeria, while old concessions continue to be profitably exploited. New infrastructure projects are under discussion aimed at increasing the capacity of Nigeria to export hydrocarbons (especially natural gas) to European and global markets (allafrica.com).

Many Nigerians continue to live in poverty, without clean water and electricity (CEE Bankwatch Network, et al, 2011: 14). The absence of reliable energy supply has not only left the rural populace socially backward but has left their economic potentials untapped. Fortunately, Nigeria is blessed with abundant renewable energy resources such as solar, wind, biomass and small hydropower potentials. The logical solution is increased penetration of renewables into the energy

supply mix (Sambo 2009:15). There is substantial flow of resources and policy attention to the fossil fuel sector. This makes it difficult for renewable energy to gain a foot- hold in Nigeria. Certain subsidies for fossil- fuel conventional energy technologies create a barrier for renewable energies to achieve a higher market share unlike the non-renewables. Presently, technology imports for conventional electricity production carry a much lower tariff than renewable energy electricity technologies. This hinders the growth of renewable energy technologies. All along, the government at all levels formulated policies towards increasing rural energy access focused on grid extension and tanker distribution of petroleum products. With increasing population, the pressures on the infrastructure for the supply of conventional energy resources will continue to increase (Efurumibe, 2013:13).

Again, conventional energy is depletable with extinction risk (Efurumibe, 2013:13). Nigeria is richly endowed with a lot of the conventional energy resources which include petroleum, gas, coal and hydro. These resources are distributed in the various parts of the country. Coal deposits are found in large commercial quantities in places like Enugu and Okaba mines in Enugu and Kogi states respectively. Petroleum and its associated gas are found in commercial quantities in the southern part of the country, in places like Rivers, Bayelsa, Akwa Ibom, Calabar, Ondo. Benin, Imo, Abia, and Delta states and recently in Ibaji Kogi state. Rivers suitable for hydropower are located in places like Kainji, Shiroro, Jebba, Makurdi, Mambilla, Lokoja etc (Oyededpo, 2014: 256). In order to enhance the energy security of the country and establish a sustainable energy supply system, it is necessary to promote the policy of diversifying the energy supply so as to include alternative or renewable resources and technologies into the nation's energy supply mix. Nigeria is endowed with abundant renewable energy resources like solar, wind, biomass, small hydro, etc., which have minimal supply logistic problems. Harnessing these resources will lead to decentralized use and local management of electricity, thereby making sustainable rural socio-economic development possible through self-reliance and the use of local natural resources (Efurumibe, 2013:13).

Nigeria is endowed with sufficient energy resources to meet its present and future needs which have development requirements. The country possesses the world's sixth largest reserve of crude oil. Which has generated an estimated USD 600 billion in income for the Nigeria state since the 1960s (Amnesty international, 2009). Nigeria is endowed with abundant supply of oil, natural gas and coal. It is estimated to have proven reserve of approximately 35 billion barrels of oil, about 2.7 billion tonnes of coal and 187 trillion barrels standard cubic feet (bscf) of natural gas according to the Draft National Energy Master Plan, 2007. Nigeria is endowed with an annual average daily sunshine of 6.25 hours ranging between 3.5 hours at the coastal region and 9.0 hours in the northern region. Nigeria receives about 5.08 x 1012 kWh of energy per day from the sun and if solar energy appliances with just 5% efficiency are used to cover only 1% of the country's surface area then 2.54 x 106 MWh of electrical energy can be obtained from solar energy and this amount of electrical energy is equivalent to 4.66 million barrels of oil per day (Maren, Agontu and Mangai, 2013: 2).

Nigeria also has enormous hydro-electricity potentials (Sambo, 2005), looking at her dwindling oil reserve and the consequent green house effect of the burning of fossil fuels within her territory. Nigeria is currently experiencing a tough time in its energy sector. Presently, incessant power

supply is the order of the day. The power Holding Company of Nigeria cannot guarantee a full-day uninterrupted power supply to Nigerians, reasons being that the present conventional energy sources are operating below their installed capacity (Efurumibe, Asiegbu and Onuu, 2014: 73). An analysis of Nigeria's electricity supply problems and prospects found that the electricity demand in Nigeria far outstrips the supply, which is epileptic in nature. The acute electricity supply hinders the country's development and not only restricts socio-economic activities to basic human needs; it adversely affects quality of life (Oyedepo, 2014: 256). In Nigeria today, burning of fossil fuel for electricity generation is the order of the day. Almost every house hold in Nigeria has a generating set. Banking industries and telecommunication companies use generating sets to run their businesses. The power holding company of Nigeria generates over one thousand mega watt of electricity via thermal stations. And these thermal stations use up gas supplied to them via the National Gas Company. Whenever there are hitches in gas supply, electricity supply will be affected (Efurumibe, Asiegbu and Onuu, 2014: 73).

There are seven river basins in the country, namely Sokoto, River Niger, Hadejia-Jama're, Chad, Upper Benue, Lower Benue and Cross River having small-scale hydropower potentials estimated to be about 734.2 MW (Sambo, 2005). Power Holding Company of Nigeria (PHCN) has estimated that, the country's outstanding, total exploitable hydro potential currently stands at 12,220 MW (Maren, Agontu and Mangai, 2013: 2). As at 2011, "Power generation has dropped from 3700 megawatts (MW) to 3200MW, indicating a loss of 500MW a result of shortage of gas supply to the thermal power stations (at the moment no substantial progress has been achieved) (Labo, 2011). As a matter of fact, since the generating system was upgraded in 1990, no new units have been added. Today, less than 3000 megawatts are being generated to meet a demand load of almost 6000 megawatts (Sesan, 2008: 3). In Nigeria Power generation has received a boost lifted by an elevation of 979 Megawatts in the total generated 4, 312. 1 mw as 16 plants reported output rise (Adalemolekun, 2020).

Revealing Nigeria's attempt at forging a sustainable energy policy and strategy (Maren, Agontu and Mangai, 2013: 3) reflected on what effort the country has made thus far. They surmise that:

> *The concept of energy security is not entirely new at the leadership level of the Nigerian nation, it has however, not been pursued with the sense of purpose, determination and consistency it deserves. In his foreword to the Proceedings of the Energy Policy Conference held in 1978, President Olusegun Obasanjo, then the military Head of State, declared that ―Energy, in all its ramifications, has finally emerged in our consciousness as a crucial element in this unavoidable industrialisation and socio-economic development process. In 1984, the Federal Ministry of Science and Technology produced a Draft Energy Policy Guideline. The contents were however limited in scope and depth. The Energy Commission of Nigeria, in furtherance of its mandate, produced a Draft National Energy Policy in 1993. This was later reviewed in 2003 by an Inter-ministerial Committee, appointed by Mr. President. When eventually a copy of the first Policy Guidelines on Energy for Nigeria was presented in 2003, it had as its cardinal goal, the achievement of a good mix in the development of Nigeria's energy resources, in an environmentally acceptable manner that would guarantee national self-sufficiency and security. The objectives of the guidelines include the development and maintenance of a regular inventory of the energy resources in Nigeria. It also aims at ensuring continuity*

> *and self-sufficiency in energy supply in the short, medium, and long- term, at economically favourable costs. The guidelines took cognisance of the need to protect the quality of the environment and the population from the hazards of energy exploitation and utilisation. It further aims at improving the nation's technical capabilities in the energy sector for State security, self-reliance and economic competitiveness.*

Over the last decade Nigerian leaders appear to have also started paying more attention to the issues relating to energy security. The first are the oil-for-infrastructure deals signed with Asian National Oil Companies NOCs under the Obasanjo administration. From the early 2000s, Obasanjo has actively sought to convince Asian (NOCs) to acquire Nigerian oil blocks in return for commitments to invest in various types of infrastructures in Nigeria (vines, et al, 2009). A second policy initiative that could be said to aim at energy security in the broad sense relates to local content development. In April 2010, President Goodluck Jonathan signed into law a more comprehensive bill, the Nigerian Oil and Gas Industry Content Act. Under this Act, domestic operators and service providers will be prioritized in awarding oil blocks and contracts. Finally, an important current policy-related issue is the fate of the Petroleum Industry Bill (PIB). At the moment, the regulation of the Nigerian energy sector is governed by many different acts, passed at different points in time. The PIB is meant to amalgamate all these different laws into one comprehensive piece of legislation. Furthermore, it is meant to drastically restructure the Nigerian energy sector (Oppewal, 2011: 6).

The Federal Government is strongly committed to expanding access to electricity in rural and semi urban areas. A comprehensive framework for rural electrification policy and strategy that meets international standards and best practices is being developed by the Federal Ministry of Power and Steel. In recent time, the Energy Commission of Nigeria (ECN) has finalized the development of a Renewable Energy Master Plan (REMP) for the country which was presented and discussed during a national workshop in August 2005 (Good, 2005 quoted in Efurumibe, Asiegbu and Onuu, 2014: 73). This plan will set-out a 20-year vision and roadmap for renewable energy to play an increasingly important role in the Nigerian economy. The convergence of resource abundance (including large and small hydro potential, solar radiation, biomass, and wind), advances in technology and expanding market opportunities for renewable energy generated electricity, underscores Nigeria's drive to develop a framework and appropriate business models to deliver power to the over 100 million Nigerians without access today Efurumibe, Asiegbu and Onuu, 2014: 73).

Although efforts to increase energy exports and to seek new markets for those exports are surely important dimensions of energy security in the Nigerian context, they are certainly not the only ones. There is something to say for understanding energy security in the context of an energy exporter on a much broader level. Indeed, when looking beyond net energy exports, it appears that Nigeria is in fact dependent on external forces for its energy security in several ways.
Giving some reasons Oppewal (2011: 4) maintained that:

> *Firstly, although there are refineries in Nigeria, the country is mostly reliant on imports to serve domestic demand for petroleum products. There is one refinery in Kaduna, one in Warri and two in Port Harcourt and the four of them together have a total refining*

capacity of 450,000 barrels per day. However, the refineries have not nearly been producing at full capacity, and in 2010 Nigeria only produced 250,000 barrels per day of petroleum products (currently they are fully not in operation). The reasons for this are manifold, but include political mismanagement, misaligned incentives and corruption, as officials can profit by not allocating crude oil to the refineries and instead earn rents on the issuance of import licenses for petroleum products. Furthermore, the output that the refineries do produce does not include enough gasoline, so that in 2010 Nigeria only produced 24,000 barrels of gasoline per day, while its domestic consumption totalled 187,500 barrels per day. Secondly, Nigeria's energy sector is to a relatively large extent dominated by foreign companies. One potential cost relates to capital flight and profit repatriation. UNCTAD estimates that more than 75% of Nigeria's terms-of-trade gain over 2002-04 following higher oil prices was annulled because of increased profit repatriation by transnational corporations (TNCs). TNC-participation also raises concerns over unequal bargaining strengths in determining the sharing of rents between the TNC and the host government. So, in the early 1990s, when Nigeria was desperately short of cash, deals were negotiated that were highly favourable to foreign oil companies, allowing them to recoup their full investments before sharing any of the profits

ENERGY SECURITY IN NIGERIA AND LESSONS FROM CHINA

China Energy Security has been a subject of global attention, which is now praise worthy and will no doubt, provided an effective guide to Nigeria. The following key areas can serve as an example for Nigeria's Energy security.

a). Energy is a key strategic issue for China's economic development, social stability, and national security. China has a credible and an efficient energy policy in place. In the years ahead energy security, economic security and national security will be inextricably linked. If we want to ensure that we can keep the lights on, we need to develop a comprehensive energy strategy (Fox, ND: 2). A robust and secure energy base requires a strategic and deliberate government policy both short and long terms that will guarantee the present and future energy needs of the nation (Maren, Agontu and Mangai, 2013: 4). Energy policy is the manner in which a nation has decided to address issues of energy development including energy production, distribution and consumption. The attributes of energy policy may include legislation, international treaties, incentives to investment, and guidelines for energy conservation, taxation and other public policy techniques. A comprehensive and coherent energy policy is essential in guiding a country towards efficient utilization of its energy resources (Oyedepo, 2014: 258).

Such a strategy will need to have three components: diversity in the type of fuels we use; diversity in the geographical sources of those fuels and the security structures that will guarantee the safe transport of these fuels (Fox, ND: 2). Fundamentally, improving energy security is about ensuring availability of reliable energy services to the economy. As such, diversification has been at the heart of the strategies embarked to achieve these (Adenikinju, 2008 cited in Maren, Agontu and Mangai, 2013: 4). Countries such as Japan, France, South Korea, Singapore, USA and most importantly China provided a set of strategies that have proved successful in most circumstances i.e.

i. increasing the number of fuels and technologies that are in the energy mix (for example, oil and gas, solar, wind, biomass, nuclear, geothermal and tidal)
ii. increasing the number of suppliers for each fuel (especially if imported);
iii. increasing energy efficiency and conservation; and
iv. Developing storage capacity for different fuels (e.g., strategic reserves).

The energy sector of the economy is greatly inefficient and this has affected every other sector of the economy (Maren, Agontu and Mangai, 2013: 2). The failure of government to prioritise energy supply is evident in its reluctance to provide adequate funds for development of the sector. This lack of funds, coupled with irresponsible management of available resources has crippled the nation's energy sector. The result of this neglect is inadequate and unreliable supply of electricity and non-electricity energy nationwide. The National Energy Policy implies that government has not allocated sufficient funds to the development of energy because there are other important issues needing attention. This is true, but government has to realise that energy is the fuel that powers all other activities – transport, industry, agriculture, health, education, security (Sesan, 2008: 5).

The Nigerian National Energy Policy was last reviewed in April 2003. Before 2003, the country had no comprehensive energy policy. It did have separate policy documents for different energy sub-sectors: electricity, oil, gas and solid minerals. Prior to 2003, there was no consideration whatsoever for the inclusion of renewable energy sources in the national energy mix. The 2003 Energy Policy document, for the first time, included elements of renewable energy planning, though in a cursory manner (Sesan, 2008: 4). This policy is sometimes only on paper but never implemented so as to promote practice of energy efficiency and energy conservation principle in the country (Oyedepo, 2014: 269). The Administration of President Goodluck Jonathan's Privatization of the Power sector. We only hope that it achieve the desired result. However, the existence of an energy policy, while crucial, does not guarantee prudent management of a country's energy resources (Oyedepo, 2014: 258).

b). China Like Nigeria has various and abundant natural endowments, such as minerals, metals, and petroleum among other natural resources; it is not a resource-poor country. Self-reliance and self-sufficiency based on these resources were the basic principles of China's energy policy both before and after the founding of the People's Republic of China in 1949 (Jian, 2011: 4). Hitherto, Breakthroughs in developing domestic oil resources freed China from its dependence on foreign oil in the mid-1960s, and ushered in an arena of oil self-sufficiency that China took great pride in. Any security strategy for energy will have to be conducted against a difficult international backdrop and will have to balance complex, competing global economic, environmental and political interests. As the world economy grows and living standards rise across the developed world, global demand for energy will continue to increase(Fox, ND: 2). It could be argued that for Nigeria to achieve genuine energy security, it should reduce its dependence on foreign companies as well as, paradoxically, its dependence on crude energy exports. The country should use its energy wealth, by maximizing linkages from the extractive sector to the rest of the economy as well as by using the generated revenues for productive investments, to stimulate more broad-based development. The failure to do so can undermine long-term energy security, primarily by causing social tensions Oppewal (2011: 5)

c). In developed countries with established strategic oil reserves such as the United States, Japan, Germany, and France, their reserves will be able to last 158 days, 161 days, 117 days, and 96 days, respectively. As for the scale of China's oil reserve, opinions vary whether it should be equivalent to 90 days of oil consumption or perhaps as much as 120 days. This is one of the areas that Nigeria must not lose sight of, judging from the current happenings any interruption in the supply chains has always had a debilitating effect on the nation's economy which most often grinded the nation's Economy and the overall programme to a halt. Having a strategic oil reserves in the country will be a great blessing.

Finally, China is playing a more and more important role in the international political and economic arena. The energy issue is one of the most important challenges that both China and the world face. Since China has been integrated into the global economy, the demand from and supply of oil and other energies to China has begun to show some impacts on the global market. At the same time, external shocks will be easily transferred to China. The solution to China's energy policy depends on its domestic reform, such as the reform of the energy pricing system, investment in and financing of the energy sector, and the change of the growth pattern from heavily industrialization to a more balanced approach. It also depends on international cooperation. Domestic reform is of great essence in a national development approach. Just like china our planners should understudy china's stride in this direction and develop our home grown approach towards the energy security which is the driver of the economy and the general development of the nation.

CONCLUSION

Energy has formed the nucleus of global activities. It also forms the basis for scientific, technological, economic, political, diplomatic, strategic, environmental and even the National security has come into the calculus for the debate and policies of modern nations both industrialized and industrializing nations at large. Energy is not only key but central to the global activities and energy security has become the greatest quest of nations today. A nation bereft of energy security is a nation in jeopardy. We have extensively reviewed the centrality of Energy and energy security in the international scheme of things. We identified the core value of energy security and the various strategies nations have deployed to insulate their nations from the debilitating effects of the interruption of energy. Like the cells in a human body so is energy and energy security to the life of nations.

We closely examined China's approach to securing their supply and what effort they have made to advance the cause of their nation given the centrality of energy security to their economy and given also the development and economic explosion that has given them an edge in the global scheme of things. The basic strategy adopted by China are: Beijing has a credible and an efficient energy policy in place, Self-reliance and self-sufficiency in oil and other resources which they took great pride in, that could take care of their domestic needs which at some point made her to be able to address her energy needs and even export energy to other nations. Now she has carefully adopted measures to meet her energy needs and this has impacted her economy positively making her a global player. Finally, her strategy of the establishment of strategic oil

reserves has a tendency to insulate her economy from vulnerabilities and so is the reforms initiated for energy security.

Nigeria shares a lot of similarity with China. China Like Nigeria was a third World nation that has grown into a global front line state, the most populous nation in Asia (if not in the whole world) while Nigeria is the most Populous nation in Africa, a richly resource endowed nation like Nigeria. It is therefore apt for her to borrow a leave from what China has done with energy security since Energy is at the core of her economy, the vagaries of energy security has a debilitating effect on her general wellbeing. This study concludes with the areas that should be of interest to the Nigerian policy makers.

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