

## **Nigeria-China Relations and Infrastructural Development in Nigeria**

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### **Abstract**

*The economies of the world have become greatly connected through globalization. Mutual benefits in forms of investments, technological and infrastructural developments, financial aids and the likes have driven many nation states to engage one another in relationships. Since the establishment of diplomatic relationship in 1971 between Nigeria and China, both countries have strived to explore available avenues to benefit from each other. The study analyses the impact of Nigeria-China relations on infrastructural development in Nigeria. The research is geared towards ascertaining if China's investments in the energy sector enhanced sustainable energy transition in Nigeria and; to determine if China's investment in the Belt and Road initiative led to transport infrastructure development in Nigeria. Documentary method of data collection was adopted for the study. Data were analysed using content analysis. The study adopted dependency theory as a theoretical framework. The findings revealed that China's investment in the Nigerian energy sector has not birthed sustainable energy transition. However, China's investment in the Belt and Road initiative has fostered rail and road transport infrastructure development in Nigeria though Nigeria still faces bottlenecks in her transport sector.*

**Keywords:** Infrastructure, development, railway, energy, investment

## **Introduction**

Nigeria-China relation spans a wide spectrum of areas: politics, trade, investment, aid, technology, science, culture, education, health and military. Nigeria's first contact with China took place in 1960 when a Chinese delegation, on the invitation of the Nigerian government, attended Nigeria's independence celebrations (Ogunsanwo, 2018). The delegation brought a message from Chinese leaders congratulating Nigeria on the victory won by the Nigerian people in their struggle against colonialism. In February, 1971, Nigeria finally established a diplomatic tie with China, more than a decade after independence. Both countries opened embassies in each other's capital within the year. At the 26th session of the United Nations General Assembly(UNGA), Nigeria surprised the West and in particular the United States, when she recognized the inclusion of mainland China in the UN as well as to the exclusion of Taiwan. The establishment of formal diplomatic ties between the two countries in 1971 was followed by the first visit to China by a Nigerian Head of State, General Yakubu Gowon in 1972, shortly after the Nigeria's civil war. Other Nigerian presidents also visited China without the Asian power reciprocating the gesture for over twenty five years. Nonetheless, in President Obasanjo's second tenure (2003-2007), a deeper Nigeria-China relation dawned. After series of visits by Obasanjo to China, China's President Hu Jintao and Prime Minister Wen Jinbao returned those visits to Nigeria (Egbula and Zheng, 2011). Several agreements were signed in the course of these visits; these include: Agreement for Reciprocal Promotion and Protection of Investments; Protocol on Co-operation on Electric Power Projects in Nigeria; Protocol on Bilateral Co-operation in Steel Industry and Oil Industry Cooperation to mention but these.

In their quest for resources and their bilateral relations with African countries, China has engaged in what is tagged "resources for infrastructure." this implies the provision of infrastructure such as, airport terminals, roads, bridges, and rails in payment for resources acquired from Africa. It is true that China's bilateral relationship with Nigeria is getting better by the day unlike the situation during the immediate post colonial era. China through the Belt and road initiative has helped develop the transport sector aiding the reduction of infrastructural deficit in Nigeria. In the context energy, most pro Chinese writers agree on the active role of Chinese companies in Africa's power sector, both in terms of magnitude and impact on new electricity capacity additions, mostly coming from renewable energy including large

hydroelectric plants. More efforts have been intensified towards securing more financial aids from China to finance Nigerian infrastructural projects. In line with this drive, President Buhari in his first visit to China in 2016 sought and obtained aids from China for the development of some projects in Nigeria. These include the West Africa's first Urban rail system valued at \$500million in Abuja; the 180km rail line connecting Abuja and Kaduna which was commissioned in 2016. While others like upgrading of airport terminals, the Lagos-Kano rail line, the Zungeru hydroelectric power project, and the Fibre Cable for the internet infrastructure are at various stages of completion (Premium Times, 2015). Similarly, during his September, 2018 visit to China, the President sought China's financial aids for the construction of 3,050 megawatts Mambilla hydroelectric power project and signed a \$328 million deal on Information and Communication Technology Project (Olowolagba, 2018).

However, the allusion that Chinese projects and financial support contribute to power sector development, extending energy access and facilitating economic growth in Nigeria are questionable when compared to the volume of generators that are imported into the Nigerian market (Igbokwe, 2020). On paper, China's activities are expected to contribute to power sector development in emerging countries through construction of new generation capacity and new grids but Nigeria for example is still battling with an unending problem of electricity generation transmission and distribution. The functionality and viability of infrastructure aids in determining a country's progress and another's failure in attracting investments, expanding trade, coping with population growth, reducing poverty, or improving environmental conditions. Adequate infrastructure in Nigeria through China's financial resources will improve investment climate in the country and strengthen infrastructure. Therefore, the main thrust of this study is the examination of the Nigeria-China relations under the President Muhammadu Buhari's administration with focus on the true state of infrastructural development as many are afraid that it is antithetical to genuine initiative for indigenous development.

## **Methodology**

The study adopts a qualitative approach anchored on the content analysis and documentary method and employed Ex post facto research design. Ex post facto research design is a type of design often applied as a substitute for true experimental research to test hypotheses in

situations in which it is not practical or ethically acceptable to apply the full protocol of a true experimental design. The study examines the nexus between Nigeria-China relations and infrastructural development in Nigeria. It analysis China's investments in the energy sector and its outcome on sustainable energy transition in Nigeria as well as China's investment in the Belt and Road initiative and its impact on transport infrastructure development in Nigeria. The study relied on analysis of secondary data from Organization for Economic Co-operation and Development (OECD), Energy Agency Africa, EU Energy partnership, reports of international development agencies, well researched academic publications which were available online and other relevant secondary literatures on Nigeria- China relations and infrastructural development in Nigeria.

### **Analysis of China's investments in some energy sectors and sustainable energy transition in Nigeria**

The pursuit of sustainable energy is strongly associated with political will and the necessary socio-economic structure, which differs across the regions of the world. Energy transition has been a permanent phenomenon (i.e. the energy system is always changing). Energy transition follows when an economy changes from one significant source of energy to another. Past transitions largely occurred at national and sometimes regional level. Conversely, because of globalization, the present energy transition will likely encompass many regions of the globe. The current energy transition has socio-economic, ecological and geopolitical dimensions, given strong links with poverty reduction, climate change mitigation, national security, economic growth, infrastructural development and global energy trade. In 2015, Buhari's administration drafted the Nigerian Renewable Energy and Energy Efficiency Policy (NREEEP), which focused on harnessing alternative energies such as hydro and biomass. This policy indicated that hydropower is the most important renewable energy source to be developed to harness the country's full potential. Despite these plans, there has been no significant addition of renewables to the national grid. Total power output remains between 3,500MW-3,800MW, with nonrenewable sources accounting for 80%-85%.

Nigeria envisioned growing its economy at a rate of 11 to 13 per cent in order to be among the 20 largest economies in the world as at 2020. To meet this ambitious growth target, the government had hydropower development targets of 6,156 MW for 2020 and 12,801 MW for

2030. It has a target to reach 30 per cent renewable energy by 2030 as well as to have 70 per cent of the energy consumed produced on-grid, compared to the current 74 per cent self-generated (International Hydropower Association, 2020). The Energy Commission of Nigeria aims to reach 20,000 MW of grid capacity by 2022. The potential of hydroelectric power plant in some selected states in Nigeria is shown in table 1 below.

**Table 1 : The potential of hydroelectric power plant in some selected states in Nigeria**

S/n	State	Potential sites	Cumulative Power Estimate (Mw)
1	Adamawa	3	28.00
2	Akwa Ibom	13	
3	Bauchi	1	0.150
4	Benue	10	1.306 (1 site)
5	Cross river	5	3.000
6	Delta	1	1.000
7	Ebonyi	5	1.399
8	Edo	5	3.828
9	Ekiti	6	1.2472
10	Enugu	1	
11	FCT	6	
12	Gombe	2	35.099
13	Imo	71	
14	Kaduna	15	25.000
15	Kano	2	14.000
16	Kastina	11	234.34
17	Kebbi	1	
18	Kogi	2	1.050
19	Kwara	4	5.200
20	Nassarawa	3	0.454
21	Niger	11	110.580
22	Ogun	13	15.610
23	Ondo	1	1.300

Source: Zarma (2017)

With regards to hydropower generation in Nigeria, in September 2013, the Nigerian government signed a deal with two Chinese firms (China National Electrical Engineering

Corporation and Sinohydro) to build the 700 MW Zungeru hydropower plant which is the second major hydroelectric power project awarded to a Chinese firm .The government approved funding for 25 percent of the project with the Export-Import Bank of China funding 75 percent via low-interest loans. The project is the largest power project in Africa to be funded with government concessional loans (This Day Live, 2013). This \$1.2 billion loan power plant that is currently under construction by the China Electric Engineering Company (CNEEC) expected to produce a yearly power generation of 2,640GWh and supply electricity to the National Grid was initially billed to be completed towards the end of 2019 two years beyond the original deadline but later shifted to 2020 and now we are in 2022 and the project is still pending.

Another Chinese-funded project is the Mambilla 3,050 MW hydropower plant in Taraba State. Chinese lenders provided over 50 per cent of the finance for the US\$5.8 billion Mambila Hydropower Plant in Nigeria. Negotiations began in 2006 with a consortium made up of the China Gezhouba Group Company Limited and China Geo-Engineering Corporation (CGGC/CGC), which were awarded the EPC contract for the project. The contract was then unilaterally and controversially cancelled by the Nigerian government and awarded to Sinohydro(This Day Live, 2014). Also, the Federal Executive Council approved a \$1 billion loan from Exim Bank of China in 2019. The funds were to be used in developing the Gurara II hydroelectric project in Kaduna State in northern Nigeria as a renewable energy project. The Gurara River is already serving to generate 30 MW of electricity and provide water for irrigation in the northern state. The Gurara II hydroelectric project which is yet to be completed is expected to generate 360 MW of electricity. The table below shows three key hydro energy investment areas by China in Nigeria.

**Table 2. Three key hydro energy investment areas by China in Nigeria.**

Projects	Location	Potential MGW	Amount
Mambilla hydroelectric plant	Taraba state	3,050	\$5.8 billion
Zungeru hydropower plant	Kaduna state	700	\$1.2 billion
Gurara hydropower plant	Kaduna state	360	\$1 billion

**Source: author's compilation**

The Mambilla HEP project which was conceived in 1982 has suffered neglect by successive military administration and under the democratic dispensation, it has featured on every presidential campaign promises of candidates starting from Chief Olusegun Obasanjo 1999 and 2003 to the late Alhaji Umaru Musa Yar'adua in 2007, President Goodluck Jonathan in 2011 and President Muhammadu Buhari in 2015 (Terkula, 2014). Almost every discussion at academic, policy and government levels on sustainable energy generation in Nigeria feature Mambilla hydro electric power (HEP) project. After over 38years of conception, there are so much doubt and conflicting reports about the Mambilla hydro power project. While government officials claim that substantial progress has been made on the Mambilla power project by way of negotiations with the Chinese companies, feasibility surveys and design plan, many people believe that the project has been delayed for too long owing to Chinese disinterest in sustainable energy transition in Nigeria and the lack of will power on the part of Nigerian government to take her destiny in her hands (Oruonye, 2015).

Given Nigeria's rich energy resources especially with regard with hydropower, the potential to make it a viable energy source is huge. Greater global co-operation can deliver benefits for all, ultimately promoting increased energy access and economic growth. However, according to (Igbokwe, 2020), China's involvement in Nigeria is part of Chinese imperialistic agenda; the internationalization of Chinese companies as well as the government's "going abroad" strategy. It is also imperative to observe at this point that Chinese interest in Nigeria is motivated by economic slowdown in China and overcapacity in various sectors. Nigeria's industrialization and economic development is seen by Chinese stakeholders as important for Chinese exports of manufactured goods in the region thus they invest in areas of benefit to them including hydropower. China's investment in hydropower has not made much impact in the development of Nigeria's hydropower energy thereby inhibiting sustainable energy transition in that area as



far as Nigeria-China relations is concerned. As long as this situation persists, the implication is that there is lack of sincerity in execution of such acclaimed projects and contracts. Nigeria badly needs investment to improve power supplies for its 206 million people. By implication therefore Nigeria's optimism that increased Chinese presence in her economy (especially in the energy sector) means development is a mirage. No doubt, hydropower can deliver to Nigeria vital electricity along with additional services of water management and increased economic activities at significant scale. The power sector remains one of, Nigeria's greatest infrastructure challenges, despite an abundant availability of energy resources in the form hydro and other renewable sources.

### **Nigeria-Chinese Consortia on Development of Bio-fuel and Bio-mass Development in Nigeria**

Since the energy crisis of the 1970s, developing new energy sources from the agricultural sector has been viewed as a way to expand the domestic energy supply and help mitigate growing dependence on imported oil in many developing and developed countries. To facilitate the adoption of biofuels and promote investment in the sector, Nigeria has developed a policy on biofuel. The Nigerian biofuel policy has been gazetted as Nigerian Biofuel Policy and Incentives No. 72 Vol. 94 and is dated June 20, 2007 (Bassey, 2010). The Nigerian National Petroleum Corporation is charged with the responsibility of carrying out the objectives of the policy in collaboration with stakeholders (Eleri et'al, 2011). The key provisions include the approval of an inclusion rate of 10 per cent for ethanol and 20 per cent for biodiesel, with a view to creating national demand; official designation/classification of biofuel as an agriculture-related industrial sector; tax measures which include reductions and exceptions from duties and VAT; establishment of the biofuel energy commission, responsible for managing the industry in conjunction with ministries and agencies; regulation of imports; establishment of a biofuel research agency (SWAC/OECD, 2008).

After more than two decades of biofuels production expansion, China has emerged as the third major producer in the world (Erick & Xuebing, 2010). The installed biomass power generation capacity in China increased sharply from 1.4 GW in 2006 to 14.88 GW in 2017. China plans to increase the proportion of biomass energy up to 15 percent and total installed capacity of biomass power generation to 30 GW by 2030. On the other hand, the Nigerian government in



2005 projected investment in biofuels as an opportunity to promote the use of renewable energy, reduce domestic dependence on fossil fuels, reduce greenhouse gas emissions and increase energy access to the population (NNPC, 2005). Despite initial commitments towards the development of the biofuels sector in 2005, more than ten years later, Nigeria has not been able to produce biofuels commercially. However, since China is moving extremely swiftly on the African continent, investing heavily in the continent's base sector and recognizing Africa's large potential for the production of biofuels, in which it clearly wants to invest, Nigeria's central state of Niger and the Chinese government therefore signed a memorandum of understanding (MOU) in 2016 for the establishment of a first ethanol plant in the state, with cassava as a feedstock. The project was to gulp 11.6 billion naira (about €60 million/US\$ 90 million). A Chinese company was to serve as a consultant to the project, and the company was expected to source 85 percent of the project investment through a soft loan from the Chinese government on 3 percent interest rate. The state government had already released 30 million naira to local cassava farmers to facilitate mass production of the commodity in Niger state. This project is said to have the capacity of converting 150,000 tons of cassava into fuel energy (Aiddata, 2017).

Also, the Nigerian National Petroleum Corporation (NNPC) signed a couple of memoranda of understanding (MoU) in China on the sidelines of the Forum for China-Africa Cooperation (FOCAC) Summit held in 2018. One of the pacts was with China National Complete Plant Import & Export Corporation, also known as Complant, while the other was with Nanning. According to the past NNPC's managing director, Maikanti Baru, the two MoUs were expected to help develop Nigeria's first biofuel production facility. The projects would help Nigeria fulfill its nationally determined contributions to the Paris Agreement. This included the requirements for blending 10% by volume of fuel-ethanol in gasoline and 20% by volume of biodiesel in automotive diesel for use in the transportation sector (Andrea, 2018). Table 3 below shows the Production data for major agricultural crops output and biofuel type in Nigeria as at 2019.

**Table 3. Production data for major agricultural crops output and biofuel type in Nigeria as at 2019**

<b>Agricultural resources</b>	<b>Production capacity (thousand metric tons)</b>	<b>Derivable biofuel type</b>
Cassava	60 million	Bioethanol
Yam	44 million	Bioethanol
Millet	11 million	Bioethanol
Maize	20 million	Bioethanol
Sorghum	6 million	Bioethanol
Rice	4.9 million	Bioethanol
Potato	1.4 million	Bioethanol
Cowpea	3.3 million	Biodiesel
Groundnut	1.55 million	Biodiesel
Oil palm	1.14 million	Biodiesel
Sugar cane	1.46 million	Bioethanol
Sweet potato	3.46 million	Bioethanol
Cocoyam	2.86 million	Bioethanol
Cotton	80,000	Biodiesel
Coffee	1,117	Biodiesel
Cocoa	385,000	Biodiesel
Plantain	3 million	Bioethanol

**Source: author's compilation**

Biofuel production is crucial in lowering emissions of greenhouse gases and stimulating industrial growth and Nigeria's quest for biofuel arguably does not represent a misplaced priority. However, the transition to high growth and low carbon development in Nigeria is hampered by a number of factors. According to Eleri et al. (2011), these factors include: lack of infrastructure and high cost of industrial production which generate cash squeeze for companies and the resultant failure to invest in technology renewal; poor implementation of stimulus packages due to policy inconsistencies, conflicting laws and regulations which wane the trust of investors on new government initiatives; poor incentives for converting to low carbon energy technologies; inadequate inter-agency coordination; financial constraints because the Nigeria financial market is presently not deep enough to offer long-term loans at reasonable interest rates; and poor public awareness. Nevertheless, the availability of different types of agricultural crop residues creates enormous potential for biofuel in Nigeria but if food

and environmental challenges are not effectively addressed, the program may be destined to fail. Therefore, with the very high potential for biofuel production, the Nigerian Government in partnership with China as well as other private investors should take steps towards investing in agriculture for the production of energy crops and the establishment of biofuel processing plant.

Biomass potential in Nigeria has little or no contribution in the share of fuels used regularly in Nigeria. Biomass resources are currently available in Nigeria and the potential to utilize them for the production of various types of biofuel especially with China's partnership is feasible but has not come to materialization. This is because despite the verbal emphasis on renewable energy, most Chinese energy financing in Nigeria goes to oil and gas instead of biomass development. If China's biomass sector generated 24.5 billion kilowatt hours (kWh) of electricity during the first quarter of 2019 (Miriam, 2021), same can be replicated in Nigeria by China because Nigeria has a substantial biomass potential of about 144 million tonnes per year.

### **Assessment of China's investment in the belt and road initiative (railway and road project) and transport infrastructure development in Nigeria**

Transportation infrastructure investments constitute important political, economic, and social processes that increase the riches and power of a country, enlarge markets, and lower trade barriers. This increases productivity outputs and leads to improvements in mobility and standard of living for the masses (William, 2016). The Belt and Road initiative (BRI) is a development strategy being used by the Chinese Government, including infrastructure and investments in countries across Europe, Asia, and Africa. Nigeria officially entered into the BRI through a memorandum of understanding (MoU) signed by President Muhammadu Buhari at the Beijing Summit of the Forum on China-Africa Cooperation, in September, 2018. Chinese leaders have made railway and highway projects an important element of the BRI. In China, Nigeria has found a partner and financier to its Infrastructure Development Plans (IDPs) by signing pacts, memoranda of understandings through its bilateral ties.

### **Nigeria-China Railway Construction Deals and Railway Development in Nigeria**

After independence there were no modernization works and Nigeria's railway facilities fell into disrepair. The reason against modernization and proper maintenance was financial. The tracks and trains were becoming less efficient and the proper funds were never coming. From history, in 2006 president Obasanjo inaugurated a project for Nigerian railway modernization. Since the beginning, the plan was interlocked with China (Katarzyna, 2020). The \$8.3bn contract awarded to China Civil Engineering Construction Company (CCECC) was to be funded from China Exim Bank. The plan assumed revitalization of the existing lines and creation of new ones. Also, during the Goodluck Jonathan Administration, Nigeria signed three loan agreements with China's Exim Bank. The agreements are; the \$500 million for Abuja Light Rail Project, \$500 million contract for the construction of 4 airports terminals in the country, and \$100 million contract for galaxy backbone expansion of connectivity among government ministries in Nigeria (Raji & Ogunrinu, 2013). China has also offered a \$6 billion loan to Nigeria for infrastructural development projects in the administration of Muhammadu Buhari and a loan of \$1.5 billion for the development of infrastructure in Nigeria, including the expansion of four airports at Lagos, Kano, Abuja and Port Harcourt.

The consequent effect of the implementation of Rail IDPs (infrastructural development projects) is to guarantee mass employment opportunities for Nigerians and to ensure wealth creation, more revenue generation and less pressure on the Nigerian roads. Therefore, connecting Nigeria with neighboring countries with standard gauge rails would be one of the steps in the project of connecting Africa by transportation infrastructure. A plan often mentioned by African Union as crucial for Africa's faster development and cooperation. In the railway sector of Nigeria, Chinese finance is backing two major standard-gauge rail (SGR) projects. The Abuja-Kaduna Railway section is the first section of the Nigerian Railway Modernization Project, using China railway technical standards and connecting the capital city of Abuja, the state of Niger and the state of Kaduna, with a total length of 186.5 km and a maximum speed of 150km/h (Bukola, 2019). On July 26th 2016, Abuja-Kaduna Railway Project officially started commercial operation, becoming the first modern railway in operation using China standard in Africa. Nigerian Railway Corporation is in Charge of Operations while the CCECC offers technical support, training service and assistance to the commercial operation (Bukola, 2019). Currently NRC has 534 staff working on the Abuja-Kaduna Railway Project. CCECC has a technical team of 17 specialists providing technical support. The second

Train Service has been put into operation since January 5th, 2018. Below in table 4 is data showing some railway projects in Nigeria, their funding model and description in partnership with China.

**Table 4: Railway projects in Nigeria, their funding model and description in partnership with China.**

Rail Line	Cost (US\$)	Funding Model	Description
Abuja – Kaduna	\$876million	500 million in loans from the Exim Bank of China; balance funded by the Federal Government of Nigeria (FGN).	187km from Abuja to Kaduna (part of the 2,700km Lagos – Kano line).
Lagos – Ibadan	\$2.53 billion	Loan from the Export-Import (Exim) Bank of China.	156 km from Lagos to Ibadan (part of the 2,700km Lagos – Kano line).
Ibadan – Kano	\$5.3 billion	FGN to provide an equity stake of 15% with the remaining 75% funded by from China’s Exim Bank.	Comprised of 4 sections - the 200km Ibadan-Ilorin section, the Ilorin-Minna section a distance of 270km and then the Abuja, Kaduna and finally Kano a distance of 300km. (part of the 2,700km Lagos – Kano line).
Abuja – Warri	\$3.9billion	FGN to provide an equity stake of 15%, China Railway Construction Corporation Limited (CRCC), an equity stake of 10%, and the remaining 75% borrowed from China’s Exim Bank. The CRCC will operate the railway and the port to recover its investment.	Originally commenced as the Itakpe – Ajaokuta cargo line in 1987, it was extended to link the capital Abuja to the port city of Warri, a distance by air of approximately 440km.
Kano- Maradi	\$1.959 billion	To be financed by bilateral loan arrangements.	To link Kano–Danbatta–Kazaure–Daura–Mashi– Katsina–Jibiya–Maradi (Niger Republic) with a branch line from Kano to Dutse.
Lagos- Calabar	The project is valued at \$11bn	Originally intended to be funded from loans from China’s Exim Bank; however following indications that the funding is not available and continuous delays to the commencement of the project (which was expected to be completed in 2018), the FGN is currently exploring other funding options.	1402 km (871 mi) to be developed in two phases. The first phase will run between Calabar and Port Harcourt; while the second phase will run between Port Harcourt and Lagos via Onitsha.
Port Harcourt- Maiduguri	\$3 billion	FGN to provide about 15% of the \$3 billion rehabilitation and reconstruction cost, while the balance will be provided by a syndicate of Chinese financiers.	Rehabilitation and reconstruction of the 1,443-kilometer (897-mile) Eastern Railway line that starts from the southeastern oil hub of Port Harcourt and terminates at the northeastern city of Maiduguri.

Source: Ighodalo and Adeyemi-Faboya (2021)

Taking an in-depth look into railway projects in Nigeria, the Abuja Rail Mass Transit Project is situated in the Federal Capital Territory of Nigeria, the completed phase 1 is composed of two lines as Lot 1 A and Lot 3, Lot 1A is 18km from Idu industrial area to satellite town Kunwa and Lot 3 is 27.245km from Abuja central area to the international airport of the capital, the total length of phase1 is 45.245km. There are 12 stations set along the route of Abuja Rail Mass Transit Project Phase 1, 8 stations for Lot3 and 4 stations for Lot 1A. Apart from the main line project, a rail depot with an area of 24 hectares was also constructed close to Idu station to serve the Abuja Rail system. Abuja Rail Mass Transit Project (Phase 1) was signed by CCECC and the Federal Capital Territory Administration (FCTA) and began commercial operations on July 13th 2018. It is known as the first light rail in West Africa (Bukola, 2019). The railway, stretching about 157 kilometers (km) with a speed of 150 km/h, marks a landmark cooperation project between China and Africa under the Belt and Road Initiative (BRI) that has significantly improved Nigeria's rail transport infrastructure and boosted its economic development.

The Abuja-Kaduna extension is important in many ways; the first segment of the Standard Gauge Railway Modernization Projects connected the capital Abuja with Kaduna. The Abuja-Kaduna line also connects the capital with the Lagos-Kano line by a modern, standard gauge track. Also, together with the development of the ports and coastal connections, the complete modernization of Lagos-Kano line could consolidate Nigeria's position in the region, as a trade and communication hub, especially for the landlocked neighbors. The Lagos-Kano works have been divided into six sections determined by stations, each around 150 km. The entire route would have at least 1124 km, with possible further extensions and connections with the Eastern Line (Port Harcourt-Maiduguri) and various connections with the capital. In 2017, construction of the second section which is Lagos-Ibadan began and on 10<sup>th</sup> June 2021 the Nigerian government officially started its full commercial operation to ease public transportation and fuel goods movement (Xinhua, 2021).

The project of connecting Abuja with the Itakpe-Warri line has been achieved. Originally, in 1987, it was planned to transport iron from Itakpe to the Warri port. The Itakpe-Warri section was finished in 2021 by a Chinese company that was working on it since 2017. Another large segment of railway modernization is supposed to take place at the coast which is the Lagos-Calabar line planned to be built in phases, just like the Lagos-Kano line. The first phase, which

is currently said to be Warri-Port Harcourt, will connect the two primary lines in the country, the Lagos-Kano and Port Harcourt-Maiduguri. After the entire line is finished, the Nigerian coast will gain a modern, high-speed connection between all its ports and possibly with the coastal neighbors. The construction of the line has been commissioned to a Chinese company and the aid for the first phase negotiated at China Exim Bank was \$11bn (Katarzyna, 2020).

The projects to revitalize the Eastern line Port Harcourt-Maiduguri is only in the draft phase. A slight revitalization of the narrow gauge without replacing it with a standard gauge has been proposed due to lack of funds. However, with the majority of tracks becoming a standard gauge, it could be reasonable to wait with the works on the Eastern line and modernize it the same way as the other lines. During construction of the rail an estimate of 20,000 local staff were employed. Since commencement of operations, this project has directly provided about 1000 jobs. During construction and operation, the project indirectly established an estimate of 200,000 jobs mostly in areas of material production, subcontracting works, equipment manufacturing and related services (Bukola, 2019).

The government of Nigeria has also begun three rail and port projects worth \$3.2billion after a syndicate of Chinese financiers agreed to put up \$2.7billion for them, 85% of the funding required. The projects are the rehabilitation of a narrow gauge railway between Port Harcourt and Maiduguri, near Nigeria's border with Chad Lagos – Jebba 480 km line, Jebba – Kano 624 km line, Kuru – Bauchi – Gombe – Maiduguri 640 km line, Makurdi – Kafanchan – Kaduna Junction – Kuru line; the Bonny Deep Sea Port on Bonny Island; and the Railway Industrial Park in Port Harcourt. The projects, which are intended to complement each other, are being carried out by the Nigerian arm of the China Civil Engineering Construction Corporation (CCECC) (Global Construction Review, 2021). Ambitious new railway projects undoubtedly carry benefits: the completed Abuja-Kaduna line is a small demonstration of the employment and commercial opportunities that railway infrastructure can bring. Chinese railway investments bring connectivity advantages, benefiting local industries and potentially attracting greater investment. This can encourage greater industrial agglomeration along Nigeria's main corridors and coastline, which in turn can help catalyze structural transformation and economic development, as well as boost local employment. The belt and road initiative has led to the development of railway transport infrastructure in Nigeria and completion of projects has



translated into operational reality. The ongoing development of rail infrastructure in Nigeria will make it a viable freight and passenger transport option (Yunnan, 2018).

### **Nigeria-China Road Construction Deals and Road Development in Nigeria**

The major road transport infrastructure in Nigeria consist of 32,000km of Federal highways including seven major bridges across the Niger and Benue rivers, the Lagos ring 3 road, the third mainland axial bridge, 30,500km of state roads; and 130,000km of local roads (Project Reserve,2020) . The development of transport sector, such as road transport reduces friction of distance; facilitate trade; allows an improved movement of people and goods; promotes overall better standard of living and ease of social cohesion and integration; finances other public spending which can be of importance for a society, such as the social security system and the education system, among others. It is of importance to highlight that Nigerian roads have often been characterized with long cracks, potholes and other pavement defects. These have posed a serious challenge and disaster such that in Nigeria one can hardly travel a kilometer without coming across long cracks and potholes. All these have resulted to a spike in the number of road accidents and a clog in the wheel of the nation's economic development Nigeria (Obido etal.,2021).

China Harbour Engineering Company has brought both experience of its parent company and its international exposure in delivering high-quality projects on schedule to bear on its craftsmanship in delivering world-class infrastructure service in Nigeria. Currently, the company is a major contractor, delivering the expansion of the 5.4Km Abuja-Keffi expressway and dualization of Keff-Akwanga-Lafia-Makurdi road, a key project of the larger continental trans-Sahara highway (Onunaiju, 2020). In 2013, the Ministry of Delta Affairs of Nigeria awarded the package of works for Section V of the A121 East-West highway to China Civil Engineering Construction, a division of China Railway Construction. The work was expected to take five years to complete and including design as well as construction. When it is complete, the A121 will connect Nigeria's two main North-South highways. Its route runs from the A1 highway at Shagamu in Ogun State to the A2 highway at Benin City in Edo State (World Highways, 2021).

The trans-Sahara highway project is a continental-scale infrastructure that passes through six African countries namely, Algeria, Chad, Mali, Nigeria, Niger and Tunisia and has the objective to make enormous contribution to the development of commercial exchanges through roads connectivity and promote regional integration. As key artery of a regional highway network, it would seamlessly integrate in the framework of the Belt and Road framework of international cooperation, initiated by China as a global massive infrastructure connectivity scheme, which facilitates trade and enhances people-to-people contacts among other things (Xinhua, 2019). The Keffi-Markurdi road project starts from the southwest of Abuja, crosses Federal Capital Territory and the states of Nasarawa and Benue. The contract amount is \$542.14 million, 15percent of which is funded by the Federal Government of Nigeria and 85percent is by China EXIM Bank in the form of Preferential Export Buyer's Credit. The expansion and dualisation of the existing carriageway promises to ease the long suffering of commuters and motorists on the Keffi-Akwanga-Lafia-Makurdi road. The duration of the project is 36 months, and construction officially commenced on April 1st, 2019, and the road is expected to be completed by 2022. The design adopted is the new expansion and dualisation on both sides of the road, thus compared to the existing carriageway, there is expected to be a smoother transportation (Odoh, 2019).

A Chinese construction firm Eighteenth Engineering Company Nigeria Limited, a subsidiary of the China Railway Construction Corporation in 2019 also commenced the construction of roads in Gombe to open up rural areas in this northeastern state, aiming to boost the local economy. The road construction is said to open up at least three communities in Yamaltu/Deba local government area of Nigeria when completed. In 2015, The Mile 12-Ikorodu road widening and Bus Rapid Transit (BRT) projects were constructed by CCECC in Lagos, Nigeria's economic hub, bringing benefit to millions of residents and motorists of the state. Over 400,000 passengers are carried daily by over 400 high capacity air-conditioned China's Yutong buses that run the corridor from Ikorodu - CMS via Mile 12. The project included widening of the road with two additional lanes and the placing of BRT lanes in the middle of the road. The width of the existing road is a 7.5 meters, with central median of 2m width (Xinhua Finance Agency, 2015).

The China Geo-Engineering Corporation (CGC) has also completed the Ilorin-Jebba road which was abandoned for about 10 years due to its deplorable condition. The road was well constructed, with a lifespan of at least 20 years. It currently records daily traffic of about 7,500 vehicles, including heavy duty trucks. Rebuilding the Ilorin-Jebba road has boosted social and economic activities (AskNigeria, 2020). Table 5 below shows some road projects in Nigeria by China.

**Table 5: Road projects in Nigeria by China**

S/N	Zone	Project Title	CNo.	Location	Name of Contractor	Name of Consultant	Length km	Original Contract Sum (N)	Contract Sum (N)	Date of Award	Commencement Date	Completion Date	Extended Compl. Date
		<b>ON-GOING PROJECTS</b>											
1	North Central	Rehabilitation of Vandeikya-Obudu Cattle Ranch Road, Phase I in Benue State, C/No 6156	6156	BENUE	CCECC Nigeria Limited	Ladiom Associates	25.8	3,296,177,230.50	6,686,554,420.40	13-Dec-12	13-Dec-12	12-Dec-13	30-Apr-18
2	North Central	Construction of Oshegbudu-Oweto Road in Benue State, C/No. 6265	6265	BENUE	CGC Nigeria Limited		24	7,962,031,030.80	7,962,031,030.80	14-Jan-15	17-Feb-15	16-Aug-16	17-Aug-17
3	North Central	Dualization of Lokoja-Benin Road: Obajana Junction-Benin Section I Phase I: Obajana-Okene, Kogi State C/No. 6135	6135	KOGI	CGC Nigeria Limited	Hancock, Ogundiya & Partners	58.59	11,663,957,682.30	30,569,460,059.99	21-Nov-12	24-Dec-12	23-Dec-14	22-Oct-17
4													

	North Central	Rehabilitation of Ilorin-Jebba-Mokwa-Birnin Gwari-Kaduna Road in Kwara State, Contract No. 6210	6210	KWARA	CGC Nigeria Limited	Rindex Associates	93.6	14,587,233,292.17	14,587,233,292.17	5-Dec-13	30-Jan-14	29-Jan-16	28-Dec-17
5	North Central	Rehabilitation of Ilorin-Kabba-Obajana Road, C/No. 6212 in Kwara/Kogi States	6212	KWARA	CGC Nigeria Limited	Iyiola Omisore & Associates	113.6	8,217,373,106.77	8,217,373,106.77	27-Nov-13	30-Jan-14	29-Jan-17	
6	North Central	Reconstruction of Sokoto-Tambuwal-Jega-Kontagora-Makera Road, Phase I&II, Section I in Niger State, C/No 6162	6162	NIGER	China Railway Construction Company(CRCC) Ltd	Watech Services limited/Elen Konsult Ltd	100	8,968,809,507.63	19,566,758,401.95	13-Dec-12	10-Apr-13	9-Apr-15	17-Aug-17
7	North East	Rehabilitation of Cham-Numan Section of Gombe-Yola Road in Adamawa State, Gombe/Adamawa States. Contract No.6300	6300	ADAMAWA/ GOMBE	CGC Nig. Ltd.			9,253,571,065.05	9,253,571,065.05	15-Mar-17			
8	North East	Rehabilitation of Maiduguri-Dikwa Gamboru-Road Section II Dikwa-Gamboru in Borno State C/No 6069	6069	BORNO	CGC Nigeria Limited	Sahel Associates	51	16,683,596,891.08	16,683,596,891.08	25-Aug-10	20-Sep-10	19-Sep-12	

9	North East	Construction of Damasak-Dutse(Nigeria)-Diffa(Niger Republic) in Borno State C/No 6071	6071	BORNO	CGC Nigeria Limited	Ove Arup & Partners Nig. Ltd	36.28	9,880,524,657.27	9,880,524,657.27	25-Aug-10	20-Sep-10	19-Sep-12	19-Sep-14
10	North East	Dualisation of Kano-Maiduguri Road linking Kano-Jigawa- Bauchi-Yobe and Borno States. (section v) Damaturu- Maiduguri,C/No. 5869 in Borno State	5869	BORNO	CCECC Nigeria Limited	Yaroson Partnership Ltd	145.109	39,998,728,481.25	67,795,690,880.01	18-Jul-06	3-Aug-06	2-Dec-09	10-Jan-16
11	North East	Rehabilitation of Maiduguri-Bama-Gwoza-Hong Road Section II: Bama-Gwoza in Borno State, C/No. 5975	5975	BORNO	CGC Nigeria Limited	Sani Mustapha & Associates	73	5,019,848,813.60	5,019,848,813.60	14-May-09	28-May-09	27-Nov-10	27-Feb-12
12	North East	Dualization of Kano-Maiduguri Road linking Kano-Jigawa- Bauchi-Yobe and Borno States. Section IV (Potiskum-Damaturu Road),C/No. 5881 in Yobe State	5881	YOBE	CGC Nigeria Limited	Pentagon Engineering Consultant	96.24	30,250,000,000.00	51,903,173,630.22	28-Sep-06	1-Feb-07	30-Nov-09	18-Dec-18
13		Rehabilitaion of Makarfi-Basawa-Funtua Road in											

	North West	Kaduna/Katsina States Contract No. 6302	6302	KADUNA/KATSINA	CGC Nig. Ltd.			17,958,728,757.59	17,958,728,757.59	15-Mar-17			
14	North West	Dualization of Kano-Katsina Road Phase I: kano Town at Dawanau roundabout to Katsina State Border in Kano State. C/No. 6213	6213	KANO/KATSINA	CCECC Nigeria Limited	Siraj Nigeria Limited	74.1	14,078,252,565.88	14,078,252,565.88	27-Nov-13	30-Jan-14	29-Jun-16	
15	South East	Rehabilitation of Abakaliki-Afikpo Road Section II: Abomega- Afikpo Road in Enugu State, C/No. 5989A	5989A	EBONYI	CCECC Nigeria Limited	Yaroson Partnership Ltd	26	3,500,000,000.00	3,500,000,000.00	14-May-09	28-May-09	27-Jul-10	31-Dec-13
16	South East	Rehabilitation Of Enugu-Port Harcourt Road Section III: Enugu- Lokpanta in Enugu State C/No.6251	6251	ENUGU	CGC Nigeria Limited		82.8	32,317,082,596.26	32,317,082,596.26	11-Dec-14	24-Jan-15	23-Jan-17	
17	South East	Rehabilitation of Umana-Ndiagu-Agba-Ebenebe-Amansi Akwa with spur to Umumba Road Section II (Umana Ndiagu-Umunba/Nkwa-Ezeagu express Obelegu section) in Enugu State, C/No 6169	6169	ENUGU	CGC Nigeria Limited	Empee Engineering Consultants	56.049	10,370,810,187.53	10,370,810,187.53	17-Dec-12	5-Feb-13	4-Aug-15	



18	South South	Dualization of Yenegwe Road Junction-Kolo-Otuoke-Bayelsa Palm (20km) in Bayelsa State, C/No. 6248	6248	BAYELSA	CCECC Nigeria Limited		41.9	26,498,476,426.25	26,498,476,426.25	11-Dec-14	24-Jan-15	23-Jul-17	
19	South South	Rehabilitation of Calabar-Ugep-Katsina Ala Road Section II( Ugep-Katsina Ala) in Benue/Cross river States, C/No. 5991	5991	CROSS RIVER	CCECC NIGERIA LIMITED	Mubassir Engineering Services Nigeria Ltd	30	5,208,582,235.00	9,136,126,840.71	14-May-09	28-May-09	27-Nov-11	27-Apr-15
20	South South	Dualization of Sapele-Ewu Road, Section I: Sapele-Agbor in Delta State, C/No. 6249	6249	DELTA	CGC Nigeria Limited		110.63	64,876,412,558.50	64,876,412,558.50	11-Dec-14	24-Jan-15	23-Jul-17	
21	South-South	Rehabilitation Of Enugu-Port Harcourt Road Section IV: Aba- Port Harcourt in Rivers State, C/No.6252	6252	RIVERS	CCECC Nigeria Limited		41.4	34,047,096,919.17	34,047,096,919.17	11-Dec-14	24-Jan-15	23-Jul-17	
22		Dualisation of Ijebu Ode-Ibadan Road Phase I Rehabilitation of Ijebu Ode-											

	South-West	Mamu Oyo State/Border Road in Ogun State C/No 6082	6082	OGUN	CCECC Nigeria Limited	Messrs Ideco Consult	37	1,696,337,058.26	1,696,337,058.26	10-Nov-10	13-Dec-10	12-Mar-12	13-Jun-14
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**Source: Federal ministry of works (2017)**

Infrastructure provide the necessary springboard to launch a country into the class of developed nations and it is an established fact that Chinese state owned firm, CCECC is playing an active role in Nigeria's transportation sector in line with the Belt and Road Initiative towards the development of the transportation infrastructure with focus on railway and roads development.

### **Conclusion**

Nigeria is still bedeviled with the challenge of electricity generation, transmission and distribution despite possessing an enormous capacity and potential for hydropower. Likewise, biomass resources are currently available in Nigeria and the potential to utilize them for the production of various types of biofuel especially with China's partnership is feasible but not a reality yet. China has also played a crucial role in developing Nigeria's railway transport infrastructure over the years through the construction by professional Chinese companies of numerous railways in Nigeria. China has also contributed to road transport development in Nigeria via the rehabilitation and construction of new roads. Undoubtedly, the bilateral relationship between Nigeria and China will be of immense benefit to both parties, if well pursued. Though China cannot solve all Nigeria's problems, the federal government in her relations with China should genuinely and aggressively pursue as an interest sustainable energy transition and continuous transport infrastructure development in Nigeria because these are true indices of infrastructural development.

The Nigerian government should ensure that unfinished projects such as the Mambilla (2,330MW), Gurara II (360MW) and Zungeru (700MW) hydropower projects committed into the hands of China in partnership with Nigeria are finished. On the other hand, Chinese government should ensure that billions of funds released for these projects are actually utilized toward the completion of these projects. Nigeria must nudge China towards more sustainable energy investments and this she can boldly do by first utilizing her abundant hydro and biomass potentials domestically within her little capacity. Adequate resources should be committed to research and development in Nigeria with regard to biomass and hydropower development.

After successful delivery of infrastructure projects in Nigeria, there is need for subsequent management and maintenance of the infrastructure assets to avoid dilapidation and a relapse into dysfunctional railway and road systems. To foster this, sponsors must ensure that the interests of their technical partners are aligned with theirs, and the arrangement must deliberately create opportunities for local capacity building by pairing local talent with international expertise right from the start of the project for necessary skills and knowledge transfer. Nigeria's leaders must push for more equal relationships with China, starting with a focus on Nigeria's own ability to co-determine the strategic agendas and priority-setting in the relationship. The growing economic partnership with China provides average Nigerians with reason for optimism for prosperity but the future is bleak without Nigeria taking her future into her own hands. With this in mind, the Nigerian government should set the completion of various infrastructural development projects contracted to China as a priority.

## References

- Aiddata (2017). Chinese Government pledges loan for Cassava Ethanol Fuel Plan Construction Project. *Project ID: 1806*. <https://china.aiddata.org/projects/1806/>.  
*AIMS Energy*, 2021, 9, (2), 379-413. <https://doi.org/10.3934/energy.2021020>
- Andrea, A. (2018). NNPC, China sign MoU on oilfield services, research & development. Africa Business Communities. <https://africabusinesscommunities.com/news/nigeria-nnpc-china-sign-mou-on-oilfield-services,-research-and-devt/>
- AskNigeria (2020). We are enjoying dividends of democracy under Buhari. <https://asknigeria.com.ng/topic/2779/we-are-enjoying-dividends-of-democracy-under-buhari>
- Bassey, N. (2010). Oil Politics: Nigeria's Unacceptable Biofuels Policy. <http://234next.com/csp/cms/sites/Next/Money/5643461-183/story.csp>
- Bukola. (2019). Nigeria Experiencing China's Belt & Road Initiative Through Rail Lines. <https://leadership.ng/nigeria-experiencing-chinas-belt-road-initiative-through-rail-lines/>
- Egbula, M. & Zheng, Q. (2011). *China and Nigeria: A Powerful South-South Alliance*. West African Challenges (WAC).No 05, Sahel and West Africa Club Secretariat (SWAC/OECD). <https://www.oecd.org/countries/nigeria/49814032.pdf>
- Eleri, E.O., Nangavo, V.S., Onuvae, P. & Ugwu, O. (2011). Towards a Low Carbon Industrial Strategy for Nigeria. Global Climate Network. <http://pubs.iied.org/pdfs/G03555.pdf?>
- Erik, C., Dehua, L., & Xuebing, Z. (2010). Biofuels production development and *Expert Guides*. <https://www.expertguides.com/articles/financing-rail>
- Federal Ministry of Works. (2017). *List of on-going federal highway projects*. [https://worksandhousing.gov.ng/management/uploads\\_images/1562351340.pdf](https://worksandhousing.gov.ng/management/uploads_images/1562351340.pdf)
- Global Construction Review (2021). China to finance three Nigerian transport upgrade projects worth \$3.2bn. <https://www.globalconstructionreview.com/china-finance-three-nigerian-transport-upgrade-pro/>

- Igbokwe, C. (2020). Nigeria-China Relations: Impact on Power and Development in Nigeria. *Asian and African Studies*, 12(1), 141–151. <https://doi.org/10.21638/spbu13.2020.110>
- Ighodalo, A. & Ayodele, A. (2021). *Financing rail infrastructure in Nigeria – future outlook. Expert Guides*. <https://www.expertguides.com/articles/financing-rail-infrastructure-in-nigeria-future-outlook/arpvboqq>
- International Hydro Power Association (2020). Country Profile: Nigeria. <https://www.hydropower.org/country-profiles/nigeria>
- Katarzyna, M. S. (2020). Chinese infrastructure investments in Nigeria - prospects and challenges in terms of gains. *Master thesis presented to Faculty of Humanities Leiden University*. <https://studenttheses.universiteitleiden.nl/access/item%3A2700028/view>
- Miriam, F. (2021). Biomass Energy in China. <https://www.bioenergyconsult.com/biomass-energy-china/>
- Nigerian National Petroleum Corporation. (2005). Nigeria to Earn US \$150m from Biofuels Initiatives. <http://www.nnpcgroup.com/news/biofuels.html>.
- Obido, O. E., Igwe, O., & Ukah, B. U. (2021). An investigation into the cause of road failure along Sagamu-Papalanto highway southwestern Nigeria. *Geoenvironmental Disasters*, 8(3). <https://doi.org/10.1186/s40677-020-00174-8>
- Odoh, I. (2019). Keffi Road, the new high road boosting Nigeria-China development – CHEC MD. <https://businessday.ng/interview/article/keffi-road-the-new-high-road-boosting-nigeria-china-development-chec-md/>
- Ogunsanwo, (2018). Short Run and Long Run Effects of Non-Oil Trade Export on Economic Growth in Nigeria. *Economica*, 7(2). <http://journals.univ-danubius.ro/index.php/oeconomica/article/view/6541>
- Olowolagba, F. (2018). Buhari Signs \$328 Deal with China, Secures Support on Mambilla Project. [https://www.google.com.ng/amp/dailypost.ng/2018/09/06/buhari-sign-\\$-328-deal-china-secures-support-mambilla-project/amp/](https://www.google.com.ng/amp/dailypost.ng/2018/09/06/buhari-sign-$-328-deal-china-secures-support-mambilla-project/amp/)
- Onunaiju, C. (2020). Nigeria's Road Infrastructure Renewal and China Relations. <https://www.thisdaylive.com/index.php/2020/01/26/nigerias-road-infrastructure-renewal-z-and-china-relations/>
- Oruonye, E.D. (2015). Politics of Hydroelectric Power Development in Nigeria: A Case Study of the Mambilla Hydroelectric Power Project. *Global Journal of Interdisciplinary Social Sciences*, 4(4) 19-25. [https://www.researchgate.net/publication/309943763\\_Politics\\_of\\_Hydroelectric\\_Power](https://www.researchgate.net/publication/309943763_Politics_of_Hydroelectric_Power)

Development\_in\_Nigeria\_A\_Case\_Study\_of\_the\_Mambilla\_Hydroelectric\_Power\_Proj  
ct

Premiumtimes. (2015, April 15). Presidency lists Nigeria's benefits from Buhari's China Visit. <http://googleweblight.com/i?u=http://www.premiumtimesng.com/news/topnews/201873-presidency-lists-nigerias-benefits-buharis-visit-visit.html&=enNG&tg=2239&pt=167>.

Project reserve (2020). An Assessment of Road Transport Infrastructure. <https://www.projectreserve.com/2020/01/an-assessment-of-road-transport-infrastructure.html>

Raji, A. & Adenike, O. (2018). Chinese investment and its implications for Nigeria's economic security. *Brazilian Journal of African Studies*, 3(6),123-142. <https://uilspace.unilorin.edu.ng/handle/20.500.12484/3854>

Sahel and West Africa Club (SWAC)/Organization for Economic Co-operation and Development (OECD) (2008). Green Fuels for Development? Improving Policy Coherence in West Africa. SWAC Briefing Note 2, September. SWAC/OECD.

Terkula, I. (2014). 32 Years After, No Power at Mambilla Hydro-power Project. <https://www.dailytrust.com.ng/sunday/index>

This Day Live. (2013, July 17). Shell Shuts Down 624 MW Afam VI Power Plant. <http://www.thisdaylive.com/articles/shell-shuts-down-624mw-afam-vi-power-plant/153576/>

This Day Live (2014, September 25). FG, China to Discuss \$3.2bn Mambilla Contract Imbroglio'. <http://www.thisdaylive.com/articles/fg-china-to-discuss-3-2bn-mambilla-contractimbroglio/177824/>

William, A.A. (2016). The Impact of Transportation Infrastructure on Nigeria's Economic Development. *Walden Dissertations and Doctoral Studies Collection*. <https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=3881&context=dissertations>

World Highways. (2021). Chinese contractor wins major Nigerian road project. <https://www.worldhighways.com/wh10/news/chinese-contractor-wins-major-nigerian>

Xinhua (2019). China biomass power generation increases 16.7% in Q1. <https://global.chinadaily.com.cn/a/201905/04/WS5ccd3bd1a3104842260b9adb.html#:~:ext=China%20added%20970%2C000%20kilowatts%20of,used%20as%20a%20fuel%20source%20road-project>



Xinhua (2021). Nigeria flags off full commercial operation of China-assisted railway.  
[http://www.xinhuanet.com/english/2021-06/11/c\\_1310001406.htm](http://www.xinhuanet.com/english/2021-06/11/c_1310001406.htm)

Xinhua Finance Agency (2015). Chinese company completes construction of road in Lagos  
<http://en.xfafinance.com/html/Economies/Trade/2015/164955.shtml>

Yunnan, C. (2018). China's Role in Nigerian Railway Development and Implications for Security and Development. Special Report United States Institute of Peace.  
[https://www.usip.org/sites/default/files/2018-04/sr\\_423\\_chen\\_final.pdf](https://www.usip.org/sites/default/files/2018-04/sr_423_chen_final.pdf)

Zarma, I. H. (2017). *Hydro Power Resources in Nigeria: Being a country*. Position paper presented at the 2nd Hydro Power for Today Conference International Centre on Small Hydro Power (IC-SHP), Hangzhou, China