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The Ajaokuta Kaduna Kano (Akk) Gas Pipeline and its Potential Impact on Industrialization in Northern Nigeria

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Abstract: Successive governments in Nigeria have initiated several policies aimed at promoting the economy through industrialization. In spite of these industrialization policies, Nigeria is still at the bottom echelon of development ladder as the Manufacturing sector which was at a time contributing about 13 % to the GDP, and second largest employer of labour is now in insentient. Currently the Manufacturing sector is contributing only 8.74 % to the nation's GDP. Many industries are collapsing largely due to unavailability of steady power among other factors. The paper is aimed at emphasizing the important role of Ajaokuta Kaduna Kano pipeline project in the industrialization of Northern Nigeria. This paper provides background information from conceptualization of the project up to the flag off for the construction of the project as well as the benefit of the project.

Keywords: Industrialization, Ajaokuta Kaduna Kano (AKK) gas pipeline, Manufacturing, Economic development, Northern Nigeria.

Introduction

One massive natural gas pipeline project in Nigeria is the Ajaokuta-Kaduna-Kano (AKK) pipeline. A daily transfer of 2.2 billion cubic feet of gas from the southern part of the nation to the central part of the country will be made easier by this. The Trans-Nigerian Gas Pipeline (TNGP) project is underway at the Nigerian National Petroleum Corporation (NNPC). The strategy to harness Nigeria's abundant natural gas reserves for electricity production and domestic consumption relies on this. The AKK pipeline is currently being constructed using a public-private partnership model known as the build and transfer (BT) framework (PPP). In Nigeria, the project is overseen by the Infrastructure Concession Regulatory Commission, and the contractor is held financially accountable for 85 percent of the total (ICRC). Although it is now twenty-four months later than anticipated, construction of the pipeline began in July 2020 and is anticipated to conclude in 2022. When completed, the AKK pipeline will link the northern, western, and eastern parts of Nigeria. Thanks to this new development, gas will be accessible and usable in strategic business areas along the country's northern corridor. Businesses should find it easier to expand and the production of electricity should improve as a result. Two preexisting systems will be linked by the AKK pipeline. Connecting the eastern and western regions of Nigeria, the Escravos-Lagos Pipelines I and II (OB3 pipeline) have a daily gas capacity of 2.2 billion cubic feet. An expanded strategy to upgrade Nigeria's domestic gas transmission infrastructure includes the OB3 pipeline. With 99 trillion tcf associated and 89 trillion tcf unassociated, Nigeria's proven gas reserves total 188 trillion cubic feet (tcf). That is why Nigeria ranks among the top countries in terms of gas reserves. Bungane predicts that in 2020, all fossil fuels will experience

the fastest growth, with the exception of coal. The fastest-growing fuel type is natural gas. As a result, the amount of energy required to produce fuels will continue to rise globally. Global demand for natural gas is projected to increase by 1.4% annually until 2040, according to the research. Strong and consistent economic growth in developing nations is driving up energy demand, which means that they will likely account for a large portion of the global increase in energy production. Its sister project, the Trans-Natal Gas Pipeline (TNGP), includes the Trans-Saharan Gas Pipeline (TSGP) project. Its purpose is to facilitate the shipment of natural gas to Europe.

Historical Development Milestone of AKK Project

A massive infrastructure project is currently underway in Nigeria known as the AKK pipeline, which encompasses the Ajaokuta-Kaduna-Kano pipeline. The location of certain gas outlets in domestic and regional networks necessitates a policy on gas development, according to Christiansen and Haugland (2001). Eliminate gas flaring, a prevalent practice in Nigeria's oil and gas industry. The AKK pipeline primarily aims to enhance the country's gas distribution infrastructure. The Federal Executive Council of Nigeria authorized its construction in 2008 as part of the Nigerian Gas Master Plan. The original idea for this project originated in 2008. "Bello and Dauda" and "Aremini and Emaviwe" (2023) (2022). A project proposal was submitted to the Infrastructure Concession Regulatory Commission as of June 14, 2017. (ICRC). The initial announcement regarding the project's tenders was made in July 2013 by the Nigerian National Petroleum Corporation (NNPC). This proposal was part of that announcement. The Federal Executive Council gave the go-ahead for the project—worth over $2.8 billion—during its 46th meeting on December 13, 2017. The council granted VML this approval on July 10, 2017, following the receipt of a PPP compliance certificate and the approval of the feasibility study. (2023). On June 30, 2020, President Muhammadu Buhari formally began construction on the project, following its award of the contract on September 13, 2018. Building on it is underway at the moment. The successful bidder was awarded the construction contract on September 13, 2018. For the year 2020, Garb will be available.

Project Financing

Rationale for Selection of PPP Model

Ajaokuta, Abuja, Kaduna, and Kano Gas Pipeline Project Delivery Options Four major development options were considered. The choices were to work with the private sector, to delay the project, to not do the project at all, or to implement the project immediately. Several Public Private Partnership (PPP) procurement strategies are on the table as options for bringing the AKK Pipeline Project to fruition. This is a reference to the BT, the BOT, and the DFBOT. After considering all of the possibilities, it was decided that the AKK Pipeline Project would benefit most from a BT with contractor financing. The Ajaokuta-Kaduna-Kano pipeline South-North option has a lengthy lead time—many years may pass before revenues begin to flow—and requires a significant upfront investment totaling billions of dollars. Because these projects require a significant upfront investment, investors must understand the risks to which their capital is exposed (Akinpelu and Isehunwa, 2016). The primary rationale for this recommendation is the potential for greater value for the money spent as a result of lower procurement, development, and management costs; lower procurement risks; shorter lead times; and higher quality and added value as a result of training and local employment. Unfortunately, the NNPC lacked the capital to continue with the endeavor (Ahmed et al., 2016). While NNPC is still responsible for operating and maintaining this vital piece of infrastructure, the BT option relieves it of the immediate burden of the enormous initial outlay for the development. Possible advantages of going with BT include:

i. An improvement in the pipeline project's overall level of operational effectiveness;

ii. A reduction in risk for the public sector as a result of a portion of that risk being transferred to the contractors;

iii. The private partners have an incentive to complete the project as quickly as possible in order to maximize their returns on investment;

iv. It frees up NNPC's limited resources so that they can be deployed to other important uses; and

v. The project will be completed at a lower cost.

vi. It frees up NNPC's limited resources so that they can be deployed in other areas

vii. Reduced development and infrastructure budget for NNPC.

Details of Project Financing Strategy

The Ajaokuta-Kaduna-Kano (AKK) gas pipeline project is expected to receive $434 million in total financing, made up of 85% debt and 15% equity. Nigerian Gas Company, a wholly owned subsidiary of NNPC, will provide the equity financing. The Bank of China and the China Export & Credit Insurance Corporation (Sinosure) are providing the loan facility, which has a repayment term of 12 years and an interest rate equal to the London Interbank Offered Rate (LIBOR) plus 3.7%. The government will guarantee the loan and repayment will come from the pipeline transmission tariff's proceeds. The Nigerian government issued a sovereign guarantee in March of 2020 to support the loan facility that was used to construct the pipeline. The GMD NNPC reports that all preconditions for closing the debt financing have been satisfied, and that lenders' internal approval processes are underway so that the financing can close by August 2020 as planned. NNPC plans to use the equity contribution it received to restart the project's execution, making up for lost time and getting the endeavor back on track *(*Akinpelu, 2017).

Contractors Involved in the Project

The Engineering, Procurement, and Commissioning (EPC) contract for the first segment of the AKK project, which covers 303 kilometers, was awarded to a consortium consisting of Messrs. Oilserv Plc and China First Highway Engineering Company (Oilserv/CFHEC Consortium). The second segment of the project, which will cover 311 kilometers and was awarded to Messrs. Brentex Petroleum Services and China Petroleum Pipeline Bureau (Brentex/CPP Consortium). The contract award followed an extensive due diligence process with compliance certificates obtained from the following Government Regulatory Bodies *(*Ruth Olurounbi 2020):

- ✓ Infrastructure Concession Regulatory Commission (ICRC)
- ✓ Nigerian Content Development Monitoring Board (NCDMB)
- ✓ Bureau of Public Procurement (BPP)

Post Award

Since the contract award, NNPC has undertaken the following actions according to VML (2023).

a. Established the AKK Project Escrow Account for finalizing the financing requirements of the project and mobilized the required 15% down payment from internal sources to serve as Sponsor Equity to back up the 85% financing required from external lenders

b. Renegotiated the EPC Contractor Financing arrangement to relieve the EPC Contractors of the obligation to fund the AKK Project thereby converting the Contractor funding model to EPC Lump Sum for obvious reasons

c. Negotiated with the EPC Contractors as a result of the change in funding strategy and obtained a reduction/savings of $298.67mn in the EPC cost thereby revising the EPC Contract sum to US$2.59bn.

Akk Pipeline Route Details

As much as possible, the AKK gas pipeline would follow the same routes as the Nigerian Pipelines and Storage Company's existing 12-inch product and 16-inch crude oil pipelines (NPSC). From Ajaokuta, the pipeline will go to Abuja, Kaduna, and then a gas station in Kano. Kogi, the Federal Capital Territory of Abuja, Niger, Kaduna, and Kano are the main states that make up the pipeline corridor. Along the route planned for the pipeline, it will cross ten highways and seven rivers. The project will be finished in three stages. The first stage will cost $855 million and involve building a 200-kilometer road between Ajaokuta and the Abuja Terminal Gas Station. The second part, which will be 193 kilometers long and cost about $835 million, will connect Abuja and Kaduna. During the third phase, a 221.5-kilometer stretch will be built between the Kaduna terminal gas station (TGS) and the Kano TGS. It is expected that this part of the project will cost a total of $1.2 billion. There will also be facilities for getting to and from the development as part of its infrastructure. The natural gas pipeline will need about 51,200 40-inch steel line pipes that weigh a total of 240,768t to be put in place. Also, 24-inch steel line pipes will be used for spur lines, 40-inch line break valves, and new tie-in valves. The system will work at a pressure of 1,000 pounds per square inch, and the pipe connections will be 40 inches in diameter (PSIG) VML (2023).

Potential Impact of AKK on Industrialization In Northern Nigeria

Industrialization is "the process by which an economy moves from being based mostly on agriculture to being based on making things." Most individual manual work has been replaced by automated mass production, and most human artisans have been replaced by assembly lines. Indicators of industrialization include economic growth, a better way to divide up the work, and using cutting-edge technology to solve problems instead of relying on external factors that can't be controlled. The AKK project could help the northern part of Nigeria become more industrialized in the following ways:

Facilitate Gas Commercialization Policy Implementation.

Despite its supposed importance as part of the Nigerian Gas Master Plan (NGMP), the federal government delayed the construction of the AKK pipeline by nearly a decade (Bello & Dauda 2022, Areremi, & Emaviwe, 2023). The NGMP suspension was the primary factor that led to this. Building the Obiafu-Obrikom-Oben (OB3) gas grid, which is 127 kilometers long, is a significant improvement over the seven deliveries that came before it, according to the current administration. The AKK project aims to help the domestic gas market grow by taking advantage of the increasing energy needs in the country's northern regions. Companies will have an easier time breaking into the home market, and the government will have more revenue to turn gas into a commodity. The Nigerian National Petroleum Corporation (NNPC) has initiated a program to distribute gas to the general public in order for the nation to maximize its substantial natural gas reserves. Improving growth efficiency and simplifying the transition from a centralized to a more diverse economy in Nigeria are two of the project's primary objectives. Here is the statement made by the NNPC. Upon completion of the AKK project, the daily domestic gas output will reach 2.2 billion cubic feet. Also, an additional 3,600 MW of power can be generated thanks to this innovation (MW). The nation hopes that many of its oil and gas-related economic objectives will be more easily attained after the construction of the 614-kilometer pipeline is complete. Less reliance on oil is something the government is aiming for. They intend to construct this pipeline and make better use of the country's abundant natural resources as part of their overall strategy. Here are some strategies that can be used to achieve policy goals:

- ✓ Clearly mapped out strategies to deepen the domestic gas market,
- ✓ Put an end to the practice of burning off excess gas at oil production sites;
- ✓ Boost national revenue through the commercialization of natural gas;
- ✓ Increase the percentage of Nigerian content in the massively expensive petroleum industry;
- ✓ Construct a sustainable energy infrastructure for the domestic economy.

According to the Nigerian National Petroleum Corporation (NNPC), the $2.8 billion AKK pipeline project will facilitate the connection of upstream and midstream oil industry operators' natural gas output to the grid and accelerate the development of new industrial corridors in northern Nigeria. The majority of these changes are likely to occur in the new pipeline corridors in northern Nigeria.

Economic Significance

Most people agree that the severe lack of energy that has affected the country's industrial and commercial businesses is the most important factor in terms of production. So, the AKK pipeline is seen as a key part of Nigeria's long-term plan to solve its industrial energy problems. The AKK project will provide the energy and resources needed for industrial growth. This will make it more financially beneficial and attractive to invest in Nigeria's business environment. When it's done, the AKK pipeline will be a stable source of production that improves the business climate across the country. The facility will continue to be important for the growth of Nigeria's manufacturing industry, power generation, and oil fields that haven't been used yet. The AKK pipeline will help operators meet the requirements of zero flare development plans. This will increase oil production in the upstream part of the petroleum industry. Previously constrained by the absence of a market for associated gas, operators can now expand their operations due to the availability of space in the AKK pipeline. Again, the AKK pipeline's expansion of the domestic gas market has a direct effect on boosting investor confidence in the government's program to turn flare gas into a commercial product by giving captured gas a ready way to leave the country. Nigeria will be able to get off the shameful list of countries with the most greenhouse gas emissions if its efforts to get oil production sites to have zero emissions are successful. The AKK pipeline is expected to give the country cheaper, cleaner, and more reliable energy while also giving the government a direct source of income. By charging producers a fee for gas transmission services, the government and others will make a steady profit. Along with tax money, the government will get an equity dividend and direct market returns that are based on how much gas is sold. The AKK pipeline has more characteristics of an industrial stimulant. In recent years, Nigeria's ability to make things has been severely hurt by a lack of energy. Liquid fuel is too expensive and doesn't make enough money to be used to power factories, and the amount of electricity they get is abysmally low. So, the AKK pipeline could supply enough fuel energy to power plants so that they can make enough electricity to power homes and businesses. With the pipeline, cleaner, cheaper gas energy can be sent straight to businesses and industries. The AKK pipeline will help the industrial sector grow, create jobs, and make the economy bigger (GDP)

Nigerian Content Development

The Nigerian Content Policy could give the AKK pipeline the best return on investment if the government sticks to it. The local Oilserv consortium, which also finished the more difficult Obiafu-Obriko-Oben (OB3) pipeline, on which the AKK pipeline is based, would have been able to finish the whole project if the funding arrangement hadn't required Chinese content in the project. This is because the funding arrangement needs the Chinese government to take part. Oilserv's involvement makes the project much more grounded in reality. When local knowledge is used, the infrastructure becomes more affordable and lasts longer. Regional refineries have stopped working because the

people who built them didn't keep up with their maintenance duties. But if the government hired the Oilserv consortium, the refineries would not have the maintenance problems they have had in the past. So, the Oilserv consortium is expected to be on-site often to check the integrity of the pipelines.

Job Creation

In case the project creates more jobs, the group in charge of the AKK project plans to hire a lot more people from the communities where the project will be located over the course of its life. At the height of the project, between 3,000 and 4,000 people are expected to be working on it. There will also be a well-thought-out plan for community development near pipeline construction sites. Getting the local kids involved in the project is a great way to get more people behind it.

Resuscitating Nigeria's Moribund Industries and emergence of new industries

Every day, textile factories close down and move to neighboring countries. Even though there are a lot of things that contribute, like old equipment, high interest rates, not investing in infrastructure, and making raw materials locally, the main cause is inefficient energy use. At the turn of the century, there were only about 25 textile companies left in the country, and most people thought they barely made enough money to stay in business. To put it mildly, the place of work is hostile. The AKK project will give the North's dormant textile industries the push they need to get going again. This is in line with the current administration's push for export substitution and domestic manufacturing. This will make Nigeria an exporter of textile raw materials, which will boost GDP, create jobs, and speed up the process of diversifying the economy. The completion of AKK project will resuscitate more than 250 textile factories and it will create at more than 1,000,000 direct jobs during its peak performance. Gas is needed for many industries to run, so its availability will have a big effect. This talk is about how natural gas is used in power plants and gas-based industries, like those that make fertilizers from urea. Using AKK, you can place these plants where fertilizer is needed, i.e. where farming is going on. Because of this, it is now easier to get and costs less. Obviously, this will have a big effect on the economy.

Power Generation

The AKK pipeline will increase the country's power generation capacity by 4,600 MW when it is completed. Power demand will rise in the Federal Capital Territory of Nigeria and Northern Nigeria, which will be met by the construction of three 1,350 MW, 900 MW, and 2,350 MW natural gas-fired power plants in Abuja, Kaduna, and Kano, respectively (Adegoke et al., 2005).

Advantage of AKK Pipeline Project

The main way to reach the goal of building a reliable and secure gas supply network connecting Nigeria's northern and southern regions is to use the country's many gas resources. It is expected that the AKK natural gas pipeline will make it easier for Nigeria to make electricity and help industrialize the eastern and northern parts of the country (Habib, & Congjiao, 2021).

- It is expected that the project will increase the number of homes in the area that use gas. This is expected to raise the amount of money the country makes from exporting natural gas.
- It is expected that moving forward with the AKK project will reduce both the large amount of gas that is burned off every year in Nigeria and the bad effects that this has on the environment.
- When the project is done, natural gas will be able to be used to make electricity and to feed industries that use gas. It will also help develop new industries along transit towns in the states of Kogi, Abuja (FCT), Niger, Kaduna, and Kano.

- The project will help local talent grow and be used, as well as encourage the transfer of technology and the making of goods in the area. There will also be a lot of direct and indirect job opportunities.
- The AKK project will use and sell the country's large gas reserves, which will help the economy grow quickly and become more diverse. This is a big part of the plan to make the future safer, better for the environment, and more prosperous for everyone in the country.
- Make sure that the money from selling oil and gas is used to help the economy grow in areas other than oil and gas.
- When finished, the AKK pipeline will increase the amount of natural gas used in Nigeria, which will help the country's economy grow.
- It would also let 4,600 megawatts of power be added to the national grid, 2.2 billion cubic feet of gas be made available for domestic use, and the textile industry, which employs more than 3 million people, be brought back to life.
- The AKK project would help gas-based industries like petrochemicals, fertilizer, and methanol grow, which would create jobs and help the economy grow in a balanced way.
- When "gas penetration" happens in these parts of the country, energy costs for businesses along the pipeline corridor will drop by a lot.
- The AKK will make less reliance on imports, which will increase exports, government income, and foreign reserves. Gas-based industries and the power generation sector will also benefit from more industrialization and new job opportunities. Also, it is hoped that once the project is done, it will help fix the economic problems in the north that are caused by the lack of gas.
- It will also make sure the country has enough energy and help the industrial and agricultural sectors grow.
- As a result, the country will be able to use its own energy.
- This project is good for the environment because it stops gas flares, improves health in oil-producing areas, reduces the country's carbon footprint, and makes sure that international agreements on climate control are followed.
- Implementing this project will reduce gas flaring, leading to an improvement in air quality near oil production sites. The upshot is development that will take a very long time to materialize. The project's goal of eliminating gas flaring creates this issue, which will inevitably arise (Habib & Congjiao, 2021). As part of its commitment to the Climate Control Treaties it has signed, the country will reduce its carbon footprint.

Conclusion

The AKK Gas Pipeline project is a major development toward Nigeria's goal of economic diversification and increased industrialization. The innovative infrastructure project aims to transport natural gas from the southern to the northern regions of Nigeria. Beyond the physical framework of the AKK project, there are additional impacts beyond the movement of gas. This facilitates the development of a vital north-south connection, which facilitates the accessibility of consumer markets to regions abundant in natural resources. So, it's a win-win situation all around: the country benefits from cheaper fuel and energy for northern industrial uses, and the south benefits from new business opportunities. However, cooperation is key if the AKK pipeline is to achieve its objectives. For a project to be technically and financially feasible, it requires interdisciplinary teams of experts from disciplines such as engineering and economics to collaborate. Businesses, whether they are well-

established or just starting out, should have the resources they need to seize opportunities when they arise. The construction of infrastructure and the adoption of policies that facilitate its expansion should be the foremost objectives of political leaders at all levels. A new industrial ecosystem can flourish with this support. For a project to be successful and well-received by the community, its members must work together. The AKK pipeline is more than simply a gas and pipe project; it is the catalyst for an impending industrial revolution in northern Nigeria. The project's ability to unite diverse groups of people behind a shared objective bodes well for economic growth and the development of a stronger, more interdependent nation. Along with infrastructure, this paper emphasizes the importance of shared prosperity, unity, and a brighter future for all Nigerians.

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