

Public Private Partnerships (PPP) And Infrastructural Development in Nigeria: A Review of the 700MW Zungeru Hydroelectric Power Plant (ZHPP) Concession

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ABSTRACT

Public private partnerships (PPPs) are "contractual arrangements between the public sector organizations and private sector investors for joint, symbiotic and collaborative provision and financing of public projects and services." The public sector often faces challenges in the sphere of finance, technical knowledge, institutional limitations in availing infrastructure projects, which begets the need of Public Private Partnerships. There is widespread proof of the emerging utilization of PPPs in the public sector services to meet the needs of the modern economy. As aptly captured in the Federal Government of Nigeria's Economic Growth and Recovery Plan (EGRP), "the value of Nigeria's total infrastructure stock (Road, Rail, Power, Airports, Water, Telecoms, and Seaports) represents only 35 per cent of GDP. This is far below the level of peer emerging market countries, like South Africa, Brazil, India, Indonesia, China and Poland, where the average is 70 per cent . The EGRP went on to assert that "to optimize the contribution of all these sectors, Nigeria needs to invest USD3 trillion in infrastructure over the next 30 years". This study presents a descriptive, desk based review of the PPP framework governing the 700MW Zungeru Hydroelectric Power Plant in Nigeria. The project was completed at the cost of \$1.3 billion through a bilateral loans split from the Export Import Bank of China and Federal Government of Nigeria. The facility was then transferred to Penstock Energy Limited under a 30 year concession. Findings from the review identified among others some outstanding issues before and after the commission activities of the power plant, which are yet to be resolved to ensure sustainable operation of the concession. It is worthy to note that most of these outstanding commission activities are critical to the successful operations of the ZHPP concession. Consequently, government and the concessionaire should take all necessary steps to ensure that these issues are handled urgently, to prevent any setbacks regarding the sustainability of the concession programme.

Keywords: Public Private Partnerships, Concession, Infrastructure, Hydroelectric Power, Sustainability, Zungeru Hydroelectric Power, Penstock Energy, Mainstream Energy.

INTRODUCTION

It is an established fact that infrastructure is a critical enabler of economic development in any given society. It acts as catalyst and is critical to the general functioning of every modern society. It provides the sub-structure upon which a given society, the super-structure in this context, is built. It could be likened to a "jugular vein" of an existing society, without it, a society cannot function. A country's state of public infrastructure can be an indicator of the country's economic development and growth. Obviously, an efficient and reliable infrastructure is critical to attract the direct foreign investment and expansion of international trade which are so crucial to growth. This explains why in every nation, provision of infrastructure assets has always remained on the front-burner of governments' agenda for development and policy. In Nigeria, the three tiers of government have come to appreciate the fact that provision of modern and functional infrastructure plays a vital role in the socio-economic lives of the people.

Since the 1990s, the importance of good infrastructure to the development process is well documented in a vast body of literature, estimating its contribution to economic growth. The World Bank (WB) landmark study on infrastructure (World Development Report, 1994) emphasized the critical role of infrastructure in the development process. Infrastructural development encompasses the construction and maintenance of physical structures such as roads, bridges, power supply, and transportation systems that facilitate economic activity and improve the quality of life for citizens. Urban infrastructures are economic social facilities which are provided by the government or by private operators, for the social and economic development of the citizenry (Adegoke *et al.*, 2010). Adedayo and Afolayan (2012) argued that the number of tarred roads, the frequency of water and power supply, the state of environmental sanitation and the efficiency of communication system are all indices of urban development. Thus, infrastructure has been recognised as the crux of human settlement development. Mabogunje (1993) stressed that the provision of infrastructure in an extensive and continuous self-sustaining basis is a *sin-qua-non* for the efficiency and liveability of cities.

In Nigeria, infrastructure development plays a vital role in driving economic growth and development, but the country's infrastructure deficit is a significant challenge that hampers economic progress. The estimated \$100 billion infrastructure deficit in Nigeria underscores the need for urgent action to address this challenge. A major drag on the pace of industrial development in Nigeria over the years is attributable to the poor state of infrastructure facilities (Adedayo and Afolayan, 2012). Therefore, raising the bar for service delivery and tackling the lack of infrastructure have been integral components of successive governments' visions in Nigeria.

As Nigeria charts its path to sustainable economic growth, investing in infrastructure is not just an option – it's an imperative. With a long-term vision, coordinated efforts, and a commitment to transparency, Nigeria can transform its infrastructure landscape, unlock economic potential, and improve the lives of millions. To achieve this vision, stakeholders must prioritize infrastructure development, foster collaboration between government and private sector, ensure transparency in project implementation, and establish an infrastructure development fund to mobilize resources and ensure timely completion of projects.

So, given the scale of the nation's infrastructure requirements and the ever-widening investment deficit in provision of public assets and service delivery in an environment of budgetary constraints, lack of capacity, general incompetence and endemic corruption, the governments, at all levels in Nigeria, are drawing on private initiatives and capital to tackle the menace of infrastructure deficits and lack of financing. This entails leveraging private sector resources and capacity for provision of infrastructure assets and services to the public through public private partnerships (PPPs) to bridge the widening infrastructure financing gap and open up the country's vast economic potentials, fast-tracking the development process.

PPPs originated from the United Kingdom with the development of mines in an arrangement (known as the Public Finance Initiative) between the government and a merchant bank several centuries ago (Guardian 3/03/09). In the past few decades, the United Kingdom have modelled a variety of public private partnerships (PPPs) for the delivery of infrastructure, public utilities and large services projects, achieving significant successes from harnessing the competences and expertise from both sectors. Emerging markets such as India and South Africa have also recorded successes using tried and tested PPP templates to create, expand and modernize infrastructure.

One of the key significant PPP initiatives in Nigeria's power sector is the concession of the 700MW Zungeru Hydroelectric Power Project in Niger State. The Federal Government of Nigeria decides to construct the 700MW Zungeru Hydroelectric Power Plant (ZHPP) at Zungeru Niger State, to provide the much-needed sustainable power supply to Nigeria, using the potential energy of water stored in a reservoir to operate turbines. The turbines are connected to a large generator and can operate on varying volumes of water to adapt to changing demand for electricity.

Therefore, following a competitive bidding process by the Bureau of Public Enterprises, the FGN through the Federal Ministry of Power concession the 700MW Zungeru Hydroelectric Power Plant under a PPP arrangement, to Penstock Energy Limited (a subsidiary of Mainstream Energy Solutions) in February 2024. In

line with the Concession Agreement, the concessionaire shall pay FGN the sum of \$70 Million per annum, for a period of 30 years. The proceeds of the concession of ZHPP will be used to repay the Chinese loan used in constructing the Power Plant. The PPP transaction was conducted under the regulatory oversight of the Infrastructure Concession Regulatory Commission (ICRC) by the Bureau of Public Enterprises.

The Zungeru Hydroelectric Power Concession represents an important case for evaluating how PPP arrangements can improve infrastructure performance and contribute to sustainable national development.

Objectives of the Study

The objectives of this study are:

1. To provide an analysis of the framework and structure of the 700MW Zungeru Hydroelectric Power Plant concession as documented in both institutional and legal reports.
2. To present the key benefits of the Concession.
3. To highlight the key operational challenges regarding the Zungeru Hydroelectric Power Concession.
4. To outline some recommendations from the lessons learned and policy pathways for future infrastructure concessions in Nigeria.

Research Questions

The following are the research questions:

1. How is the conceptual framework and structure of the 700MW Zungeru Hydroelectric Power Plant concession?
2. What are the key benefits of the Zungeru Hydroelectric Power Plant Concession
3. What are the key operational challenges regarding the Zungeru Hydroelectric Power Plant Concession?
4. What strategic recommendations and lessons can be synthesized from existing literature to improve future Public-Private Partnerships in the Nigerian power sector?

RESEARCH METHODOLOGY

The study will adopt a descriptive literature review which relies on secondary data, including documentations, policy papers, and institutional reports.

Gaps in the Literature

A serious gap identified in the literature reviewed involve some outstanding bottlenecks before and after the commission which are yet to be resolved by parties to the concession. Failure to resolve these issues urgently could result in unnecessary legal disputes that will ultimately affect the sustainability of the concession.

CONCEPT OF PPP IN INFRASTRUCTURAL FINANCING

As highlighted earlier, there is huge infrastructure gap in the country, it is estimated that Nigeria needs to invest more than USD 3 Trillion in the next 30 years to bridge the gap (NIIMP). Ratio of infrastructure stock to GDP in some emerging economies (e.g. South Africa, Brazil, Indonesia, Poland, etc) is 70% compared to 35% for Nigeria (ERGP, 2017). With the above in mind, it has become evident that government alone cannot muster the resources (finance and expertise) to meet their needs and the involvement of the private sector is not just desirable, but necessary.

Often, severe fiscal constraints face countries because of past neglect in the maintenance of infrastructure. This increased awareness has resulted in governments looking to the private sector to complement its scarce resources. According to Adepetun (2008), most countries have adopted the PPP policy about two or three decades ago as a way of fixing their infrastructural gap and delivering good welfare for their citizens.

The benefits of PPPs in infrastructure development are numerous. For instance, PPPs can enhance efficiency and innovation, provide access to capital, and mitigate financial and operational risks associated with complex infrastructure projects. By collaborating with the government on infrastructure projects, private sector stakeholders can gain new business opportunities, improve their brand reputation, and develop new skills and expertise. This collaboration can also help private sector companies to demonstrate their commitment to social responsibility and improve their competitiveness in the market.

Legal Framework for PPP in Nigeria

Since the beginning of the fourth democratic experience in May 1999, the Federal Government of Nigeria has embarked on an extensive liberalisation and privatisation program, to inject private sector money and expertise in order to ensure quality infrastructure and service delivery to the teeming population. In 2007 specifically, the Federal Government of Nigeria articulated its Seven Point Agenda which outlined the seven key drivers for Nigerian development. At the top of this list of indicative parameters, is the adequate provision of critical infrastructure as a means to catalyse economic growth with the transport sector as a high priority for PPP investment.

Pursuant to the above, the Federal Government of Nigeria inaugurated the Infrastructure Concession Regulatory Commission (ICRC) in late 2008 to drive the PPP program in Nigeria. As a first step towards establishing the proper legal and regulatory environment to attract private sector investors, the Federal Executive Council approved the National Policy on Public Private Partnership, sponsored by the ICRC after stakeholder consultations and technical inputs from, inter alia, the World Bank and the United Kingdom Department for International Development (DFID). The key PPP principles driven by the Commission are: Value for money; public interest; output requirements; transparency; risk allocation; competition; and capacity to deliver. This policy sets forth the ways in which private investment could be leveraged in tackling the menace of poor infrastructure stocks and boosting delivery of services to the public in a manner that is sustainable. This is pursuant to sections 33 and 34 of the Infrastructure Concession Regulatory Commission Act (ICRCA) which empower the Commission to take directives from the President regarding matters of policy and power to make regulations, respectively.

The entire PPP framework in Nigeria hinges on the principles of achieving better value and affordable services. As expressed in the National Policy Document, there are economic, social and environmental objectives for the adoption of PPP model as a strategy for infrastructure development. It is the belief of the government that a private-sector led drive for infrastructure development through PPPs will open up the infrastructure and service delivery landscape in Nigeria to efficiency, inclusive access and overall improvement of the quality of public service delivery in a sustainable way.

Typically, the regulatory environment embraces the rules of procedure governing the way and manner institutions saddled with regulatory functions exercise their powers. For a regulatory process to be credible, it must be transparent and objective. Rules and procedures must be lucid and objective for the purposes of fairness, impartiality and prompt action from the regulatory body concerned. A typically conducive regulatory environment will create a level playing field for all players on the PPP terrain. At minimum, there should be guarantees as to the protection of consumers through regulations that touch on minimum service requirements, coverage, pricing and generally to seek to prevent abuses of the rights of consumers.

The crux of the ICRC Act is that the transfer of public sector responsibilities to the private sector in the form of concessions must follow international best practice through open bidding and a competitive process. In keeping with the required transparency and accountability, the Government's key policy objectives for its infrastructure

investment and management programme as well as PPP arrangements are driven by economic, social and environmental considerations.

Economic Considerations

- To accelerate investment in new infrastructure and ensure that existing infrastructure is upgraded to a satisfactory standard that meets the needs and aspirations of the public.
- To ensure that all investment projects provide value for money and that the costs to government are affordable.
- To improve the availability, quality, and efficiency of public services in order to increase economic growth, productivity, competitiveness, and access to markets.
- To increase the capacity and diversity of the private sector by providing opportunities for Nigerian and international investors and contractors in the provision of public infrastructure, encouraging efficiency, innovation, and flexibility.
- To ensure that infrastructure projects are planned, prioritized, and managed to maximize economic returns and are delivered in a timely, efficient, and cost effective manner.
- To manage the fiscal risks created under PPP contracts within the government's overall financial and budgetary framework.
- To utilize federal and state assets efficiently for the benefit of all users of public services.

Social Considerations

- To ensure balanced regional development.
- To increase access to quality public services for all members of society.
- To ensure that user charges for new or improved public services are affordable and provide value for money.
- To respect the employment rights and opportunities of existing employees and to ensure that any redundancy or other social safety net issues are resolved before final project approval.
- To enhance the health, safety, and wellbeing of the public.
- To encourage the direct or indirect participation of small and medium sized enterprises in PPP projects.

Environmental Considerations

- To ensure compliance with local and global environmental standards and procedure in initiating, procuring and managing projects of this magnitude.
- To protect and enhance the natural environment.
- To minimize greenhouse gas emissions and other pollutants.

Key Principles of PPP

In determining whether PPP is an appropriate procurement option for public infrastructure and services the Government applies the following key principles.

Value for Money

Achieving the best value for money in public services is the key consideration at all stages of a project's development and procurement. The project appraisal considers not only cost but also risks and service quality. The value for money is tested by comparing the costs at Net Present Value (NPV) of PPP proposals against a value for money benchmark as appropriate. The benchmark is usually an estimate of the costs of providing an equivalent service through the budgeting process or otherwise.

Public Interest

Consideration for public interest requires that:

- Public authorities should ensure adequate consultation with end-users and other stakeholders prior to the initiation of an infrastructure project;
- Private sector participants in a PPP project contributes to strategies for communicating and consulting with the general public, customers, affected communities, and corporate stakeholders, with a view to developing mutual acceptance and understanding of the objectives of the public and private parties; and,
- Private sector contractors in the provision of vital services to communities are usually mindful of the consequences of their actions for those communities and work, together with the public authorities, to avoid or mitigate socially unacceptable outcomes.

Risk Allocation

In practice, risks are allocated to the party best suitable to manage them. The allocation of risk therefore determine the chosen method of private sector involvement and allocation of responsibilities, which is based on an assessment of public interest.

Output Requirements/ Specifications

The formal agreement between the public authority and the private contractor is specified in terms of verifiable service standards to be provided on the basis of output or performance-based specifications. It contains provision regarding responsibilities and allocations of risk in the case of unforeseen events. In the case of the Zungeru 7000MW hydropower project concession, the output specification entails the construction, operation and maintenance of the dam, water hydropower plant and other facilities to achieve the maximum installed capacity of water supply, irrigation, electricity generation and evacuation based on acceptable capacity factor for the plant. The concessionaire is expected to minimize technical losses and ensure that the plant is properly maintained with upgrades as regular as appropriate.

Transparency

Transparency and openness are requirements of all government procurement, including PPP projects:

- Fiscal discipline and transparency must be safeguarded and the potential public finance implications of sharing responsibilities for infrastructure with the private sector fully understood;
- A sound enabling environment for infrastructure investment—which implies high standards of public and corporate governance, transparency and the rule of law, including protection of property and contractual rights—are put in place to encourage the participation of the private sector;
- Public authorities take effective measures to ensure public and private sector integrity and accountability and establish appropriate procedures to deter, detect, and penalize any anomaly accordingly;

- The awarding of infrastructure contracts or concessions is designed to guarantee procedural fairness, non-discrimination, and transparency.

Competition

The benefits of private sector participation in infrastructure is increased by effective competition and by ensuring that business activities are subject to appropriate commercial pressures, dismantling unnecessary barriers to entry, implementing, and enforcing relevant competition laws.

Capacity to Deliver

Authorities responsible for privately operated infrastructure must have the capacity to manage the commercial processes involved and to partner on an equal basis with their private sector counterparts, as and when the need arises.

Engaging with the Market

Projects to be procured within this policy must have the formal approval of the Federal Executive Council (FEC) before the involvement of the private sector. Public authorities communicate clearly the objectives of infrastructure policies and put in place mechanisms for consultation between the public and private sector partners regarding these objectives.

THE ZUNGERU HYDROELECTRIC POWER PLANT (ZHPP) PROJECT

Economic diversification has been a recurring mantra for Nigerian governments both past and present. There is a consensus of opinion that agriculture and stable power supplies are some of the key drivers of the economic diversification efforts. Incidentally, water from dams has proven to be at the center of both hydropower generation and enhanced all-year round agricultural production in the country. Nigeria possesses an abundance of water resources comprising of about 267.3billion cubic meters of surface water and 53 billion cubic meters of ground water, with over 200 dams in different locations across the country. A good number of these dams have great prospects for water supply, irrigation for agriculture and hydropower potentials. The Zungeru dam along the Kaduna River in Niger State can be classified into this category of dams in the country. The project has an installed capacity of 700MW, driven by the use of renewable resources of the Kaduna river. The Zungeru Hydroelectric Power Plant comprises;

- Reservoir at elevation of 230m,
- A concrete faced rock fill dam with a maximum height of approximately 113m,
- A concrete spillway equipped with four radial gates designed to pass probable maximum flood (PMF),
- A powerhouse located on the left bank dam toe containing four 175MW turbine/generating units for a total rated output of 700MW.

The 700MW ZHPP therefore, contributes to Sustainable Development Goal (SDG) 7 of clean and affordable energy for all by 2030, Sustainable Energy for All (SEfor4ALL), the Multi-Tier Framework for Energy Access (MTF), as well as support the Government of Nigeria climate change obligations under the Paris Accords/Agreement, with respect to promoting renewables and reducing carbon emissions.

Construction of the 700MW Zungeru Hydroelectric Power Plant (ZHPP)

The Federal Government of Nigeria (FGN) decided to construct the 700MW Hydroelectric Power Plant at Zungeru Niger State, to provide the much-needed sustainable power supply to Nigeria. The Zungeru hydropower project, located on the Kaduna River in Niger State, Nigeria, was built by a Chinese consortium comprising Sinohydro Corporation Limited and China National Electric Engineering Company.

The ZHPP which costs about \$1.3bn (₦162.9 billion), is the biggest power project completed in Nigeria in the past 10 years, and one of the biggest power projects in Africa to avail preferential loan facility from the Export-Import Bank (Exim Bank) of China. The project is designed to generate 2,630 GWh of energy with a total installed capacity of 700 MW. The main components of the Zungeru hydropower project include a 2,400m roller-compacted concrete (RCC) gravity feed dam, an underground powerhouse located behind the RCC dam, a tailrace channel, and two switchyards on both banks of the river.

Zungeru Hydroelectric Power project is part of the federal government efforts to arrest the issues of perennial power shortage and enhance industrial growth and green investment. The initial study for the feasibility was carried out in December 1983 by Messrs. Chas T Main International (USA), and another in 1991 by TORNIO, an Italian contractor. The final feasibility study was closely followed by the final engineering design issued in 1992 by consortium HIDROSERVE (Brazil) and APPIO (Italy), WADASCO (Nigeria). The Zungeru hydroelectric power project is of strategic importance to the power sector due to the urgent need to improve security of power supply to the nation. The capacity of 700MW was recommended based on the belief that the project contributes to the development of the national economy by supplementing the power production from other hydropower stations nationwide.

The scope of the contract included a topographical survey, the design and building of the main dam structure, as well as the construction of access roads and other ancillary infrastructure for the project. Kunming Survey and Design Institute, a subsidiary of China Hydropower Engineering Consulting Group (CHECG), was appointed to provide design and technical services for the project in March 2013.

The ZHPP was expected to provide the following benefits:

- a) The Project is geared to bridge the power supply deficit in Nigeria.
- b) The Project will contribute significantly to the National Power Supply thereby boosting economic activities in the country. In Nigeria, more than 30% of the production cost is spent on energy sources.
- c) The Zungeru Hydropower Project created job opportunities directly or indirectly to Nigerians at every stage of the Project.
- d) Zungeru hydropower plant facilitates efficient and cost-effective inland navigation, opening up new opportunities for trade and commerce along Nigeria's waterways.
- e) The Zungeru hydropower plant's integration of irrigation capabilities offers immense potential for agricultural development, ensuring a stable and reliable water supply for farmers in the region.

Key Policies for Development of Hydropower

The justifications for the development of hydropower have their foundation on these key policy imperatives:

- The nation shall fully harness the hydropower potential available in the country for electricity generation,
- The nation shall pay particular attention to the development of the mini and micro hydropower schemes,
- The exploitation of the hydropower resources shall be done in an environmentally sustainable and socially acceptable manner,
- Private sector and indigenous participation in hydropower development shall be actively promoted,
- Planned and ongoing large hydro projects such as Mambila, and Gurara II shall be accelerated and accorded higher priority, and

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- Multi-sectorial frameworks shall be designed and put in place to encourage the private sector to develop mini and micro hydropower schemes.

Key Objectives of Hydropower Development

The key objectives of hydropower projects include:

- To increase the percentage contribution of hydroelectricity to the total electricity generation and to ensure that a minimum contribution of 10% is maintained at all times from large and small hydros combined.
- To extend electricity to rural and remote areas, through the use of mini and micro hydro power schemes.
- To diversify the energy resource base and the mix between large, mini and micro hydro.
- To further contribute to remote and off-grid power development in Nigeria.
- To ensure minimum damage to the ecosystem arising from hydropower development.
- To attract private sector investments into the hydropower sub-sector.
- To develop socially acceptable and equitable hydro power.
- To ensure the safety and security of large and small hydro generating facilities

Key Strategies for achieving Hydropower Projects

The key strategies for achieving hydropower projects include:

- Establishing and maintaining multilateral agreements to monitor and regulate the use of water in international rivers flowing through the country,
- Ensuring increased indigenous participation and the application of gender mainstreaming in the planning, design and construction of micro, mini and large hydropower stations,
- Providing basic engineering infrastructure for the domestic manufacturing of components of hydropower plants, equipment and accessories,
- Encouraging the private sector, both indigenous and foreign, in the establishment and operation of mini and micro hydropower stations, under the Power Sector Reforms initiative,
- Providing basic hydro resource assessment, a national hydro prospecting tool, and feasibility analysis of opportunities across the country,
- Encouraging the private sector, both indigenous and foreign, in the local production of components of hydropower plants and accessories,
- Ensuring that rural electricity boards incorporate small-scale hydropower plants in their development plans,
- Promoting and supporting research and development activities for the local adaptation of hydropower plant technologies,

- Concluding studies and updating data on the hydro potential of our rivers and identifying all the possible locations for dams. The available data is hosted on the internet, to encourage prospective investors make an investment decision based on a portfolio of bankable projects, and
- Ensuring adequate security for all hydro power plants with respect to off- country sources of water supply.

CONCESSION OF THE ZUNGERU HYDROELECTRIC POWER PLANT (ZHPP)

With the electricity demand projected to grow to 213GW by 2040, the Federal Government of Nigeria has to rely on private sector investments, best practices and technology to close the projected demand gap. The realisation of the importance of private sector investment was demonstrated with the sale and privatisation of both the generation and distribution assets of the defunct Power Holding Company of Nigeria (PHCN) to private investors, with the fundamental changes to the ownership, control and regulation of the power sector as clearly outlined in the National Electric Power Policy (2002) and ultimately enshrined in the Electric Power Sector Reform (EPSR) Act of 2005.

The Kainji, Jebba, and Shiroro dams in Niger State and the Gurara Phase 1 dam in Kaduna State have combined 1,960MW of hydropower plants already successfully concessioned to private sector management. Similarly, the 136MW Manya project in Taraba State, the 182MW Bawarku hydropower project in Benue State, as well as the 40MW Itisi hydropower and multipurpose projects, are green field projects at various stages of concession by the Federal Ministry of Water Resources. The FGN had since the privatisation supported and encouraged private sector to take the lead in closing the gap in the electricity industry in the country. Government's efforts are geared towards incremental generation capacity enhancement using diverse sources of power.

Following a competitive bidding process by the Bureau of Public Enterprises, the FGN finally hands over Zungeru Hydroelectric power plant to the preferred concessionaire, Penstock Energy Limited, in February 2023.

The National Council on Privatisation (NCP), Nigeria's privatisation and commercialisation agency, had at its 7th meeting for the year 2020, held on 21st December 2020, approved the concession of ZHPP, with the intention that the proceeds of the concession of ZHPP will be used to repay the Chinese loan used in constructing the Power Plant.

The main objectives of the concession of Zungeru Hydroelectric power plant are to;

- ✓ Leverage private sector access to private finance and reduce reliance on government budgetary allocation to fund the Chinese loan.
- ✓ Efficiency and better facility management (maintenance) culture that will ensure longevity of the Infrastructure of the Zungeru Hydro Plant.

Consequently, upon NCP's approval, the Bureau of Public Enterprises (BPE) published the Request for Qualification (RfQ) for the concession of ZHPP. This was communicated through three (3) national dailies namely Thisday, Business Day & Daily Trust Newspapers, on Thursday 27th October 2022. Upon the completion of this process, a total of eleven (11) submissions were received from prospective investors at the submission deadline of 2:00pm on Thursday 24th November 2022.

Subsequently, the RfQs were evaluated, and three (3) prospective bidders were prequalified. A Request for Proposal (RfP) was issued to each of them on Tuesday 17th January 2023. The prequalified prospective bidders are listed below:

1. Africa Plus Partners Nigeria Limited Consortium (APPNLC)
2. Mainstream Energy Solutions Limited (MESL), and;
3. North-South Power Consortium (NSP)

At the conclusion of the bidding process, Mainstream Energy Solutions through its Special Purpose Vehicle (SPV), Penstock Energy, emerged the winners of the process and were deemed the preferred concessionaires for the ZHPP.

Upon completion of the transaction, the concession agreement was signed by the BPE and concessionaire, Mainstream Energy Solutions Ltd (MESL) through Penstock Limited, its Special Purpose Vehicle (SPV).

Following the execution of the Concession Agreement (CA), and after 15 working days in line with the CA, payment of the first tranche 50% of the commencement fee of **N67,271,848, 712.67** (Sixty-Seven Billion, Two Hundred and Seventy One Million, Eight Hundred and Forty Eight Thousand, Seven Hundred and Twelve Naira and Sixty Seven Kobo Only) was made on 6th January, 2024 by Penstock Limited.

The ZHPP transaction is another example of the desire of the Federal Government of Nigeria (FGN) to engage the services of a competent Private Investor as a concessionaire to operate, maintain, manage and then transfer the 700MW Zungeru Hydroelectric Power Plant under an Operation and Maintenance (O&M) concession arrangement that reverts these rights to government after a 30-year period. The government has made an effort to increase private sector and foreign investor participation in the electric power sector by commissioning independent power producers (IPPs) to generate electricity through the privatisation and by soliciting investors for the construction of new power plants.

The 30-year Operate, Maintain, Manage and Transfer (O&M) concession for the 700MW hydroelectric power plant was recommended for the following reasons:

- It is in tandem with existing policy and legislative framework which approved concessions as model for private sector's involvement in the nation's infrastructure development and operations.
- The concession period takes into consideration the payback period for the concessionaire and their projected profit. It also takes into consideration priorities of the Operation and Maintenance, project lifecycle and the minimum 18 months' rehabilitation period needed to restore the facility to its best state before handover back to government.
- The Federal government through the relevant MDAs retains the ultimate ownership of the assets but transfers all the financial and operational risks to the concessionaire.
- The concession of the power assets does not contravene with the ownership of the water bodies as the water resources is still in the hands of the government.

CONCEPTUAL FRAMEWORK AND STRUCTURE OF THE ZHPP CONCESSION

The ZHPP concession was structured as a PPP under an Operate, Maintain and Management framework. The FGN retains absolute ownership of the asset, while management and commercial operations are transferred to a private entity (Penstock Energy Limited), for a given period of time. The whole essence of the initiative is to ensure operational efficiency, proper maintenance and above all, grid stability.

Penstock Limited (the concessionaire) pays the FGN through BPE an annual concession fee of \$70 million over a 30 year period, which is expected to yield an estimated \$2.1 billion for the Nigerian government. The fee will be used in defraying the China Exim Bank's preferential loan used in constructing the facility.

As highlighted earlier, the 700MW of the ZHPP will be generated by four 175MW turbines, designed to inject 2.64 billion kWh of electricity into the National Grid and this would roughly met 10% of the country's domestic energy needs. Beyond power generation, the facility could be used for irrigation, water supply and fish breeding.

KEY BENEFITS OF THE CONCESSION OF ZUNGERU HYDROELECTRIC POWER PLANT

The concession of the 700MW Zungeru Hydroelectric Power Plant to Penstock Limited (a subsidiary of Mainstream Energy Solutions Limited) has brought about substantial benefits to Nigeria. These includes the following;

- a) Leveraging private sector access to private finance: The concessionaire pays the Federal Government of Nigeria an annual concession fee of \$70 million and 5% royalties. The concession fees is expected to yield an estimated \$2.1 billion in total revenue over the 30-year term.
- b) Reducing reliance on government budgetary allocation to fund the China Exim Bank loan and day to day management/maintenance of the power plant: The loan agreement with the China Exim Bank envisaged that the funds realised from the operations of the ZHPP are to be transferred to the China Exim Bank towards the repayment of the loan used in constructing the power plant. This effectively transferred the financial burden of maintaining the complex away from government budgets while helping to indirectly backstop the \$1.3 billion Exim Bank of China loan used for construction.
- c) Efficiency and better facility management culture that will ensure longevity of the infrastructure: Private management injects specialized innovation, operational technical know-how, and strict maintenance regimes typical of seasoned industry players.
- d) Optimized National Grid Injection: Commercial operators ensure maximum uptime, driving the facility to steadily generate its estimated 2.64 billion kWh annually to cover roughly 10% of Nigeria's domestic energy needs.
- e) Synergy with Existing Infrastructure: Mainstream Energy Solutions already successfully manages the nearby Kainji and Jebba hydropower plants, allowing shared institutional expertise and better-integrated grid infrastructure management.
- f) Environmental and Regional Development Sustained Clean Energy Capacity: Private sector proficiency safeguards the plant's zero-carbon footprint, directly contributing to Nigeria's Energy Transition Plan and net-zero targets.
- g) Flood and Agricultural Control: Professional management of the dam's massive 10.4 billion cubic meter reservoir guarantees stable flood control and dependable downstream irrigation for over 5,000 hectares of farmland.
- h) Local Economic Transformation: Private investments catalyze surrounding agricultural processing zones, improve fish-breeding infrastructure, and create long-term local employment opportunities across Niger State.

KEY CHALLENGES OF THE ZUNGERU HYDROELECTRIC POWER PLANT CONCESSION

The following are some of the key challenges that requires immediate attention and are critical to the efficient operation and management of the ZHPP power plant.

Some Outstanding Issues Before and After Commissioning Activities of the Power Plant, which are critical components for the success of the concession. These activities remain outstanding despite their significance to the concession. Several gaps were identified during negotiations with the Preferred Concessionaire of ZHPP. These gaps, which require further clarification and resolution, were categorized into three key areas: Environmental, Outstanding Issues before commission activities, and Outstanding Issues after commission activities. Addressing these gaps is essential to ensure efficient operations and the full evacuation of power from the ZHPP plant.

- a) Reconciliation of the survey plan with that of the Niger State Government's land registry to resolve the land size discrepancy (2,500 ha vs. 6,000 ha) and confirm which area relates to outstanding payments.
- b) Issues concerning the As-Built Drawings and Operational Manuals.
- c) Status of outstanding compensation to affected communities.
- d) Pending documentation for the alternate access road, including; Right of Way declaration, ESIA revalidation, and Reconciled survey plan.
- e) Construction of a new 118km 330KV Double Circuit Transmission Line to Millennium City, Kaduna State and Power evacuation facilities for ZHPP.
- f) Bus Extension at the Triple Point Switching Station in Mararaba, Niger State to accommodate the additional power coming from the Zungeru Hydropower Station.
- g) Completion of the 25km 132KV Zungeru-Tegina transmission line and bay extension at the Tegina transmission substation.

Grid Collapse and Load Rejection: Grid failures have become a defining feature of Nigeria's electricity sector. Nigeria Electricity Regulatory Commission (NERC) data showed that between 2010 and 2022, the country suffered at least 222 partial and total collapses, while reports document 12 more across 2024 and 2025. The 700 megawatt plant often underperforms. The national grid struggles to take all the power that the ZHPP generates, causing local blackouts.

Poor Market Remittances: Power despatched from ZHPP must pass through the national grid, where low distribution company (Disco) remittances and limited grid wheeling capacity often delay the revenue flow down to the market. This often affects the concessionaires ability to carry out other essential services to support their operations.

Host Community Disputes: Displaced residents from the dam site have faced unpaid compensation, poor resettlement plans, and environmental conflicts.

RECOMMENDATIONS ON THE WAY FORWARD FOR THE SUSTAINABLE OPERATION OF THE ZUNGERU HYDROELECTRIC POWER PLANT (ZHPP) CONCESSION.

1. The outstanding issues or gaps identified before and after the commission activities must be immediately resolved to ensure sustainable operation of the concession. It is worthy to note that most of these outstanding issues highlighted above are critical to the successful operations of the concession. Consequently, government and the concessionaire should take all necessary steps to ensure that these issues are handled urgently.
2. Secondly, the compensation issue though part of these outstanding activities, it is essential that both Niger State government and Federal government of Nigeria find a more palatable means of resolving this matter as soon as possible. This is to grant the concessionaires unfettered asses to the hydro power plant to avoid any future encumbrances.
3. Adequate funding to ensure that loan repayment to the China Exim Bank is not in any way delayed. Considering the fact that the signed agreement with the Chinese does not envisaged any delay in repayment, government must at all times ensures that there are extra resources to fund the loan account.
4. The incessant Grid collapse which have become a defining feature of Nigeria's electricity sector, must be addressed by the FGN, otherwise the power plant will continue to suffer from inability to evacuate power generated from the brand new 700MW plant.

5. Finally, the issue of poor market remittances should be aggressively addressed to ensure the financial viability of the whole value chain.

CONCLUSION

Based on our earlier discussions, it is obvious that without adequate infrastructure, the Nigerian economy may not be able to overcome its structural challenges and achieve sustainable growth and development. It will, therefore, be worthwhile for the Nigerian government and policymakers to implement policies geared towards the development of infrastructure. PPPs offer Nigeria a dependable and sustainable funding option, increased accountability, accelerated infrastructure provision and faster implementation of projects. Nigeria's huge infrastructure deficit is an opportunity to partner on a win win basis with the private sector in virtually all economic and social infrastructure spaces. One of the biggest obstacles to the effective implementation of PPPs is the lack of local talent in the area of technical and structuring competence. The result is often a vehicle which is top heavy with international advisers, and perhaps more complex structures, often impacting negatively on implementation. A good project development and preparation is therefore key to the effective implementation of PPPs..

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