

Harnessing the Advantages of Local Crude Oil Refinery to Solve the Fuel Crisis in Nigeria

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Abstract

The Nigerian refineries have a nameplate capacity of 445,000 barrels per day and are located in three different states around Nigeria: Rivers, Delta, and Kaduna. The daily demand for petroleum products to power various machines in Nigeria is estimated to be 8 million liters. This daily consumption is challenged by frequent price increases and the scarcity of the commodity. The fuel crisis in Nigeria has persisted as a recurrent challenge, impacting various sectors of the economy and the lives of its citizens. The gasoline crisis is characterized by scarcity, long queues at filling stations, and economic disruptions. This crisis stems from a combination of factors spanning from inadequate infrastructure to policy inconsistencies. Nigeria, despite being an oil-producing nation, lacks adequate refining capacity, leading to heavy dependence on fuel imports and susceptibility to fluctuations in global oil prices. Using the method of philosophical analysis, the paper argues that the adoption of local-centric refineries will reduce the cost of production, create job opportunities, and reduce the importation of petroleum products. Furthermore, it will also reduce the negative effects of scarcity and price increases on the economy and the citizens. The local technology for refining petroleum products is practiced by the native inhabitants of Nigeria, and it constitutes a significant part of the country's cultural heritage, but it does not receive much attention in Nigeria due to its environmental impact and the lack of political will to implement indigenous technology. The study concludes that local refineries could help solve the petroleum crisis in Nigeria.

Keywords: Native Centric Refinery, Biafra, Drum, Cultural Heritage, Crude Oil

Introduction

For more than ten years now, the Nigerian refineries have been cash cows for corrupt officials, who benefitted more from importing fuel than refining it at home. Gasoline increased the prices of goods, resulting in inflation. This has affected the growth rate

of the Nigerian economy.¹ The three major hi-tech refineries are located in Warri, Port-Harcourt, and Kaduna, yet none of these refineries could function effectively to meet the daily need for petroleum products in Nigeria. The estimated daily demand for petroleum products in Nigeria as of 2010, which are: petrol (30 million liters); dual-purpose kerosene (10 million liters); and diesel (1.8 million liters), is expected to grow.² Despite having a nameplate limit that should take care of local demand, Nigeria still imports over 80% of refined products to meet its present needs.³ The non-functioning of these refineries has led to scarcity, and an indiscriminate increase in the price of the commodity has destabilized economic and industrial activities in recent years. Furthermore, the Nigerian government has been spending billions of dollars to maintain these existing refineries, sending crude oil abroad to refine and return the refined product to Nigeria. Currently, most of Nigeria's domestic petroleum product needs are met through importation, as the domestic refineries are not capable of supplying enough to meet the ever-growing demand.⁴⁻⁵

The act of shipping crude oil abroad and importing refined products to Nigeria has led to an increase in the cost of production, and it massively drains scarce foreign exchange reserves. It also leaves consumers at the mercy of global oil price volatility and dependent on foreign suppliers. Subsidies on gasoline prices cost the government billions of dollars annually, and the cost of loading and offloading, including the exchange rate of the international market, are challenges in the

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1. O.C. Kidochukwu, "The Effect of Shortage in the Supply of Premium Motor Spirit (Fuel Scacity) On Socio-Economic Activities of Citizens in Nigeria" *Journal of Academic Research in Economics*, 1 (2016).
 2. A.H. Isa, S. Hamisu, H.S. Lamin, M.Z. Ya'u, and J.S. Olayande, "The perspective of Nigeria's projected demand for petroleum products." *J Petrol Gas Eng.* 4, no. 7, (2013): 184–187
 3. U.C. Okokpuije, E.T. Okonkwo, K. Akinlabi, Okokpuije, and A. A. Atayero, "Selection of a Perfect Location for Establishing Crude Oil Refinery in the Niger Delta, Nigeria" *Journal of Physics: Conference Series*, 13, no. 3, (2019) Conf. Ser. 1378 032100 DOI 10.1088/1742-6596/1378/3/032100
 4. Isa et al, "The perspective of Nigeria's projected demand for petroleum products."
 5. Isa et al, "The perspective of Nigeria's projected demand for petroleum products."

petroleum industry.⁶ The effects of the fuel crisis include the loss of man-hours and the rising cost of living as transport fares and the prices of foodstuffs increase on a daily basis. Fuel is one of the major dynamic forces in the economy, so a price change will cause economic ripple effects on businesses because the majority of them require fuel, which affects their operating costs.⁷ Petrol scarcity has led to post-traumatic stress disorder (PTSD) among the citizens. PTSD reawakens traumatic memories linked to fuel scarcity and the increase in the price of commodities, creating depression and anxiety.⁸

Nigeria's gasoline problem has continued to be a persistent issue, affecting many aspects of the country's economy and people's daily lives.⁹ This problem, which is typified by a lack of fuel, lengthy lines at gas stations, and economic disruptions, is the result of a number of issues, including inconsistent policies and inadequate infrastructure.¹⁰ Decades of underinvestment in infrastructure, including refineries, pipelines, and storage facilities, exacerbate supply chain disruptions, contributing to the persistent scarcity of fuel.¹¹ Inconsistent government policies, particularly in fuel subsidy regimes and pricing mechanisms, create uncertainty in the market, discourage investment in the sector, and perpetuate inefficiencies in the distribution system.¹² The Nigerian National Petroleum Corporation (NNPC) faces challenges

6. Isa et al, "The perspective of Nigeria's projected demand for petroleum products."

7. The Long Wait for Nigeria's Oil Refineries Continues (Leadership Newspapers, 2024). <https://leadership.ng/the-long-wait-for-nigerias-oil-refineries-continues/>

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11. Khalid Siddig, Angel Aguiar, Harald Grethe, Peter Minor, and Terrie Walmsley. "Impacts of Removing Fuel Import Subsidies in Nigeria on Poverty." Energy Policy 69 (2014): 165-178

12. Alexander Farrell, Hisham Zerriffi, and Hadi Dowlatabadi. "Energy Infrastructure and Security." Annu. Rev. Environ. Resour. 29 (2004): 421-469.

such as corruption, inefficiency, and infrastructure deficits, which hinder its effectiveness in the oil and gas sector. Punch, citing the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), reported that the country's production output in September 2023 was about 14 percent higher than what it pumped in the preceding month of August 2023.¹³ The data from the NUPRC indicated that in September, Nigeria's crude oil production (excluding condensates) was precisely 1,346,562 barrels per day, which was a 165,429 bpd increase compared to the 1,181,133 bpd produced in August this year¹⁴. Further analysis of figures obtained from the NUPRC indicated that in January, February, and March, the country's oil outputs were 1,266,659 bpd, 1,292,240 bpd, and 1,266,737 bpd, respectively.¹⁵ However, Nigeria heavily relies on imported petroleum products due to its inadequate capacity to meet domestic needs. Strengthening local petroleum refineries could alleviate these challenges by promoting self-sufficiency, reducing import costs, and fostering economic growth through job creation and industrial development. Additionally, corruption within the oil sector, including fuel smuggling and diversion, undermines efforts to address the crisis and perpetuates supply shortages.

Moral implication of Fuel crisis

The fuel crisis disproportionately affects the most vulnerable segments of society, leading to increased transportation costs, inflationary pressures, and disruptions to businesses and daily life. Young people, including children, suffer disproportionately due to inflationary pressures, which ease the impact of the rising cost of rain, disruptions to trade, and high food prices.¹⁶ This poses several moral

13. Masami Kojima. "Fossil Fuel Subsidy and Pricing Policies: Recent Developing Country's Experience." *World Bank Policy Research Working Paper* 7531 (2016).

14. <https://punchng.com/oil-production-hits-1-35million-barrels-day-highest-in-2023/>

15. <https://punchng.com/oil-production-hits-1-35million-barrels-day-highest-in-2023/>

16. <https://punchng.com/oil-production-hits-1-35million-barrels-day-highest-in-2023/>

implications that extend beyond mere economic and environmental concerns. It creates a moral dilemma as it exacerbates existing inequalities, making basic necessities less accessible to those who are already struggling. Prolonged fuel shortages often result in increased reliance on alternative energy sources, such as generators, contributing to environmental degradation and health hazards.¹⁷ Also, politicians in Nigeria captured the scarcity and increase of petroleum products to advance their political careers. The distribution of resources becomes a pressing issue during a fuel crisis. Wealthier nations often have better access to alternative energy sources or can afford the rising prices of fuel, while poorer nations may face severe shortages leading to humanitarian crises. Addressing these disparities requires a global perspective and a commitment to justice.¹⁸ Kidochukwu maintained that

The burden of fuel scarcity is borne more by the poor, thereby increasing their suffering and their poverty level. Price hikes in fuel had led to an increase in the transportation cost of goods and, in turn, increased the prices of goods, resulting in inflation. These had affected the growth rate of the country.¹⁹

The reason for the non-functioning of the three existing refineries in Nigeria has been attributed to corruption among the political class. Native-engineering is the way to maintain existing refineries. Nigeria must stop relying on imports of refined oil or the race to build the biggest refinery using foreign technologies. Instead,

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17. Nicola Jones, Nicola, Caroline Harper, Sara Pantuliano, Sara Pavanello, Kim Kyunghoon, Shreya Mitra, and K. Chalcraft. "Impact of the economic crisis and food and fuel price volatility on children and women in the MENA region." Overseas Development Institute (ODI) Working Paper 310 (2009).
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 19. S.S. Akpan and M. Nnamseh. "Managing the Risk of Petrol Scarcity in Nigeria: A Test of the Efficacy of Strategic Management Approaches". *Global Journal of Human-Social Science Research*, 1, no.5, (2014): 24-38.

native-centric refineries should be seen as a way to address fuel scarcity and prevent indiscriminate price increases. Fuel crises often result from overconsumption and reliance on non-renewable resources, contributing to climate change and environmental degradation.²⁰ Addressing these crises ethically involves transitioning to sustainable energy sources and reducing carbon emissions to mitigate the impact on future generations. However, the failure to fix the Nigerian refineries over these years was a strategy problem. Nigerians can only fix crude oil refining by acquiring the technical know-how and organic capability to locally fabricate, locally assemble, and locally install all components of refineries, leveraging indigenous capability. Nigeria and Nigerians possess and control the necessary knowledge; possession of crude oil as a natural gift within its geographical boundary will no longer be an obligatory requirement in the nation's quest to fix its energy needs and export the surplus^{21,22}. This study is an appraisal of local-centric refineries as a panacea to the fuel crisis in Nigeria. Applying the local method of petroleum refining would entail scrutinizing the process, its underlying principles, and its implications from a philosophical perspective.²³ Philosophical analysis would lead us to questions like what the essence of petroleum refining is. Is it merely the transformation of crude oil into usable products, or does it entail deeper philosophical implications about human interaction with the environment and technology? Is it morally justifiable to exploit natural resources for human benefit, considering the environmental consequences and societal impacts of the local refineries for petroleum products? Examining these philosophical dimensions, one

20. Kidochukwu, "The Effect of Shortage in the Supply of Premium Motor Spirit"

21. A. Oluwayomi. 'Why Nigeria Must Build Indigenous Capacity on Refinery Construction' (2023) <https://guardian.ng/news/why-nigeria-must-build-indigenous-capacity-on-refineries-construction/>

22. O. Chike. NNPC States Why it Failed to Fix Refineries and Build a 200,000-Capacity Refinery (2020) <https://nairametrics.com/2020/06/14/nnpc-states-why-it-failed-to-fix-refineries-to-build-200000-capacity-refinery/>

23. Oluwayomi. "Why Nigeria must build indigenous capacity on refinery construction"

can gain deeper insights into the local method of petroleum refining and its broader implications for society, the environment, and human existence.

Local Crude Oil Refinery

It is no longer news that the Nigerian military has been burning down illegal refineries in the Niger Delta without tapping into the experience of the illegal miners. The Biafra method of refining petroleum products during the war is popularly known as the "Artisanal Petroleum Refinery" (APR).²⁵ Artisanal Petroleum Refinery" uses rudimentary equipment to process or refine crude oil into different products. APR is rampant in the Niger Delta area of Nigeria, and its activities maybe outside the boundaries of Nigerian legal law but the indigenous technology helps refine different petroleum products, including gasoline, automated gas oil, and kerosene.

Typically, the method used by the native-centric refinery is comparable to the one used by illegal refineries. It is a manual form of fractional distillation where different components of crude oil (gas, Premium Motor Spirit (PMS), kerosine, diesel, and the residuals) are extracted at different temperatures.²⁵ Emmanuel maintained that the local method of refining petroleum products includes: Pouring crude oil into the cooking pot and heating it using crude oil as fuel, when the crude oil is heated for a while at a controlled temperature, which the older engineers in the team usually monitor, vapor will rise through the pipe connected to the cooking pot into a tank. The cooling tank is usually some meters away from the tank.²⁶ The drum is a heavily built tank that is heated from below, powered by crude oil, making the heat steadier

24. Glory R., M.O. Raimi, S. Izah and A.A. Iyingiala, "Public and Environmental Health Implications of Artisanal Petroleum Refining and Risk Reduction Strategies in the Niger Delta Region of Nigeria," *Journal of Biological Research & Biotechnology*, 21 (2023).

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26. <https://neusroom.com/whats-left-to-be-said-about-the-civil-war -this-veteran-tells-story-of-how-land-locked-biafran-soldiers-refined-crude-oil/>

and easier to control. Under high temperatures and pressure, vapors are released, rise through a pipe (or series of pipes) connected to the cooking pot, and then condense into another tank where they cool. In the end, different components of crude oil are released at different temperatures. The first product is gas, followed by PMS (petrol), kerosene, and diesel. The production process lasts for nearly a day.²⁷ Onakpohor et al. state that crude oil is allowed to sit for 3 hours in a storage tank. This process allows for the separation of the crude oil into various components, such as gasoline, diesel, and other petroleum products, providing economic opportunities and utilizing local resources.

There are also environmental concerns associated with this type of operation.²⁸ The local refineries require few personnel, a low capital outlay to set up, and easy-going business for local private investors. The indigenous experience of refining petroleum products is a deliberate transition of cultural heritage, accumulated knowledge, values, and skills from one generation to another.²⁹ It is a continuous reconstruction of experience and an adjustment to reduce the negative impact it has on the environment. Local oil refineries could play a significant role in addressing some of these issues by providing alternative refining capacity. Many local refineries suffer from poor maintenance practices, resulting in low operational efficiency and frequent breakdowns. Local refineries often lack the necessary investment for modernization and expansion, limiting their capacity to meet domestic demand and compete in the global market. Some local refineries struggle due to a lack of government support, including policies and incentives to promote

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27. <https://newsroom.com/whats-left-to-be-said-about-the-civil-war -this-veteran-tells-story-of-how-land-locked-biafran-soldiers-refined-crude-oil/>
 28. A. Onakpohor, B.S. Fakinle, J.A. Sonibare, M.A. Oke, and F.A. Akeredolu. "Investigation of Air Emissions from Artisanal Petroleum Refineries in the Niger Delta, Nigeria". *Heliyon*, 6, no.11, (2020).
 29. I.M. Osebor and B.P. Irabor. "The Role of Metaphysics in the Development of Native-Centric Education". *Oracle of Wisdom, Journal of Philosophy and Public Affairs (Owijoppa)*, no, (2023).

their development and viability.³⁰ Local refineries may not adhere to stringent environmental regulations, leading to pollution and environmental degradation in surrounding areas. To address these issues and maximize the role of local oil refineries as an option, the Nigerian government and NNPC need to prioritize reforms aimed at improving transparency, reducing corruption, and promoting investment in infrastructure and technology. Additionally, supportive policies and incentives should be put in place to encourage the sustainable development and operation of local refineries while also ensuring compliance with environmental standards.

The environmental effects of the native-centric refinery are acknowledged, but the indigenous method of refining petroleum products could be beneficial to solving the problems of the scarcity of petroleum products in Nigeria if improved upon. The traditional technique is deeply rooted in the cultural and environmental context of the indigenous communities, which reflects their understanding of local ecosystems and tapping the natural resources of the environment. It constitutes an important part of their cultural heritage and should therefore be protected against exploitation by industrialized countries. Emmanuel captured Chinua Achebe's book entitled *"There Was a Country,"* where he mentioned that European oil companies insisted that oil-industry technology was so complex and that the Igbos would never, in the next five hundred years, be able to figure it out. We knew that wasn't true. Igbos during the war learned to refine their oil during the two-and-a-half years of the Biafran struggle. The Igbos were able to demonstrate that it was possible for African people to refine crude oil entirely on their own using indigenous technology in the form of a native-centric refinery.³¹ This technology is a comparative advantage for Nigeria, as

30. Christopher Ehinomen and Adepoju Adeleke. "An assessment of the Distribution of Petroleum Products in Nigeria." *E3 Journal of Business Management and Economics* 3, no. 6 (2012): 232-241.

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it is efficient and cost-effective, utilizing local raw materials from the beginning to the finished product that prioritizes the interests, needs, and involvement of indigenous or native communities in its operations and decision-making processes. This approach recognizes the historical injustices; environmental protection and management faced by indigenous peoples in resource extraction industries and seeks to rectify these issues by centering their perspectives, rights, and well-being⁻⁻³²⁻

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Conclusion

Indigenous technology focuses on how the past could shape the future through the promotion of cultural heritage and securing sustainable energy development in the 21st century to resolve the impasse of the fuel crisis in Nigeria. Native-centric refineries, if implemented, will be one of the vehicles employed for sustainable energy and the promotion of cultural values. The study concludes that a native-centric refinery is urgently needed in the mainstream of the petroleum industry, and it is a valuable tool that ensures the development of indigenous capacity in Nigeria to attain energy sufficiency and boost its economic potential.

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