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Gas Plant Operations and Electricity Supply in Utorogun: Catalyzing Industrial Growth and Economic Development of the Host Communities

Atake Odjuvwuedewe John, Ph.D.
Department of General Studies
Federal Polytechnic Orogun
Email: atake.odjuvwuederie@fepo.ed.ng

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ABSTRACT

This research explores the operations of the Utorugun Gas Plant in Ughelli South Delta State, Nigeria and how the provision of electricity to its host communities stimulates industrialisation and enhances economic activity. The research highlights challenges being faced by the communities, including limited access to electricity, underdeveloped gas infrastructure and scanty industrial activities. Electricity supply is a key enabler of small and medium enterprises (SMEs), agro-processing, and other value-adding industries in the surrounding communities. In addition to direct employment, the presence of the gas plant ought to trigger infrastructure development, improve livelihoods, and encourage a public-private partnership focus on community development. It criticises the mechanism and pattern of electricity distribution that denies the host communities electricity supply from the power and energy being generated in these communities. The refusal of the gas plant to step down power through a gas turbine, and distribute electricity generated from the gas plant to the communities, hinders the industrial growth in Utorugun, Otughievwen and Otor-Udu, as well as the impacted Communities. The inefficient power supply has limited investments, job creation, business expansion, and socio-economic progress, in addition to stifling the broader economic contributions that could be realised at the national level from optimised energy sector operations. Recommendations are for improved policy frameworks, sustainable energy use, and stronger collaborations between stakeholders to ensure that the economic benefits are maximised and evenly distributed.

Keywords: *Utorugun Gas Plant, gas plant operations, electricity supply, economic development, host communities*

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INTRODUCTION

Urhoboland is one of the leading producers of Natural Gas in the Western Niger Delta (Urhobo Foundation, 1998). The establishment of major gas-based industries in Urhoboland attests to the abundance of natural gas reserves in the area. The gas-based facilities include Otorogu Gas Plant, Otu-Jeremi. It is the largest gas-processing plant in Sub-Saharan Africa. It processes Natural Gas for the Utorogu-Escavos-Lagos gas pipeline, the Egbin thermal Station in Ikorodu, the Shagamu Cement Factory, Industrial Estates in Ikeja, Ogba and Ilupeju in Lagos and Agbara in Ogun State. The gas also supplies the West African Gas Project, Nigerian Gas to the Benin Republic, Togo and Ghana. It is proposed that the gas pipeline will be extended to Cote d'Ivoire, Liberia and Sierra Leone. Under the National Gas Master Plan, the pipeline network has been primed to deliver gas to all major cities and industrial zones in the Federation.

The two power stations at Ughelli and Ogorode, respectively that supply electricity via the national grid to different parts of Nigeria are located in Urhoboland. The Delta Power Station 1-IV was originally commissioned in1966; the station supplies electricity to Benin, Lagos. It is a gas-fired thermal electricity station in South-Western Nigeria. Similarly, the Ogorode Power Station, which was commissioned in 1978, feeds major Nigerian cities and large-scale electricity consumers via the National grid. Electricity supply from the station was stepped down for consumers in Sapele and environs only in 2007.

This study examines the economic and industrial impact of the Utorugun Gas Plant's operations and electricity supply to its host communities. As a vital energy infrastructure, the Utorugun Gas Plant contributes significantly to national power generation while directly enhancing the socio-economic conditions of its surrounding communities through improved energy access. The paper investigates how a consistent electricity supply can spur local industrial growth, support entrepreneurship, create employment opportunities, and improve public service delivery. Furthermore, it assesses the role of gas infrastructure in stimulating investments and facilitating inclusive development within the Niger Delta region. Watts (2004) provides a critical examination of the "resource curse" in the Niger Delta, arguing that without inclusive development frameworks, energy infrastructure may exacerbate inequality and conflict. While recognising the economic potential that can be unlocked by the gas plant, the study also addresses key challenges such as environmental sustainability, equitable resource distribution, and governance gaps in stakeholder engagement. The findings underscore the importance of strategic energy infrastructure in driving grassroots development and its multiplier effect on national economic performance.

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Problem Statement

There is inadequate access to electricity by the host communities despite proximity to the gas plant. The insufficient electricity supply is largely responsible for the host communities' inability to set up local industries and lack of industrial productivity as a means of livelihood. The dearth of infrastructure has hindered the growth of small and medium enterprises (SMEs), as well as local manufacturing industries. Similarly, the lack of industrial stimulation has limited the community members of employable age, thus making them unemployed or underemployed. In the distribution of benefits, communities have not been considered in the decision-making process by the company, resulting in a disconnection between the government, the gas plant management, and the communities. The solutions identified by the research include a reliable electricity supply to the host communities, for a direct and affordable supply of electricity from the Utorugun Gas Plant. The energy will promote industrial and economic activities, stimulate small-scale industries, agro-processing, recycling and other entrepreneurial ventures. The rise of local industries will boost the standard of living and contribute to the national economy.

The Utorogun Communities are endowed with significant natural gas resources that necessitated the establishment of gas plant operations. However, the host communities have faced challenges, such as limited access to electricity, underdeveloped infrastructure, and low levels of industrial activity. The disconnection between resource wealth and local development raises critical questions about the effectiveness of current gas utilisation strategies and electricity supply mechanisms.

The mechanism and pattern of electricity distribution whereby the host communities do not get an electricity supply from the energy and power being generated in these communities is unacceptable. The inadequate distribution of electricity generated from the gas plant hinders the potential for industrial growth in Utorugun and its environs. The inefficient power supply has limited job creation, business expansion, and socio-economic progress, in addition to stifling the broader economic contributions that could be realised at the national level from optimised energy sector operations. There is therefore a need to critically evaluate how gas plant operations and electricity supply in Utorugun can better serve as catalysts for industrial development, improve living standards in host communities, while contributing meaningfully to Nigeria's overall economic growth.

This study aims to assess the role of gas plant operations and electricity supply in Utorugun, while promoting industrial growth, enhancing economic development in the host communities. The specific objectives are:

1. To evaluate the current state of gas plant operations in Utorugun through capacity analysis, output, and operational efficiency of the gas plant.
2. To examine the distribution and reliability of electricity supply from the gas plant in Utorugun.

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3. To assess the impact of electricity supply on industrial development by identifying existing industries and the potential for new industrial ventures to be driven by improved power supply.
4. To analyse the socioeconomic effects of the gas plant operations on employment rates, income levels, infrastructure development, and quality of life in the communities
5. To determine the contribution of Utorugun's gas operations to Nigeria's national economy. Quantify contributions in terms of energy supply, revenue generation, and national industrialisation goals.
6. To identify challenges and policy gaps hindering optimal benefits from the gas plant operations and electricity supply by providing insights into regulatory, infrastructural, and socio-political barriers.

Literature Review

Natural gas plays a crucial role in the energy mix, with gas processing plants being key components of the energy infrastructure. The Utorugun Gas Plant, located in Delta State, is one of Nigeria's significant natural gas processing facilities. Gas plant operations facilitate electricity generation and supply, which are crucial for both local industrial activities and national economic growth. According to Adewuyi et al. (2020), natural gas development in Nigeria bridges the energy access gap and improves electricity reliability. Similarly, Iledare (2007) notes that gas utilisation projects serve as catalysts for economic transformation when properly integrated into national development plans.

Gas-based electricity supply and industrial development of the Utorugun host and impacted communities are at the heart of this research. The availability of gas-fired electricity influences industrial productivity. Akinbami et al. (2003) argued that access to reliable electricity is essential for industrial competitiveness, particularly in energy-intensive sectors. The proximity of industrial activities to gas plants like Utorugun enhances energy security, reduces transmission losses, and encourages the development of local economies. Furthermore, Oyedepo (2012) highlights that electricity supply challenges in Nigeria have historically hindered industrial expansion, and gas infrastructure investments can reverse this trend.

The host and impacted communities, corporate social responsibility, and economic development are knitted issues with questions whose answers shall be provided by this research. Gas operations impact host communities in multiple ways,through employment, infrastructure development, and social investment. The Utorugun area, as a host to significant gas operations, has seen mixed outcomes from such projects. Idemudia (2010) opines that corporate social responsibility (CSR) practices of oil and gas firms have been insufficient in fostering true development in the Niger Delta communities.

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The national economic impact of gas-based industrialisation cannot be overemphasised. The strategic use of natural gas can significantly improve macroeconomic indicators through energy exports, job creation, and industrial development. Okonkwo et al. (2015) assert that natural gas is underutilised in Nigeria, and its potential for enhancing GDP and reducing poverty is largely untapped. Obi and Okwechime (2011) examine the implications of energy sector reforms and argue that a consistent gas supply for electricity generation is critical for Nigeria to become an industrialised economy.

The gas industry operates within a policy and regulatory context. Eboh et al. (2012) state that coherent policy frameworks are needed to ensure that gas infrastructure projects, like Utorugun, contribute to inclusive national development. The Nigerian Gas Master Plan (NGMP) and associated policy instruments were designed to promote domestic gas utilisation, particularly for power generation and industrial use. Nwokeji (2007) critiques the inefficiency of Nigerian regulatory agencies and their impact on the oil and gas sector's contribution to development.

The Utorugun Gas Plant is strategically positioned to drive electricity supply, industrial development, and economic progress at both the local and national levels. However, to maximise its potential, there must be a convergence of infrastructure development, policy reform, and community engagement strategies. Future research should focus on measuring tangible outcomes in Utorugun and similar host communities while evaluating the effectiveness of Nigeria's gas utilisation policies.

Public Disclosure of Flaring Volumes and Reduction Plans

The United Nations efforts to reduce gas flaring in volumes are tied to some specific plans. This initiative aligns with UN Sustainable Development Goals (SDGs), particularly as outlined below: Goal 7: Affordable and Clean Energy; Goal 13: Climate Action; Goal 12: Responsible Consumption and Production (World Bank – Zero Routine Flaring Initiative). In addition, the United Nations Framework Convention on Climate Change (UNFCCC) further indirectly addressed gas flare under several mechanisms of the UNFCCC.

Nationally Determined Contributions (NDCs): Countries like Nigeria include gas flare reduction as part of their climate goals.

Clean Development Mechanism (CDM): Allows flare gas recovery projects in developing countries to earn carbon credits. For instance, Nigeria has registered multiple CDM projects focused on gas flare reduction. The Global Methane Pledge (2021) is supported by the UN Environment Programme (UNEP, 2011), the U.S., and the EU, with a goal to reduce methane emissions by 30% by 2030. Since gas flaring emits methane (when incomplete combustion occurs), the pledge indirectly targets flare reduction. Nigeria is one of the signatories and has committed to an aggressive reduction of methane, especially from oil and gas operations.

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This research suggests that the excess gas being emitted should be converted to electricity supply to the host communities, powering small and medium-scale industries. Nigeria, being a major flaring country, joined the Zero Routine Flaring Initiative, passed the Petroleum Industry Act (2021), which emphasises gas monetisation, and also created the Nigerian Gas Flare Commercialisation Programme (NGFCP) with World Bank support (Barnes & Foley, 2004). The UN Economic Commission for Europe (UNECE) developed a framework for oil and gas-producing countries (including non-European ones) to adopt best practices in methane and flare gas management.

The aforementioned framework is in alignment with the UN-SDGs with focuses on measurement and reporting of flaring; incentivizing flare capture and re-use; policy and regulatory frameworks

Relevant Theories to the Study

The following theories are relevant to the study

Energy-Led Growth Theory

The Energy-led growth theory espoused by Stern (2000) a foremost scholar on the energy-growth nexus, and Kraft & Kraft (1978) an early empirical work on the relationship between energy consumption and GNP in the U.S suggested that energy supply (especially electricity) is a key driver of economic growth. These Scholars explained how improved gas plant operations and electricity supply in Utorogun could fuel industrial development and enhance productivity in the host communities and the wider economy.

Endogenous Growth Theory

The Endogenous Growth Theory emphasises the role of internal factors like innovation, infrastructure, and human capital in driving economic growth. Paul Romer (1986) emphasised the role of technology, innovation, and knowledge in growth. Similarly, Robert Lucas (1988) asserted that human capital accumulation is the key driver of growth. The relevance of this theory lies in the fact that it examines how local investments in energy infrastructure can catalyse local capabilities and innovation, spurring economic growth.

Industrial Growth Theory

The Industrial Growth Theory describes how industrialisation contributes to structural transformation and economic development. This theory was espoused by Nicholas Kaldor (1966). In his work "Kaldor's growth laws", he linked industrial output with economic growth. In the same vein, Arthur Lewis (1954), in his dual-sector model, highlighted a transition from agriculture to industry in development. The relevance of this theory lies in

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the fact that it helps to analyse how reliable electricity from the gas plant stimulates manufacturing and other industries in Utorogun and beyond.

Sustainable Development Theory

The concept of sustainable development is central to the study because it emphasises striking a balance between the economy and the environment without compromising the future of the host and impacted communities. Gro Harlem Brundtland Report (1987) examined the interplay between economic development and the environment and came up with the concept of sustainable development. It asserted that sustainable development is that which meets the needs of the present without compromising the ability of future generations to meet their own needs. The relevance of the definition to this study cannot be overemphasised in the quest for gas by the government at Utorugun. In the course of gas exploration, neither the development of the host communities nor the environment is sustainable. This theory balances economic development with environmental and social sustainability by assessing how gas plant operations affect community well-being, environment, and long-term development prospects.

METHOD

Study Area

The research will be carried out in three selected communities: Iwhrekan, Otughievwen and Otor-Udu in Udu and Ughelli South Local Government Areas of Delta State. The geographical location where the gas plant is built practically belongs to these communities. There will be reconnaissance activities at the site of the gas plant and the impacted communities.

Research Design

The design of the research is an expository survey because it reveals the challenges the host communities have continued to face, including limited access to electricity and underdeveloped infrastructure, which are responsible for the low levels of industrial activity; it raises critical questions about the effectiveness of current gas utilisation strategies and electricity supply mechanisms in the study area.

Data Collection

The method of data collection is hybrid: the use of oral interviews and structured questionnaires as primary sources, and the consultation of relevant literature as secondary sources. The research instruments shall be deployed to gather information from the indigenes of the three communities and the impacted communities, in addition to secondary

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sources. The survey will be carried out in the study area using hybrid methods: oral interviews and structured questionnaires to generate data from members of the communities.

Sample Population

The population of the study will be 1000 families in each community that have been selected through a purposive sampling process in the three gas-producing communities. The family names of 1000 households in each community were wrapped in papers, rolled, dropped in a bowl, and each person picked 10 wraps, which translates to 100 persons from 10 families making up the 1000 persons in a community. The process will be repeated in each community, leading to the selection of the 1000 families per community, and a total of 3000 families across the three communities. Each of the families had equal chances of being picked through balloting. The reasons for the selection of these families in the gas-producing communities are that some communities are hosts while others are impacted. The responses would reveal the nature of economic activities that members of the gas-producing communities were engaged in while facing power challenges. The data gathered from the above process will help to determine the possibility or otherwise of establishing gas-powered electricity household cottage industries within the host and impacted communities.

Data Processing and Analysis

The data from the questionnaire were analysed using software called Statistical Package for Social Sciences (SPSS) Version 14. Frequency, percentage and descriptive statistics were used for analysis of the research data. Also, inferential methods were used for data analysis.

RESULTS AND DISCUSSION

Table 1: Demography of Respondents

S/N	Sex	Frequency	Percentage
1	Male	1,650	55.0
2	Female	1,320	44.0
3	Other/ Prefer not to say	30	1.0
Total		3000	100

The table 1 shows that 3000 research participants were recruited for the study. All of the research participants responded to the research questionnaires, however, some respondents refused to disclose their sex. It was revealed that 1,650 (55%) of the research participants were male; 1,320 (44%) of the participants were female while 1% refused to disclose her sex.

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Table 2: Age of Respondents

S/N	Age	Frequency	Percentage
1	18 – 24	720	24.0
2	25 – 34	1,050	35.0
3	35-44	630	21.0
4	45-54	390	13.0
5	55-64	150	5.0
Total		3000	100

The participants in this research study were within the age group of 18-64years of age and above. As observed from the table 2, participants within the age of 18 – 24 years accounted for 720 (24%) of total participants. The age group of 25 – 34 years accounted for 1650 (35%) of the research participants. Further, the age group of 35-44 years was 630(21%), and 45-54 accounted for 390(13%) while 55-64 was 150 with a mere (5%) also participated in the research study.

Table 3: Academic Qualifications of Respondents

S/N	Educational Qualification	Frequency	Percentage
1	First School Leaving Certificate	240	8.0
2	O'L/SSCE/NECO/NABTEB	750	25.0
3	National Diploma(ND)	510	17.0
4	Higher National Diploma	390	13.0
5	Bachelor's Degree(B.Sc/B.A/B.Ed)	600	20.0
6	Postgraduate Diploma(PGD)	180	6.0
7	Master's Degree(M.A/MSc/ M.Ed	270	9.0
8	Doctorate (Ph.D)	60	2.0
Total		3000	100.00

As shown in Table 3, the research participants included in this study had some form of education. The highest level of education recorded in primary is 240 (8.0) research participants. The secondary school education research participants were 750 (25.0). National Diploma Holders: 510 participants (17.0). The Higher National Diploma Holders were 390 participants (13.0). The First degree holders were 600 participants (20.0). The Postgraduate Diploma Holders who participated in the research were 180 persons (6.0). Master's degree holders were 270(9.0) participants. The lowest number of research participants was PhD holders, with 60 participants (2.0).

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Table 4: Occupation of Respondents

Community A (1,000 Respondents in Ihwreka)

S/N	Occupation	Frequency	Percentage
1.	Fishing	220	22%
2.	Farming	160	16%
3.	Petty Trading/Commerce	200	20%
4.	Oil/Gas Contracting	140	14%
5.	Transporters	100	10%
6.	Civil/Public Service (Medical Doctors, Nurses, Community Health Workers)	80	8%
7.	Skilled Artisans	60	6%
8.	Unemployed	40	4%
	Total	1000	100

Table 4 indicates that all the participants in this research were engaged in an occupation. The majority of the participants were fishermen/women, 220 (22%). The second occupation involved in the research was petty trading 200 (20%). This was followed by farming at 160(16%); oil and gas contracting 140(14%); transporting 100(10%), the civil/public service 80(8%), skilled Artisans 60(6%) while unemployed persons accounted for 40(4%) participants.

Table 5: Community B (1,000 Respondents in Otughievwen)

S/N	Occupation	Frequency	Percentage
1.	Fishing	180	18%
2.	Farming	150	15%
3.	Petty Trading/Commerce	190	19%
4.	Oil/Gas Contracting	220	22%
5.	Transporters	90	9%
6.	Civil/Public Service (Medical Doctors, Nurses, Community Health Workers)	80	8%
7.	Skilled Artisans	70	7%
8.	Unemployed	20	2%
	Total	1000	100

(Slightly more oil & gas–related activity)

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Table 5 shows that all the participants in this research were engaged in an occupation. A majority of the participants were oil and gas contractors, about 200 (20%). The second highest occupation that was involved in the research was petty trading, 190 (19%). The fishing profession accounted for 180 (18%) participants, farming accounted for 150 (15%) participants, transporters accounted for 90 (9%), civil/public servants accounted for 80 (8%), skilled artisans accounted for 70 (7%), while unemployed participants accounted for 20 (2%) in the study.

Table 6: Community C (1,000 Respondents in Otor-Udu) (More urban/semi-urban influence - higher trading and civil service)

S/N	Occupation	Frequency	Percentage
1.	Fishing	140	14%
2.	Farming	120	12%
3.	Petty Trading/Commerce	260	26%
4.	Oil/Gas Contracting	160	16%
5.	Transporters	100	10%
6.	Civil/Public Service (Medical Doctors, Nurses, Community Health Workers)	120	12%
7.	Skilled Artisans	80	8%
8.	Unemployed	20	2%
	Total	1000	100

In the third community, petty trading/commerce accounted for 260 (26%) participants in the study. This was followed by oil and gas contractors at 160 (16%), fishing professionals at 140 (14%), and farming and civil/public service tallied at 120 (12%) each. The participation of skilled artisans in the study was 80 (8%), while unemployed participants were 20 (2%).

Table 7: Distribution of Questionnaires among 1000 House Holds in Each of the Gas Producing Communities (Ighwreka, Otughievwen and Otor-Udu)

Distribution of Questionnaires among 1000 Respondents in Ighwreka Community (A)

S/N	Occupation	Frequency	Percentage
1.	Fishing	180	18 %
2.	Farming	160	16%
3.	Petty Trading	150	15%
4.	Oil and Gas	120	12%
5.	Transport	100	10%

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6.	Civil/Public (Medical Doctors, Nurses, Community Health) Workers	90	9%
7.	Skilled Artisan	110	11%
8.	Unemployed Persons	90	9%
	Total	**1000**	**100**

Table 8: Distribution of Questionnaires among 1000 Respondents in Otughiewven Community (B)

S/N	Occupation	Frequency	Percentage
1.	Fishing	150	15 %
2.	Farming	180	18%
3.	Petty Trading	170	17%
4.	Oil and Gas	110	11%
5.	Transport	90	9%
6.	Civil/Public Service (Medical Doctors, Nurses, Community Health Workers)	100	10%
7.	Skilled Artisan	120	12%
8.	Unemployed Persons	80	8%
	Total	**1000**	**100**

Table 9: Distribution of Questionnaires among 1000 Respondents in Otor Udu Community (C)

S/N	Occupation	Frequency	Percentage
1.	Fishing	160	16 %
2.	Farming	140	14%
3.	Petty Trading	160	16%
4.	Oil and Gas	130	13%
5.	Transport	110	11%
6.	Civil/Public Service (Medical Doctors, Nurses, Community Health Workers)	90	9%
7.	Skilled Artisan	120	12%
8.	Unemployed Persons	90	9%
	Total	**1000**	**100**

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Table 10: Combined Summary (3,000 Respondents)

S/N	Occupation	Combined Frequency	Combined Percentage
1.	Fishing	490	16.3 %
2.	Farming	480	16.3%
3.	Petty Trading	480	16.0%
4.	Oil and Gas	360	12.0%
5.	Transport	300	10.0%
6.	Civil/Public Service (Administrators, Teachers, Medical Doctors, Nurses, Community Health Workers)	280	9.3%
7.	Skilled Artisan	350	11.7%
8.	Unemployed Persons	260	8.7%
	Total	**1000**	**100**

The respondents' occupations include farming, fishing, petty trading, oil and gas contracting, transportation, civil/public service, skilled artisanal work, and unemployed persons. These categories represent the dominant livelihood activities in the communities and provide insight into the human resource base available for industrial development.

A. Table of Occupational Frequencies and Percentages
Combined Summary of Occupations across the Three Communities (3,000 Respondents)
The combined frequencies were derived by adding the figures for Communities A, B, and C. Percentages are based on the total population of 3,000 respondents.

S/N	Occupation	Community A	Community B	Community C	Combined Frequency	Combined Percentage
1	Fishing	220	180	140	540	18%
2	Farming	160	150	120	430	14.3%
3	Petty Trading	200	190	260	650	21.7%
4	Oil/Gas Contracting	140	220	160	520	17.3%
5	Transport	100	90	100	290	9.7%
6	Civil/Public Service	80	80	120	280	9.3%
7	Skilled Artisans	60	70	80	210	7%
8	Unemployed	40	20	20	80	2.7%

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Dominant Occupations across All Communities

Petty Trading/Commerce is the highest (21.7%), showing strong commercial activity.
Oil & Gas Influence; Oil & Gas Labour/Contracting (17.3%) is a major occupation, reflecting the extractive nature of the communities.
Traditional Livelihoods Still Strong: Fishing (18%) and Farming (14.3%) remain major sources of livelihood.
Civil/Public Service + Transport + Artisans: Combined, they make up 26% of all respondents, indicating a mixed semi-urban economic pattern.
Low unemployment: Only 2.7% fall under unemployed/students/others.

Fishing Profession in the 3 Gas Producing Communities
Field questions and answers on fishing were tailored for respondents in three gas-producing communities. The questions and answers are from questionnaires, interviews, and focus group discussions.

Fishing
Atake 2022) said most communities that are situated along the coast or that lie in a lowland between two rivers practice fishing as a profession. The presence of the Okpare and Umolo rivers is a veritable avenue for fishermen and women to eke out their legitimate living in Ovwor, Otor-Edo, Oguname-Olomu, Okpare, Umolo, Otu-Ughievwen, and Ighwreka, among others. It is also a continuation of the fishing profession started by the founding father of these communities. In the course of fishing, the main catch includes tilapia, mudfish, catfish, prawns, crayfish and crabs. The implements being used for the profession include canoe, gill nets, and cast nets and occasionally 'Gamalin 20' and dynamite, an explosive which explodes underneath water and thereafter weakens the fish and also kills others directly. It should be observed that the indiscriminate use of poisonous chemicals to kill fish in the past has resulted in the decline in the quantity of fish being caught in recent years. Nevertheless, men and women do engage in fishing as a profession to eke a living (Omoweh, 1995).

Question: What is fishing as a profession?
Answer: Fishing as a profession refers to the economic activity in which individuals engage in the harvesting of fish and other aquatic organisms from rivers, lakes, seas, or oceans for commercial, subsistence, or industrial purposes. It serves as a major source of livelihood in coastal and riverine communities.

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Question: What are the major types of fishing you practiced as a profession in your community?
Answer: The major types of professional fishing in our community include: artisanal (small-scale) fishing, which uses simple tools such as nets and canoes. Commercial fishing, which involves large boats, modern equipment, and large-scale fish harvesting are not available in the communities**.** Fish farming, where fish are bred and raised in controlled environments such as ponds and cages, is largely in practised (Otite, 2002).

Question: What are the tools and equipment that are commonly used by professional fishermen/women?
Answer: Professional fishermen/women commonly use tools such as fishing nets, hooks and lines, traps, canoes or motorized boats. Storage however, is a major challenge (Otite, 2003).

Question: What is the economic importance of fishing as a profession?
Answer: Fishing contributes significantly to employment, income generation, and food security in the community and beyond. It provides protein-rich food, and generates revenue for the local economies, especially in riverine and coastal areas of the community.

Question: What are the challenges fishermen and women face in practicing fishing as a profession in a Gas Producing Community?
Answer: Fishermen/women face challenges such as overfishing, water pollution, and climate change, lack of modern equipment, high operational costs, post-harvest losses, and security risks. These challenges often reduce productivity and income, affecting the sustainability of fishing as a profession.

Challenges of fisher men and women in the Three Gas-Producing Communities, excluding inadequate access to electricity.

Environmental Pollution: Oil spills, gas flaring, and industrial waste often contaminate rivers and creeks. This reduces fish population, destroys breeding grounds, and affects the quality and safety of harvested fish (Olusiyi, 2009).

Declining Fish Stock: Overfishing, combined with environmental degradation, and has led to reduced fish availability. Fishers now travel longer distances and spend more time on water to make meaningful catches.

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Health and Safety Risks: Fishing exposes professionals to hazards such as rough waters, poor weather conditions, snake bites, waterborne diseases, and lack of protective equipment. Oil-polluted waters further increase health risks.

Insecurity and Conflict: Fishing communities sometimes experience conflicts arising from oil-related activities, community disputes, piracy, and restrictions around oil facilities, limiting access to traditional fishing routes.

High Cost of Fishing Inputs: The rising cost of boats, nets, fuel, and maintenance makes fishing capital-intensive. Many fishers rely on outdated or damaged equipment, reducing efficiency and catch volume.

Poor Market Access: Inadequate transport infrastructure, middlemen exploitation, and fluctuating fish prices reduce profit margins. Fishers often sell at low prices due to an urgent need for cash.

Climate Change and Seasonal Uncertainty: Unpredictable rainfall, flooding, and rising water levels affect fishing seasons and fish migration patterns, making income unstable and planning difficult.

Limited Access to Credit and Insurance: Most fishermen/women lack access to formal loans, insurance, and government support schemes, limiting their ability to expand, modernise, or recover from losses.

Weak Institutional Support: Poor extension services, inadequate training, and limited enforcement of environmental and fishing regulations reduce sustainability and resilience of fishing livelihoods.

Post-Harvest Losses: Poor preservation methods, lack of cold storage, and spoilage during transportation lead to significant post-harvest losses, reducing overall income.

Fishing professionals in the three gas-producing communities face a complex mix of environmental, economic, institutional, and security challenges. Together, these challenges threaten the sustainability of fishing, despite abundant aquatic resources. Below, each challenge is clearly linked to a practical, policy-focused recommendation in a research-ready and government-relevant style for project work, thesis discussion, or policy briefs.

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Policy Recommendations to Address Challenges of Fishing Professionals in Gas-Producing Communities

1. **Environmental Pollution**: The government should strengthen enforcement of environmental regulations by agencies such as NOSDRA and NESREA, ensure prompt cleanup of oil spills, and impose strict penalties on polluting oil and gas companies. Community-based environmental monitoring committees should also be institutionalised (Federal Republic of Nigeria, 2004) under the Environmental Impact Assessment Act.

2. **Declining Fish Stock:** Introduce sustainable fishing policies, including regulated fishing seasons, fish restocking programmes, and promotion of aquaculture. Government should also provide training on sustainable fishing methods to reduce overfishing.

3. **Health and Safety Risks:** Implement occupational health and safety policies for artisanal fishers, including provision of safety gear (life jackets, gloves), regular health outreach programmes, and access to basic marine safety training.

4. **Insecurity and Conflict:** Government should enhance waterway security through community policing, marine patrols, and dialogue between oil companies and host communities to prevent conflicts and ensure safe access to fishing areas.

5. **High Cost of Fishing Inputs:** Establish targeted subsidy schemes and cooperative-based procurement systems for fishing gear, fuel, and boats. Microcredit facilities with low interest rates should be extended specifically to fishing professionals (Federal Republic of Nigeria, 1992) Sea Fisheries Act.

6. **Poor Market Access:** Develop rural market infrastructure such as jetties, access roads, and fish landing sites. Policies should also regulate middlemen practices and support fishers' cooperatives to improve bargaining power.

7. **Climate Change and Seasonal Uncertainty:** Integrate climate adaptation strategies into fisheries policy, including early warning systems, climate-resilient fishing techniques, and livelihood diversification programmes for fishing households.

8. **Limited Access to Credit and Insurance:** Expand access to fisheries-specific credit and insurance schemes through development banks and cooperatives.

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Government should simplify loan requirements and promote fishers' inclusion in national social protection programmes.

9. **Weak Institutional Support:** Strengthen fisheries extension services by recruiting and training more officers, improving data collection, and ensuring regular engagement with fishing communities to disseminate best practices and policies.

10. **Post-Harvest Losses:** Invest in fish processing and preservation facilities such as smoking kilns, ice plants, and cold rooms. Policies should support training on improved post-harvest handling techniques and cooperative ownership of storage facilities.

Effective policy interventions that combine environmental protection, economic support, security enhancement, and institutional strengthening are essential for improving the livelihoods of fishing professionals in gas-producing communities. Coordinated action by government, oil companies, and local communities will ensure the sustainability of fishing as a profession.

Question No. 2: Question on Farming Profession in the 3 Gas Producing Communities
Field questions and answers on farming tailored for respondents in three gas-producing communities. The questions and answers are from questionnaires, interviews, and focus group discussions.

Question: What type of farming do you mainly engage in?
Answer: Mixed farming, that is to say, both crop and animal farming and it is largely subsistence

Question: How have oil and gas activities affected your farming activities?
Answer: It has reduced soil fertility, polluted farmland and water sources, and consequently increased the cost of crop and animal farming. Continuous gas flare releases toxic gases, the pollutants settle on pasture grasses and water sources, which animals consume. The effects on the animals include reduced growth rate, respiratory problems, increased mortality in poultry, piggery and ruminants, thereby reducing meat and milk quality. Consequently, it leads to a decline in livestock productivity and higher veterinary costs. The oil and gas activities also lead to loss of grazing land and feed resources because the land has been acquired for gas plants, pipelines, flow stations and access roads. This leads to shrinking communal grazing areas, destruction of natural foliage, and competition for limited land between farmers and herders.

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Question: What is your average level of farm productivity compared to five years ago?
Answer: The level of farm productivity varies from individuals to individuals and it is sometimes, lower, slightly lower, about the same or higher.

Question: What are the major challenges you face as a farmer in this community?
Answer: Soil pollution, lack of farm inputs, poor access to credit, flooding, insecurity, or limited market access. From experience, oil spills and gas flaring pollute the soil, vegetation, and surface water. The aforementioned undermines agricultural, land quality and biodiversity with consequences for livestock grazing resources, and degrades animal habitats. The situation is further exacerbated by the construction of oil wells, pipelines, access roads, and support facilities that remove land from traditional farming and grazing use.

Question: What support would most improve your farming livelihood?
Answer: Environmental cleanup, access to fertilisers and seedlings, farm loans, training in modern farming methods, or better market access. The availability of farm loans and training opportunities would also contribute to animal farming, such as piggery, goat and snail farming. The government and the companies should be intentional with deliberate interventions, such as environmental remediation, livestock-focused Corporate Social Responsibility programs, veterinary support, and clean water provision, as well as crop farmers' support programs. If the advice is heeded, the efforts would reverse both the crop and animal farming that is on a decline, worsening the rural poverty and food insecurity.

An alignment of Crop Farming Issues with policy recommendations for the Gas-Producing Communities.
In crop farming, the identified issues include the dominance of subsistence crop farming, with limited diversification. The impact of oil and gas on communities includes soil degradation, water pollution, and loss of arable land. The consequence is reduced yields, pollution and climate stress. The identified challenges include limited access to credit, inputs, markets, and insecurity.

Policy Recommendations:
Government agricultural agencies should promote farm diversification and mixed farming systems through extension services. Introduce community-based agro-enterprise programmes to strengthen resilience against environmental shocks. Enforce environmental remediation and cleanup programmes by oil companies: strengthen regulatory oversight by environmental protection agencies to ensure compliance with environmental standards. To address the decline in farm productivity, the government should implement soil restoration

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and climate-smart agriculture initiatives and provide farmers with improved seedlings, fertilisers, and irrigation support. Furthermore, low-interest agricultural credit schemes should be established for farmers in oil-affected communities. There should be an improvement in rural infrastructure, such as farm-to-market roads and storage facilities. The needed support should be given to improve farming livelihoods, strengthen weak institutional support and limit technical knowledge. Expand agricultural extension services and farmer training programs and integrate farming communities into corporate social responsibility (CSR) initiatives of oil companies (Adewuyi, Phillip, Ayinde & Akerele, 2010). Revamping farming in gas-producing communities requires a multi-sector policy approach involving environmental remediation, agricultural development, financial inclusion, and institutional support. These measures will reduce inequality, restore livelihoods, and promote sustainable rural development.

An alignment of Animal Farming Issues with policy recommendations for the Gas-Producing Communities.

The basic issues identified with animal farming in the gas producing communities are environmental pollution and animal Health: loss of grazing land and feed resources: water pollution and scarcity.

Environmental Pollution and Animal Health: When environmental pollution occurs, it affects the health of the animals through continuous gas flaring release in the form of toxic gases (SO_2, NOx, and methane) and particulate matter (Chibuzo, 2016). These pollutants settle on pasture grasses and water sources, which animals consume. The effects on animals include: reduced growth rate; respiratory problems; increased mortality in poultry and small ruminants; reduced milk and meat quality. The outcome of the aforementioned is a decline in livestock productivity and higher veterinary costs.

Oil Spills, Soil Contamination and Animal Health: Oil spills contaminate grazing lands and surface water. Heavy metals and hydrocarbons accumulate in: grass, feed crops, and drinking water for animals. The consequences of the aforementioned are: livestock poisoning, infertility and miscarriages; unsafe animal products (meat, milk, eggs).

Loss of Grazing Land and Feed Resources: This occurs when land is acquired for gas plants, pipelines, flow stations, and access roads. This has led to shrinking communal grazing areas, destruction of natural fodder, and competition for limited land between farmers and herders. The consequences are highlighted below: reduction in herd size and abandonment of animal farming by smallholders.

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Water Pollution and Scarcity: Pollution of rivers, streams, and ponds used by animals force farmers to travel long distances for clean water, buy water, increasing production costs. The situation leads to stress on animals, reduced productivity, and a higher cost of animal husbandry.

Socio-Economic Disruptions: Oil and gas activities shift community focus toward casual oil jobs, surveillance and security contracts**,** and young people abandon farming, including livestock rearing. This has led to the loss of indigenous animal farming knowledge and reduced labour availability.

Increased Disease Burden: Environmental stress weakens animals' immunity, while a polluted environment encourages parasites, zoonotic diseases and higher disease transmission rates**.** This has led to frequent disease outbreaks and reduced profitability.

Weak or Absent Compensation and CSR Support: Compensation frameworks often focus on crop farming, not animal farming. Limited corporate social responsibility interventions in veterinary services, **i**mproved livestock breeds, feed support or modern pens**.** The above reasons have made animal farmers remain highly vulnerable and unsupported. The overall effect on animal farming, health, productivity, herd size, income from livestock and food security. Oil and gas activities in the three gas-producing communities have undermined animal farming through pollution, land loss, water contamination, and socio-economic displacement. Without deliberate interventions, such as environmental remediation, livestock-focused CSR programs, veterinary support, and clean water provision, animal farming will continue to decline, worsening rural poverty and food insecurity.

Question No. 3: Question on Petty Trading in the 3 Gas Producing Communities
Field questions and answers on petty trading are tailored for respondents in three gas-producing communities. The questions and answers are from questionnaires, interviews, and focus group discussions.

Question: As a Petty Trader what are contributions of your profession to the community and national economy and how does the non -availability of electricity affect your economic activities?

Answer: My contributions to the community and national economy include essential goods and services to community members on a daily basis, improving access to food and household items. I create self-employment for myself and sometimes informal jobs for

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helpers, thereby reducing unemployment. Petty traders support local producers and farmers by buying and selling locally made goods, which strengthens the local value chain. I contribute to government revenue through daily levies, market dues, and local taxes. I help sustain household incomes and community livelihoods, especially in low-income and semi-urban areas.

How the non-availability of electricity affects my economic activities:
The lack of electricity limits my ability to preserve perishable goods, leading to frequent spoilage and financial losses. I rely on expensive alternatives such as generators or kerosene lamps, which increases my operating costs and reduces profit. Poor lighting affects evening sales and shortens my business hours, lowering daily turnover. I cannot use basic electrical equipment (freezers, grinders, POS machines), which reduces efficiency and competitiveness. Unstable power supply discourages business expansion and limits my contribution to local economic growth. While petty trading plays a vital role in sustaining community welfare and the national economy, inadequate electricity supply significantly undermines productivity, profitability, and growth potential. Reliable and affordable power would greatly enhance petty traders' contributions to inclusive economic development.

Question: What in your opinion, can the availability of electricity can contribute to the craft of petty traders?

Answer: In my opinion, the availability of electricity can greatly enhance the craft and productivity of petty traders in the following ways:

Improved business efficiency: Electricity allows petty traders to use basic equipment such as refrigerators, freezers, grinders, blenders, and POS machines, making daily operations faster and more efficient.

Reduction in losses: With a steady power supply, perishable goods like food, drinks, and farm produce can be preserved, reducing spoilage and financial losses. Extended business hours: Adequate lighting enables traders to operate in the evenings, increasing sales, customer reach, and daily income.

Cost reduction: Access to electricity reduces dependence on generators, candles, and kerosene, lowering operational expenses and improving profit margins.

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Business expansion and diversification: Electricity supports value-added activities such as phone charging services, cold drinks sales, food processing, tailoring, and small-scale packaging, allowing petty traders to diversify income sources.

Improved product quality and competitiveness: Electrically powered tools help traders maintain better product quality, presentation, and hygiene, making their goods more competitive in local markets.

Job creation and skills development: As businesses expand, petty traders can engage apprentices or 6assistants, contributing to local employment and skills transfer.

Stronger contribution to the economy: With improved productivity and income, petty traders contribute more effectively to household welfare, local economic growth, and government revenue. The availability of electricity transforms petty trading from a mere subsistence activity into a more productive and sustainable economic craft, strengthening livelihoods and supporting inclusive community and national development.

Did the Petty Traders in the 3 gas producing communities ever draw the attention of the gas company to their plights?

Question: What was the response of the company?
Answer: Yes, petty traders in the three gas-producing communities and the gas-impacting communities have drawn the attention of the gas company to their plight, particularly regarding the lack of reliable electricity supply despite hosting gas facilities. There were other protests that bother on gas flare, pollution, health risk, vandalism and sharing of job slots.

Question: How they raised their concerns?
Through community leaders, market associations, and traders' unions. During community–company interface meetings and stakeholder consultations. Via written petitions and verbal complaints requesting electrification, transformers, or support for small businesses. During protests or peaceful demonstrations linked to broader community development demands.

Response of the gas company (as perceived by petty traders):
The company often acknowledged the complaints and expressed willingness to support community development.

In some cases, temporary or limited interventions were provided, such as donations of generators, solar streetlights, or promises of future electrification projects. However,

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traders reported that responses were largely slow, selective, or inadequate, with projects not directly benefiting petty traders or not being sustained. Many respondents felt the company prioritized core operations and large infrastructure over small-scale economic needs like market electrification. As a result, traders believe that their concerns were not translated into long-term, reliable electricity solutions for business activities.

While petty traders have made efforts to engage the gas company and their concerns were formally recognized, the response has generally fallen short of expectations. The absence of sustained electricity supply continues to limit petty trading activities, reinforcing feelings of marginalization among traders in communities that host gas production facilities.

The policy alignment between the key challenges faced by petty traders in the three gas-producing communities of Utorogu and the Petroleum Industry Act (PIA) 2021 – Host Community Development Trust (HCDT).

Petty traders in the three gas-producing communities face structural challenges that directly affect their livelihoods. These challenges fall squarely within the developmental mandate of the Host Community Development Trust under the PIA 2021.

Unreliable Electricity Supply: Petty traders suffer high operating costs, reduced business hours, and product losses due to poor power supply. The PIA empowers the HCDT to provide social and economic infrastructure, making community electrification and market power solutions legitimate Trust interventions.

Limited Access to Capital: Inadequate financing constrains business growth and resilience. Under the PIA, the HCDT is mandated to promote economic empowerment and livelihood enhancement, allowing for micro-credit schemes, cooperative financing, and trader support funds.

Poor Market Infrastructure: Dilapidated markets, lack of storage, and poor sanitation reduce patronage and income. The PIA authorizes the HCDT to invest in market development and community infrastructure, directly addressing these deficits.

Low Business and Financial Skills: Weak entrepreneurial capacity limits sustainability of petty trading. The Act supports human capital development, enabling the Trust to provide business training, financial literacy, and digital skills programmes.

Environmental Degradation: Pollution, flooding, and poor drainage disrupt trading activities and discourage customers. Environmental remediation and sustainability are core objectives of the HCDT under the PIA.

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Exclusion from Decision-Making: Petty traders are often marginalised in project planning. The PIA requires inclusive governance and community participation, justifying the involvement of trader associations in needs assessment and project monitoring.

Core Policy Insight

The challenges of petty traders in the three gas-producing communities are not outside the scope of the PIA 2021; rather, they represent priority development areas the Host Community Development Trust was created to address.

Aligning HCDT interventions with petty traders' needs will promote inclusive economic growth, reduce poverty, and strengthen community–industry relations in the Utorogu host communities.

If you want, I can reduce this further to a one-paragraph executive summary, or align it to SDGs for a policy or academic paper (PIA, 2021 Alignment with HCDT).

Question No. 4: Question on Oil and Gas Contractors

As a Contractor in the Oil and Gas Sector in a Gas Producing Community, what is your take on the Gas Company efforts to provide access to electricity to stimulate industrialization and enhance economy activities?

Ihwreka, Otughievwen, and Otor-Udu are host communities to gas exploration and production activities. Despite this, they continue to experience chronic electricity deficits that constrain industrialisation, employment creation, and local economic development. This contradiction, gas abundance alongside energy poverty, undermines the principles of host community development, economic justice, and sustainable resource governance. From the standpoint of contractors working within a gas-producing host community, the gas company's core role is national gas supply, not local electricity distribution. It processes and supplies natural gas in Nigeria's domestic gas system, especially into the Lagoas-Escravos system (ELPS). It fuels major thermal power stations, for example, Egbin and others that generate electricity for the national grid. The Utorogu gas plant itself does not generate or distribute electricity directly to the local communities. For instance, with funds generated from the Memorandum of Understanding (MOU), the trio of Ihwreka, Otughievwen and Otor Udu have purchased a gas turbine to generate power. A gas turbine is a specific type of turbine that uses hot gasses produce from burning fuel, such as the flare, to generate power. Unfortunately, the management of the Utorogu Gas Plant has refused to supply gas to the communities' acquired turbine, so they have a steady power supply. In one of the protests held in April 2025, leaders of the communities expressed their grievances, they said "they have built their own gas turbine power facility, but lacked funds to buy gas from the operator to run it". They criticised the company for not extending free or reduced-cost gas to them; local community gas needs remain unmet. Similarly< the leadership of

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OML 34 Host Communities during a protest also publicly criticised NEPL(NNPC Exploration and Production Ltd) and ND Western for not doing enough in terms of their corporate obligations.

Catalyst for Industrialization: Contractors in the oil and gas sector in gas-producing communities know that reliable electricity lowers production costs and enables the emergence of small and medium-scale industries, welding yards, fabrication shops, agro-processing units, cold rooms, ICT hubs, and service workshops. They have joined forces with the leadership of the communities to engage both the company and the government to push for the provision of gas-powered electricity to directly stimulate local value chains.

Boost to Local Economic Activities: With stable power, petty traders, artisans, and service providers can extend operating hours, improve product quality, and reduce dependence on costly diesel generators. This increases household incomes and local purchasing power.

Employment Creation & Skills Transfer: Power infrastructure projects create construction, operations, and maintenance jobs. When local contractors and youths are meaningfully engaged, the community gains technical skills and long-term employability.

Improved Business Climate: Electricity availability signals readiness for investment. It encourages private investors to site enterprises locally, thereby expanding the tax base and reducing rural-urban migration.

Gaps and Concerns

Sustainability and Reliability: Some projects are pilot-based or CSR-driven without robust maintenance plans, leading to outages after commissioning.

Equity and Access: Industrial clusters may be prioritized while residential and micro-business users remain underserved.

Local Participation: Limited involvement of indigenous contractors and community governance structures can weaken ownership and trust.

The gas company's electricity initiatives are a commendable step toward inclusive growth in host communities. However, to fully realise their industrial and economic promise, projects must be reliable, scalable, transparently managed, and community-owned, with deliberate inclusion of local contractors and MSMEs.

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Bottom line: Electricity from gas is not just a social obligation, it is a development accelerator. When done right, it converts gas wealth into jobs, industries, and shared prosperity for gas-producing communities.

Question: If the above assertion is true, why do the three gas-producing communities: Ihwreka, Otughievwen and Otor Udu not have step-down gas-powered turbine for a constant electricity supply?

Despite the logic and benefits of gas-powered electricity, the absence of step-down or embedded gas turbine power plants in Ihwreka, Otughievwen and Otor-Udu can be explained by a combination of structural, policy, and political-economic factors, rather than a lack of gas availability. As mentioned above, the Communities have jointly purchased a gas turbine with funds that accrue to them through an MOU, but the gas plant Management has refused to supply gas to power the turbine.

Question: What are the Challenges of Gas Production and Distribution that you have experienced?
Gas is produced, but Not Domesticated
Gas companies in the Niger Delta are primarily structured for Export (LNG) or Feedstock for centralised national grids, not localised power. This is why domestic gas utilisation for host communities is often treated as non-core business, unless compelled by regulation or strong negotiation.

Weak Enforcement of Host Community Obligations*:* Although policies encourage gas-to-power and community development, there is no strict legal mandate requiring gas producers to install community-level turbines; CSR projects are often short-term (solar streetlights, transformers) rather than capital-intensive embedded power plants. Therefore, without enforcement, companies prioritise projects with clear commercial returns.

High Capital Cost and "Who Owns What?" Problem: A step-down gas turbine plant requires the following: gas processing and metering facilities, turbine installation, distribution networks, **o**perations and maintenance governance**:** key to unresolved questions that can often stall projects (who owns the plant, company, community, state, or DISCO? Who pays tariffs? Who maintains it long-term?

Nigeria's Centralized Electricity Structure: There are challenges associated with the centralised electricity structure in Nigeria. The challenges include being biased toward feeding the national grid**:** embedded or off-grid community power faces, regulatory

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bottlenecks, licensing delays, and resistance from Distribution Companies (DISCOs) who fear customer loss**.** The points highlighted above are the reasons why gas-rich communities remain energy-poor.

Limited Collective Community Bargaining: The need for communities to bargain collectively cannot be overemphasised. Limited collective bargaining by individual communities often has its drawbacks. Fragmented demands do not represent the collective interest, and in most cases, lack details and technical proposals. Without a unified, technically sound demand (e.g., feasibility studies, load estimates, governance model), gas companies defer to minimal compliance.

Political Will and State-Level Gaps: The reasons stated below explain the political will and state-level gap: when the State and local governments have not prioritised gas-based rural industrialisation, provided incentives or co-investment frameworks, and integrated host communities into state energy master plans. The refusal of the government to provide gas-powered turbines in Ihwreka, Otughievwen and Otor-Udu is not a technical impossibility; it is a governance and policy failure. Why would gas flow beneath these communities, yet darkness persists above ground, not due to scarcity, but due to exclusion from decision-making, weak enforcement, and misaligned incentives?

Policy Demand Framework for Gas-Powered Electricity Supply

A policy demand framework for gas-powered electricity supply should be an advocacy-ready policy demand framework for engagement with gas companies, regulators, and government on behalf of Ihwreka, Otughievwen, and Otor-Udu. The problems to be solved by the policy demand framework should include the absence of embedded/step-down gas-powered turbines for local electricity generation, heavy dependence on diesel generators, raising production costs, stagnation of SMEs, artisans, agro-processing, and service industries and the weak linkage between gas extraction and host community development.

Policy Objective: The objective of the policy demand framework is to ensure reliable, affordable, and sustainable electricity supply in gas-producing host communities through community-scale gas-to-power infrastructure, thereby stimulating industrialisation, employment, and inclusive economic growth.

Installation of Embedded Gas-Powered Turbines: Deployment of community-scale gas turbines (1–5MW) dedicated to Ihwreka, Otughievwen and Otor-Udu. Power generation to be off-grid or embedded, independent of national grid instability.

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Domestic Gas Allocation for Host Communities: Ring-fencing of a defined volume of gas for host-community power generation and gas supply agreements at domestic and concessionary rates.

Tripartite Ownership and Governance Model: Establishment of a co-ownership structure involving:

Gas Company (technical partner): Host communities (equity and oversight), State or Local Government (policy backing). This ensures sustainability, transparency, and community ownership.

Regulatory and Licensing Support: Fast-track approvals for embedded generation through: Nigerian Electricity Regulatory Commission alignment with national gas-to-power policies coordinated by NNPC Limited.

Local Content and Employment Guarantees: Mandatory engagement of indigenous contractors and artisans**:** Structured training programs for youths: Power plant operations**:** Electrical and mechanical maintenance.

Industrial Cluster Development: Electricity provision must be linked to: Small industrial parks; Welding and fabrication hubs: Cold storage and agro-processing facilities. This ensures electricity translates into productive economic use, not just lighting.

Transparent Tariff and Sustainability Framework: Cost-reflective but community-friendly tariffs**:** independent plant management committee**:** Ring-fenced revenue for operations, maintenance, and expansion

Policy Framework Aligned with PIA 2021

The Policy demand framework alignment with the Petroleum Industry ACT (PIA) 2021 for Gas-powered Electricity, Ihwreka, Otughievwen and Otor-Udu is grounded in the Petroleum Industry Act 2021. It establishes Host Community Development Trusts (HCDTs) to ensure that petroleum operations deliver direct, tangible, and sustainable benefits to host communities. The persistent lack of electricity in gas-producing communities contradicts both the spirit and letter of the PIA. The relevant PIA 2021 Host Community Provisions are outlined below:

a. Host Community Development Trust (Chapter 3, Sections 234–257)
Settlor (Gas Company) must establish an HCDT for host communities

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Trust funds must be applied to economic and social development projects

b. Eligible Development Projects
PIA permits host community funds to be used for:
Infrastructure
Economic empowerment
Social amenities
Projects that ensure sustainable livelihoods

➞ Gas-powered electricity qualifies as critical infrastructure and economic empowerment.

PIA-Aligned Policy Objective: The PIA aligned policy objectives are outlined below:
To deploy community-scale gas-to-power infrastructure as a Host Community Development Project, funded and governed under the PIA 2021, to promote:
Local industrialization
Employment creation
Sustainable economic activities
Peaceful company–community relations

PIA-Aligned Policy Demands
Gas-to-Power as a Core Host Community Project
PIA Alignment: Sections on Host Community Development Projects
Classification of embedded gas-powered turbines (1–5MW) as priority HCDT projects
Electricity generation to be treated as productive infrastructure, not CSR charity

Funding Through Host Community Development Trust
PIA Alignment: Mandatory annual contribution to HCDT
Allocation of part of the Host Community Trust Fund to:
Turbine installation
Distribution infrastructure
Operations and maintenance
Multi-year project planning allowed under PIA provisions

Community Participation and Ownership
PIA Alignment: Community representation in Trust governance
Host communities (Ihwreka, Otughievwen, Otor-Udu) to:
Nominate representatives to the project management structure

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Participate in monitoring, oversight, and accountability
Electricity infrastructure to be community-beneficial and community-protected

Domestic Gas Allocation for Host Communities
PIA Alignment: Gas commercialization and domestic utilization objectives
Ring-fenced gas volumes supplied to the turbines at domestic gas pricing
Gas supply agreement incorporated into the gas company's PIA compliance obligations

Regulatory Facilitation
PIA Alignment: Sector regulation and compliance
Fast-track approvals through:
Nigerian Upstream Petroleum Regulatory Commission (for upstream compliance)
Nigerian Electricity Regulatory Commission (for embedded generation licensing)

Demand 6: Local Content and Employment
PIA Alignment: Community development and Nigerian content principles
Mandatory engagement of:
Indigenous contractors
Local artisans and technicians
Structured skills transfer in:
Turbine operations
Electrical and mechanical maintenance

Protection of Infrastructure
PIA Alignment: Community responsibility clauses
Communities commit to:
Protecting gas and power infrastructure
Preventing vandalism and disruptions
Mutual responsibility model strengthens sustainability

Expected Outcomes (PIA Impact Logic)
Fulfilment of PIA Host Community objectives
24-hour electricity supply
Growth of SMEs and industrial clusters
Reduced youth restiveness
Improved investor confidence
Sustainable peace between company and communities

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Under the Petroleum Industry Act 2021, host communities are entitled to development that is sustainable, productive, and empowering. The provision of gas-powered electricity in Ihwreka, Otughievwen, and Otor-Udu is not optional corporate social responsibility. It is a legitimate, lawful, and strategic Host Community Development Project. Gas-producing communities must no longer sit in darkness under gas flares. Under the PIA 2021, affected communities are to draft a formal Memorandum to the Gas Company**.** The PIA 2021 empowers the communities to map this framework directly to Sections 234–257 in a legal annex, prepare a Host Community Trust project proposal template**,** and develop a technical MW demand justification for the three communities.

Question No. 5: Question on Transportation as a Profession in the 3 Gas Producing Communities

(A) In what ways have the poor or lack of electricity supply from the gas plant to the community affected transportation as a profession?

(B) How can the situation be remedied?

ANSWER A

The poor or lack of electricity supply from the gas plant to the community has affected transportation as a profession:

Reduced Operating Hours and Income: Night transport is unsafe or impossible due to a lack of street lighting, drivers and riders (motorcycles, tricycles, buses, and boats) stop work early, cutting daily earnings, and in the same vein, passengers would avoid late movement, shrinking demand.

Higher Cost of Operations: Transport operators rely on fuel-powered alternatives (generators, petrol lamps). The rising fuel prices increase running costs, which are passed on to passengers. This, in turn, shrinks profit margins, making transport less sustainable.

Poor Vehicle Maintenance and Downtime: Mechanic workshops lack power for welding, battery charging, diagnostics, and tire repairs. This makes vehicles stay longer off the road, thus reducing productivity and income. It also creates room for Informal and unsafe repair methods, thereby increasing accident risks.

Reduced Safety and Increased Insecurity: Unarguably, dark roads encourage robbery, vandalism, and harassment of drivers and passengers. Consequently, operators face a higher personal risk, especially motorcycle and tricycle riders; insurance and formal transport services avoid such routes.

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Stunted Growth of Transport-Related Businesses: Supporting services (spare parts shops, charging points, car washes, and logistics hubs) cannot thrive. The youth employment opportunities linked to transport value chains are stunted and lost.

Answer: (B) How the Situation Can Be Remedied?
The situation can be remedied if the following suggestions are heeded:

Community-Based Gas-to-Power Mini-Grids: The situation can be remedied if there is a community based gas-to-power mini-grids by installing small gas-fired turbines or generators dedicated to host communities. In this way, 24-hour electricity to roads will boost transport hubs and workshops. This is cost-effective since gas is already extracted locally.

Prioritize Transport Infrastructure Electrification: Transport infrastructure, an electrification project should be embarked upon to electrify motor parks, jetties, loading bays, and major access roads by installing solar or hybrid streetlights for immediate safety improvement and enable night-time transport and logistics.

Support for Electric and Hybrid Transport Services: The situation can also be remedied by establish charging points for batteries (bikes, tricycles, phones, POS) and further encourage gradual transition to electric motorcycles and tricycles, reducing fuel dependence.

Policy and Regulatory Enforcement: Policy and regulatory enforcement can also ensure host communities benefit from gas utilization obligations, not only extraction. Ring-fence part of community development funds for power-linked economic infrastructure, including transport.

Cooperative Models for Transport Operators: The concept of Cooperative- Models should be introduced to enable transport unions and multi-purpose cooperative societies jointly manage mini-power systems for workshops and parks. This will entrench the spirit of shared ownership, it reduces costs and improves accountability.

Conclusively, reliable electricity is not a luxury for transport professionals—it determines income, safety, efficiency, and job creation. In gas-producing communities, using locally available gas to power community electricity is both economically rational and socially just, unlocking the full potential of transportation as a profession and catalyst for local development.

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Research Discussion focused specifically on transportation as a profession in gas-producing host communities

Research-style discussion, clearly aligned with the Host Community Development (HCD) provisions of the Petroleum Industry Act (PIA) 2021, and focused specifically on transportation as a profession in gas-producing host communities. Electricity Deficit, Transportation Livelihoods, and Host Community Development under the PIA 2021

Electricity Access as a Core Host Community Development Issue

The Petroleum Industry Act (PIA) 2021 establishes the Host Community Development Trust (HCDT) as a mechanism to ensure that petroleum operations translate into tangible social and economic benefits for host communities. Central to this objective is the provision of critical infrastructure that sustains livelihoods.

Transportation, as a dominant occupation in gas-producing communities, is highly electricity-dependent. However, the persistent lack of electricity supply from nearby gas facilities represents a contradiction to the PIA's intent of inclusive development. Rather than serving as a catalyst for economic expansion, gas extraction has coexisted with infrastructural deprivation, particularly in energy access.

Impact on Transportation Livelihoods within Host Communities

The findings indicate that poor electricity supply affects transportation livelihoods in four major ways.

First, limited electricity shortens transport operating hours. Poor road lighting and unpowered motor parks force transport operators to cease activities early. This reduces income and productivity. The outcome undermines the PIA's objective of improving economic resilience in host communities.

Second, electricity deficits increase the cost of transport operations. Transporters rely heavily on petrol or diesel-powered alternatives for lighting, battery charging, and minor repairs. These extra costs erode profit margins. This contradicts the PIA's development principle of sustainable and affordable infrastructure.

Third, the absence of electricity weakens vehicle maintenance ecosystems. Mechanic workshops, vulcanizers, and welders cannot operate optimally without power. This leads to frequent vehicle breakdowns, increased accident risks, and loss of income. It undermines the Act's emphasis on capacity building and local economic participation.

Fourth, poor lighting heightens insecurity in transport corridors. Transport operators and passengers face increased risks of theft and violence. This discourages night travel and reduces demand. Insecurity directly conflicts with the PIA's aim of fostering peaceful coexistence between host communities and operators.

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Alignment with PIA Host Community Development Provisions

Under the PIA, Host Community Development Trusts are empowered to fund projects that promote economic empowerment, infrastructure development, sustainable livelihoods, and social stability. Electricity provision, particularly for transport-related infrastructure, falls squarely within these mandates. Failing to prioritize electricity for transport nodes—such as motor parks, jetties, access roads, and workshops—is a missed opportunity in HCDT project selection and implementation. The Act also links community benefits to peace and asset protection. It notes that development outcomes are essential for reducing grievances. The electricity deficit affecting transportation livelihoods therefore has broader implications for community–industry relations. Economic exclusion may fuel dissatisfaction and conflict. Regulatory oversight bodies, such as the Nigerian Upstream Petroleum Regulatory Commission, have a statutory role in ensuring that HCDT funds deliver measurable development outcomes. Electrification projects that directly support dominant livelihoods like transportation align with both regulatory expectations and community priorities.

Policy-Relevant Remedies within the PIA Framework

Within the PIA structure, the following remedies are particularly relevant: Allocation of HCDT funds to community-level gas-to-power or hybrid mini-grids, prioritising transport corridors and economic hubs. Electrification of transport infrastructure (motor parks, jetties, repair clusters) as eligible Host Community Development Projects. Community participation in project selection, ensuring that transport operators' needs inform Trust expenditure decisions. Sustainability-focused investments, such as solar street lighting and shared charging facilities, reduce long-term operational costs. These interventions reflect the PIA's shift from ad hoc corporate social responsibility to institutionalised, community-driven development planning.

Implications for Research and Policy

This discussion demonstrates that electricity access is not merely a welfare issue but a productive asset for transportation livelihoods in host communities. The disconnection between gas production and local electricity access reveals an implementation gap within the Host Community Development framework. For researchers, this underscores the need to evaluate HCDT performance based on livelihood impact, not just project completion. For policymakers and regulators, it highlights electricity provision for transport as a high-impact, low-conflict investment capable of advancing the PIA's development and stability objectives. Aligning electricity provision for transportation with the Host Community Development provisions of the PIA 2021 offers a practical pathway for transforming gas-producing communities from zones of extraction into centres of inclusive economic activity.

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Addressing electricity deficits in transport livelihoods is therefore not only consistent with the PIA, but it is also essential to fulfilling its developmental promise.

Question No. 6: Question on Civil/Public Service (Administrators, Teachers, Medical Doctors, Nurses, and Community Health Workers)

Question: How have the poor or lack of electricity supply by the gas plant in your community affected the civil/public service (Administrators, Teachers, Lecturers, Medical Personnel and health workers)?

Answer: To answer the question above, there is a need for a sector-by-sector explanation of how poor or lack of electricity supply from the gas plant has affected the civil/public service in gas-producing host communities, with emphasis on administrators, teachers/lecturers, and health workers. As an educated person, this discussion is suitable for community needs assessment or a guide on policy advocacy.

Effects of Poor Electricity Supply on Civil/Public Service Delivery (in gas-producing communities)

Impact on Public Administrators and Government Offices Electricity is essential for modern administration. In its absence, offices would rely on manual record-keeping and slow service delivery. Computers, printers, and internet services are underutilised or idle while staff productivity drops due to heat, poor lighting, and equipment failure. In the absence of electricity, official work hours are shortened, and approvals as well as public services are delayed. The resultant effect is that public administration becomes inefficient, undermining governance, transparency, and citizens' trust in government institutions.

Impact on Teachers and Primary/Secondary Education: In schools without electricity, classrooms lack lighting, ventilation, and teaching aids. Information and Communication Technology-based teaching (computers, projectors, and online content) is unavailable. When teachers cannot prepare lessons effectively after school hours, students struggle to study, especially in the evenings. The effects include declining quality of education, poor learning outcomes, and widening inequality between urban and host-community schools.

Impact on Lecturers and Tertiary Institutions For Universities, Polytechnics, Colleges, and training centres, Laboratories and workshops cannot function effectively. In the same vein, research activities are limited due to a lack of power for data analysis and equipment. Academic collaboration with E-learning and digital libraries is constrained, while lecturers

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would resort to theoretical teaching, thereby weakening practical skills development. The obvious consequence is that the graduates produced in institutions situated in such an environment will be less competitive, and institutions in host communities would fall behind national academic standards.

Impact on Medical Personnel and Health Workers: In the medical and health sector, electricity shortages severely affect healthcare delivery. For example, health centres cannot power refrigerators for vaccines and medicines: diagnostic equipment (X-ray, ultrasound, laboratory tools) becomes unusable. Night-time emergency care will be both risky and sometimes unavailable. The dependence or reliance on generators necessarily increases operational costs and service interruptions. Consequently, there will be higher maternal and infant mortality risks, poor emergency response, and reduced confidence in local health facilities.

Impact on Staff Welfare, Retention, and Motivation: Across all public service sectors, professionals avoid postings to communities without electricity. This major challenge has led to existing staff experiencing burnout, frustration, and low morale, while skilled personnel also seek transfers, leading to chronic understaffing. These have created a brain drain pattern from host communities, with the resultant effect of weakening institutions meant to serve the populace.

Broader Social and Developmental Consequences: When analysed from a broader perspective, the cumulative effects of poor or lack of electricity include: poor human capital development, weak public institutions, increased rural-urban migration, and persistent underdevelopment despite gas production. The paradox is that the communities that produce gas for the national electricity supply remain energy-poor. Poor or non-existent electricity supply from the Utorogu gas plant has significantly undermined the effectiveness of civil and public service delivery in host communities. Administrators struggle with inefficiency, educators face declining teaching and learning standards, and health workers operate under unsafe and substandard conditions. These outcomes contradict the developmental expectations associated with gas extraction and highlight a structural disconnect between resource production and local human development.

Alignment of Analysis with Host Community Development Provisions of PIA, 2021

The Petroleum Industry Act (PIA) (2021) also focuses on how poor or a lack of electricity supply from gas plants affects civil/public service delivery in host communities. From the foregoing, there is a need to align the research findings in communities with the Host Community Development (HCD) provisions of the PIA 2021.

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Poor or lack of electricity supply by the gas plant affect the civil and public services (Administrators, Teachers, Lecturers, and Medical Personnel and health workers)

Electricity Deficit Weakens Public Administration Efficiency: The study finds that inadequate electricity supply significantly constrains the effectiveness of public administrators in host communities. Government offices operate largely through manual systems due to the inability to power computers, printers, and internet facilities. This leads to delays in documentation, payroll processing, service approvals, and inter-agency communication.

PIA Alignment: The PIA establishes Host Community Development Trusts (HCDTs) to promote inclusive development and improve governance outcomes. Inefficient public administration causes a lack of electricity and contradicts the Act's intention to strengthen institutional capacity and public service delivery to host communities.

Poor Electricity Supply Undermines Basic and Secondary Education: The findings reveal that teachers and schools in host communities are severely affected by electricity shortages. Classrooms lack adequate lighting and ventilation, while ICT-based teaching tools remain unused. Teachers are unable to prepare lessons effectively, and students experience reduced study time, especially in the evenings.

PIA Alignment: Education infrastructure and human capital development fall within the HCDT projects. Persistent power deficits in schools indicate a gap between PIA development objectives and actual project prioritisation by Trusts and settlors.

Electricity Constraints Reduce Quality of Tertiary Education and Skills Development: In tertiary institutions located within or near host communities, lecturers face limitations in laboratory, work, research activities, and digital learning. Practical and technical training, essential for employability in energy-producing regions, is compromised.

PIA Alignment: The PIA emphasises economic empowerment and capacity building of host communities. Inadequate electricity in tertiary institutions weakens skills acquisition and undermines the long-term economic sustainability envisioned under the Act.

Health Service Delivery Is Severely Disrupted: The study identifies electricity access as a critical determinant of healthcare quality. Medical personnel and health workers report

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challenges in vaccine storage, diagnostic testing, emergency response, and nighttime care. Health facilities rely heavily on generators, increasing costs and service interruptions.

PIA Alignment: Health infrastructure is a priority development area under the HCD framework. Poor electricity supply in health facilities directly contradicts the Act's goal of improving social welfare and quality of lif**e** in host communities.

Poor Electricity Supply Drives Workforce Attrition in Public Service: Across administration, education, and healthcare sectors, the study finds that professionals should avoid postings to communities without reliable electricity. Existing staff seek transfers, resulting in chronic understaffing and low morale.

PIA Alignment: The PIA links sustainable development to peaceful coexistence and asset protection. Weak public services caused by electricity deficits may fuel dissatisfaction and grievances, undermining community stability and trust in petroleum operations.

Host Community Development Implications: The findings demonstrate a clear disconnect between gas production activities and local electricity access, revealing an implementation gap within the Host Community Development framework. Although the PIA mandates that host communities benefit directly from petroleum operations, the absence of electricity in public institutions shows that development interventions have not sufficiently targeted productive social infrastructure.

Electricity provision for civil and public service institutions represents a high-impact Host Community Development Intervention. Unlike short-term social projects, power supply strengthens governance, education outcomes, healthcare delivery, and human capital retention. Its absence, therefore, magnifies underdevelopment despite proximity to gas facilities.

Regulatory oversight bodies such as the Nigerian Upstream Petroleum Regulatory Commission are expected to ensure that HCDT projects align with the Act's objectives. Prioritising electricity infrastructure for public service institutions would provide measurable, cross-sectoral development benefits consistent with PIA expectations.

Policy-Relevant Interpretation of Findings

Within the PIA Host Community Development framework, the findings suggest that:
Electricity access should be classified as foundational HCD infrastructure, not a peripheral project. HCDT funding should prioritize schools, health facilities, and government offices for electrification using gas-to-power or hybrid mini-grids. Community needs assessments must incorporate public service functionality indicators, not only physical project

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completion. Reliable electricity can improve service delivery, enhance staff retention, and reduce community grievances.

Alignment with Host Community Development Provisions of the PIA 2021

The Petroleum Industry Act (PIA) 2021 establishes the Host Community Development Trust (HCDT) to ensure petroleum operations deliver sustainable social and economic benefits to host communities. Eligible projects include education, health, infrastructure, and capacity development. The survey findings demonstrate that the lack of electricity is a binding constraint across all these sectors. Although gas extraction occurs within these communities, public institutions remain energy-deprived, revealing a disconnection between resource production and local development outcomes.

Under the PIA, Development projects are expected to improve the quality of life, and the benefits should promote peace, stability, and economic inclusion. Host communities must see a measurable development impact. Electricity provision for schools, health facilities, and government offices must meet all three criteria and should therefore be prioritised within HCDT investment decisions. Regulatory oversight by bodies such as the Nigerian Upstream Petroleum Regulatory Commission is critical to ensuring that Trust funds are directed toward foundational infrastructure rather than low-impact projects.

Policy-Relevant Implications from the Study

The study establishes that electricity access is a multiplier intervention to improve governance, education, and healthcare simultaneously. A generator-dependent service delivery is financially unsustainable and grossly inefficient. Failure to electrify public institutions undermines the developmental intent of the PIA and weakens community trust.

This study finds that poor or non-existent electricity supply from gas plants has significantly undermined civil and public service delivery in host communities. Administrators operate inefficiently, educators face declining teaching standards, and health workers provide care under unsafe and suboptimal conditions. These outcomes contradict the developmental intent of the Petroleum Industry Act (PIA) 2021. Study evidence confirms that poor or absent electricity supply from gas operations has significantly weakened civil and public service delivery in host communities. These outcomes contradict the evidence on development and the statutory objectives of the Petroleum Industry Act (PIA) 2021. Embedding electricity provision for public institutions within Host Community Development planning is therefore not optional. It is central to achieving inclusive, sustainable, and peaceful development in gas-producing communities. Aligning electricity provision for public service Institutions with Host Community Development provisions offers a strategic pathway for transforming gas-producing communities into centres of

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effective governance, quality education, and reliable healthcare, thereby fulfilling both the letter and spirit of the PIA.

Question No. 7: Question on unemployment in a gas Producing Community
How would the provision of gas-powered electricity in a gas producing community solve the problem of unemployment?

Question: What is the value chain link between gas-powered electricity and unemployment in a gas producing community?

Question: Given the relationship between the gas company, and the availability of statistics of unemployment in the community, why have the company not taken deliberate steps to address the problem, and if she has done that, what exactly did she do?

Question: How would the provision of gas-powered electricity solve unemployment in a gas-producing community?

Answer: *Direct employment effects:* The provision of gas-powered electricity will create immediate jobs across the energy value chain in the operation and maintenance of turbines, substations, and mini-grids. There will be job opportunities for electrical technicians, safety officers, metering staff, local security, logistics, and facility management roles. These non-extractive jobs would remain in the community even when drilling activities have reduced to the barest minimum.

Indirect and induced employment: The availability of reliable electricity would reduce production costs and simultaneously enable labour-absorbing enterprises. Some of the labour absorbing enterprises are welding and fabrication, block-moulding, carpentry, auto repairs, fish processing, cold storage, rice milling, cassava processing. The enterprises also include ICT services, printing, phone repairs, tailoring, and creative trades. The trend would further make businesses to expand, and bring about the employment of apprentices, sales workers, drivers, as well as administrative staff.

Skills formation and youth absorption: Unarguably, the provision of electricity would enable: vocational training centres (TVET) and digital skills hubs and evening adult education. It will popularize on-the-job apprenticeship systems and convert unemployed youth into skilled labour thereby addressing structural unemployment rather than short-term joblessness.

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Reduction of disguised unemployment: In many gas communities, residents are "employed" in low-productivity survival activities. Electricity raises productivity, turning underemployment into gainful employment with stable income.

Question: What is the value chain link between gas-powered electricity and unemployment in a gas producing community?
Answer: *Value-chain link between gas-powered electricity and unemployment:* The provision of electricity in the community will establish the value chain link between gas powered electricity and unemployment.
Integrated value-chain explanation: The integrated value chain explanation is highlighted below:

Stage: electricity Function: employment outcome: gas-to-power conversion: local turbines /embedded generation: technical and operational jobs: power distribution: mini-grids, transformers, meters: electricians, installers

Productive Use: Workshops, agro-processing, and ICT contribute to increased employment among artisans and SMEs, which leads to market expansion. This, in turn, lowers costs and allows for longer operating hours. Increased business growth and hiring result, enabling greater income circulation. As wages are spent locally, this stimulates induced jobs in sectors such as transport and trade.

Multiplier Effect: Each megawatt of reliable electricity supports dozens of SMEs, hundreds of direct and indirect jobs, expansion of farming, fishing, transport, education, and health value chains**.** Thus, unemployment declines not because of welfare, but because productive economic activity expands.

Question: Why have the gas company not deliberately addressed unemployment?
Answer: *Structural reasons for inaction:* One reason the gas company has not addressed unemployment is its corporate social responsibility-driven approach, focus on scholarships, one-off donations, and short-term skills programs. The aforementioned do not restructure the local economy of the communities, and do not reduce unemployment.

Separation of core business from community economy: Gas companies treat electricity as a national grid issue, not a community development obligation despite operating gas facilities in the communities.

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Weak use of unemployment statistics: The Company knows that unemployment occurs because communities often furnish the company with data on unemployed persons. The company rarely integrate the data into their project design.

Projects are not tied to measurable job-creation indicators: The Company avoid risk and regulatory ambiguity: it avoids creating "precedent" demands**.** There are always unclear boundaries between government and corporate responsibility, with neither the government nor the company taking responsibility for the unemployment plaguing the communities.

Influence of Respondents' Occupations on Industrial Productivity

The analysis reveals that the occupational structure of the respondents has significant implications for industrial productivity in the presence of gas-fired electricity. The availability of reliable gas-powered energy is a critical factor that enhances the efficiency, scale, and sustainability of industrial activities. Each occupational group contributes differently to this process.

Farmers and fishers men/women: They constitute major providers of raw materials for agricultural and marine-based industries. With stable electricity, agro-processing and fish-processing industries can operate more efficiently through mechanised production, cold storage, and value-addition activities. This, in turn, stimulates rural industrialisation and reduces post-harvest losses.

Skilled Artisans: This includes welders, electricians, mechanics, and fabricators, who represent a crucial technical workforce needed for installing, operating, and maintaining industrial equipment. Their presence increases industrial uptime and supports the expansion of small and medium-scale enterprises that rely on electric power.

Oil and gas contractors: They also play a pivotal role by offering specialised technical services and infrastructural support necessary for maintaining energy systems and industrial installations. Their activities complement the gas-fired electricity supply and ensure the reliability of energy infrastructure within the communities.

Transport operators: Transporters contribute to industrial productivity by facilitating the movement of raw materials, industrial inputs, and finished products. Efficient logistics systems are essential for sustaining industrial operations and expanding market reach.

Petty traders: The petty traders support supply chains and distribution networks for industrial and consumer goods. Reliable electricity enhances their operations, such as

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refrigeration, packaging, and retail services, thereby strengthening local commercial activities.

Civil and public servants: This sector indirectly influences industrial productivity through the provision of administrative, regulatory, and institutional support. Their roles help create an enabling environment for industrial growth and investment.

Unemployed persons: The unemployed persons represent a potential labour pool that industries can absorb as production expands. Their availability ensures adequate manpower for factory operations and emerging industrial ventures.

Occupation and Industrial Impact with Gas-Fired Electricity
Farming: Supplies raw materials for agro-processing; electricity enables mechanized processing and storage.

Fishing: Supports fish-processing industries through improved freezing, drying, and packaging.

Petty Trading: Strengthens supply chains; electricity supports cold storage and small-scale industrial retail.

Oil & Gas Contracting: Provides technical services and infrastructure crucial for industrial energy systems.

Transport Services: Facilitates distribution of materials and products, enhancing industrial efficiency.

Civil/Public Service: Offers regulatory and administrative support to industrial development.

Skilled Artisans: Provide installation, fabrication, and maintenance services for industrial machinery.

Unemployed Persons: Serve as an available labour reserve for expanding industrial sectors**.**

Implications of Findings
The findings suggest that the communities possess a diverse occupational structure capable of supporting industrial growth. With improved gas-fired electricity, industries can leverage

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the available labour force, raw materials, and technical expertise to increase productivity, reduce production costs, and stimulate economic development. The synergy among these occupational groups highlights the transformative potential of a stable energy supply in resource-rich communities.

Occupations and their Influence on Industrial Production

There are occupations that are likely to influence industrial productivity if there is gas-fired electricity. Gas-fired electricity improves power supply, reduces production costs, and enables mechanisation. The following occupations among the respondents have a direct or indirect impact on industrial growth:

Farming

How it influences industrial productivity
Reliable electricity enables agro-processing industries such as:
Rice mills
Cassava/garri processing factories
Palm-oil mills
Cold storage for perishable agricultural goods
Farmers supply raw materials for these industries, increasing output, value-addition, and exports.

Fishing

How does gas-fired electricity contribute, and influence industrial production in the fishing occupation?
Steady electricity supports:
Fish freezing and cold-chain storage
Fish drying/smoking facilities
Packaging industries
Improved storage reduces post-harvest loss, enabling scaling into commercial industrial fish processing.

Petty Trading

Contribution
Traders distribute goods produced by local industries.
Electricity supports small industrial activities such as:
Cold beverages
Retail refrigeration
Helps create a vibrant supply chain for industrial products.

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Oil and Gas Contracting
Contribution
Gas availability directly supports energy-intensive industries, while contractors provide:
Technical services
Pipeline maintenance
Infrastructure development
These services expand industrial operations and energy reliability.

Transport Workers
Contribution
Industrial expansion needs:
Movement of raw materials
Delivery of processed goods
Good transport services enhance industrial distribution efficiency.

Civil/Public Servants
Indirect Influence
They support:
Policy formulation
Licensing and regulatory oversight
Administrative support for industrial infrastructure
Strong local governance encourages industrial investment.

Skilled Artisans
(One of the strongest influencers)Examples: welders, electricians, mechanics, carpenters, machine technicians
How they influence productivity
Industries depend on skilled artisans for:
Machine installation
Fabrication
Repairs and maintenance
Building and construction
Electricity improves their productivity and enhances industrial capacity and uptime.

Unemployed Persons
Indirect Potential Influence
With new industries powered by gas:
Unemployed persons can be absorbed as factory workers

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They increase labour availability
Expands the industrial workforce base.

Summary: Most Influential Occupations
If ranking the occupations by direct impact on industrial productivity, given gas electricity:
1. Skilled artisans
2. Oil and gas contractors
3. Farmers
4. Fishing workers
5. Transport workers
6. Petty traders
7. Civil/public servants
8. Unemployed persons (potential labour reserve)

Fishing professionals in the three gas-producing communities face a complex mix of environmental, economic, institutional, and security challenges. These challenges, when combined, threaten the sustainability of fishing as a livelihood despite the communities' natural aquatic resources. A policy-focused linkage of each identified challenge to practical policy recommendations for the government are suitable. Effective policy interventions that combine environmental protection, economic support, security enhancement, and institutional strengthening are essential for improving the livelihoods of fishing professionals in gas-producing communities. Coordinated action by government, oil companies, and local communities will ensure the sustainability of fishing as a profession.

Findings among farmers as professionals in the three gas-producing communities revealed their challenges, including soil pollution, lack of farm inputs, poor access to credit, flooding, insecurity, and limited market access. It was further said that oil spills and gas flaring pollute the soil, vegetation, and surface water. The aforementioned undermines agricultural land quality and biodiversity, with the consequence of reducing livestock grazing resources, and degrades animal habitats. The situation is further exacerbated by the construction of oil wells, pipelines, access roads, and support facilities, which remove land from traditional farming and grazing use. When environmental pollution occurs, it affects the health of animals through the continuous release of toxic gases (SO_2, NOx, and methane) and particulate matter. These pollutants settle on pasture grasses and water sources, which animals consume. The effects on animals include reduced growth rate, respiratory problems, increased mortality in poultry and small ruminants, and reduced milk and meat quality. The outcome of the aforementioned is a decline in livestock productivity and higher veterinary costs.

Among the petty traders, findings revealed their contributions to the economy, including the provision of essential goods and services to community members on a daily

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basis. Improving access to food and household items, and the self-employment, and sometimes, the provision of informal jobs for helpers, thereby reducing unemployment. Petty traders support local producers and farmers by buying and selling locally made goods, which strengthens the local value chain. They contribute to government revenue through daily levies, market dues, and local taxes. Petty traders sustain household incomes and community livelihoods, especially in low-income and semi-urban areas. The Study observed that the lack of electricity limits the ability of the petty trader to preserve perishable goods, leading to frequent spoilage and financial losses. The reliance on expensive alternatives such as generators or kerosene lamps increases operating costs and reduces profits. Poor lighting affects evening sales and shortens my business hours, lowering daily turnover. Petty traders cannot use basic electrical equipment (freezers, grinders, POS machines) due to unstable electricity, which reduces efficiency and competitiveness. Unstable power supply discourages business expansion and limits their contribution to local economic growth. Petty traders play a vital role in sustaining community welfare and the national economy; an inadequate electricity supply significantly undermines productivity, profitability, and growth potential. The availability of reliable and affordable power would greatly enhance petty traders' contributions to inclusive economic development.

Findings revealed during interactions with oil and gas contractors that the 3 communities, Ihwreka, Otughievwen and Otor-Udu, have used funds realised from MOU with the gas company to build a gas turbine to enable them generate electricity, but the management of Utorogu gas plant NEPL (NNPC Exploration and Production Ltd) and ND Western refused to supply gas even at a low cost, to power the turbine. The Utorogu gas plant itself does not generate or distribute electricity directly to the local communities. The ND Western/NPDC Joint Venture under the 2021 Petroleum Industry Act is to fund a Host Community Development Trust (HCDT), with apportioning of operating expenditures to benefit host communities.

ND Western/NPDC Joint Ventures publicly state their role primarily as a national gas supplier. The PIA encourages community participation and ownership. Findings from professional transporters in the communities revealed that the lack of electricity affects their livelihood, because transporters cannot work late and because the roads are not lit. The reduction in the number of hours consequently affects their income. In the same vein, the lack of electricity also affects safety, as well as the security of lives and properties. The lack of electricity contributes to a poor vehicle maintenance culture, high operation costs, and stunted growth of transport-related businesses. The provision of electricity through step down mini grid is one of the many solutions to the challenges posed to the transportation business in the three gas-producing communities.

This study examined the occupational distribution of respondents across three gas-producing communities and assessed how the availability of gas-fired electricity can

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influence industrial productivity. The analysis showed that the major occupations include farming, fishing, petty trading, oil and gas contracting, transport services, civil/public service, skilled artisanal work, and unemployed persons. These occupational groups represent a diverse labour structure with high potential for industrial development.

The findings revealed that gas-fired electricity plays a central role in enhancing industrial efficiency and expanding local productivity. Farmers and fishers provide raw materials that can support agro-processing and fish-processing industries. Skilled artisans form a crucial technical workforce needed for industrial machinery installation, maintenance, and fabrication. Oil and gas contractors supply specialised technical services essential for energy infrastructure. Transport operators support logistics, while petty traders strengthen local value chains and distribution networks. Civil and public servants offer regulatory and administrative support that encourages investment and industrial growth. The unemployed population forms an accessible labour pool for emerging industries. Overall, the synergy among these occupational groups highlights the capacity of the communities to support sustained industrialisation when reliable electricity becomes available.

CONCLUSION AND RECOMMENDATIONS

The study concludes that the occupational characteristics of respondents in the three gas-producing communities provide a strong foundation for industrial productivity, particularly with the introduction of stable gas-fired electricity. Reliable energy supply is a catalyst that unlocks the economic potential of farmers, fishers, artisans, traders, contractors, and transport workers. It enables mechanisation, value addition, and expansion of small and medium-scale industries. With adequate infrastructural, administrative, and policy support, these communities can transition from primary-resource-based economies to vibrant industrial hubs. Therefore, gas-fired electricity serves not only as an energy source but also as a strategic driver of industrial transformation and community development. Based on the findings, the following recommendations are proposed:

Strengthen Energy Infrastructure: Government and private investors should expand and maintain gas-fired electricity infrastructure to ensure steady and reliable power supply for domestic and industrial use.

Promote Agro-Processing and Fish-Processing Industries: Communities should establish or support industries that utilize local raw materials such as cassava, rice, palm produce, and fish. This will reduce post-harvest losses and increase value addition.

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Capacity Building for Skilled Artisans: Training programs should be developed to enhance the skills of welders, electricians, technicians, and machine fabricators to meet industrial standards.

Support Small and Medium Enterprises (SMEs): Credit facilities, grants, and business advisory services should be provided to petty traders, small manufacturers, and start-ups to help them leverage improved electricity for industrial expansion.

Strengthen Transport and Logistics Systems: Investment in roads, waterways, and transport facilities is needed to improve the movement of goods and enhance industrial efficiency.

Encourage Local Content Participation: Oil and gas contractors should be supported through policies that promote local content, enabling them to offer more technical and infrastructural services to industries.

Improve Administrative and Regulatory Frameworks: Civil and public service structures should be strengthened to ensure transparent licensing, regulatory oversight, and support services that encourage industrial growth.

Employment and Skills Development for Youths: Programs should be established to train unemployed youths in industrial skills, entrepreneurship, and technical fields to create a competent workforce for new industries.

Promote Public–Private Partnerships
Collaborative projects between government, private sector, and community leaders should be developed to establish and sustain industrial ventures powered by gas-fired electricity.

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