POLICY BRIEF

An Assessment of Natural Gas Price Formation in Ghana: Implications for Industrial Development and Inclusive Growth

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Abstract: Access to reliable energy, particularly electricity, has consistently been identified as one of the most significant constraints to doing business in Ghana. Improving energy supply remains one of the government’s top priorities indicated by the recent procurement of several thermal-based electricity generation supplies in addition to a commitment to develop the country’s natural gas market. Ghana’s domestic gas resources have the potential to significantly change the fuel supply dynamics over the next 15 to 20 years, however issues with the pricing of natural gas have not been fully understood by stakeholders. This paper analyses the emerging gas industry in Ghana, specifically natural gas price formation and identifies the constraints to the development of gas markets, and the role of policy in shaping this market. Our findings indicate that a review of the current uniform transportation and distribution tariffs is necessary to bring domestic gas prices down. This will, in turn, catalyse broad-based development and inclusive growth through the economic multipliers it creates. The paper provides a basis for informed, evidence-based policymaking and discussions on gas use and gas pricing.

Keywords: Natural Gas Prices; Gas Markets; Competition; Pricing Model; Energy Access.

1. The Policy Issue

Access to reliable energy, particularly electricity, has consistently been identified as a significant constraint to doing business in Ghana, especially for small and medium scale enterprises (SMEs) which constitute a significant proportion of the economy (World Bank, 2018 & 2013). Inadequate power supply, resulting in load shedding and power outages, has had a negative impact on businesses, forcing them to resort to more expensive power-generation units that run on petrol and diesel fuel. The increase in their operational costs and the subsequent impact on their cash flows led to reduced output and job losses. The Institute of Statistical, Social and Economic Research (ISSER) estimates that the 2007-2008 and the more recent 2014-2016 power crisis dubbed ‘dumsor’ cost Ghana about 2% of GDP (USD 766 million) from the production of goods and services. This challenge, driven in part by the estimated 10% year-on-year demand growth for power, implies that about 250 megawatts (MW) of new generation capacity needs to be procured annually (Acheampong & Ankrah, 2014).

The discovery of oil and gas in commercial quantities since 2007 and subsequent production has changed Ghana’s fuel supply dynamics. This change has led to the restructuring of energy policy including initiatives to develop the domestic gas (associated and non-associated) reserves to provide fuel for thermal generation and inclusive growth through the economic multipliers it creates. The paper provides a basis for informed, evidence-based policymaking and discussions on gas use and gas pricing.

The discovery of oil and gas in commercial quantities since 2007 and subsequent production has changed Ghana’s fuel supply dynamics. This change has led to the restructuring of energy policy including initiatives to develop the domestic gas (associated and non-associated) reserves to provide fuel for thermal generation and other industrial uses such as petrochemicals. This aligns with government’s vision of making Ghana the petroleum hub of the West African sub-region. At the same time, strategic procuring of alternative liquefied natural gas (LNG) imports for gas-to-power projects to replace expensive liquid fuels namely light crude oil (LCO) and diesel for use in petrochemicals production and transportation is ongoing. Thus, natural gas is poised to play a crucial role in Ghana’s energy sector as power demand grows and thermal generation capacity is expanded.

Despite this changing dynamic, issues of gas use and its ability to drive industrial development, particularly the economic pricing of natural gas
have not been fully explored. Issues of gas pricing have been found by companies and countries to be commercially and politically sensitive due to its impacts on what consumers pay and the economics of investing in new infrastructure for future energy demand (International Gas Union, 2014). Also, gas pricing issues have received considerable attention in policy circles in recent years given the transition to more sustainable and environmentally friendly energy systems to address climate change. Considering these developments, we believe that a thorough understanding of natural gas utilisation and pricing is crucial in working out the linkages between energy security and inclusive development. For relevant stakeholders, a detailed understanding of components that feed into the gas price ensures that discussions of gas use and pricing is approached from an informed perspective.

This policy brief provides a concise but comprehensive assessment of gas price formation in Ghana. Further, it contextualises this considering the recent energy and industrial policy changes in Ghana as well as dynamics in the West African region. Our findings indicate that a review of the current uniform transportation and distribution tariffs is necessary to bring domestic gas prices down. This will, in turn, catalyse broad-based development and inclusive growth through the economic multipliers it creates. The brief provides a basis for informed, evidence-based policymaking and discussions on gas use and gas pricing.

2. Key Findings

2.1 Landed Costs of Various Fuels to Ghana

Figure 1 shows the landed costs of gas delivered from four sources [Jubilee, TEN (Associated), TEN (Non-Associated), OCTP Gas (Integrated, Non-Associated), and WAGP Gas (Nigeria)] to the various industrial clusters in Tema and Takoradi, mostly for power production. On a pecking order basis, Jubilee gas has the lowest wellhead purchase/commodity price among the sources. This is because the gas is associated and, also, the first 200 bcf is delivered free to the government of Ghana as part of the conditions of the petroleum agreement.

Average delivery price of WAGP gas in 2017 was $8.6/mmbtu and that of Ghana Gas was $8.8/mmbtu; Ghana gas 80% and WAGP 20% results in weighted average of $8.8/mmbtu. For 2018, PURC estimates $7.3/mmbtu as weighted average cost. From our analysis, the weighted average, based on 120 mmscfd (Jubilee), 75 mmscfd (TEN), 30 mmscfd (WAGP) and 100 mmscfd (OCTP) is 6.4/mmbtu. OCTP is developed on an integrated basis with similar cost-saving rationale as the Jubilee and TEN. OCTP field includes the non-associated gas fields Sankofa and Gye Nyame (“Sankofa Gas Field”) and the Sankofa East oil field. Bringing these significant non-associated gas reserves to market requires a high enough price to support capex and opex recovery, be it a stand-alone gas or an integrated development. The gas costs would have been much higher were the field to have been developed on a stand-alone basis with all the associated infrastructure needed to evacuate the gas to market.

The 20-year gas sales agreement signed between the OCTP field developers (Eni and Vitol) and GNPC (also with a carried and participating interest in the field and as the gas buyer) in 2014 provided a gas price of $9.80/mmbtu under a 90% take-or-pay provision to lift 62 bcf of gas annually (180 mmscfd) (World Bank, 2015). The pricing formula under the GSA included a link to the US Consumer Price Index, Henry Hub gas prices, and Brent crude oil prices (World Bank, 2015).

Additionally, GNPC the gas buyer could reduce the agreed gas price by $0.55/mmbtu per every $100 million contributions they made towards building the gas pipeline from the FPSO to the onshore receiving facilities. The indexation provisions in the contract, coupled with the fact that the OCTP project has been delivered below the estimated $7.9 billion price tag due to cost deflation induced by the 2014-16 oil price slump, means that headline gas price is now 20% lower at a reported $7.89/mmbtu. Regarding WAGP gas imports from Nigeria, the $8.45/mmbtu delivered gas price is made up of the gas purchase (commodity price) additionally comprised of a base price indexed to Bonny Light oil prices and US inflation (Fulwood & Bros, 2018).
2.2 Structural non-payment risks across Ghana’s energy value chain

Gas will continue to offer Ghana significant cost savings, security of supply and meet environmental benchmarks than other fuel choices. However, structural non-payment issues from the inability to recoup costs of gas supplied by E&P companies to GNPC through to GNGC for use by VRA and other IPPs in power generation poses systemic risks (see Figure 2).

Some projects like OCTP partially mitigated by sovereign guarantee, MIGA guarantee and dedicated ring-fenced escrow accounts to service gas purchases; however, the fundamental credit worthiness of energy sector institutions need to be relooked again (domino effects). Despite floating of $2.5 billion ringfenced Energy Sector Levies Act (ESLA) Bond using receivables from the energy sector levy, arrears are still being accrued in the value chain.

Figure 1 Gas Costs and Tariffs in Ghana

Figure 2 Market Players in Ghana’s Gas Value Chain
3. Conclusion and Policy Recommendations

Research sought to provide a concise but comprehensive assessment of gas price formation in Ghana. It further contextualises this considering the recent energy and industrial policy changes in Ghana as well as dynamics in the West African region. What currently exists in Ghana’s domestic gas market is a natural monopoly dominated by GNPC and its subsidiary GNGC which aggregates gas from all the E&P production companies.

1. Ghana with its gas resources is dedicated to the domestic market must face the tradeoff challenge: providing investment incentives for E&P companies, capturing gas rents by maximising royalties and taxes, ensuring regular supply and ultimately cost reductions in the critical power sector.

2. Our findings indicate that while the average delivered cost of gas in Ghana is $6.4/mmbtu, the weighted average sales price is $8.8/mmbtu (2017) and $7.3/mmbtu (2018) to power producers, resulting in significant downstream rents in excess of $1-$2/mmbtu over the period.

3. Although aspects of the gas industry are inherently monopolistic, domestic gas market price regulation with a view of accruing significant rents may not be optimal.

4. There is a need for detailed rules on price determination to be published by the industry regulator. This should particularly provide a clear economic basis for other aspects of the price make up beside the commodity charges – that is, the gathering, processing, transportation and other regulatory levies.

5. Such information would not only enlighten but help reduce potential tariff conflicts, ultimately improving consumer welfare.

6. Other benchmarking research on gas prices in several African countries and other emerging countries where gas is marketed in the domestic market show that wholesale gas prices mostly for power generation ranges from $3-$6/mmbtu.

7. Future studies can quantify the implications of these domestic gas prices and pricing policy on different demand sectors including the power sector. The price of gas could be plugged into the electricity tariff formula to ascertain the final electricity tariff with additional scenario modelling to determine the elasticity of demand for natural gas and its multiplier impacts on the economy.

4. References

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IMANI Center for Policy & Education is a Think Tank of considerable local and international repute based in Ghana. Founded in March 2004 by Mr. Franklin Cudjoe, IMANI has carved a niche in Ghana’s policy environment for putting out objective, independent analysis and critique on many issues, using tried and tested techniques that apply across different disciplines. Through effective communication skills and the ability to work with public-spirited media and civil society, we are shaping national, regional and global agenda to close the "citizen participation gap" in the governance process.

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