

Review Article

Market Trends and Outlook for Oil and Gas, a Review

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Abstract

Hydrocarbon business globally, commands enormous influence over the dynamics of financial integrity on wealth creation in the world economy, through global trade. Citing example with Nigeria's Oil and Gas industry, her richly endowed mineral deposits, for the past six decades has (directly or indirectly) played very significant role on virtually all economic and commercial activities; in determining the financial health/viability of the nation's economy. The global economy presently faces challenges of the global warming due to the climate change that has occurred as a result of incremental growth in energy demands and consumption. Energy, known as a critical factor to life is essential for purposes of powering the economy through daily economic activities, and also for maintenance of man's existence, has its own consequences on the environment in the course of its production and utilization. As a result, it has been proven to be posing a number of challenges, threats to life and man's sustainable existence because of the adverse incidences on the planet, resulting from impact of carbon emissions being generated from energy consumption of fossil fuels/Oil and Gas sources (among other greenhouse gases, GHGs). Energy transition, as a phenomenal trend on the global energy solutions management, would contain these global challenges (in ever increasing global population with its imminent threat of energy crisis/poverty) by applying energy-mix menu and technologically advanced initiatives (the proposed Maximum energy-minimum emissions strategy) to control global warming by net-zero carbon emissions target through decarbonizing technologies; for sustainability of the planet.

Keywords

Hydrocarbon Business, Energy Consumption, Energy-Mix Menu, Global Warming, Net-Zero Carbon Target, Maximum Energy-Minimum Emissions

1. Introduction

Market trends and outlook on oil and gas significantly keys into the elemental principles and diverse approaches to stabilizing and sustaining the hydrocarbon business in the contemporary global economy that is facing global climate challenges, which resulted to the environmental disruptions caused by global warming. This climate change impact occurred from continuous consumption of energy sourced from fossil fuels (coal, oil and gas) that discharge and emit carbon dioxide (CO₂, a greenhouse gas/GHG) into the atmosphere;

in the process of energy utilization to power and drive the economy (for daily economic and commercial activities) and man's lifestyle with daily needs (heating of homes against cold weather conditions and for cooking purposes), as a continuous maintenance of life for man's existence on the planet.

The global challenges therefore, are better addressed through trendy market outlook on the global energy economics and management (at all times), for sustainability through energy transition that will constantly assure "energy

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security” from any eventual “energy crisis” or “energy poverty”; in a changing world that is ever increasing in population. The increasing world population, which has been projected to reach 9.8 billion by 2050 invariably, exerts mounting pressure at different times and periods/seasons on the global energy demands that should be met by establishing a sustainable and affordable energy security for the society [1]. Technological advancement has made it possible (through scientific research programmes) that the current threat on man’s future existence on the planet by the impact of environmental catastrophe that is tending towards 2 °C global temperature increase, causing all kinds of unsustainable huge economic and financial losses, health challenges and social imbalance on life’s maintenance as a result of the global warming; can be adequately addressed by making sure that the carbon emissions to the atmosphere is scientifically controlled in all world economies.

A lot of techniques and methods are being currently introduced at the instance of the United Nations’ climate-action clarion calls for urgent measures on all countries of the world; for mitigation and adaptations in the face of global warming. The principles behind the measures being taken, focuses on carbon neutrality methods of either carbon capture and storage (an innovative technology that is supported by big oil companies and applied by high-emitting industries), or carbon balancing (where the amount of the GHG emitted into the atmosphere; in the course of a continuous daily economic and commercial activities, globally). The emitted quantity is equally and effectively taken out in carbon balancing. These methods deployed simultaneously for carbon dioxide removals target to effectively counterbalance hard-to-abate residual emissions, towards making sure that the net-zero target by 2050 [2] is effectively pursued and achieved, with a temperature ceiling of not above +1.5 °C (as agreed and signed by most nations in the continuous global climate change yearly conventions).

This interestingly, has evolved an approach recently being proposed and applied for a continuous utilization and consumption of energy sourced from fossil fuels, which has even been identified as the primary cause, and in fact, a major factor for the excessive generation of the GHG/CO₂ that is heating up the entire earth’s atmosphere beyond the naturally permissible level of the “greenhouse effect”. This greenhouse effect is the GHG (that accumulate in the atmosphere, to form the heat-reflective layer, insulation); which was originally warming the earth enough by keeping it at a livable temperature to support life from freezing, at places like the arctic regions. This approach being introduced by the national oil company (NOC) of the Abu Dhabi National Oil Company (ADNOC) in the United Arab Emirate; is a strategy known as “Maximum energy, minimum emissions” [3]. Sultan Al Jaber, the ADNOC CEO says, “We know that fossil fuels will continue to play a role in the foreseeable future in helping meet global energy requirements”.

For a country like Nigeria (for instance), that is globally acknowledged as the foremost Oil producing country in Af-

rica. The above strategy suits the economy very well because, the trending energy transition from fossil fuels to renewable energy sources would still create a window that does not completely terminate or shut down further extraction of crude oil and gas but, allows continued usage to exploit her abundantly endowed natural resources. This especially, aligns with the “Nigerian gas master plan” by contributing to the United Nations’ (UNs’) climate action towards “cleaner energy future” through enhanced local production of Liquefied Natural Gas, LNG; to process Liquefied Petroleum Gas, LPG and Compressed Natural Gas, CNG. This shall be observed as renewable energy remains an “addition” to include all sources of energy in the energy-mix menu; [4] in the course of managing the global energy solutions (energy efficiency), for the future sustainable energy security; and the eventual overall economic growth of the Nigerian economy.

2. Hydrocarbon Business

In Nigeria’s hydrocarbon business, the future has a tremendous chance with great opportunities that would effectively nullify and neutralize the presently market pricing impact of the highly inflated imported petroleum products’ pump prices (especially the gasoline/petrol, kerosene and diesel) by fully developing to fill the gap of unutilized capital stock on gas value-chain in production of alternative energies from natural gas, in the nation’s oil and gas industry. This conceptual idea is in sync with proposed “maximum energy - minimum emissions” strategy that is climate compliant. It is an approach with numerous advantages in terms of cost, energy affordability, availability and sustainability into the future global energy demand that supports the world’s economic growth and development, through the ever trending energy transition of the present industrial era.

The future cleaner energy and alternative to the traditional dirty energy from fossil fuels (Coal and Crude Oil that are long chain hydrocarbon compounds), also sourced as natural gas, to drive prosperity and power daily economic and commercial activities within the economy, is aspired through energy transition roadmap for climate compliance. The said hydrocarbon business needs to be vigorously pursued in the ongoing United Nation’s climate actions, to mitigate global warming and implement climate adaptation measures because we need to come to terms with realities of the times by transforming the local economy with our naturally endowed natural gas deposits to provide energy and create wealth with it; while aligning with the call by UN Secretary-General Antonio Guterres that “our world climate action on all fronts-everything, everywhere, all at once” [5].

In Nigeria where inflations have a trajectory rise on energy products (as a result of the petrol subsidy removal), which has further impoverished the vulnerable masses (considering their weak disposable income versus the recently hiked pump prices of petrol, kerosene and diesel). This development indirectly supports a drastic transition in the energy sector to

generate, produce through local processing of the nation's abundant natural gas deposits; and distribute both the CNG and LPG products that are far cheaper, affordable and readily available, for consumption. Nigeria's gas reserves have been estimated to last for 94 years, while Nigeria alone accounts for 33% of Africa's gas reserves, (with estimated gas reserves that range within the neighborhood of 184 to 209 trillion cubic feet). On the other hand, this cleaner energy product (CNG) will go a long way, contributing to reduction of carbon emissions for carbon neutrality or carbon balancing (where the excess GHG emitted thro energy production and consumption is equally taken out); for the sole aim to achieving the net zero target by 2050 (within the temperature ceiling of +1.5 °C).

3. Energy Consumption Dynamics

Energy consumption at this age and times all over the world, demands that the global energy consumption should be tailored to suit different economies on the basis of availability and affordability (based on the global energy-mix portfolio, available and peculiar to specified climes) to such economies located at different parts of the globe. This therefore, supports diversification on energy generations and provision (or "energy addition" concept in energy transition) on the energy-mix portfolios as earlier stated. In effect, this composition in energy-mix of the various primary energy sources for energy consumption-needs for power/electricity generation; fuel for transportation, heating and cooling of both residential and industrial facilities in any specified global location. The energy-mix includes; fossil fuels (Coal, Crude oil and Natural gas), various sources for renewable energy (Wind, Hydro, Solar, Geothermal, and biomass or wood), and nuclear source.

Diversification in no small measures on consumption dynamics, shall aim at boosting respective power sectors, and investment of profits from upstream petroleum in downstream industries (mega-refineries, petrochemicals, methanol, urea and fertilizer plants, Liquefied Natural Gas, LNG & Gas to Liquid, GTL plants, etc). Basically, the aim should be to domesticate their oil and gas resources to drive domestic industrialization and economic growth [6]. This mode of chemical industrialization with the government expenditure made on capital investments favors GDP growth and productivity, and cuts down on the import element of foreign refined products within the energy sector if the economy.

The market trends and outlook for the future management of energy products in Nigeria's oil & gas industry currently known to be experiencing an energy product consumption paradigm shift from petrol to CNG (an auto gas fuel) as an alternative automotive fuel, suddenly transits from the consumption of the very exorbitant, traditional dirty energy products (fossil fuels sourced, e.g. petrol). This alternative option for transportation fuel is because of the present needs, on the basis of three critical factors (economic, social and environmental) that are considered from their respective perspectives and dimensions, whenever the issue of energy

sustainability is extensively considered or being addressed globally.

The energy consumption dynamics therefore, specially prioritizes the economic benefits of the consumers' products cost on the basis of their meager disposable incomes, in the light of the presently hyperinflation in the Nigeria's economic space (as a way to cushion the effect and economic impact of fuel subsidy removal). This singular reason effectively and innovatively swings the arm of the pendulum very considerably, in favor of the CNG consumption (rather than petrol) for energy and power generation to drive all aspects of the economy. Most internal combustion engines are being converted from the conventional mode to LPG/CNG carburetors, to save cost of energy and energy efficiency in terms of climate compliance. This move fully supports the Nigeria Gas Expansion Programme initiative, by optimally making the energy consumption dynamics with the alternative transportation fuel streams available, to replace the expensive petrol with its technology (through research and development, R&D) within the economy, in the long term.

4. Global Warming

The climate action policies and signed protocols by the nations of the world, at the instance of the United Nations in the fight to mitigate global warming alongside deploying climate adaptation measures; to check and control further emissions of the greenhouse gases (GHGs), present very attractive opportunity for the future market trend in the natural gas business (looking at the contents of the "Nigerian gas master plan" initiatives) for the nation's economic growth through multi-sectoral investments in the nation's gas value-chain. The efficient utilization of the proven gas reserves of about 209 trillion cubic feet (209 tcf), for cleaner energy supplies as a means of supporting the carbon emissions reduction measure should be supported by every stakeholder. The effective carbon balancing method and technology in replacing the dirty traditional fossil fuels of Coal and Crude oil sources; for supplies of cost-efficient affordable products of natural gas (LPG and CNG) further contributes towards net zero target. Reduction in gas flaring of natural gas/associated gas, trapped and harvested as the raw material for processing of the LPG and CNG is another commendable climate action towards actualizing net zero.

In the energy transition plan, globally, the global green economy strictly focuses on actions and measures that mitigate and control global warming through technological processes that reduce carbon emissions, and insist on the multi-laterally agreed net zero target by 2050, where the temperature ceiling does not exceed 1.5 °C (to avoid the otherwise looming catastrophe against the already threatened planet earth). However, the global energy generation, production and supplies need to adequately align with the global demand on energy consumption. This is emphasized in the light of the ever rising world population, estimated to hit 9.8 billion by

2050. This from its perspective mounts extra pressure on actualizing energy security (that would take care of incidences of energy poverty and energy crisis at any point in time, globally). It is on this premise that the proposed strategy of “Maximum Energy – Minimum Emissions” strategy favors the poorer nations, especially within Africa; with the global warming mitigation measures that support energy addition on the energy-mix module, managed globally on the energy solutions format [7] in the global energy transition plan. For an oil producing country like Nigeria within Africa, processing of cleaner energy like CNG and LPG would help the economy grow under the proposed strategy. This is because; the natural gas value chain supports climate compliant (although it is fossil fuel).

5. Discussion

There are indeed, several ways that wealth could be created from the activities going on in the Oil and Gas Industry (especially within the Nigeria’s hydrocarbon industry). Looking at the future of the Oil and Gas Industry; opportunities abound in the gas value-chain expansion programme that lays more emphasis on development of natural gas utility for cleaner energy production as an alternative automotive or transportation fuel to refined petroleum products like petrol. The existing challenges (GHG emissions) of the global climate change that arose from the energy production and consumption sourced from fossil fuels (coal and crude oil especially) are already being checked by the UN’s climate actions of mitigation and adaptation, while the energy transition process still allows the continued exploitation and optimal utilization of the hydrocarbon resources capital stock. This task involves full optimization of the gas utility for a sustainable provision of future energy that is affordable and reliably available at all times, to erase any tendencies of energy poverty and energy crisis that could have arisen due to the ever increasing world population that is ever mounting pressure on the global energy demand.

The Nigeria gas master plan and gas policy are strategically structured to promote gas value-chain investment opportunities within the economy; specially designed to foster economic growth through the enormous potential for wealth creation inherent in that sub-sector, if efficiently harnessed [8].

Decarbonization process in the future [9] development of alternative energy for transportation [10] and industrialization, dwells majorly on the technological innovative applications of optimal utilization of associated/natural gas to enhance energy security strategy (support and increase the volume of cleaner alternative energy [11] in the energy-mix menu) through a transition concept of energy addition that progressively tones down the tendencies of carbon emissions. This is inclusive of carbon tax policy [12], carbon balancing method [13] and a reduction on gas flaring activities in the industry [14]; which ultimately fall in alignment and equally promotes more production of cleaner energy products (LPG and CNG) that are

alternative to the conventional dirty energy products (petrol, diesel and kerosene); which altogether are sourced from fossil fuels [15] but, the alternatives support the template that proposes “Maximum Energy – Minimum Emissions” strategy.

6. Conclusion

The roadmap for the global energy sector, towards the production and supplies of cleaner alternative energy of the future, with an aspired target to achieve net zero by 2050; particularly favors development and establishment of the Nigeria gas master plan and policies that critically promote massive investments in the gas value-chain of the economy. The said investments for domestic production of both LPG and CNG (in addition to other economic benefits, social improvements, and environmental advantages) would significantly boost economic growth and development that will be reflected in the statistical data of the national economic efficiency/Gross Domestic Product (GDP)/productivity from the gas sub-sector; in the sustainable future of the nation’s hydrocarbon industry (for cost effective, energy efficient, readily available and affordable cleaner alternative energy products).

It is hereby recommended that continued research should be conducted for the overall global energy transition plan.

Abbreviations

GHG: Greenhouse Gas
 NOC: National Oil Company
 ADNOC: Abu Dhabi National Oil Company
 UN: United Nations
 LNG: Liquefied Natural Gas
 LPG: Liquefied Petroleum Gas
 CNG: Compressed Natural Gas
 tcf: Trillion Cubic Feet
 GTL: Gas to Liquid
 GDP: Gross Domestic Product

Author Contributions

Nwachukwu Chuba Sunny is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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