



# OIL AND GAS INDUSTRY IN NIGERIA AND THE QUEST FOR ENERGY TRANSITION

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**Professor S. O. Isehunwa**  
**University of Ibadan**  
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# Presentation

- ▶ Introduction and General Overview
- ▶ Some issues in Energy Transition
- ▶ Some lessons from Oil and Gas Sector
- ▶ Conclusion and Recommendations



# OIL & GAS INDUSTRY OVERVIEW

## UPSTREAM

**EXPLORATION**

**DRILLING**

**PRODUCTION**

**NATURAL GAS**



## MIDSTREAM

**TRANSPORTATION**

**REFINING**

**GAS PROCESSING**

**PETROCHEMICALS**



## DOWNSTREAM

**BLENDING/  
MANUFACTURING/  
PACKAGING**


**DISTRIBUTION**

**MARKETING**



Source: Erinne, J. N. (2015)


## Oil and Gas Industry in Nigeria: General Overview

- ▶ Industry accounts for @60% of government revenue, and over 90% of export earnings.
  - ▶ Accounts for only 6-9% of GDP.
  - ▶ IOCs currently hold more than 90% of the oil reserves and operating assets and account for over 80% of the country's crude oil production. However, production by IOCs has shrunk over the past ten years by an annual average of 4%.
  - ▶ NOCs and marginal field players have increased production by up to 15% annual growth rate.
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## **Oil and Gas Industry in Nigeria: General Overview**

The Midstream & downstream sectors are currently dominated by NNPC, with 4 oil refineries with total installed capacity of 445,000 bbls/d and about 5000km network of pipeline connecting them to 22 white products depots. It also has one crude oil terminal, 4 Product jetties, 9 Liquefied Petroleum Gas plants and 20 pump/booster stations.

Utilization capacity of the refineries are generally very low, consequently, there is still massive importation of petroleum products to meet up the domestic demand.



# Oil and Gas Industry in Nigeria: Challenges

- ▶ Petroleum getting more difficult to find
- ▶ Smaller fields
- ▶ Aging facilities and staff
- ▶ Harsher terrains of discovery
- ▶ Safety, Security & Environmental issues
- ▶ Unstable prices
- ▶ Community issues
- ▶ Technology and higher business costs
- ▶ Depleting reserves



# Oil and Gas Industry in Nigeria: Challenges

- ▶ Companies have tried to meet these challenges through:
- ▶ Cost reduction measures
  - Staff rationalization
  - Vertical integration
  - Strategic business units
  - Strategic Partnerships
  - Portfolio diversification
- ▶ Engaging government, regulators, etc.



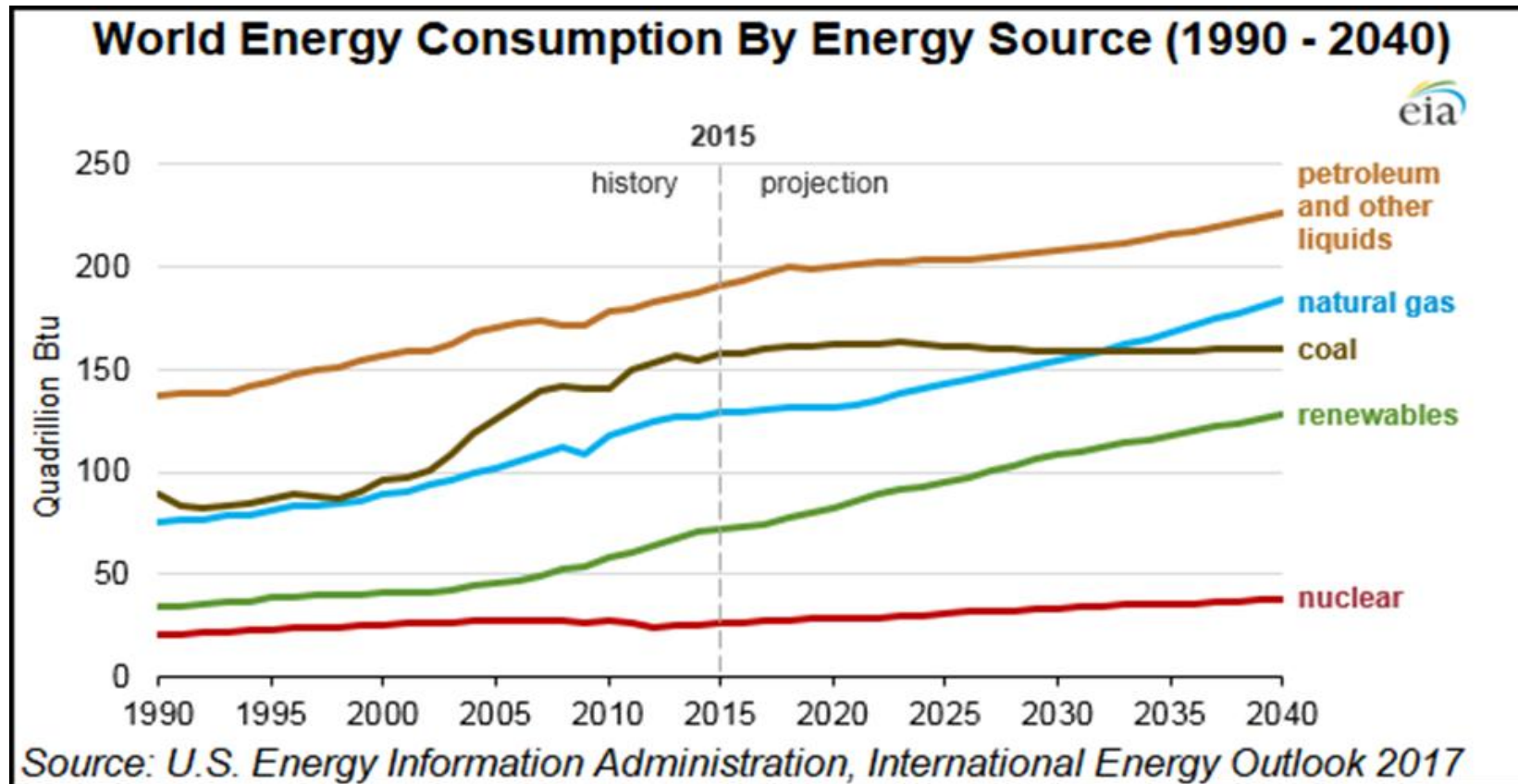
# Future Global Energy Demand Outlook

- ▶ Energy and human development are inextricably linked hence, global energy demand is expected to continue to grow due to factors such as population growth, industrialization, and growing urbanization especially in the developing economies.
- ▶ Between 2020–2040, global energy demand is expected to grow by 20%, with transportation energy demand expected to grow by over 20% and the industrial sector representing 50% of energy end use.

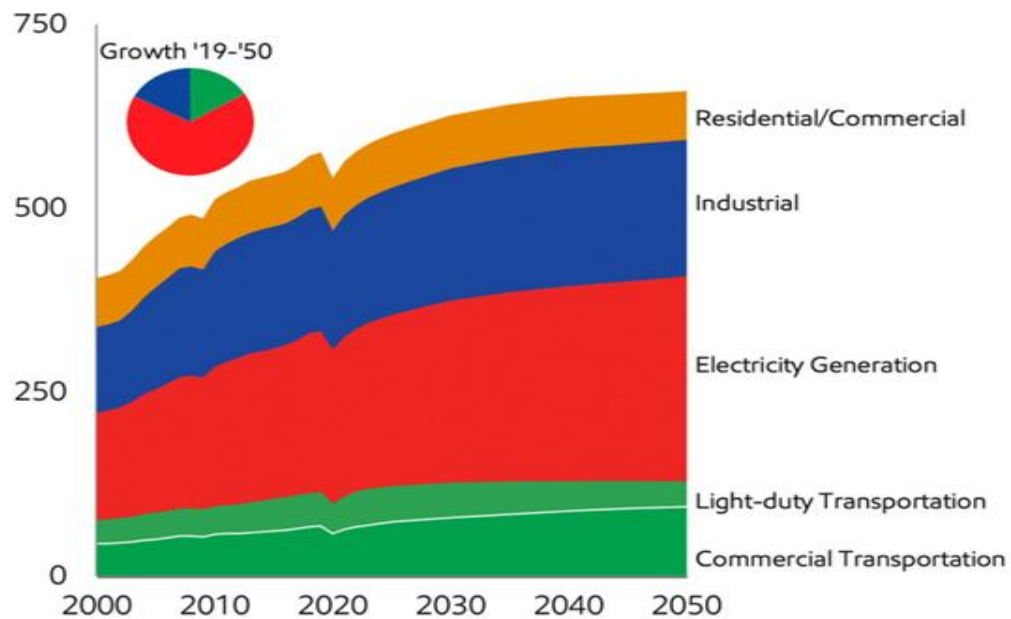




# Future Global Energy Demand Outlook



# Future Global Energy Demand Outlook (Source: ExxonMobil)

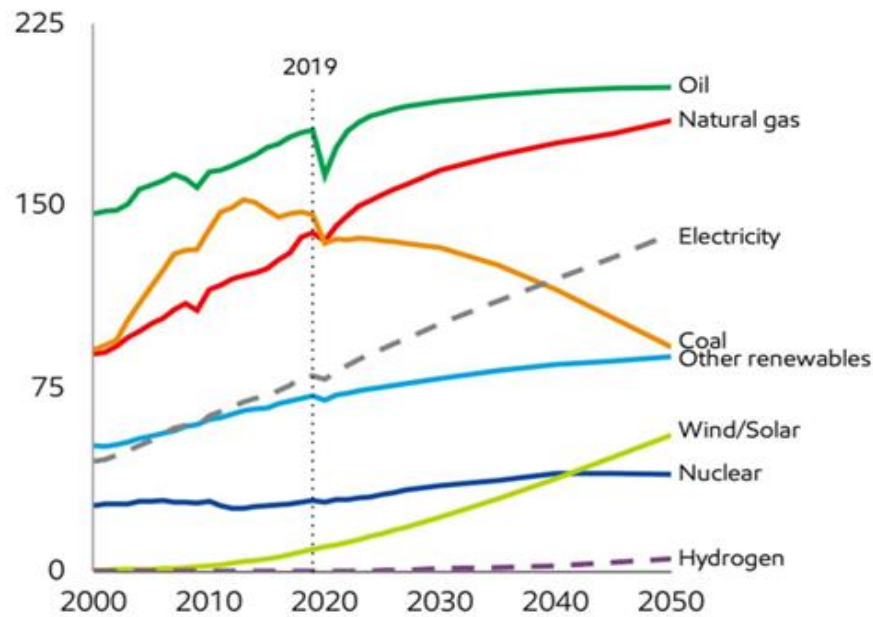


# Future Global Energy Demand Outlook

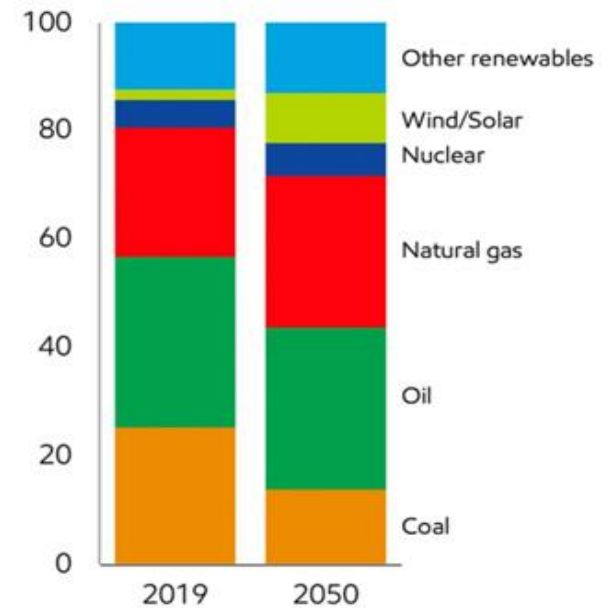
- ▶ Projected future energy mix scenarios indicate a broad range and show that there is no single energy source or technology that can achieve the Paris Agreement.
- ▶ Oil and natural gas will remain a significant part of the energy mix for decades, reinforcing the need for continued investment.
- ▶ Lower-emission renewable energy sources, carbon capture and storage, and hydrogen will play important increasing roles.

# Future Global Energy Demand Outlook (Source: ExxonMobil)

Quadrillion BTUs



Percent of primary energy (%)



# Future Global Energy Demand: Petroleum Industry Response

- ▶ The global oil and gas industry response to the clean energy transition focuses on three issues: survival, profit, and growth in such a way for the industry to play a leading role in the net zero carbon drive.
- ▶ Major steps being taken to achieve these objectives include:



# Future Global Energy Demand: Petroleum Industry Response

- ▶ Diversifying business models to stronger downstream opportunities around electricity generation.
- ▶ Developing decarbonization technologies including carbon capture, utilization, and storage and hydrogen production.
- ▶ Promoting energy efficiency technologies and mitigate emissions.
- ▶ Re-examining geopolitics to reduce exposure to potential “stranded assets,”

# Future Global Energy Demand: Petroleum Industry Response

- ▶ Avoid long-cycle projects in high-cost or high political risk jurisdictions while identifying projects or partnerships in jurisdictions with more long-term gains
- ▶ Adopting climate-focused Environment Social Governance (ESG) principles into business models.
- ▶ Some companies have announced suspension or decrease in oil and gas exploration in new frontiers while making significant increase in funding low carbon energy projects.

# Energy Transition in Nigerian Oil and Gas Industry

- ▶ Energy transition is not a new development in the Petroleum industry.
- ▶ In the early days of the industry in Nigeria, focus was on oil production, hence companies were rightly called ‘Oil Companies’. In the 90’s, there was a transition to ‘Oil and Gas’, and efforts to get value from associated gas which had hitherto been flared. The drive to get even more value from gas led to gas-to-power projects.



# Energy Transition in Nigerian Oil and Gas Industry: Investment Drivers

- ▶ Technicals
- ▶ Economics
- ▶ Commercial issues
- ▶ Operational considerations
- ▶ Policies and Political considerations



# Energy Transition in Nigerian Oil and Gas Industry: Theoretical framework

- ▶ **Consumer Theory**

- ▶ Demand for energy begins with the choices consumers make. Consumer utility theory postulate that consumers derive utility from the attributes embedded in a commodity and not the commodity itself. According to this theory, consumers will reach a preference and choose from among alternatives and multidimensional properties that maximizes utility.

# Energy Transition in Nigerian Oil and Gas Industry: Theoretical framework

- ▶ Energy Ladder Theory (ELT)
- ▶ Energy Ladder Theory postulates that income and energy price influence affordability for people. It suggests that low income households rely on 'cheap' biomass and will shift to fuels such as kerosene as their income increases, and ultimately to modern fuels such as LPG and electricity with higher income.

# Energy Transition in Nigerian Oil and Gas Industry: Theoretical framework

- ▶ Fuel Stacking Transition Theory
- ▶ This theory emerged from observations that households in developing countries do not switch completely to modern fuels but consume multiple fuel types during energy transitions due to irregular and variable income, fuel supply problems, fluctuation of fuel prices, etc.
- ▶ The theories suggest that energy utility, affordability, availability, energy mix and reliability are some of the factors that must be considered during energy transitions.

# Nigerian Oil and Gas Industry: Natural Gas as Transition Fuel

- ▶ Nigeria has an estimated 182 trillion cubic feet proven natural gas reserves, the 9th in the world and foremost in Africa. The current gas production stands at about 8.2 Bcf/day with 80% of produced gas exported.
- ▶ There has been significant reduction in gas flaring.
- ▶ But one major challenge is the huge stranded gas reserves

# Nigerian Oil and Gas Industry: Natural Gas as Transition Fuel

## Reserves Availability (Source: NNPC)

Reserves Required	Reserves Available
LNG & Other Exports = 71TCF	Long Term Reserves = 70 TCF
Inter Government Export = 15 TCF	
Industries = 39 TCF	Short/Medium Reserves Available = 112 TCF
Power Plants = 31 TCF	
<b>Total = 156 TCF</b>	<b>Total = 182 TCF</b>

# Nigerian Oil and Gas Industry: Natural Gas as Transition Fuel

- ▶ Opportunities for investment:
- ▶ Power generation by IPPs, microturbines manufacture
- ▶ Industrial Raw material: Methanol, fertiliser, Cement, hydrogen production
- ▶ Plastics, aluminium, Steel, etc.
- ▶ Domestic Use: LPG, CNG stoves, CNG Cookers
- ▶ Automotive fuel: CNG, Gas-to-Liquids

# Nigerian Oil and Gas Industry: Natural Gas as Transition Fuel

- ▶ Opportunities for investment:
- ▶ Consolidating the regional market through the West African Gas Pipeline and the Trans-Saharan gas projects.
- ▶ Sustaining and expanding LNG projects for export, Mini-LNG, etc.
- ▶ Investment in gas infrastructure



# Lessons from Petroleum Industry Experience

- Success story of Joint Ventures: NLNG
- Local Content Development
- Research and Development
- Managing Uncertainties and Risks



# NIGERIAN CONTENT DEVELOPMENT

## **2010 NOGICD Act:**

Nigerian content in the oil and gas industry is the quantum of composite value added to, or created in the Nigerian economy through the utilization of Nigerian human and material resources for the provision of goods and services to the petroleum industry, within acceptable quality, health, safety and environment standards in order to stimulate the development of indigenous capabilities.



# Objectives of the NCD

- ❖ NCD aim at curing the “Dutch disease” or “Resource curse” phenomenon by:
  - ❖ Promoting in-country value
  - ❖ Retaining more spend in the country
  - ❖ Get more locals impacted.
  
- ❖ Development of some renewables is also subject to ‘Dutch disease’ if care is not taken.



# Constraints to NCD

- ❖ Inadequate infrastructure
  - ❖ Weak industrial/manufacturing base
  - ❖ Inadequate local technical competencies
  - ❖ Low financial capacity of domestic firms
  - ❖ Weak regulatory institutions
- ❖ There is therefore need to go beyond policy and regulations by addressing underlining constraints or challenges.



# Evaluation of Local Technological Capacity

(Source: Isehunwa and Falade, 2005)

- ❖ Technological Infrastructure Base.
- ❖ Technical Manpower: quantity, mix and quality
- ❖ Government expenditure in Science, Engineering and Technology Development
- ❖ Government expenditure on Research and Development
- ❖ Private Sector expenditure on R&D locally
- ❖ International comparisons



# Evaluation of Local Technological Capacity (Source: Olayiwola, 2003)

- ❖ Infrastructure
- ❖ Experience
- ❖ Skills
- ❖ Knowledge
- ❖ Business Environment Indicators



# Key Issues to drive NCD

- Human capacity development
- Use of local materials in the country
- Technology and Innovation
  
- Universities are well placed to promote these drivers



# Opportunities For Universities

- Education and Training
- R&D on relevant local materials, technology & innovations
- Be part of R & D clusters
- Strategic partnerships with service companies.
- Provide technical, laboratory services, etc.
- Provide support to resolve operational challenges.



# Conclusion

The transition to clean energy provides challenges as well as opportunities for the Petroleum industry in Nigeria to grow and become 'energy companies'.

There are several lessons from the Petroleum Industry in the drive to clean energy.


One opportunity for reducing cost of business is the use of in-country higher institutions to drive human capacity development, promote NCD, and lower the cost of doing business.

# Recommendations

- ▶ Improve communication, collaboration and consolidation on NCD within universities, industry, and government.
- ▶ Constant promotion of technology and innovation through exhibitions and fairs, involving industry, government and universities.
- ▶ Universities should have flexible arrangements with the industry to attract retired industry experts, exchange of academics and industry executives, and involve industry players in university advisory boards.



# Recommendations

- ▶ Universities should look beyond contributions to knowledge in their research works but also harness scope for entrepreneurship and business value addition.
  - ▶ Government should mandate indigenous companies to have MOUs on R&D with Nigerian Universities.
  - ▶ Government should encourage industry to carry out research in Nigerian Universities and this should be tax deductible unlike in the 2021 PIA.
  - ▶ Industry should take more interest in R&D in the Universities and develop those with business value addition potentials
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*Thank you for listening.*