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NIGERIA: THE GULF OF GUINEA'S ENERGY HUB

MAPPING THE PATHWAY

17TH PSRG-RICHARDSON HSSE FORUM

Adegbite Falade
16th September 2025

OUTLINE

Overview of Energy Hubs

Case Studies of Global Energy Hubs

Common Enabling Features of Energy Hubs

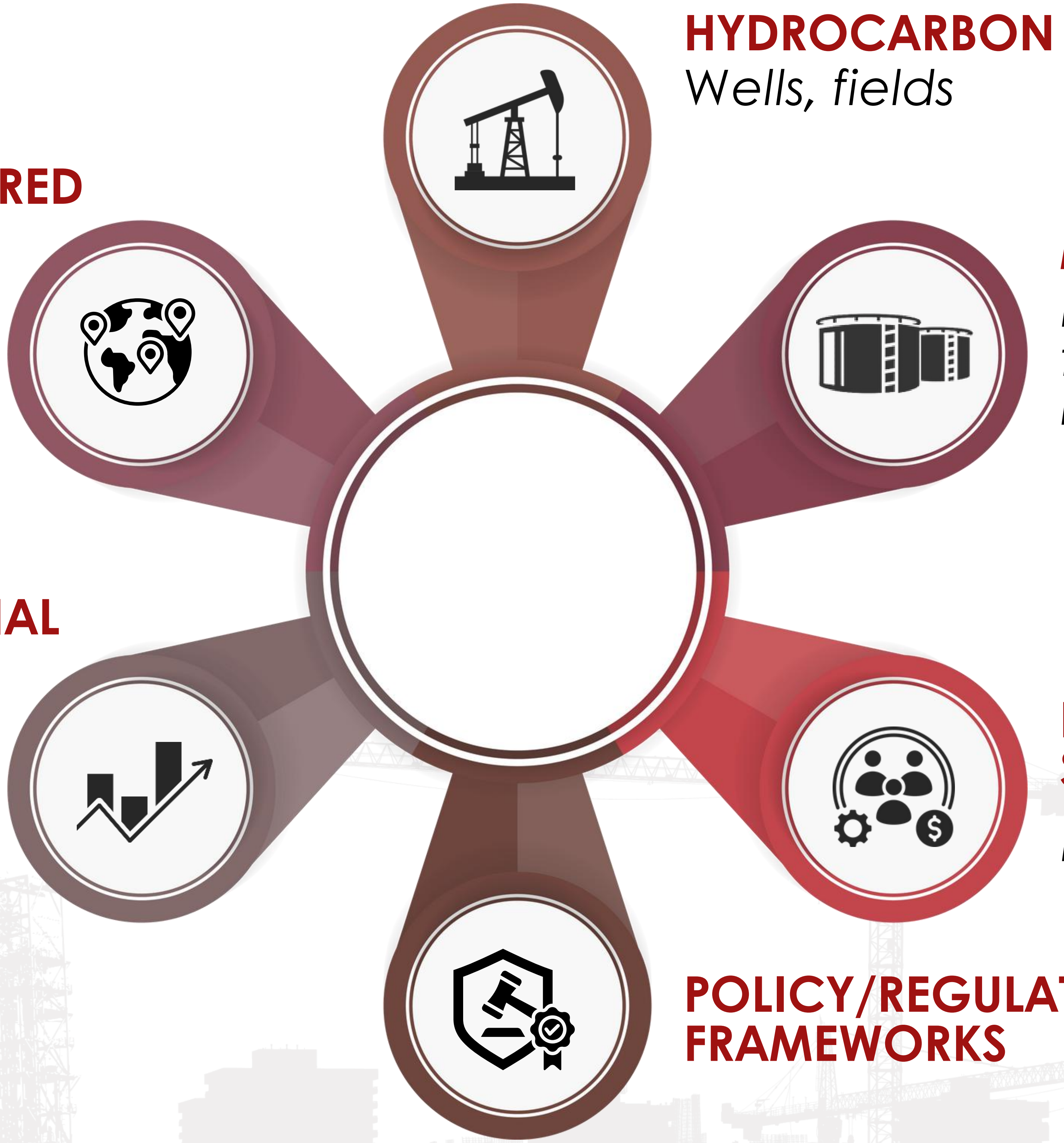
Overview of the Nigerian Energy Space

- Energy Hub Features
- Energy Hub Gaps

Identified Gaps

Recommendations

WHAT IS AN ENERGY HUB?



HYDROCARBON RESOURCES

Wells, fields

MATERIAL INFRASTRUCTURE

Petrochemical complexes, LNG trains, tank farms, pipelines, grids, bunkering, storage

DENSE HUMAN CAPITAL AND SERVICES

EPC, OFS, maritime, digital

POLICY/REGULATORY FRAMEWORKS

MARKET AND FINANCIAL PLATFORMS

Benchmarks, exchanges, ancillary services

GEOGRAPHY-ANCHORED ECOSYSTEM

Port, city/region, industrial district

STRATEGIC IMPORTANCE OF ENERGY HUBS

Security of Supply

Trade flows & price discovery

Industries

Refining and Processing

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CASE 1 – HOUSTON, USA (UPSTREAM)

The Energy Capital of the World!

Industry Size

- **Regional GDP (2022):** USD 633B
- **Exports (2022):** USD 176B, with ~¾ tied to energy commodities.
- **Employment:** ~234,000 energy-related jobs (2024), equal to ~40% of regional workforce.
- **Corporate concentration:** Over **3,000** energy-related firms

Major Assets & Operators

- **Global HQs:** ConocoPhillips, Occidental, and U.S. operations of supermajors.
- **Service giants:** Halliburton (HQ), SLB (HQ), Baker Hughes.
- **Port of Houston:** Handles ~275 million short tons annually, supporting crude exports and imports of equipment.

Manpower & Knowledge Cluster

- **Universities:** University of Houston Energy Institute, Rice University, Texas A&M (nearby).
- **Specialized R&D:** Focus on petroleum engineering, subsea tech, carbon capture.
- **Workforce:** Highly skilled, with wage premia 25–30% above U.S. averages for energy occupations.

Local Service Industry & Supply Chain

- EPC cluster; OFS density.
- Financial/legal ecosystem with energy trading desks (BP, Shell, Chevron) and insurers.
- ~40% of U.S. chemical industry employees are in Greater Houston.

Enabling Features

- **Infrastructure:** Houston Ship Channel, two major airports, rail.
- **Legal/finance:** Strong contract law, U.S. capital markets.
- **Technology adoption:** Digital oilfield, seismic imaging, CCUS pilots.
- **Policy support:** State of Texas favorable tax regime, U.S. DOE R&D funding.

Related Regulation

- **Federal:** Department of Energy, EPA.
- **State:** Texas Railroad Commission regulates oil & gas.
- Regional resilience planning for hurricanes and flooding.

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CASE 2 – ROTTERDAM, NETHERLANDS (MIDSTREAM)

Largest Port in Europe

Industry Size

- **Throughput (2024):** 435.8 million tonnes cargo.
- **Container traffic:** 13.82 million TEUs (2024).
- **Economic value-add:** EUR 29.6 billion (~USD 32 billion).
- **Jobs supported:** ~192,000 (direct + indirect).

Major Assets & Operators

- Port of Rotterdam Authority.
- **Refineries:** Shell Pernis (~400,000 bpd), ExxonMobil, BP.
- **Tank storage majors:** Vopak, Oiltanking, Koole.
- **Chemicals cluster:** BASF, LyondellBasell.

Manpower & Knowledge Cluster

- Highly skilled maritime, logistics, and engineering labor.
- **Integration with universities:** TU Delft, Erasmus University Rotterdam.

Local Service Industry & Supply Chain

- Advanced maritime services, ship repair, pilotage.
- Innovation clusters in hydrogen, CCUS, and biofuels.

Enabling Features

- **Pipelines:** Connected to Germany, Belgium, and France.
- **Storage:** 14 independent terminal operators with millions of m^3 capacity.
- **Refineries:** Shell, ExxonMobil, BP, Gunvor operate major complexes.
- **Digitalization:** Smart Port initiative for digital logistics optimization.

Related Regulation

- EU policies on climate, emissions trading, and energy security.
- Dutch government incentives for hydrogen and CO_2 transport (Porthos project).

CASE 3 – JAMNAGAR, INDIA (DOWNSTREAM)

World's largest refining complex

Industry Size

- **Capacity:** 1.24–1.4M barrels/day, representing ~25% of India's refining.
- **Petrochemicals:** Integrated with world-scale facilities producing polymers, aromatics, and fuels.
- **O2C business:** Reliance's oil-to-chemicals unit is the group's largest revenue contributor.

Major Assets & Operators

- Two refineries (domestic & export-oriented).
- Integrated captive port handling crude and VLCCs.
- Adjacent petrochemical plants and power generation.

Manpower & Knowledge Cluster

- Reliance employs tens of thousands across its refining & petrochemical divisions.
- Workforce trained via Reliance Petroleum Training Institute.

Local Service Industry & Supply Chain

- Gujarat state has a dense cluster of OFS, EPC, and ancillary suppliers.
- Vibrant ecosystem for chemicals and plastics manufacturing

Enabling Features

- **Scale & integration:** Ability to process heavy/sour crudes into high-value fuels.
- **Infrastructure:** Dedicated pipelines, power plants, port.
- **Export focus:** >60% of output exported, primarily to Asia, Africa, Europe.

Related Regulation

- Governed by India's Petroleum Ministry.
- Benefited from government incentives for refinery investment and export zones.
- Subject to Indian environmental & safety regulations, as well as global IMO fuel standards.

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REGIONAL & GULF OF GUINEA COMPARISON

Metric	Nigeria	Angola	Ghana	Equatorial Guinea
Oil Reserves (bbl)	~36.97 billion	9.0 Billion	0.66 Billion	1.1 Billion
Gas Reserves (Tcf)	~209-210 Tcf	13.5 Tcf	1.7 Tcf	5.0 Tcf
LNG Export Capacity	22 MTPA (NLNG)	5.2 MTPA (Angola LNG)	None	3.7 MTPA (Punta Europa)
Refining Capacity	650K bpd (Dangote) + NNPC Refineries (445K bpd, currently offline) 24.5k bpd Modular Refineries	65K bpd (Luanda Refinery)	45k bpd (Tema, intermittent ops)	20K bpd (Bioko Oil Terminal)
Population (Market Size)	~220-227 million	~35 Million	~33 Million	~1.7 Million
Key Advantage	Unmatched scale of reserves, market size, and new infrastructure.	Stable production, deepwater expertise.	Stable democracy, emerging producer.	Established LNG, regional gas processing ambitions.
Key Disadvantage	Security instability, infrastructure deficit.	Over-reliance on oil, lack of diversification.	Smaller resource base, power sector debt.	Depleting fields, very small population.

Resource Dominance

Infrastructure Game-Changer

LNG Leadership

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NIGERIA IN THE GULF OF GUINEA

73.8%

Proven Oil Reserves of the total Gulf of Guinea's oil reserves.

86.2%

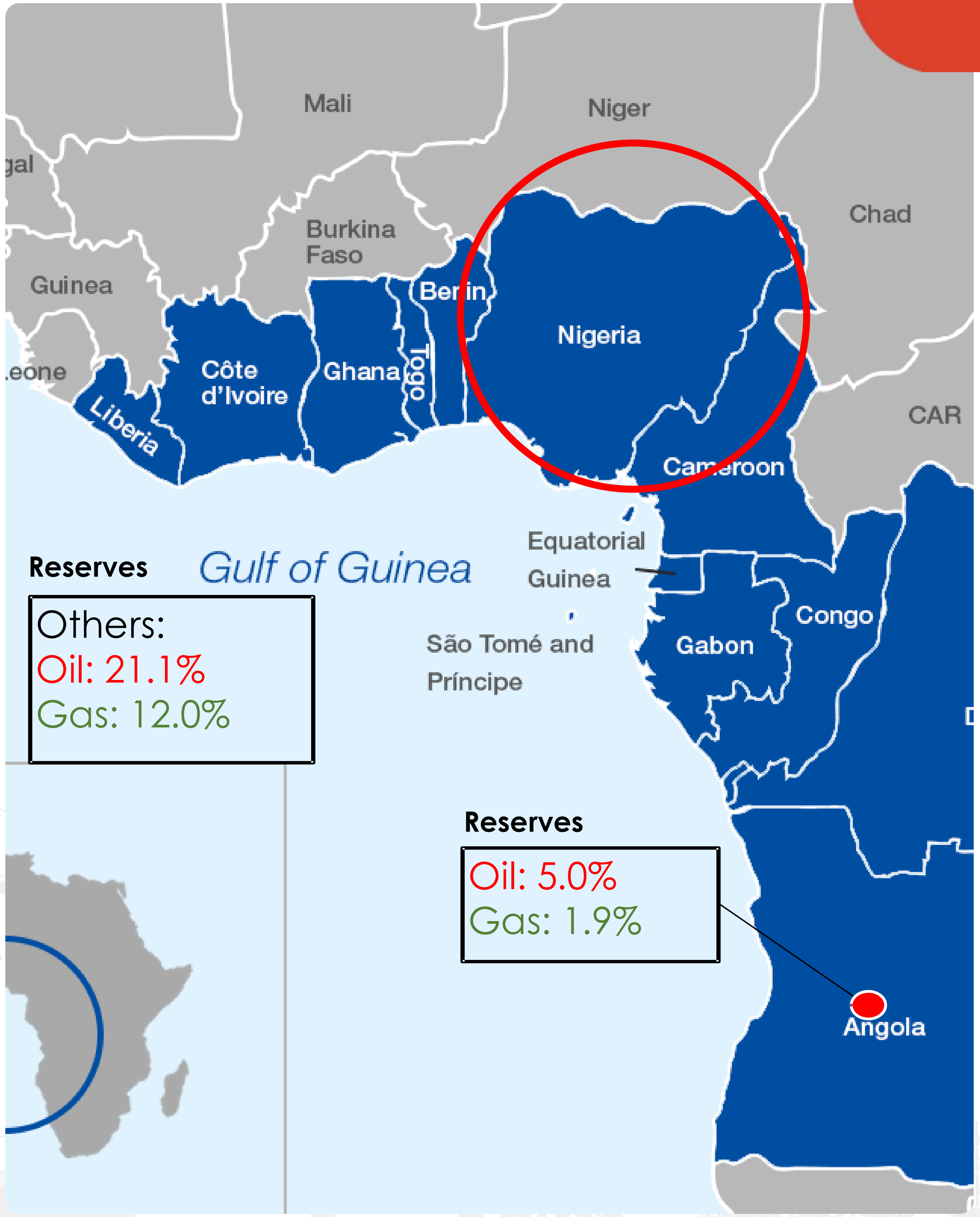
Proven Natural Gas Reserves of the region's reserves.

49%

Oil Production of the Gulf of Guinea's daily output.

~76%

Natural Gas Production of the total volume from the region.



WHERE DO WE CURRENTLY STAND?

	Upstream	Midstream	Downstream
Large scale of resources	✅	✅	✅
Strategic Location and Geographic Advantage	✅	✅	✅
Infrastructure Scale and Integration	🔴	🔴	🔴
Financial Ecosystem and Access to Capital	🔴	🔴	🔴
Regulatory and Policy Frameworks	🟡	🟡	🟡
Knowledge Clusters and Skilled Workforce	🟡	🟡	🟡
Presence of Global Energy Companies & Local Service Industries	🟡	🟡	🟡
Market Access and Trade Connectivity	✅	✅	✅
Adaptability to the Energy Transition	🔴	🔴	🔴

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GLOBAL HUBS COMPARISON: THE ASPIRATION GAP

Metric	Nigeria (Potential)	Houston, USA	Rotterdam, NED	Singapore
Primary Role	Production & Processing Hub	Full-Spectrum Hub (Upstream, Midstream, Downstream, Finance, Tech)	Trading, Storage & Logistics Hub	Refining, Trading & Bunkering Hub
Refining Capacity	~1.1Million bopd (installed) ~670,000 bpd (operational)	~2.6 Million bpd** (Texas Gulf Coast)	~1.2 Million bpd	~1.5 Million bpd
Port Throughput (TEUs)	~1.5 Million (Lagos)	~3.5 Million	~14.5 Million	~37.3 Million
Storage Capacity	Limited	Massive (Strategic Petroleum Reserve + commercial)	Europe's largest (over 30 million m3)	Asia's largest independent storage
Ease of Doing Business	131st (out of 190)	High (within US)	42nd (Netherlands)	2nd
Key Infrastructure	Emerging pipelines, single large refinery.	Vast interconnected pipeline network, petrochemical complex, financial markets.	Deepwater port, extensive tank farms, "Port of the Future" smart logistics.	Deepwater port, world's top bunkering port, advanced petrochemical cluster.

Infrastructure & Logistics Gap

Diversification & Value Chain

Governance & Stability

RECOMMENDATIONS

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UPSTREAM

Explortation, Production & Service Clusters

Increase oil production

- From 1.8M BPD – 4M BPD

Focused Incentives on Exploration

- From 38Bn – 50 to 70Bn by 2040

Scale up capacity in the Service Sector

- Incentivise M&A in the indigenous Contractors sector – Review implementation of NCDMB/ force balance sheet consolidation
- Incentivise return of International Service Contractors
- Focused development of service hubs (Port Harcourt, Warri, Uyo, Lagos)
- Scale up port activities (INTEL (Port Harcourt); KOKO (Delta); LADOL (Lagos); LFTZ

Man Power

- National Programme (Geo Science, Engineering, AI/Tech)
- Strengthen the specialised institutes (PTI, FUPRE, etc.)
- Commitment of NCDMB Education Levy
- Mandatory internship programmes by all operators – NCDMB to fund stipends/ 2yr post graduation attachments in the industry
- Simulation centers for geosciences, engineering, drilling.
- Incentivise the "JAPADA" of trained Nigerians in diaspora

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MIDSTREAM & DOWNSTREAM

Transportation, Storage & Transshipment, Refining and Distribution

- **Liberalise the roll out of critical transport infrastructure**
  - Pipelines, rails, road, etc. using PPP schemes
- **State of Infrastructure emergency**
  - Scaling up of Ports (Deep Sea Ports, etc.)
  - Storage (Midstream & Downstream depot)
  - Transport pipelines (Gas, products,) *No Longer NNPC-funded.
- **Government to provide credit backstop to incentivize private participation in infrastructure rollout**
- **Prioritization of rail network to support cargo transport.**
- **Cost reflective gas price & electricity tariffs (PHCN).**
  - Remove the subsidy or subsidize production and not consumption

CALL TO ACTION

Continue as a fragmented exporter of raw hydrocarbons?

Deliberately build the institutions, infrastructure, and industries that define successful hubs?

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THANK YOU