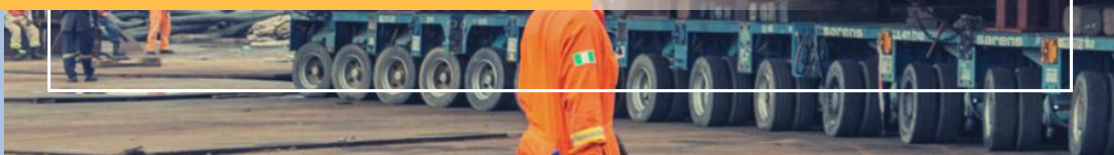


NIGERIA UPSTREAM

In this report

Exploration, Production,
Marginal Fields, Onshore,
Shallow Water, Deep Water,
Contracts, Companies, Projects.





ABOUT HAWILTI

Hawilti is a pan-African investment and commodities research agency dedicated to unlocking Africa's business potential by providing market intelligence that supports deals across key growth sectors.

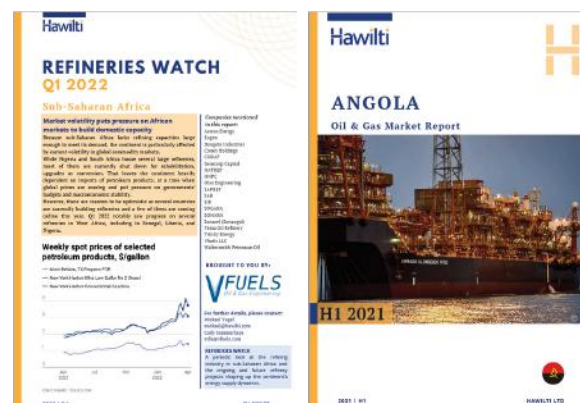
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NIGERIA - UPSTREAM

2022/2023

This market report is a Hawilti report series on Nigeria's upstream oil & gas industry prepared by Hawilti's analysts with contributions from various public and private sector executives in Nigeria.

For questions about this report or to provide updates, data, or information that would contribute to the programme, please email info@hawilti.com.

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Key Takeaways

- Nigeria's oil and gas industry experienced historic crises throughout 2022 as the sector struggled with severe crude thefts and pipeline vandalism constraining output. However, resumption of operations at onshore export terminals towards the end of 2022 have turned the outlook positive for 2023.
- As part of their risk management and monetisation strategies, onshore operators are expected to accelerate the development of associated infrastructure such as storage tanks, modular refineries, and gas processing modules.
- While onshore production is expected to recover, incremental growth is likely to come from shallow water where several independents are progressing brownfield and greenfield projects.
- The deep-water segment will be marked by a new Bidding Round launched in December 2022, and by the scheduled shut-down of TotalEnergies' Akpo FPSO on OML 130 in Q3 2023, which will temporarily affect output from Nigerian deep offshore for about six weeks.
- High oil prices will be an incentive to drill and Nigeria is expected to see renewed drilling activity throughout 2023, especially in shallow water but also onshore where dozens of new marginal field owners (PPLs) will seek to make the best of their new 3-year licenses to start producing and redevelop assets acquired during the last Marginal Fields Licensing Round.

Hawilti's Production Forecast, bpd (2020 - 2025)

Our short-term, conservative view is that Nigeria's onshore segment will be recovering over 2023-2025 while deep-water will witness modest growth on the back of infill drilling programmes. Real production growth in the short-term is likely to come from shallow water.

Terrain	2020a	2021a	2022e	2023f	2024f	2025f
Deepwater	631,500	591,000	535,000	545,000	550,000	550,000
Shallow-water	473,000	442,500	455,000	475,000	500,000	550,000
Onshore	726,000	571,500	400,000	550,000	600,000	650,000
Total	1,830,500	1,605,000	1,390,000	1,570,000	1,650,000	1,750,000

*Source: Hawilti+ research and estimates, 2020-2022 figures based on NNPC and NUPRC data. **Note:** Onshore figures represent net volumes from export terminals and not figures from wellheads - readers are advised that onshore output is likely to remain heavily volatile over the forecast period.*

Recovery & Outlook

Nigeria is a fairly diversified economy where government revenues heavily rely on oil, which is itself the single largest export revenue earner.

Nigeria's gross domestic product (GDP) remains fairly diversified with the oil sector accounting for less than 10% of economic output. Agriculture, particularly crop production, remains the pillar of economic activity and has traditionally contributed a fourth of Nigeria's GDP, followed by trade (15%). However, filling up state coffers is heavily reliant on oil & gas revenues. Depending on oil prices and oil production levels, the Nigerian government collects 50 to 60% of its yearly revenue from the country's oil sector. Similarly, oil & gas exports account for a whopping 90% of total export revenues, including 80% from oil and 10% from liquefied natural gas (LNG).

Nigeria continues to face external vulnerabilities that deeply affect its short-term prospects.

The performance of the Nigerian economy continues to be deeply linked with that of its oil sector and of global commodity prices. Unfortunately, the crash of oil prices in 2016 and 2017, and again in 2020, sent it to recession twice in the span of five years. Even as the economy recovered in 2021, the country's crude petroleum and natural gas GDP kept falling as under-investment, crude theft, and crippling infrastructure limit production.

Recovering from both recessions has been tedious to say the least. On top of external shocks (oil prices, inflation), Nigeria's persistent insecurity has not boded well for its economic recovery. Beyond just insecurity caused by Boko Haram across its Northern states, Nigeria must also deal with repeated insurgency in the Niger Delta that targets oil companies, especially their workers and infrastructure, but also a growing herder-farmers' conflict across its central states.

Throughout 2022, crude theft has imposed itself as the single most important challenge faced by the industry and the country. By August 2022, Nigeria's oil production had fallen below the 1m bopd threshold, a historic low that the country had not seen in decades. The NNPC Ltd estimated at the time that almost half a million barrels of oil were lost daily.

In this context, growth projections from the oil & gas sector have been revised downwards.

While the macroeconomic stability of Nigeria depends on its ability to pump more oil, growth projects remain sluggish in the short-term.

Despite historically high commodity prices, Nigeria will not benefit from a favourable pricing environment until it can get its oil to market. While offshore assets continue to perform well, onshore producers remain dependent on export terminals where force majeure have become too frequent. As a result, and until efficient alternative crude evacuation systems are in place, the sector will only grow modestly.

The government has notably revised its growth projections downwards and expects the oil GDP to reach the NGN 13,000 bn threshold only by 2025 as opposed to 2021. Similarly, oil and condensate production is expected to remain low in the short-term with a 2023 Budget assuming a daily output of 1.69 million barrels per day (mbpd) as opposed to previous projections of over 2 mbpd.

Nigeria's Projected Oil GDP, # bn (2020 - 2025)

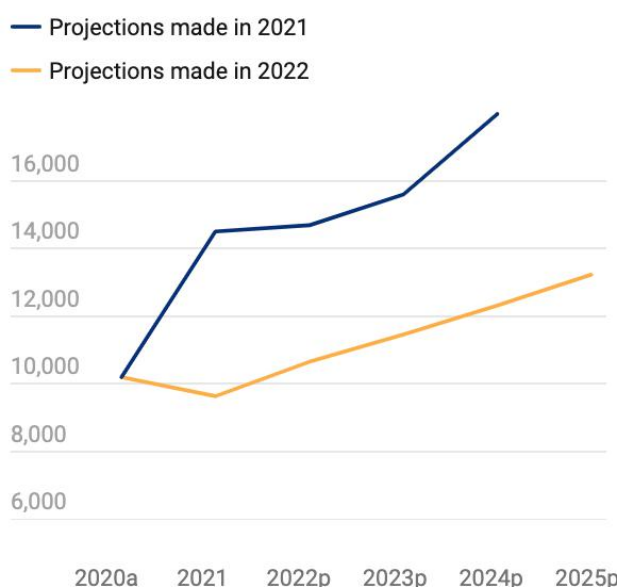


Chart: Hawilti • Source: Budget Office

DRIVERS

To boost the sector, Nigeria has embarked on several initiatives to ensure policy certainty and development programs across the value-chain.

- In 2021, the country adopted the **Petroleum Industry Act (PIA)** to give policy certainty to investors and clarify its regulatory framework once and for all. The move has been accompanied by the settlement of several dispute with PSC contractors.
- In 2021, Nigeria concluded a new **Marginal Fields Bidding Round** that saw the award of some 50 fields to new operators in onshore, swamp, and shallow water areas. The current price environment is encouraging new players to fast-track redevelopment plans and re-enter wells as soon as possible to start producing.
- Nigeria has embarked on a **Decade of Gas** (2020 – 2030) initiative to promote investments in gas infrastructure (production, processing, distribution). Investments in gas has been further encouraged by soaring diesel prices that have positively impacted the demand for CNG and LNG in the domestic market. In parallel, the government has relaunched the National Gas Flare Commercialization Program.



BARRIERS

Despite signs of recovery, the outlook for Nigeria's oil & gas sector in 2023 will be negatively affected by key externalities.

- Historic levels of **crude theft and pipeline vandalism** have weakened the balance sheets of several onshore producers, forcing them to spend more on OPEX rather than CAPEX. Onshore, the focus remains to get barrels to market instead of investing to increase production.
- The new **NNPC Ltd** has demonstrated a clear intent to consolidate its assets portfolio as it continues to work towards an IPO in the future. The company has taken over the control and/or operatorship of key assets in shallow water, effectively slowing down their redevelopment. Meanwhile, its restructuring and the necessary transition period that comes with it has indirectly delayed the execution of projects across its JV operations onshore and in shallow water.
- IOCs are pursuing their **divestment programs** onshore but most ongoing transactions are currently on hold, which adds more uncertainty over onshore investments in the near future.
- The upcoming **presidential election** cycle will create short-term uncertainty that is likely to defer investment decisions until after the next administration settles in (June 2023).

Nigeria's Budget Assumptions

2023

Projected production, mbpd	1.69
Benchmark Price, \$/bbl	70.00
Oil revenue, NGN bn	1920.00
GDP Growth, %	3.75
Exchange rate, NGN/USD	435.57
Inflation, %	17.16

Table: Hawilti • Source: Budget Office



▲ President Buhari signed the Petroleum Industry Bill into law in September 2021.

The Petroleum Industry Act (PIA), 2021

Nigeria is currently implementing its most ambitious regulatory reform yet – the Petroleum Industry Act (PIA) of 2021. It took almost two decades, two historic crashes in commodity prices and two recessions for Nigeria to finally adopt it, and it is now expected to provide much-needed regulatory certainty for investors seeking to do business in Africa's most populous nation.

A major factor to judge the efficiency and impact of the PIA will be its ability to revive deep-water projects and incentivise investments in onshore and shallow water areas.

The upstream sector is now regulated by the Nigerian Upstream Regulatory Commission (NUPRC), who is responsible for both the technical and commercial regulation of upstream petroleum operations.

Under the PIA, new royalty rates are based on production and price and are the lowest for deep-offshore and frontier areas and the highest for onshore areas. Tax-wise, the Petroleum Profit Tax (PPT) is replaced with the Companies Income Tax (CIT) and Hydrocarbon Tax (HT), but deep offshore is exempted from the latter.

Overall, the highest headline rate of tax for a producer will be 60%, compared to the former rate of 85%.

Upstream operations are now operated under 3 new classes of licenses granted by the Commission namely:

- Petroleum Exploration Licence (PEL) - exploratory rights for a single renewable 3-year term.
- Petroleum Prospecting Licence (PPL) - maximum of 6 years for onshore and shallow water acreages and 10 years for deep offshore and frontier acreages.
- Petroleum Mining Lease (PML) - win and dispose of crude oil, condensates and natural gas for a maximum of 20 years.

Equally important, the Nigerian National Petroleum Corporation (NNPC), which previously functioned as both a regulator and operator, is now a commercial and profit-focused entity. It recently incorporated at the end of 2021 as the Nigerian National Petroleum Company (NNPC) Ltd. The transformation of NNPC is expected to make the market more competitive, and allow NNPC to raise its own capital to fund its field development plans and work programs across its joint-venture portfolio.



**NIGERIAN UPSTREAM
PETROLEUM REGULATORY
COMMISSION**



**NIGERIAN MIDSTREAM AND
DOWNSTREAM PETROLEUM
REGULATORY AUTHORITY (NMDPRA)**



DEALS TRACKER

The extent of Nigeria's discovered yet undeveloped oil & gas reserves continues to support strong M&A activity across the country's upstream sector. Below are selected completed and yet-to-complete transactions currently shaping up the industry and sourced from the Hawilti+ research terminal.

DEAL/ASSET	SELLER	BUYER	ANNOUNCEMENT DATE	VALUE	NOTES
Pan Petroleum Aje Ltd (100%)/OML 113 (12.1913%)	Panoro Energy	PetroNor E&P	21-Oct-19	\$10m	
Petrobras Oil and Gas (POGBV, 50%)/OML 127 (8%), OML 130 (16%)	BTG Pactual E&P V.B.	Africa Oil Corp.	1-Nov-19	\$519.5m	
OML 113 (2.25%)	EER (Colobus) Nigeria Ltd	ADM Energy	24-Feb-20	\$3m	
ELI (10%)/ Alternative Crude Oil Evacuation System (ACOES) OML 18	Energy Link Infrastructure (Malta) Ltd	San Leon Energy	3-Aug-20	\$15m	
Decklar Petroleum (15%)	Decklar Resources	San Leon Energy	1-Sep-20	\$7.5m	
COPDC (30%)/OML 65	COPDC Petroleum Development Company Ltd.	Sirius Petroleum	Nov-20	TBA	
OMLs 86 & 88 (40%)	Chevron Nigeria	Conoil	Dec-20	\$250m	Pre-empted by NNPC
OML 17 (45%)	Shell Petroleum Development Co. (SPDC) JV	Heirs Oil & Gas	15-Jan-21	\$1.1bn	
KONH (51%)/Barracuda Field RSA (OML 141)	K.O.N.H. UK Ltd	ADM Energy	23-Mar-21	\$1.3m	
Purion Energy (100%)/Asaramatoru Marginal Field RFTSA (OML 11)	Purion Energy	Decklar Resources, Inc.	9-Jun-21	TBA	
ELI (5.625%)/Alternative Crude Oil Evacuation System (ACOES) OML 18	Walstrand Malta	San Leon Energy	24-Jun-21	\$2m + \$6.5m conditional	
Midwestern Leon Petroleum Ltd (MLPL, 60%)/OML 18 (16.42%)	Midwestern Oil & Gas	San Leon Energy	24-Jun-21	TBA	Yet to complete
NHNL/NW OML 141 RSC (100%)	Noble Hill-Network Ltd (NHNL)	Zenith Energy	31-Aug-21		Not completed
SPDC JV (30%)/ OML 20, 21, 22, 23, 25, 27, 28, 31, 32, 33, 35, 36, 43, 45, 46, 74, 77, 79	Shell Petroleum Development Co. (SPDC) JV	TBA	Q3 2021	TBA	On hold since January 2022
Westfield Exploration and Production Ltd (100%)/Emohua Marginal Field RFTSA (OML 22)	Westfield	Decklar Resources, Inc.	6-Oct-21	\$7m	
Urano Luxco (45.56%)/Prime Oil & Gas B.V. (4.56%)	Urano Luxco	Petralon Energy	Oct-21	\$45.65m	
OML 18 (16.2%)	Sahara Field Production 18 Ltd	Eroton E&P	18-Nov-21		Sahara OML 18 Acquisition Agreement yet to be signed.
Mobil Producing Nigeria (MPNU)/OMLs 68, 69, 70, 104	ExxonMobil Corp.	Seplat Energy	25-Feb-22	\$1.283bn	Opposed by NNPC
Urano Luxco (15%)/Prime Oil & Gas B.V. (1.5%)	Urano Luxco	Petralon Energy	Mar-22	\$14.85m	
Ubima Marginal Field (82%)	Seplat Energy	All Grace Energy	28-Apr-22	\$55m	
SPDC JV (10%)/ OML 20, 21, 22, 25, 27, 31, 32, 33, 35, 36, 43, 45, 46, 74, 77, 79	TotalEnergies E&P Nigeria	TBA	28-Apr-22	TBA	
Abiala Marginal Field (95%)	Naphta E&P	Seplat Energy	Q2 2022		
OML 18 (1.8%)	Bilton Energy Ltd	Eroton E&P	8-Jul-22		Agreement signed but transaction yet to complete.
Addax Petroleum Dev. Nigeria/OMLs 123, 124, 126, 137)	Sinopec Group	NNPC Ltd	1-Nov-22	N/A	Transfer, Settlement and Exit Agreement (TSEA)

SWOT Analysis:

Nigeria's Upstream Sector

STRENGTHS



- With over 37 bn barrels of proven oil reserves and over 200 Tcf of proven gas reserves, Nigeria is one of the most established hydrocarbons provinces in the world with relatively high prospectivity.
- A significant number of undeveloped discoveries are onshore and in shallow water and can be brought on-stream within 12-18 months.
- The country relies on a growing base of local producers and local services companies able to support the value-chain cost-efficiently.
- Petroleum Industry Act (2021) gives new policy certainty on investing in and developing onshore, shallow water and gas projects.



WEAKNESSES

- Uncertainty over the implementation of the Petroleum Industry Act (PIA) and its impact on investor sentiment, especially when it comes to the pricing of gas.
- Unstable security context, repeated pipeline vandalism and outages, resulting in international companies divesting from onshore and shallow water Nigerian blocks.
- Oil export terminals and evacuation infrastructure onshore are often subject to Force Majeure, thereby limiting production potential from rich onshore assets.
- The size of the existing domestic gas market does not support yet the necessary economies of scale to make investments in gas infrastructure bankable.

OPPORTUNITIES



- Efficient monetisation of associated gas, which could cut flaring and help expand access to energy and clean cooking.
- The exit of IOCs from the Niger Delta present attractive opportunities to invest in low-cost brownfield gas assets.
- Strong pipeline of brownfield investment opportunities, both at the asset and company levels. This is especially the case in onshore and shallow water areas, with short payback periods (6-12 months).
- Recently-concluded Marginal Fields Bidding Round offer attractive farm-in and investment opportunities for companies seeking exposure to Nigerian onshore and shallow water fields with drill-ready prospects and existing nearby export infrastructure.



THREATS

- Continued insurgency in the Niger Delta and maritime insecurity in the Gulf of Guinea.
- Upcoming presidential election of 2023 and change of administration.
- Multilateral and international investors are increasingly shying away from investing in fossil fuel projects, which severely impacts the ease of accessing finance for gas projects.

2022 Milestones

25 February 2022: Seplat Energy announces its proposed cash acquisition of Mobil Producing Nigeria Unltd (MPNU) for \$1.283bn plus up to \$300m contingent consideration.

20 May 2022: NNPC closes its acquisition of Chevron's 40% interest in OMLs 86 & 88 at a price of \$290m (NGN 119bn).

28 June 2022: Official unveiling of Nigeria's new Host Communities Development Regulations and award of Petroleum Prospecting Licences (PPLs) to winners of the latest Marginal Fields Bidding Round.

13 July 2022: PetroNor E&P completes the acquisition of Panoro Energy's interests in OML 113, paving the way for the redevelopment of the Aje field.

19 July 2022: Official unveiling of the new NNPC Ltd.

25 July 2022: TotalEnergies achieves First Oil at the Ikike field on OML 99.

11 August 2022: formal commissioning of the Efe field on OML 152 by Newcross Petroleum.

12 August 2022: Renewal of OML 128 (Equinor-operated), OML 130 (TotalEnergies-operated), OML 132 (Chevron-operated), OML 133 (ExxonMobil-operated), and OML 138 (ExxonMobil-operated).

16 August 2022: Renewal of OML 125 (Eni-operated).

30 September 2022: the NUPRC announces the re-launch of the Nigeria Gas Flare Commercialisation Programme.

1 October 2022: The NCDMB's new Policy on the Procurement of Bare Lines Pipes becomes effective.

1 November 2022: Addax Petroleum Development Nigeria Ltd signs a Transfer, Settlement and Exit Agreement (TSEA) with NNPC Ltd for offshore blocks OML 123, OML 124, OML 126, and OML 137.

21 December 2022: the NUPRC announces the Mini Bid Round 2022 that seeks to award seven deep-water exploration blocks.

Crude Theft.

Bonny Terminal

Escravos Terminal

Brass Terminal

Forcados Terminal

Qua Ibo Terminal

Pipelines



Throughout 2021 and 2022, crude theft has imposed itself as the single most important challenge faced by Nigeria's oil & gas industry.

While NNPC reported crude thefts of some 200,000 bpd in 2021, losses had increased to some 470,000 bpd by mid-2022. As a result, Nigeria lost his position as Africa's biggest oil producer over the past few months, with daily production falling behind that of Angola and Libya.

Combined with export terminal shut-downs and pipeline vandalism, crude thefts have limited Nigeria's ability to ramp up production and benefit from higher oil prices. As a result, the country has consistently failed to meet its OPEC quotas, with differentials reaching levels as high as 700,000 bpd in September 2022. The losses are significant enough that they have negatively impacted Nigeria's oil & gas GDP, which has been in the red since 2020. More importantly, the sophistication and scale of thefts is so significant that it suggests the existence of a large-scale organised criminal operation.

The situation is affecting only onshore producers, who have focused almost exclusively on securing their current production and getting barrels to market rather than investing in increasing output. For the same reason, several onshore investments and drilling programs are on hold as operators are focused on OPEX rather than CAPEX spending. This represents a huge opportunity cost for the industry and the country, especially during a period of high oil prices.

Consequently, onshore oil production currently represents only about 40% of the country's total output compared with its traditional 50%+.

Nigeria's Quarterly Real O&G GDP Growth at Constant 2020 Prices, % (2016 - 2022)

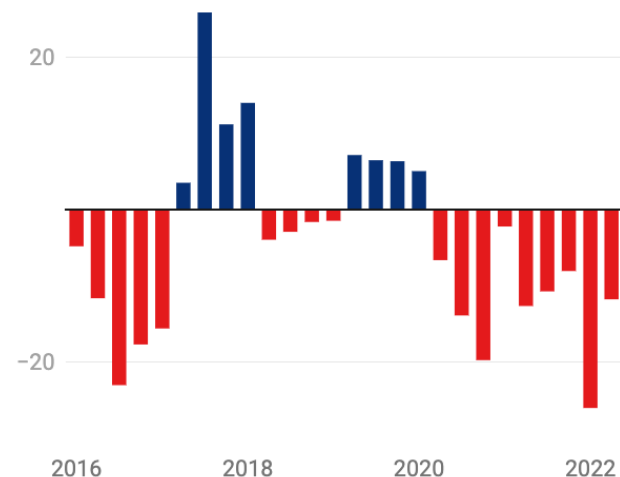
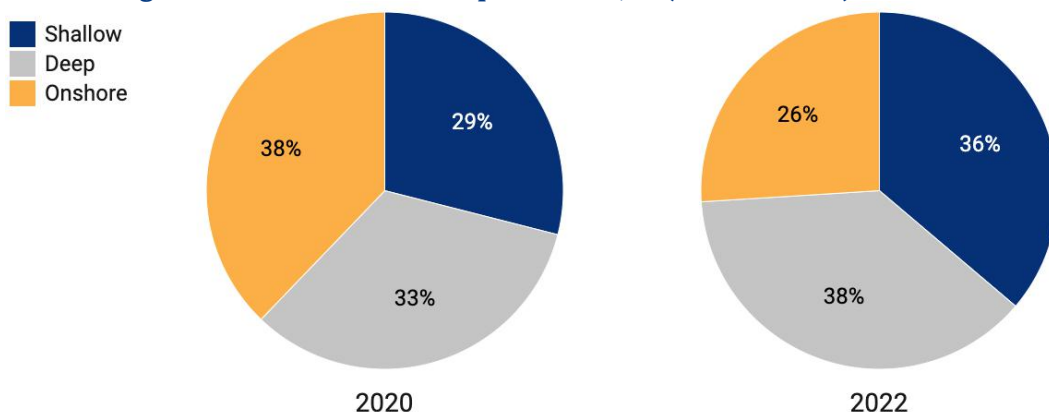


Chart: Hawilti • Source: NBS

While western terminals like Escravos (Chevron) and Forcados (Shell) were the worst affected in 2016, recent turmoil is mostly focused on the evacuation systems around the Bonny (Shell) and Brass (Eni) terminals in the eastern part of the Niger Delta. Unfortunately, these are also rich in associated gas so it has also negatively affected the production and supply of gas to Nigeria LNG and the domestic market.

Alternative crude evacuation systems have been slow to take off and require the set up of completely different operating models. The availability of storage infrastructure and logistics assets, especially double hull barges, remain a key challenge for most operators. Producers must also bear much higher operating costs, with barging solutions costing on average \$6-12/bbl depending on the draft, and barging + trucking requiring some \$14-22/bbl, according to industry sources.

Share of Nigeria's oil and condensate production, % (2020 vs. 2022)



Hawilti estimations based on Jan-Oct. period only

Chart: Hawilti • Source: NUPRC

BONNY

Shell's Bonny oil export terminal and evacuation system has been the worst affected in 2021 and 2022.

The Bonny terminal receives oil from two major pipeline systems: Shell's Trans-Niger Pipeline, and Aiteo E&P's Nembe Creek Trunk Line (NCTL).

The NCTL has suffered severe downtime throughout the year, preventing Aiteo E&P, Eroton E&P, BelemaOil and Newcross EP to export any barrels for most of 2022.

The Bonny oil pipeline system has not performed much better either and caused significant losses to producers feeding into the network. In early 2022, Heirs Oil & Gas notably reported over 90% losses from its newly acquired OML 17, a figure that Hawilti was able to independently verify.

As a response, most ongoing alternative crude evacuation projects executed in Nigeria concern producers feeding into the Bonny terminal.

To evacuate oil from OML 18, Energy Link Infrastructure (ELI) has notably deployed a new floating, storage, and offloading (FSO) vessel able to store up to 2 million barrels. While oil has so far been barged to the facility, a pipeline will soon be laid to unlock additional export volumes. The FSO is much needed in the area and will benefit other producers such as Niger Delta E&P who has also set up its own barging system.

Meanwhile, additional producers such as Newcross EP are reportedly working with their lenders on setting up their own evacuation system as well.

Affected operators and producing assets (Bonny oil terminal)

- SPDC JV (OMLs 20, 21, 22, 23, 27, 28, 32)
- TotalEnergies JV (OML 58)
- Aiteo (OML 29)
- Eroton E&P (OML 18)*
- Newcross EP (OML 24)*
- BelemaOil (OML 55)
- Heirs Oil & Gas (OML 17)
- NEPL (OML 11)
- Seplat Energy
- Niger Delta EP (Ogbele Marginal Field)
- Waltersmith (Ibigwe Marginal Field)

*Alternative crude oil evacuation system in place or in development

Last but not least, the unreliability of the Bonny system is likely to impact the economics of newly awarded marginal fields located around the terminal, whose operators must now seek additional evacuation routes as they work towards First Oil.

Monthly oil output from Shell's Bonny oil export terminal, mn bbls (2020 - 2022)

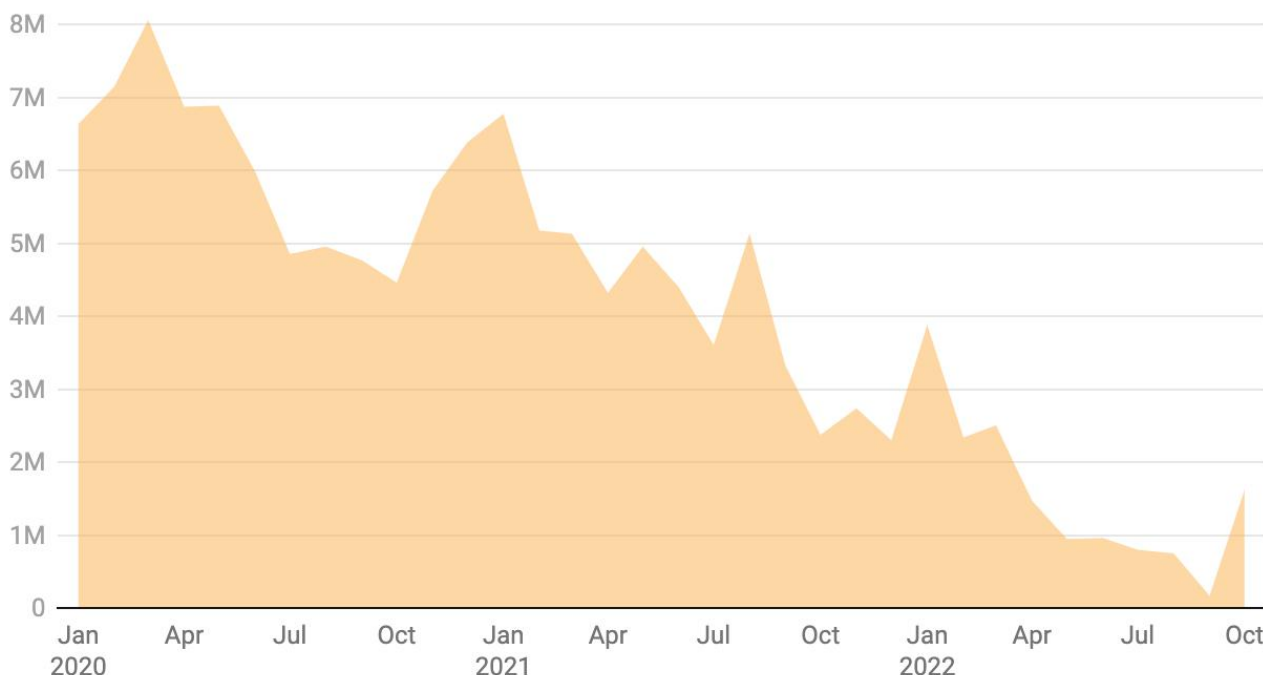


Chart: Hawilti • Source: NUPRC

Eni's Brass oil export terminal and evacuation system has been the second worst affected in 2021 and 2022.

Export volumes from the Brass system have been plummeting since mid-2020 and did not recover for most of 2021/2022. While the Brass network is mostly used by NAOC (Eni) to evacuate its oil from OMLs 60, 61, and 62, it is also one of the evacuation systems used by several independents and marginal fields producers.

Because OMLs 60, 61, and 62 are critical suppliers of associated gas feedstock to Nigeria LNG, repeated shut ins of the system in 2022 has negatively impacted Nigeria LNG's ability to operate at full capacity. In mid-2022, the LNG terminal operator revealed that it was operating at only 68% capacity due to theft of crude oil and pipeline vandalism.

However, Brass tends to be only one of two options for many other producers, so the unavailability of the terminal is less consequential than others. For instance, most marginal fields producers that rely on Brass have also commissioned their own alternative route via Shell's Forcados terminal. They include Midwestern Oil & Gas and Energia who built the Umugini pipeline in the 2010s to access the Forcados Terminal whenever the Brass system faces disruptions.

Other independents producers around the Brass network like Sterling Oil on OML 143 do not rely at all on the terminal and have their own FSO deployed offshore to evacuate their oil.

Affected operators and producing assets (Brass oil terminal)

- Nigerian Agip Oil Co. JV (OMLs 60, 61, 63)
- Aiteo Eastern E&P (OML 29)
- Seplat Energy (OML 53)*
- NNPC (OML 124)
- SEEPCO (OML 143)*
- Midwestern Oil & Gas (Umusadege Marginal Field)
- Pillar Oil (Umuseti/Igbuku Marginal Field)
- Energia (Ebendo Marginal Field)
- Platform Petroleum (Egbaoma Marginal Field)

*Alternative crude oil evacuation system in place or in development

Others like Seplat Energy are taking steps to operationalise their own evacuation system via trucking, especially from the Jisike and Ohaji South fields on OML 53. For now, most of the block's oil is sent to the nearby modular refinery of Waltersmith Petroman Oil. On its side, Energia is progressing the development of a modular refinery to process its oil on site instead of exporting it.

Monthly oil output from Eni's Brass oil export terminal, mn bbls (2020 - 2022)

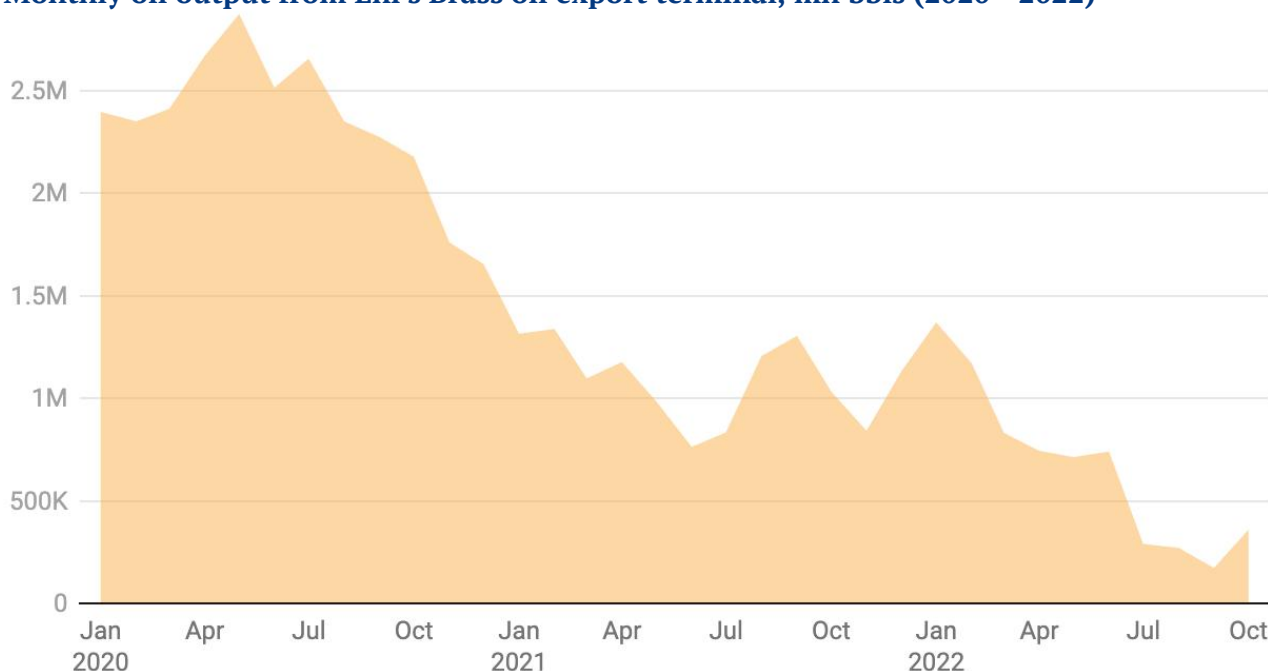


Chart: Hawilti • Source: NUPRC

FORCADOS

Shell's Forcados oil export terminal is posting better performances than in previous years.

The Forcados system made headlines for most of 2016 following its closure and related losses of several billions of dollars for Nigeria. However, improved security and monitoring measures have been taken since and the Trans-Forcados Pipeline along with the terminal have become more reliable. The terminal did go through two periods of Force Majeur in July 2021 and October 2022 due to "operational issues", negatively output volumes for several operators.

The terminal receives oil from the 850,000 bopd Trans-Forcados Pipeline operated by Heritage Energy Operational Services (HEOSL), with an actual capacity of 650,000 bopd. The pipeline is the direct evacuation route for OML 30 (Shoreline Natural Resources/NEPL) and serves as the backbone for several branch lines serving neighbouring blocks and fields. It is one of Nigeria's most important evacuation route in terms of volumes and the number of operators it serves.

Despite recent improvements, the unreliability of the Forcados system had previously pushed some operators to set up their own evacuation systems. This is the case of Neconde Energy (Nestoil Group) who has always and consistently barged all of its production from OML 42 to its own FSO, the Ugo Ocha.

Affected operators and producing assets (Forcados oil terminal)

- Shell Pet. Dev. Co. JV (OMLs 43, 45, 46)
- NEPL (OMLs 98 & 111, OML 26/FHN, OML 34/ND Western, OML 40/Elcrest*)
- Seplat Energy West (OMLs 4, 38, 41)
- Shoreline Natural Resources (OML 30)
- Neconde Energy (OML 42)*
- Asharami Energy (OML 148)*
- COPDC Pet. Dev. Co. (OML 65)
- Midwestern Oil & Gas (Umusadege Marginal Field)
- Pillar Oil (Umuseti/Igbuku Marginal Field)
- Energia (Ebendo Marginal Field)
- Platform Petroleum (Egbaoma Marginal Field)

*Alternative crude oil evacuation system in place or in development

For others, accessing Forcados remains the best option but can only be done via barging. This is the case for Asharami Energy's subsidiary Enageed who currently barges its oil production from OML 148 to the Forcados Terminal, and so does Seplat Energy for Gbetiokun's oil (OML 40).

Monthly oil output from Shell's Forcados oil export terminal, mn bbls (2020 - 2022)

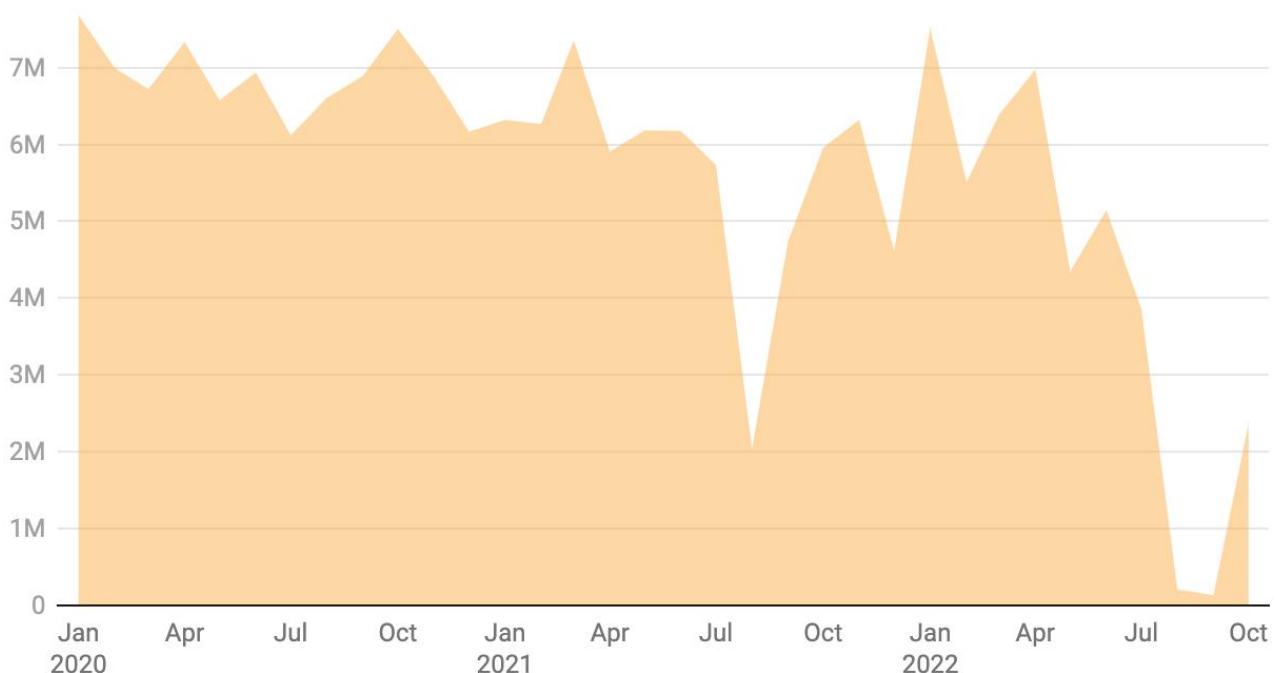


Chart: Hawilti • Source: NUPRC

ESCRAVOS

Chevron's Escravos oil export terminal remains one of the most reliable in Nigeria.

Half of the oil exported from the Escravos system comes from shallow water blocks OML 90 and OML 95, both operated by the Chevron Nigeria JV. As a result, the system is not subject to much vandalism or theft. In addition, remaining supplies come from assets located very close to the terminal, such as Chevron Nigeria's OML 49, which limits the likelihood of vandalism and theft.

The Escravos oil terminal is sought after as a preferred export route by several operators. In 2022, the 160km Amukpe-Escravos pipeline finally became operational and opened up an entire new export route for several producers in the Western Delta that seek an alternative to the Forcados system. This is especially the case of Seplat Energy, who intends to use the pipeline whose starting point is located at Amukpe on its block (OML 38) and crosses OML 41. Out of the pipeline's 160,000 bpd of capacity, the Seplat Energy/NEPL joint-venture is entitled to inject 40,000 bpd.

Moving forward, the reliability of the Escravos system will be critical to several new marginal fields producers whose recently acquired field are located on OMLs 49, 90, and 95.

Affected operators and producing assets (Forcados oil terminal)

- Chevron Nigeria JV (OMLs 49, 90, 95)
- Conoil (OML 103)
- Dubri Oil (OML 96)

*Alternative crude oil evacuation system in place or in development



Monthly oil output from Chevron's Escravos oil export terminal, mn bbls (2020 - 2022)

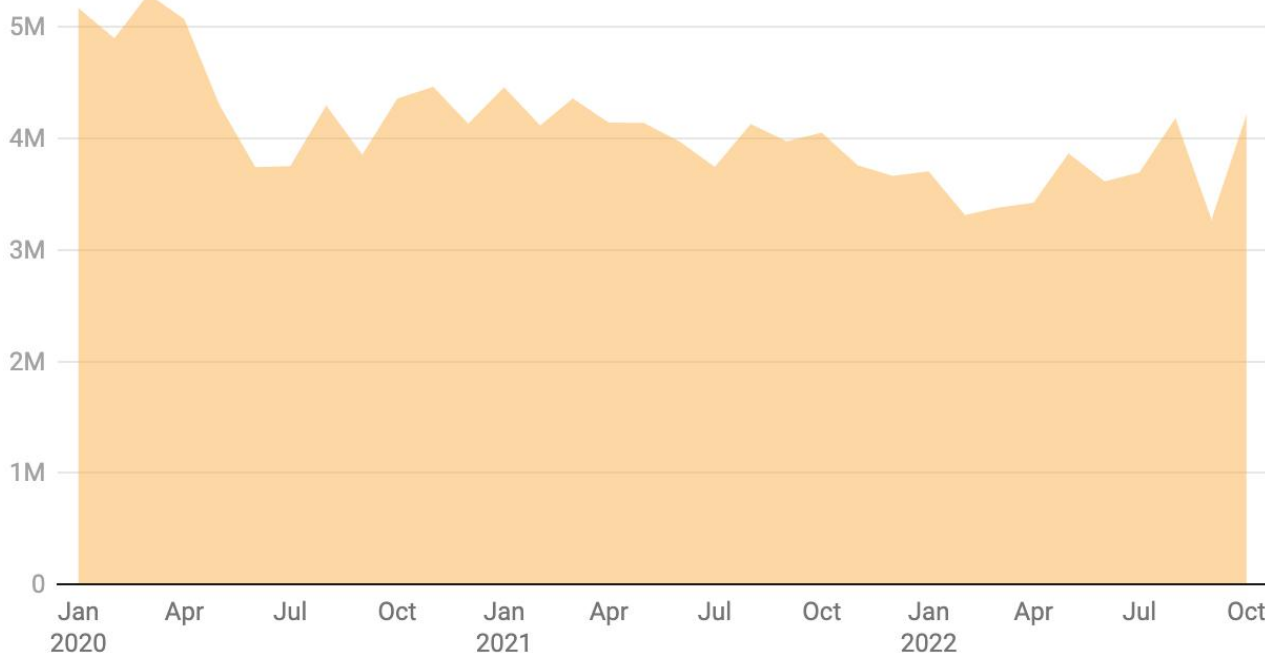


Chart: Hawilti • Source: NUPRC

ExxonMobil's Qua Ibo oil export terminal continues to perform despite ageing infrastructure.

Almost all of the oil exported from Qua Ibo comes from ExxonMobil's shallow water fields within OMLs 67, 68, and 70. The assets have recently been acquired by Seplat Energy, including the export terminal, although the transaction is disputed by NNPC and is yet to complete.

Because most of the lines are offshore and under water, the system does not suffer from vandalism nor theft. Oil is simply gathered at the Idoho offshore platform before being sent to shore for processing and export at Qua Ibo. However, ageing infrastructure requires constant maintenance and repairs: in December 2020, the terminal had to be shut down for several weeks following a fire incident for instance.

Qua Ibo also serves as an export hub for several neighbouring marginal fields, including Network E&Ps' Qua Ibo field and Frontier Oil's Uquo field.

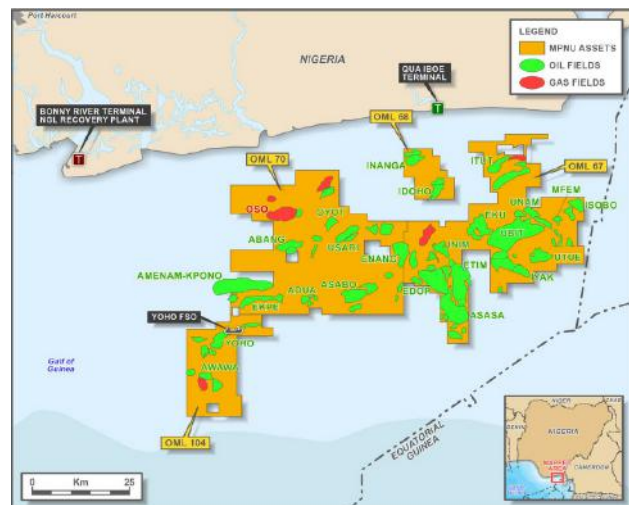
During the latest Marginal Fields Bidding Round, several of the new fields awarded are located within ExxonMobil's blocks and will benefit from existing infrastructure to monetise their reserves quickly.

Map: Seplat Energy ►

Affected operators and producing assets (Forcados oil terminal)

- Mobil Producing Nig. JV (OMLs 67, 68, 70)
- Frontier Oil (Uquo Marginal Field)
- Network E&P (Qua Ibo Marginal Field)
- Savannah Energy (Stubb Creek Marginal Field)

*Alternative crude oil evacuation system in place or in development



Monthly oil output from ExxonMobil's Qua Ibo oil export terminal, mn bbls (2020 - 2022)

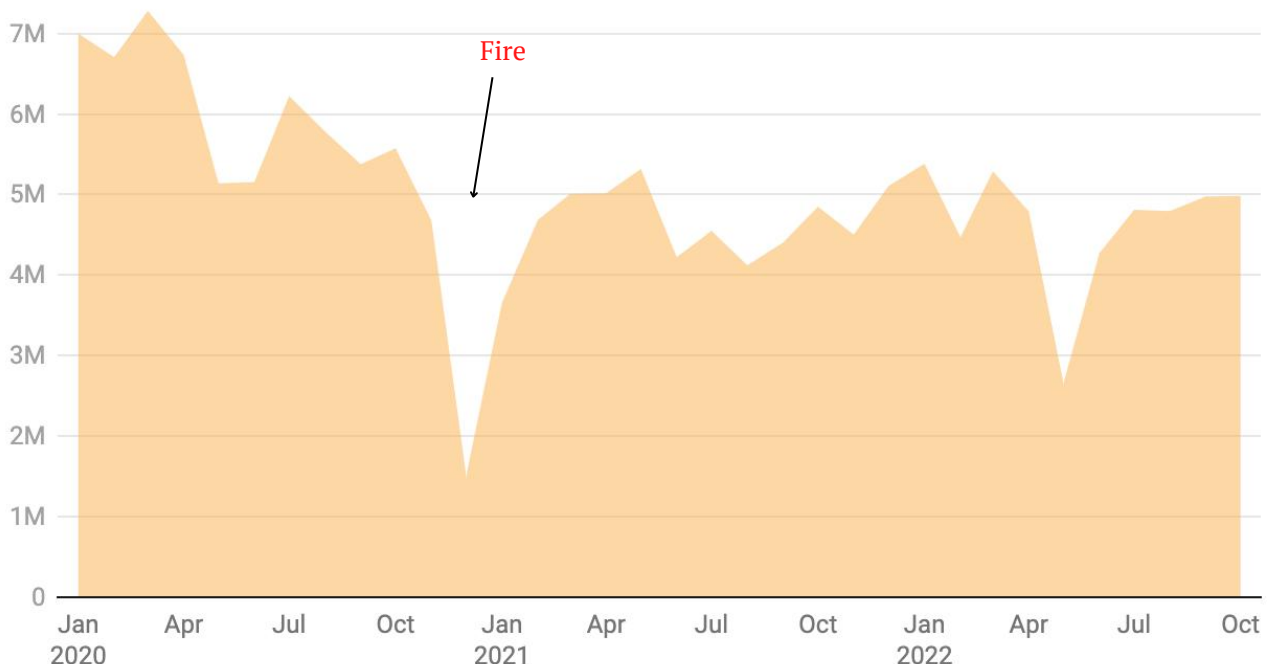


Chart: Hawilti • Source: NUPRC



FOCUS ON CAPRICORN MARINE GROUP

The Capricorn Marine Group is a growing provider of mobility and logistics solutions across West Africa. Established in Nigeria in 1998, the group has grown to incorporate three companies dedicated to shipbuilding and ship repair, marine and logistics services, and the provision of key oil & gas equipment.

Its flagship company, Capricorn Marine Technologies Plc, has established a strong reputation in the design, procurement, and building of offshore oil & gas infrastructure. It also has joint ownership of two deep-sea passenger and cargo vessels, MV Shammah and MV Jireh, that operate weekly between several ports in West and Central Africa. Thanks to a partnership sealed with Izmir Shipyard of Turkey in 2020, it can locally design and build passenger, crew, and patrol and service boats in High-Grade Aluminum Alloy and High-Density Polyethylene (HDPE) thermoplastic material.

A Strong Play in Oil & Gas

The Capricorn Marine Group is a strong provider of services and equipment to oil & gas companies in Nigeria.

The company is notably the distribution partner of the Emerson Coriolis flowmeters, used as a direct measurement of mass flow, density and temperature across the upstream and downstream sectors. It is also the distributor and marketing partner of Manuli Hydraulics' marine hoses, offering both Poseidon (steel cord-reinforced) or Nautilus (textile cord-reinforced) models used for oil & gas transfer operations in offshore/onshore crude oil management activities. To complement its play in marine hoses, Capricorn Marine also owns one of the country's best oil & gas marine hose repair and certification facilities, capable of in-situ oil and gas GMPHOM 2009 and OCIMF hoses repair and re-certification.

Capricorn Marine Group

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In 2012, it incorporated Herald Marine & Energy Ltd to increase its support to oil & gas operators by providing evacuation solutions to producers and diversifying its products offering. The company notably has joint ownership of two tank barges used to store and evacuate oil by ship instead of relying on Nigeria's insecure pipeline network. The company's MT Herald Grace (11,605 DWT) and MT Herald Emmanuel (8,450 DWT) have already both built a strong track record in that area and have been mobilized for several independent and marginal field operators in the Niger Delta.

Promoter of Marine Safety

Capricorn Marine recently became the exclusive regional distributor and service partner of the Dtorque 50 Turbo diesel outboard engine in West and Central Africa. The Dtorque 50, manufactured by Neander Shark GmbH, is a 50 HP, double-crankshaft, turbocharged diesel outboard engine that meets the most stringent safety requirements for any offshore operations. The engine relies on a low fuel consumption (about 12 liters/h at full throttle) with a lifespan of more than 10,000 hours before overhaul.

Exploration.

Oil Reserves
Gas Reserves
Seismic

Drilling
Wells



The world's 11th biggest oil reserves

The growth of Nigeria's oil reserves has stagnated since 2007 on the back of policy uncertainty and lower oil prices between 2016 and 2020, which have impacted exploration spending. The country's proven oil reserves currently stand at 37.046 billion barrels, according to recent OPEC and NUPRC data. The Nigerian government now aims at growing reserves to 50 bn barrels by 2030, an ambitious target that would require substantial investment into exploration over the coming years. The NNPC has notably embarked on exploration programmes in several onshore frontier basins outside of the Niger Delta, including the Anambra, Chad, and Sokoto Basins.

To support such frontier exploration, the PIA provides for a Frontier Exploration Fund consisting of 10% of rents on petroleum prospecting licences and petroleum mining leases. The law also provides that 30% of the profits of the NNPC be allocated to the financing of exploration in frontier basins in places like Anambra, Dahomey, Bida, Chad and the Benue Trough.

The world's 8th biggest gas reserves.

Nigeria remains a predominantly gas province and holds the world's eighth largest reserves of natural gas. In June 2021, the Federal Government announced the discovery of an additional 3.53 Tcf of gas, beefing up the country's proven gas reserves to 206.53 Tcf. These include 100.73 Tcf of associated gas and 105.8 Tcf of non-associated gas. Nigeria now wants to increase its volumes of proven gas reserves to 220 trillion cubic feet (Tcf) by 2030. Given limited deep-water activity in the market, Hawilti expects most future exploration and discovered gas reserves to come from established indigenous players and new local marginal field operators both onshore and in shallow water.

Exploration activity is picking up

Exploration started to slowly but steadily intensify in 2022, with key exploratory wells drilled and completed onshore.

Seplat Energy completed the drilling of its high-impact, near-field Sibiri prospect (previously known as Amobe) on OML 40 at the start of 2022. The well was successful and encountered eight oil bearing reservoirs with 353 ft. of gross hydrocarbon pay. The operator is now securing approvals for an extended well test (EWT) and has started construction of the flowline to tie back the discovery to its Opuama facility.

Also onshore, Chevron Nigeria drilled and completed the Saturn-1 well on OML 49, and later abandoned it. Meanwhile, Sterling Oil E&P Co. drilled several prospects on OPL 2005 and OPL 2006 northwest of Bonny. Finally, Nigeria re-opened exploration and development at the end of 2022 within its Northern States with the launch of the Kolmani Integrated Development Project (Benue Trough) on OPL 309 and 310. Africa Oilfield Movers/SEEP Co was recently selected by NNPC as a Financial and Technical Services partner for the integrated development of both blocks. The scheme notably includes the commercialisation of hydrocarbons via the construction of a 120,000 bpd oil refinery, 500 MMscf/d gas plant, 300 MW gas-to-power plant, and 2,500 tpd fertilizer unit.

Oil & gas had been found there with the Kolmani-1 well in the 1990s with an estimated 33 Bcf of gas. NNPC eventually drilled the Kolmani-2 appraisal well in 2019 followed by Kolmani-3 in 2021, and says it has found 1bn barrels of oil and 500 Bcf of gas.

2023 could also see exploration and appraisal drilling offshore, with TotalEnergies embarking on a drilling campaign on OML 130 that could target prospects around Egina and Akpo.

Growth of Nigeria's Proved Oil Reserves, mn bbls (1960 - 2021)

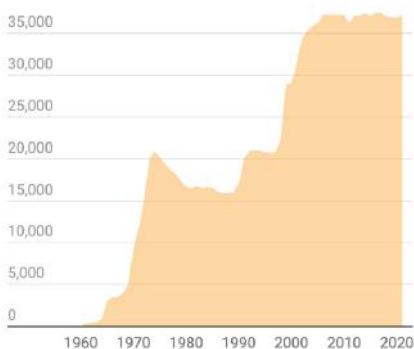


Chart: Hawilti • Source: OPEC



President Buhari at the Kulmani-2 well site in 2019.

Growth of Nigeria's Proved Gas Reserves, Bscm (1960 - 2021)

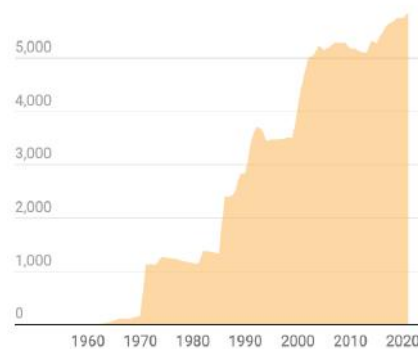


Chart: Hawilti • Source: OPEC

Deep-Water

Shallow Water

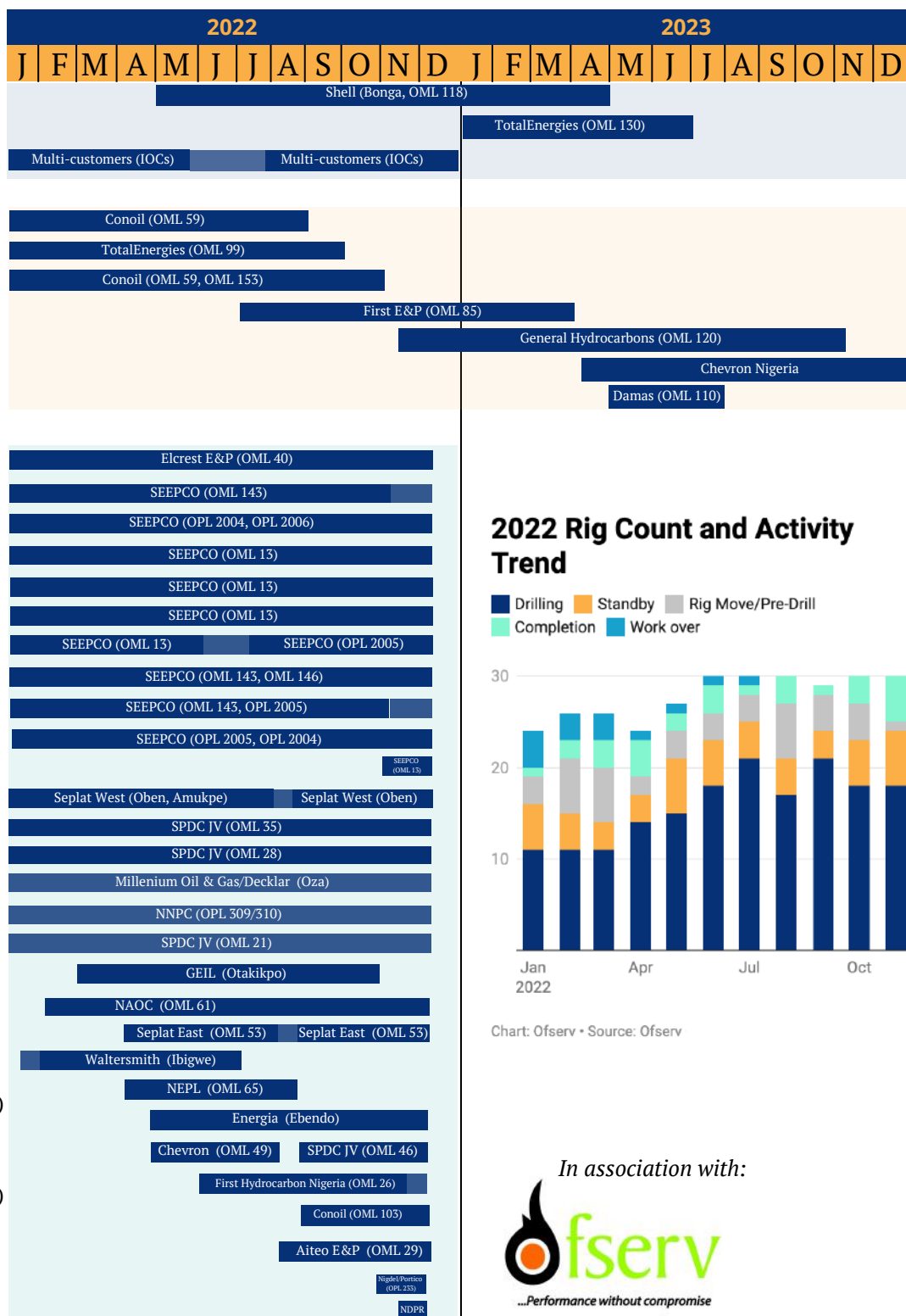
Onshore

RIGS TRACKER

Valaris DS-10
Noble Corp.
Helix Q7000

Adriatic I (Shelf D.)
Baltic (Shelf D.)
Shelf D. Resourceful
Shelf D. Mentor
Blackford Dolphin
TBC (upcoming tender)*
TBC (upcoming tender)*

Dephwise Majestic
Bogel Durga 1
Bogel Durga 2
Bogel Durga 3
Bogel Durga 4
Bogel Durga 5
Bogel Durga 6
Bogel Durga 7
Bogel Durga 8
Bogel Durga 9
Bogel Durga 10
HPEB 119 (HPCN)
BR 301 (SDF)
Hilong 29 (HPCN)
Rig 151 (Wellsmart)
Ikenga 101 (PDL)
Hilong 19 (HPCN)
T26 (KCA Deutag)
Hilong 27 (SAP Hilong)
Hilong 7 (HPCN)
ACME-5
Rig Discovery 201 (AG Butler)
HPEB 187 (HPCN)
OES Respect
Rig Discovery 202 (AG Butler)
Imperial (Depthwise)
ST Elaine (Aviam Offshore)
Oritsetimeyin (Sel. Marine)
HPEB 120 (HPCN)



*tentative timeline

Notes: Onshore data only available until November 2022. Onshore data is inclusive of pre-drill, drilling, and completions periods, but exclusive of rig move, pre-mobilisation, and maintenance periods. Lighter colors represent standby periods.

In association with:



Onshore.

Divestments
IOCs
Independents

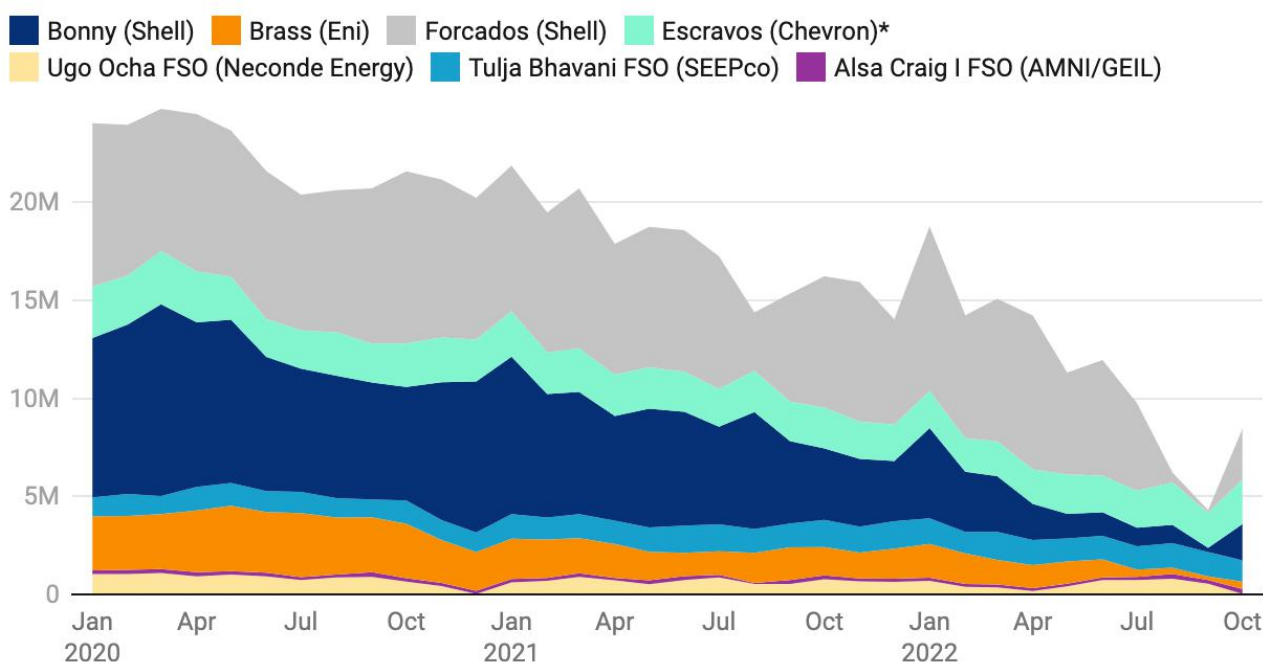
Brownfield
M&A
Evacuation



HAWILTI VIEW

- The outlook onshore remains uncertain despite progress made towards the last months of 2022 with the re-opening of the Bonny and Forcados terminals. The reliability of evacuation terminals and of their pipeline network will continue to dictate performances from most onshore operators.
- The crises of 2021-2022 have forced several producers to develop their alternative crude evacuation systems via new lines, barging, and trucking. Such solutions make production costs more expensive but are expected to mitigate the impact of crude theft moving forward and help segment recovery.
- Against market challenges, operators are expected to accelerate the development of associated infrastructure such as storage tanks, modular refineries, and gas processing modules.
- The segment will continue to be marked by divestments from international oil companies (IOCs), especially Shell and TotalEnergies, although key transactions are currently on hold.
- While onshore infrastructure is ageing and vulnerable to vandalism, higher oil prices are an incentive for several established operators and new marginal fields owners to drill and re-enter wells. Consequently, Hawilti predicts a steady recovery of the onshore sector over 2023-2024.

Nigeria's monthly onshore liquids production, bbls



**Escravos' liquids output is split between onshore and shallow water*

Chart: Hawilti • Source: NUPRC

Addressing crude theft onshore remains a priority

Nigeria's onshore oil & gas production is expected to steadily recover throughout 2023. The resumption of exports from Shell's Bonny and Forcados oil terminals at the end of 2022 already supported a recovery of oil volumes, which is likely to continue next year.

However, onshore producers will remain vulnerable to pipeline vandalism and crude theft unless long-term and sustainable solutions are found. In the short-term, several of them have embarked on implementing their own alternative crude evacuation systems, mostly by barging and trucking oil to the closest export terminals.

Until now, very few onshore operators already had their own systems to evacuate their oil. Neconde Energy, part of the Nestoil Group, was the first one in Nigeria to implement a long-term barging operation to evacuate oil from OML 42 to its own FSO unit offshore, Ugo Ocha. Sterling Oil also has its own FSO stationed offshore, the Tulja Bhavani, to handle production from OMLs 143 and 146.

Others are currently barging directly to established export terminals, including operators such as Seplat Energy or Asharami Energy but also marginal field owners like Green Energy International and more recently Niger Delta E&P.

However, the availability of barging facilities is currently preventing several additional operators to follow suit. Nigeria is in critical shortage of double-hull barges, the safest possible ships able to handle the transportation of oil. As a result, smaller vessels or makeshift facilities are used, making crude transportation riskier.

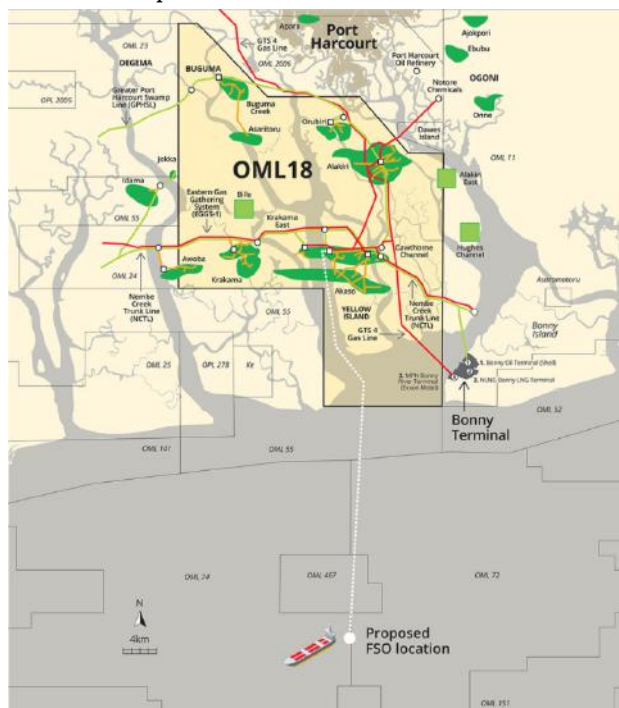
Most future alternative evacuation systems are likely to focus on avoiding the Bonny network, especially the Nembe Creek Tunk Line (NCTL) operated by Aiteo E&P that serves Aiteo E&P (OML 29), BelemaOil (OML 55), Newcross (OML 24), and Eroton E&P (OML 18). None of these companies have exported for several months this year, data from NNPC shows. To avoid evacuating oil via NCTL, Energy Link Infrastructure (ELI) is currently developing an alternative for OML 18 which could possibly serve neighbouring assets as well. The midstream infrastructure company is in the process of deploying a new FSO unit, the ELI Akasso, to which oil can initially be barged before a pipeline is laid to shore. The converted tanker can hold 2 million barrels and will be a much needed breather for Eroton E&P as it embarks on the further development of OML 18, one of Nigeria's most prolific onshore assets.

However, more reliable lines and stronger governance frameworks are required to secure Nigeria's oil barrels in the long-term. In 2022, the commissioning of the Amukpe-Escravos pipeline marked the first time in seven years that a new pipeline was opened. The 160,000 bpd, 67-km export line was laid via horizontal directional drilling (HDD), making it a lot less vulnerable to vandalism.

To secure the rest of Nigeria's onshore pipeline network, drones are now increasingly being used to carry out pipeline inspection. Similarly, several solutions are being considered to curb theft, including the installation of steel cages and CCTV at wellheads and manifolds.

Legally, it remains to be seen whether the PIA will put in place efficient mechanisms to tackle theft and vandalism.

Under the new regime, it is the responsibility of local communities to protect infrastructure. In effect, upstream companies are required to contribute a certain amount of their actual operating expenditure to a host communities development trust fund. Rates have been fixed at 3%-5% for upstream companies, and 2% for other companies. In the event of vandalism, sabotage and other civil unrest causing damage to petroleum facilities or disruption of production activities, the given community will forfeit the cost of repairs. While the mechanism addresses communities' demands, the contribution rates have fallen short of their 10% expectations.



Map: San Leon Energy

FOCUS ON

OML 34

OML 34 is a primarily gas asset, operated since 2012 by the joint venture of the NNPC Exploration and Production Ltd (NEPL, 55%) and ND Western (NDW, 45%). With proved and probable gas reserves of about 6 Tcf, it has tremendous development potential and offers ND Western significant opportunities for midstream and downstream infrastructure investments.

A Strategic Gas Asset

Three gas processing plants with a combined capacity of 600 MMscf/d are currently operational on OML 34: the 360 MMscf/d NAG-1 and 150 MMscf/d NAG-2 plants at Utorogu and an additional 90 MMscf/d plant at Ughelli East.

Gas from Utorogu is injected into the Escravos-Lagos Pipeline System (ELPS) that supplies several of Nigeria's gas-to-power plants, fertilizer units, and gas distribution companies. ELPS is also the starting point of the West Africa Gas Pipeline (WAGP), so Utorogu's gas is currently exported to Benin Republic, Togo, and Ghana.

Meanwhile, Ughelli East's gas is supplied to the 976 MW Transcorp Ughelli gas-to-power plant and the Beta Glass plant.

While OML's 34 gas production has been previously capped at 270 MMscf/d for many years, NDW has executed the necessary interventions to increase output in recent years. The first step was the revamping of the Ughelli East Gas Plant to restore its capacity to 90 MMsc/d, followed by the revamp of the Utorogu NAG-1 plant. As a result, a production peak of 385.82 MMscf/d was notably attained in 2020. The rehabilitation process is still ongoing to ensure all plants' production capacity is attained.

TIMELINE

20 April 2011: Incorporation of ND Western as a SPV to acquire the jointly held 45% participating interest of the SPDC JV, TEPN and NAOC in OML 34.

31 July 2012: NDW executes the Sales and Purchase Agreement (SPA) for the acquisition of 45% interests in OML 34

1 September 2012: The transaction of a 45% interest in OML 34 to ND Western is completed.

28 February 2019: NPDC and ND Western receive statutory approval for the renewal of OML 34 for a further 20 years.

3 July 2020: Gas production peak of 385.82 MMscf/d

"Thanks to various interventions, we have unlocked additional gas production and have registered a peak of 371.81 MMscf/d for 2022 so far. Moving forward, ND Western will be developing its own midstream gas business for natural gas liquids while establishing the Utorogu industrial park."

EBERECHUKWU OJI,
MD/CEO,
ND WESTERN



Supporting Nigeria's industrialization

ND Western has embarked on a growth strategy that will see it monetise OML 34's reserves to drive industrialisation in the Niger Delta.

One strategy developed by the company to further monetize its gas more successfully is the development of its own midstream gas business for natural gas liquids and the establishment of the Utorogu industrial park. The park is currently in development and will be providing gas feedstock and power to support industries and factories willing to co-locate on site and access cheaper gas directly at the pump.

Meanwhile, the company is also progressing plans to construct its own modular oil refinery on site.

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Prospects for onshore oil

Nigeria's onshore oil production is expected to steadily recover over 2023-2025, although the COVID-19 pandemic and OPEC quotas proved that restarting wells in Nigeria can be a lengthier process than expected.

Several key blocks are expected to support the recovery of export volumes from onshore assets from 2023.

On OML 152, where Newcross Petroleum started production in 2022, additional volumes could come from the installation of an early production facility (EPF) for which negotiations have been held with NNPC in 2022.

On OML 18, the availability of a new evacuation option via the ELI Akasso FSO is expected to unlock significant export potential from the block. The operator, Eroton E&P, had to shut down production for most of 2022 to avoid losing its oil to theft. With a new evacuation route in place, the asset could easily pump an average of over 40,000 bopd and embark on its further development. In 2016, the partners on OML 18 had notably submitted a 5-year plan with a CAPEX of \$1.5bn to increase output to 115,000 bopd and 485 MMscf/d via 50 notional wells and 26 gas wells. AIM-listed San Leon Energy is in the process of acquiring a controlling interest on the block, and believes it could ramp up production to up to 100,000 bopd in 2023 if the transaction closes.

Redevelopment and further development opportunities are also being exploited by the NNPC Exploration and Production Ltd (NEPL) on its assets. The company has selected several services partners under Risk Finance and Technical Services Agreements (RFTSA) to ensure the quick development and financing of its plans for key assets such as OML 13 and OML 65.

On OML 13, Sterling Oil executed an intensive drilling campaign in 2022 with up to four rigs at one time, which could quickly translate into additional volumes from the block. Meanwhile on OML 65, COPDC and Sirius Petroleum have put together an Approved Work Programme (AWP) on behalf of NEPL, whose Phase 1 will see the drilling of nine wells to further develop the Abura field and increase production by up to 11,000 bopd. This would be a first step in maximising the block's 40,000 bopd of infrastructure capacity.

Seplat Energy, who expects to have completed 15 wells in 2022, should also be pumping additional barrels next year as it starts maximising capacity from the Amukpe-Escravos pipeline.

Prospects for onshore gas

While the potential to grow Nigeria's gas production is strong, output will continue to be mitigated by an unfavourable and regulated pricing environment.

In the short-term, production of associated gas will recover along with decreasing levels of crude theft and the end of floods in the Niger Delta. The recovery of volumes will be driven by the need to meet contracted obligations with key off-takers such as Nigeria LNG or large industrial facilities.

However, only the implementation of a willing buyer/willing seller (WB/WS) regime and expansion of midstream infrastructure could unlock the true potential of Nigeria's gas sector. While the market has witnessed an uptick in gas monetisation, companies are likely to wait for a clearer pricing regime before investing in new gas wells. The focus for now will be on processing associated gas to cut flaring. In that regard, the relaunch of the Nigerian Gas Flare Commercialisation Programme (NGFCP) in 2022 could provide a boost to the processing of onshore associated gas. As such, gas production will keep increasing over 2023-2025 but only marginally.

2023 will notably see the opening of the 300 MMscf/d ANOH gas plant of Seplat Energy and the NNPC, with Shell's SPDC JV in charge of delivering the gas wells to feed the facility. The SPDC is also moving forward with the Uzu field development plant that will support its gas supply obligation to Nigeria LNG (Trains 1 to 6) via the 1.25 Bscf/d Gbaran central processing facility on OML 28.

Overall, onshore gas production is likely to pick up only post-2025 once large off-takers near commissioning of new gas-based facilities (NLNG T7, Padah LNG notably) and once key pipelines such as AKK are commissioned to open up the market to Northern States.

Associated infrastructure trends.

To decrease exposure to unreliable third-party export infrastructure, several onshore producers are currently investing in the construction of associated midstream and downstream infrastructure. While a few modular and small-scale gas processing plants are on the table to cut flaring, the market is witnessing a strong appetite for additional storage capacity and refining infrastructure. While four modular refineries have been commissioned already at Ogbale, Ibigwe, Edo and Kwale, more projects are in the pipeline. This is especially the case of existing onshore and marginal fields producers who have access to their own feedstock.



FOCUS ON BELL OIL & GAS

Over the years, Bell Oil & Gas has become one of Nigeria's most diversified suppliers of equipment and services to the country's energy sector. Following the crises of 2016-2017 and 2020, the company has emerged more resilient and stronger and is now evolving into an integrated services provider by building additional capacity across its business lines.

An Indigenous Business with International Standards

Bell Oil & Gas' wide network of international technical partners has earned it a solid reputation from operators in Nigeria and enabled it to participate in most of the country's key onshore, shallow water, and deep-water projects. It remains a supplier of choice to most international oil companies (IOCs), independent operators and EPC contractors in the market for a wide range of services.

It notably emerged as the most competitive and technically qualified bidder for the supply of valves, glass-fibre reinforced vinyl ester (GRVE) bisphenol A post-cured pipes, flanges, and fittings to Nigeria LNG's \$10bn Train 7 project. Production of the GRVE pipes and fittings is currently ongoing with delivery scheduled for the end of 2022 under a Project Master Agreement.

Bell Oil & Gas

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<https://belloil.com/>



Servicing Nigeria's Upstream Operators

Via partnerships with major international mills, Bell Oil & Gas has notably become a major supplier of lines pipes and OCTG products, while another partnership with NOV Fiberglass Systems has supported its growing market share in composite pipe systems. In fact, Bell Oil & Gas has the only in-country fabrication facility for composite pipes, which is now located from Port Harcourt to the Lekki Free Zone, Lagos. The company's support to the upstream industry also involves growing capabilities in Valve Assembly and Testing, Rotating Equipment and Well Testing, supported by partnerships with EXPRO and Haimo. It notably offers state-of-the-art custom-built multiphase flow meters with solutions covering fixed metering skids and turnkey mobile testing services.

The EVOLUTION of Bell Oil & Gas

Bell Oil & Gas embarked in 2019 on project EVOLUTION, a \$20m investment that will see it become a truly integrated services provider.

Bell Oil & Gas is indeed in the process of commissioning an ultra-modern valve assembly, service, testing and painting plant, and OCTG/pipe threading facility at the Lekki Free Zone, which will turn it into an oilfield procurement, fabrication, installation, and maintenance provider. More importantly, it makes the company compliant with the NCDMB's Policy on the Procurement of Bare Line Pipes which became effective in October 2022.

With an annual capacity of 50,000 metric tons, the facility will mark a milestone in the history of Nigeria's local content development. Upon completion, Bell Oil & Gas will commence valve manufacturing and production locally.

Shallow Water.

Divestments
Independents
M&A

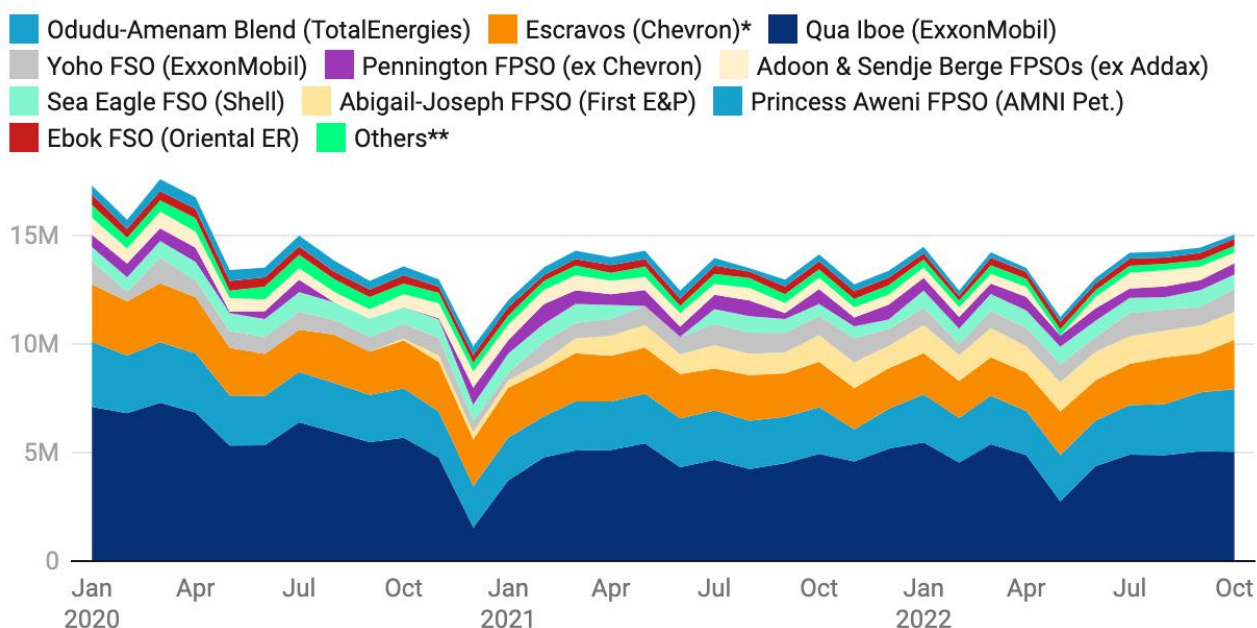
Brownfield
Greenfield



HAWILTI VIEW

- The outlook in shallow-water is positive with production expected to keep growing in the near term as independents execute brownfield and greenfield development plans.
- Availability of evacuation infrastructure, including onshore terminals (Escravos, Qua Iboe) and FSO/FPSO units, makes for attractive tie-back opportunities across the segment.
- Several drilling campaigns already scheduled for 2023, including at OML 120 by General Hydrocarbons (rig already mobilised) and around Escravos by the Chevron Nigeria JV as part of Project Panther (upcoming rig tender).
- Strong pipeline of projects will drive market activity over the 2023-2026 period and rely on projects executed by General Hydrocarbons, SPDC/Sunlink, Oriental Energy Resources, West Africa E&P, Yinka Folawiyo Petroleum/PetroNor E&P, and AMNI Petroleum notably.
- The segment holds several blocks and assets with significant upside that are now in the hands of NNPC Ltd (ex. Chevron and ex. Addax assets notably). The ability of the company to raise funds and/or secure technical and financial partners for these assets could unlock tremendous segment growth between 2023-2030.
- Uncertainty over the MPNU/Seplat Energy deal likely to continue until mid-2023, holding back investments over Nigeria's biggest shallow water producing assets.

Nigeria's monthly shallow water liquids production, bbls



*Escravos' liquids output is split between onshore and shallow water **Others include Tamara Nanaye FPSO (YFP - until Nov. 2021), Okono FPSO (NPDC/Eni), and Ajapa FPSO (Brittania-U)

Chart: Hawilti • Source: NUPRC •



© Century Group

FOCUS ON CENTURY GROUP

Champion of Nigerian Content

Over the years, Nigeria's Century Group has built unique capacities and capabilities in servicing the oil & gas sector and remains until today the only fully Nigeria-owned company that owns and operates floating, production, storage and offloading (FPSO) vessels on the continent. Beyond FPSOs, the subsidiaries of the Century Group have also developed experience in managing a wide range of critical oil & gas infrastructure assets, including floating, storage and offloading (FSO) units, mobile offshore production units (MOPU), shore bases and turret systems. The Group's services offering spans a wide range of sectors including among others operations & maintenance, onshore and offshore logistics services, trading, engineering support services, and the lease of production and storage facilities.

A Successful Track Record with FPSOs

Via its flagship subsidiary Century Energy Services Ltd (CESL), the Century Group has managed to build a strong reputation as a reliable O&M and technical partner for FPSOs in Africa. CESL notably kept the Aje field operational on OML 113 for operator Yinka Folawiyo Petroleum between 2014 to 2021, maintaining the asset productive and profitable via its FPSO Front Puffin, later renamed FPSO Tamara Nanaye. It facilitated the vessel's operations & maintenance in the Benin Basin, helping to bring and keep Lagos in the club of oil producing states for several years. On OML 120, CESL has also been in charge of the procurement, operations & maintenance of the FPSO Armada Perdana for the early life of the Oyo field since 2009. Now renamed FPSO Tamara Tokoni, the vessel is expected to continue serving as a production hub for OML 120's new operator.

A Local Content Enabler

By building domestic capacities across the value-chain, the Century Group has been able to emerge as one of Nigeria's most competent services companies. The Group is now well placed to both support existing and new local operators in the market and to develop its own oil & gas fields via its upstream subsidiary Century Exploration & Production Ltd (CEPL). During the 2010s, Century had successfully supported the initial wave of local content development in Nigeria by providing key support and services to new block and marginal fields operators such as AMNI Petroleum on OML 112 or Oriental Energy Resources on OML 67. As the Nigerian market experiences a new wave of local content growth, Century will continue to offer solutions that help operators decrease their exposure to O&M risks and offer competitive rates in the management of critical oil & gas assets in Nigeria.

World-class Logistics Support Services

Via its subsidiary Century Ports & Terminal (CPTL), the Century Group operates and manages the Kidney Island support base facility on OML 11 on behalf of its owner, the Shell Petroleum Development Co. (SPDC) JV. The shore base offers Century the ability to coordinate and support a wide range of operations within the Niger Delta and offer crucial logistics support to oil companies operating in the region.

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Africa's most attractive and sought-after blocks support strong M&A activity.

Nigeria's shallow water areas offer some of the most attractive greenfield and brownfield development opportunities on the continent. From the maritime border with Benin to that with Cameroon, Nigerian waters hold several discovered oil & gas fields and appraised discoveries waiting to be developed. Their location in shallow water make their field development plans a lot less expensive to execute than deeper discoveries elsewhere. First E&P's Anyala oilfield (OML 83) for instance, which achieved First Oil in October 2020, relies on unit technical costs of \$16/barrel.

For the same reason, the shallow water space in Nigeria is witnessing strong M&A activity. Assets with strong redevelopment potential have attracted the interests of several local and international independents, although very few transactions have closed following NNPC's exercising of its pre-emption rights on several deals.

In 2022, the company notably closed its acquisition of Chevron's OMLs 86 and 88 that include the Pennington terminal, preventing Nigerian independent ConOil from closing the deal. It also managed to sign a Transfer, Settlement and Exit Agreement (TSEA) with Addax Petroleum Development Nigeria in November to take over offshore blocks OML 123, OML 124, OML 126, and OML 137. These hold tremendous potential for further production of oil, and several Tcf of undeveloped gas reserves.

More importantly, NNPC is disputing the acquisition by Seplat Energy of Mobil Producing Nigeria (MPNU), which notably operates the Qua Iboe oil terminal and the highly prolific OMLs 67, 68, 70, and 104 with a 40% interest representing +/- 95,000 boepd. These are Nigeria's biggest producing shallow water assets, whose development rely on 90 shallow water and offshore platforms and 300 producing wells. The completion of the transaction is currently uncertain, which will delay further investments in the assets.

Meanwhile, other transactions have closed and could pave the way for fresh investments. On OML 113, PetroNor E&P recently secured Panoro Energy's interests in the block and has become the technical operator of the Aje gas field redevelopment in cooperation with the operator, Yinka Folawiyo Petroleum (YFP). The partners expect to approve a project able to produce some 25,000 boepd with a focus on producing gas for power and deliver LPG to the domestic market.

A robust pipeline of projects will drive production in the short and medium-terms.

Nigerian independents will be driving shallow water activity over the coming years as they develop several discovered oil and gas fields and make use of existing production and evacuation infrastructure to quickly monetise their reserves.

First E&P is expected to double output from its Abigail-Joseph FPSO as it achieves First Oil at Madu on OML 85. The field's conductor-supported platform (CSP) was completed in 2022 and is already offshore, where First E&P has mobilised the Shelf Drilling Mentor until Q1 2023 for the drilling campaign.

On OML 120, **General Hydrocarbons (GHL)** has mobilised the Blackford Dolphin rig for its drilling campaign on Oyo, expected to last until Q3 2023. The new operator hopes to start production soon by relying on the Century Group's FPSO Tamara Tokoni, which is still on site and can handle about 47,000 bopd and 120 MMscf/d at full capacity.

Chevron Nigeria (CNL) is also expected to resume drilling in shallow water offshore Escravos next year. The major started its search at the end of 2022 for a jackup drilling unit that it intends to mobilise for two years starting in mid-2023.

On OMLs 71 & 72, **West Africa E&P (WAEP)**, a joint-venture of the Dangote Group and First E&P, continues to progress the development of the Kalaekule field. Production could start as early as mid-2023, with Kalaekule being only the first development phase of a project expected to rely on the Century Group's FPSO Tamara Nanaye that was previously deployed on the Aje field (OML 113).

By 2024, **Oriental Energy Resources** is expected to have achieved First Oil at Okwok, its second marginal field. The Nigerian company is already the biggest marginal fields producer in the country, and Okwok will confirm its leadership with the deployment of a 40,000 bpd FPSO unit.

Additional projects in the medium-term would include the development of the Hi gas field by **Sunlink Energies & Resources** and Shell on OML 144. The field is expected to be a key supplier of gas to Nigeria LNG's 7th train and needs to start production before the end of this decade.

AMNI Petroleum International is finally expected to be driving market activity as it brings First Oil to Tubu on OML 52. The company is in the process of securing funding from the Afreximbank to execute development plans on both OML 52, next to its Ailsa Craig I FSO, and OML 112 where it already uses the Century Group's FPSO Princess Aweni.

FOCUS ON DORMAN LONG ENGINEERING

On the back of fresh investments, the 70-year-old company is expanding its footprint and is strategically positioned to support the expansion of Africa's gas infrastructure.



Made of Steel

Initially incorporated as Amalgamated Engineering Ltd, DLE specialised early on in the provision of steel fabrication and erection services to Nigeria's civil construction industry. As one of Nigeria's first structural engineering companies, it was responsible for the provision of structural steel to critical bridges, factories and warehouses developed after Independence. Its structural steelworks have in fact formed part of many industrial buildings constructed from the 1950s to the 1970s, especially around Lagos and Port Harcourt, and including the famous Niger Bridge.

Upon its merger with British Steel in 1960, Amalgamated Engineering became Dorman Long & Amalgamated Engineering Ltd and witnessed its first expansion phase, including tanks.

The Building of Nigerian Content

By 2002, it had become Dorman Long Engineering and had strategically positioned itself to support the boom in Nigeria's telecommunications, power, and oil & gas industries. By offering structural steel and structures that were previously procured from abroad, Dorman Long was able to support the growth of local content very early on in Nigeria. Over the years, it has grown into an oilfield equipment, structural steel, marine structures engineering and fabrication company able to support the most challenging industrial and infrastructure development projects in Africa. Its track record of steel fabrication and erection services comprises of major engineering services works, including for almost all oil majors and energy services companies operating in Nigeria.

- Africa's largest engineering quality hot-dip galvanising facility at Agege (Lagos), with an installed capacity of 90,000 MT/annum.
- West Africa's largest rolling machine located at Idi-Oro (Lagos), within a manufacturing facility for steel fabrication, rolling, and welding works.
- Naval Dockyard (Lagos) with a deep sea quay for fabrication and assembly works.

Positioned for Growth

Dorman Long's track record has allowed it to retain major clients in Nigeria but also attract financiers to support the company's expansion and diversification. In 2021, it notably received a fresh equity investment from Africa Capitalworks to support the refurbishment of its equipment and help expand its regional footprint.

As it grows to play a larger contribution to the continent's development, Dorman Long remains a major player in Nigeria where it is currently part of the biggest energy infrastructure projects in upstream, gas, and downstream. In 2022, it notably completed the MADU conductor-supported platform (CSP), a critical component of First E&P's shallow water development on OML 85. The company is also a fabrication subcontractor on Seplat Energy's 300 MMscf/d ANOH gas plant, Nigeria's biggest ongoing midstream gas project.

Finally, Dorman Long is one of the local companies involved in the rehabilitation of the Port Harcourt Refinery, where NNPC and its contractor Maire Tecnimont ambition to restore 90% of the facility's nameplate capacity by 2024.

Dorman Long Engineering Ltd

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Seplat Energy's Proposed Acquisition of Mobil Producing Nigeria: What You Need to Know

In February 2022, Seplat Energy proposed to acquire Mobil Producing Nigeria Unlimited (MPNU) from Exxon Mobil Corporation, Delaware (ExxonMobil).

The transaction covers the entire operated offshore shallow water business of ExxonMobil in Nigeria, including a 40% interest in four offshore oil mining leases (OMLs 67, 68, 70 and 104) comprising of some 90 shallow water platforms and 300 producing wells.

It also includes the Qua Iboe Terminal, one of Nigeria's largest export facilities and one of the country's most efficient oil export terminals.

Finally, Seplat Energy would also gain a 51% interest in the Bonny River Terminal (BRT) and natural gas liquids (NGL) recovery plants at EAP and Oso.

The purchase price was set at \$1,283 million plus up to \$300 million contingent consideration (subject to lockbox, working capital and other adjustments). The four OMLs combine some 445m barrels of oil equivalent (boe) of 2P reserves, including 92% of liquids. This sets the valuation at about \$2.9/boe.

Proposed Funding Structure

Debt
\$825m

Equity
\$300-400m

The transaction would add a working interest production of almost 100,000 barrels of oil equivalent per day (boepd) to Seplat Energy's daily output. In comparison, the company produced +/- 45,000 boepd in 2022 so the acquisition would triple its output.

The acquisition was expected to be completed before the end of the year, with an effective date of January 1st, 2021. However, the transaction has run into regulatory issues and disagreements over the interpretation of pre-emption rights under the Joint Operating Agreement (JOA) between NNPC and MPNU.

A Focus on Gas

With its acquisition of Mobil Producing Nigeria, Seplat Energy would sit on top of 7 Tcf of shallow water gas reserves that it could develop. The four OMLs hold indeed significant discovered gas resources and have the necessary wells and infrastructure in place to ease their commercialisation in the future.

This notably includes the Bonny River Terminal (BRT) that recovers natural gas liquids (NGLs) to deliver fractional yield products such as propane (C3), butane (C4), and pentane (C5+). It notably supplies the domestic market with LPG but also supports exports with 3-4 vessels per month.

Seplat Energy has also announced that the blocks offer significant upside from potential LNG development projects serving global markets. In fact, local company UTM Offshore is currently executing a FEED study on a floating LNG (FLNG) unit to monetise OML 104's associated gas.

TIMELINE

25 February 2022: Seplat Energy announces its proposed cash acquisition of Mobil Producing Nigeria Unltd (MPNU) for \$1,283m + \$300m contingent consideration.

19 May 2022: Seplat Energy announces that the NUPRC has declined to give consent to its acquisition of MPNU.

5 July 2022: The NNPC Ltd starts an action at the State High Court of the Federal Capital Territory in Abuja to declare that a dispute has occurred between itself and MPNU in relation to the interpretation of pre-emption rights under their Joint Operating Agreement and order NNPC and MPNU to arbitration as required by the JOA.

8 August 2022: Seplat Energy announces that it has received ministerial consent from President Muhammadu Buhari for its acquisition of MPNU. The same day, the NUPRC re-asserts that the status-quo remains.

\$1.283bn
purchase price

4
Oil Mining Licences
(OMLs)

95,000 boepd
W.I. production
(2020)

300
producing wells

FOCUS ON NESSCO



A Growing Nigerian Services Conglomerate

New Energy Services Company Limited (NESSCO) is a fully Nigerian-owned company incorporated in 2003 and providing services to the African oil & gas industry and the broader infrastructure space. It notably specialises in engineering, procurement, construction and facility management and relies on 75 qualified Nigerian engineers to deliver projects across the value-chain. The company currently counts over 1.5 million safe working man-hours with zero loss time injury (LTI) delivered to date.

NESSCO has notably sealed partnership with international crane manufacturers such as Techcranes International, TSC Offshore and UNIC Cranes Europe to offer lifting operations and maintenance services, and it continues to be one of the biggest and sole representatives of such international brands in Nigeria.

As a result, it has been able to provide services to a wide range of projects in the country, including for clients such as ExxonMobil and TotalEnergies for onshore, shallow water and deep-water projects.

New Energy Services Co. Ltd.

Plot 292H Ajo Adeogun St.
Victoria Island, Lagos
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- ISO:9001:2015 and BS OHSAS 18001:2007 certified;
- State-of-the-art 5,000 sq. metres construction and fabrication yard in Port Harcourt;
- 200-ton computerised horizontal tensile and compressive test bed;
- Nigerian Content Equipment Certificate (NCEC) Category A for the fabrication, maintenance, manufacture of assembly and maintenance of cranes and hoists in Nigeria.

A Diversified Offering

NESSCO is part of a broader group of companies including Nessco Drilling Services (drilling rigs, subsea & marine services, marine and shipping logistics), Technomak New Energy Services (EPCI, process automation, digital solution, cyber security and design), South Port Construction Nigeria (UNIBRIDGE solution, civil construction, construction equipment and property management), Nessco Logistics Services (haulage services and heavy duty equipment) and South Power Cement for cement production.

In addition to leveraging on its network of companies to provide an integrated service delivery, NESSCO is also diversifying its range of products and solutions. It notably recently commenced hose fabrication, pressure testing and crimping services from its operational base in Port Harcourt.

An Integrated Service Delivery

NESSCO has maintained strong technical alliances with global players in his services areas. These notably include Eiffage for its Unibridge® solution, TSC for EPCIM services, ITP Interpipe for pipe-in-pipe solutions, and Orapi Applied for the provision of high performance consumables.

Deep-Water.

FPSOs

Maintenance

IOCs

Brownfield

Subsea



HAWILTI VIEW

- Deep-water production to remain relatively stagnant in 2023 as most production hubs face maturing reservoirs and production decline. Output likely to be maintained by infill drilling by Shell on Bonga (OML 118) in 2022 and upcoming infill drilling by TotalEnergies on Egina and Akpo (OML 130) in 2023.
- Segment will be marked by the scheduled shut-down of TotalEnergies' Akpo FPSO on OML 130 in Q3 2023, which will temporarily affect output from Nigerian deep offshore for about six weeks.
- Medium-term outlook is positive with two major subsea tie-back projects currently under study and likely to be approved post-elections. These include Bonga North by Shell on OML 118 (150,000 boepd peak) and Preowei by TotalEnergies on OML 130 (70,000 boepd peak).
- Recent renewal of most producing deep-water leases in mid-2022 sent encouraging signals on the future of deep-offshore investments in Nigeria, although any investment decision is likely to come only after the presidential elections.
- Continuing deep-water operations in Nigeria will require investment into maintenance and life extension works on several production facilities. Several brownfield projects are notably under study to monetise gas more successful (Agbami) or extend the life of facilities (Bonga, Abo).
- Government planning a new licensing round for seven deep-water blocks in 2022/2023.

Nigeria's monthly deep-water liquids production, bbls

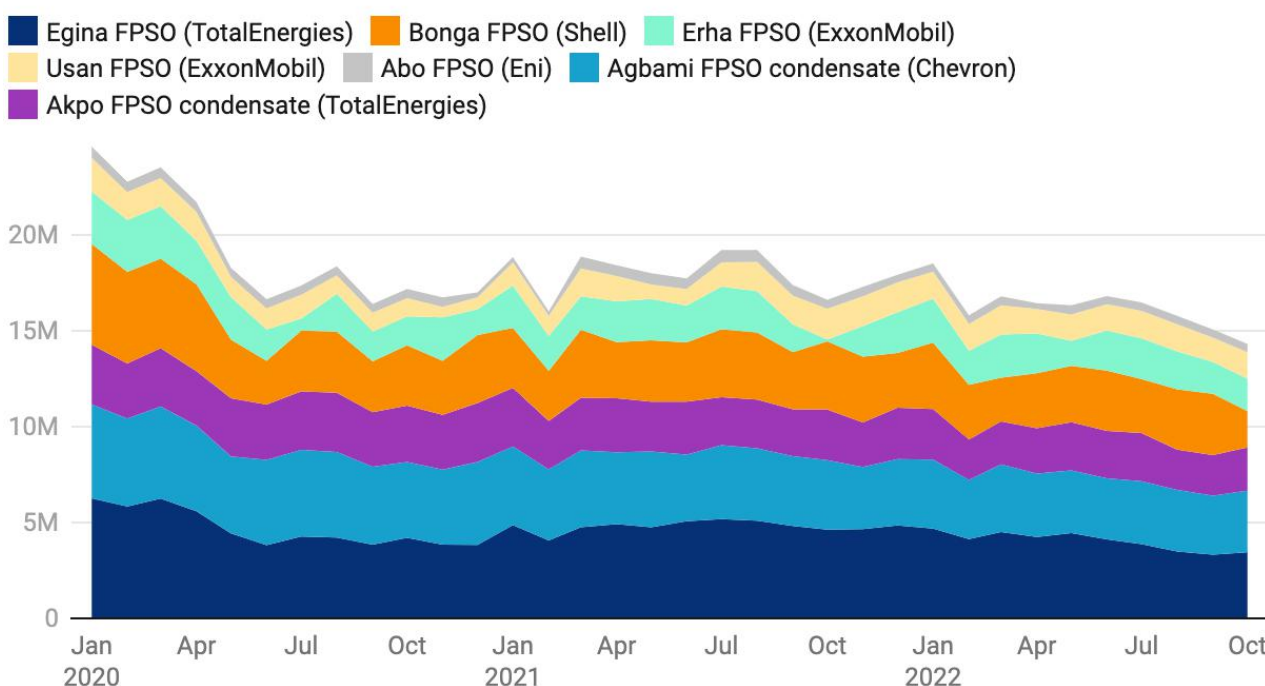


Chart: Hawilti • Source: NUPRC

Nigeria's deep-offshore is slowly awakening after recent regulatory reforms.

On the back of regulatory uncertainty, deep-water operators in Nigeria have been reluctant to further invest in the segment for years. The Egina project, a \$16bn venture of TotalEnergies on OML 130, was the last major deep-water development to come onstream in 2018.

All other deep-water producing assets have been operating for decades and are facing natural decline, including Abo (2003), Bonga (2005), Erha (2006), Agbami (2008), Akpo (2009), and Usan (2012).

The segment also holds several significant undeveloped discoveries whose development could easily boost Nigeria's daily production by several hundreds of thousands of barrels. They notably include Nsiko (OML 140, Chevron), Bonga SW/Aparo (OML 118/132, Shell/Chevron), Bosi (OML 133, ExxonMobil), Owowo (OML 139/OPL 223, ExxonMobil), Preowei (OML 130, TotalEnergies), Uge (OPL 214, ExxonMobil), Etan-Zabazaba (OPL 245, Eni/Shell), and Nnwa-Doro and Bilah (OML 129, Equinor).

While several of these developments were progressing towards FID by 2020, the passing of Nigeria's Deep Offshore and Inland Basin Production Sharing Contract (Amendment) Act at the end of 2019 severely impacted their profitability. The 2019 amendment bill notably removed the water depth-based royalty to replace it with a flat 10% royalty on all deepwater PSC, in addition to the introduction of a price-based royalty adding 0 to 10% depending on the oil price. In effect, the regulation added an extra layer of complexity to making these deep-water discoveries economically viable. The COVID-19 pandemic gave the final blow to these plans, who have since then been put back on the shelves.

The signing of the PIA in 2021 after decades of back and forth of negotiations reignited hopes to see some of these deep-water discoveries being developed. However, the new legislation might have been too little too late, with no clear signs given from IOCs so far that it has incentivised them to develop such multi-billion barrels discoveries.

Meanwhile, the government has still taken measures to pave the way for fresh deep-water investments by IOCs. In August 2022, NNPC Ltd resolved disputes with several production sharing contractors and renewed the respective production sharing contracts (PSC) accordingly.

In total, six oil mining leases (OMLs) have been renewed including

- **OML 125** (Eni-operated), which contains the producing Abo field;
- **OML 128** (Equinor-operated), which contains part of the producing Agbami-Ekoli field operated by Chevron;
- **OML 130** (TotalEnergies-operated), which contains the producing Akpo and Egina fields and the undeveloped Preowei discovery;
- **OML 132** (Chevron-operated), which contains the undeveloped Aparo field next to Shell's Bonga FPSO;
- **OML 133** (ExxonMobil-operated), which contains the producing Erha field and the undeveloped Bosi discovery;
- **OML 138** (ExxonMobil-operated), which contains the producing Usan field and the undeveloped Ukot discovery.

Upon its settlement of various disputes with PSC contractors and renewal of these leases, NNPC declared it was expecting \$500bn of new investments in the segment.

Deepwater Operators' Liquids Production, bbls (Jan-Oct. 2022)

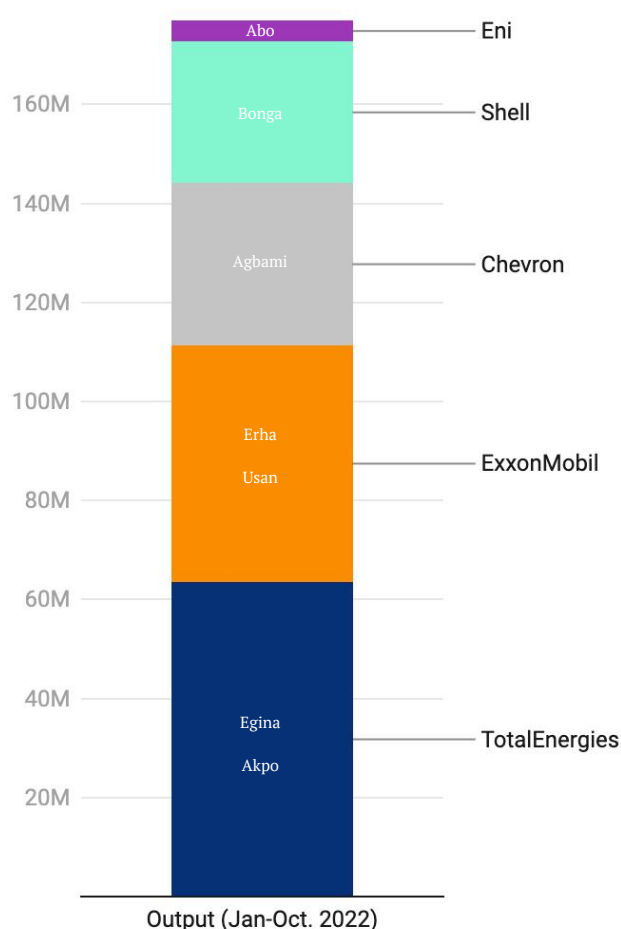


Chart: Hawilti • Source: NUPRC

FOCUS ON CAVERTON OFFSHORE SUPPORT GROUP (COSG) Plc

In 2021, COSG entered a new phase of growth and diversification with the opening of its Maintenance, Repair and Overhaul (MRO) facility at the Murtala Mohammed International Airport (MMIA) in Lagos, along with a world-class aviation training center equipped with Africa's first level D helicopter simulator for the Leonardo AW139 helicopters.



© COSG Plc

Nigeria's Largest Aviation Logistics Support Company

Over the past two decades, COSG's subsidiary Caverton Helicopters has grown to become Nigeria's leading indigenous aviation logistics support company, serving the country's growing oil & gas industry.

The company relies on a fleet of 22 helicopters and 1 fixed-wing aircraft to support offshore operations of major international oil companies (IOCs) like Shell, Chevron, TotalEnergies, and Eni. Since it acquired its first helicopter in 2006, Caverton Helicopters has delivered contracts worth \$3.5bn for oil companies in Nigeria and has recently ventured into Cameroon as it expands within the broader West African region.

The success of the company continues to rely on its long-lasting partnerships with original equipment manufacturers (OEMs) such as Honeywell Aerospace, Airbus Helicopters, and Leonardo. In addition, Caverton Helicopters has expanded its footprint and is now able to operate out of two facilities at the Murtala Mohammed Intl

- Current fleet of 22 helicopters and 1 fixed-wings aircraft.
- Maintenance, Repair, and Overhaul (MRO) facility within free trade zone;
- World-class aviation training center with level D helicopter simulator for the Leonardo AW139 helicopters;
- Bases and facilities in Lagos, Warri, Port Harcourt, and Cameroon.

Airport in Lagos, the Ozumba Heliport in Victoria Island (Lagos), two bases in Warri (Delta State), and one in Cameroon. The company also relies on third-party bases of Shell, Agip (Eni) and the Nigerian Airforce (NAF) in Port Harcourt.

"As offshore drilling activity recovers in West Africa, we are well-positioned to service the market with the mid- and long-range helicopters that IOCs need to support their operations."



CAPT. IBRAHIM BELLO,
MANAGING DIRECTOR,
CAVERTON
HELICOPTERS LTD.

Local Content in the Air and on Water

While COSG is an undisputed leader in aviation services, it actually started up back in 1999 as a key player in the operations of marine vessels and the transportation of petroleum products in Nigeria.

Its special transportation services have relied over the years on a fleet of tankers, vessels, boats, and barges supporting the trading of key commodities such as cooking gas and providing support to offshore oil & gas operations. Key services notably include marine onshore and offshore field services, the supply of vessels and tankers, the provision of barges, charter services, agency services, and boat management maintenance and operations.

Caverton Marine's first assets were acquired in the 2000s, including MT Awero in 2003, MT Ashabi in 2004, MT Lolade in 2005, and MT Blue Gas in 2007. But the company's growth really took off after Nigeria LNG (NLNG) contracted it to provide tanker vessels for the lifting of cooking gas for a period of two years in 2007. Caverton Marine was eventually selected to oversee activities between NLNG and its domestic off-takers under the Domestic LPG Scheme. The company's marine operations were finally upgraded too "AA" by the Nigerian Content Development & Monitoring Board (NCDMB) in 2014.

A New Hub for Aircraft Maintenance and Pilots Training

In 2021, COSG completed the construction of a Maintenance, Repair and Overhaul (MRO) facility at the Murtala Mohammed International Airport (MMIA) in Lagos, with a free trade zone status. It comprises of a 5,600 m2 hangar located airside between the two principal runways of the MMIA. The facility now provides both rotary and fixed wing maintenance services for third party operators on the continent, and notably started maintenance of the Benin Republic Presidential Air Fleet in mid-2022. Along with the commissioning of its MRO, COSG also opened a world-class aviation training center at MMIA, equipped with Africa's first level D helicopter simulator for the Leonardo AW139 helicopters. The facility offers bespoke training of pilots within sub-Saharan Africa and holds a certification from the European Aviation Safety Agency (EASA).

Caverton Offshore Support Group Plc

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A strong momentum for brownfield deep-water activity.

Despite the settlement of several disputes with IOCs, deep-water activity is likely to remain slow in the short-term and focus on brownfield projects, especially subsea tie-backs.

Both Shell and TotalEnergies are expected to lead the segment over the coming years as they seek to maximise capacity at their Bonga and Egina FPSO by tying back nearby discoveries to their production infrastructure.

On OML 118, whose PSC was renewed in May 2021, Shell continues to consider two major brownfield projects: Bonga North Tranche 1 (120,000 boepd at peak) and Bonga Main Life Extension & Upgrade (60,000 boepd at peak). Both are likely to move forward given their lower development costs. In May 2022, Shell started the tendering process for the Bonga North subsea tie-back project by issuing pre-qualification documents for three main packages: the topsides modification of the Bonga FPSO; the EPC of flowlines, risers, umbilicals, and installation works; and the design, manufacture, and supply of subsea equipment.

On OML 130, TotalEnergies has restarted engineering works on the development of its Preowei discovery, expected to be tied-back to the Egina FPSO. The 70,000 bpd field development plan was already approved by Nigerian authorities in

2019 and the recent renewal and conversion of OML 130 could finally pave way for a final investment decision (FID) soon.

Additional brownfield works in deep-water will also focus on FPSO modifications and maintenance. At Agbami, Chevron has been waiting for the renewal of OML 127, due to expire in 2024, before it can take FID on the Agbami Gas Project. The project is expected to focus on the reduction of non-routine flaring, the increase of oil recovery and the unlocking of additional gas for exports.

Finally, BW Offshore's Abo FPSO could witness some activity as well as operator Eni seeks to extend the life of the asset beyond 2023 and benefit from the recently-renewed lease on OML 125.

An uncertain outlook for greenfield deep offshore projects.

Meanwhile, new deep-water hubs are unlikely to be approved in the short-term. Shell maintains the option of developing Bonga Southwest, which would rely on a new FPSO and a unitization with the Aparo field, but has not given signs that the 150,000 boepd project would be sanctioned soon.

Equinor could also develop significant deep-water gas within the Bilah gas and condensate discovery (OML 129) and Nnwa-Doro gas discovery (OML 129/OML 135), but is expecting better fiscal terms before it can do so.

In August 2022, NNPC Ltd resolved disputes with several PSC contractors and renewed the leases for OMLs 128, 130, 132, 133, 138, and 125.



FOCUS ON RUSSELSMITH GROUP

RusselSmith is a leading provider of integrated energy services, with diverse interests across various segments of the energy sector. Through its focus on local capacity development, technology adoption, and access to global partnerships, RusselSmith has built strong domestic capacity in Nigeria while expanding its footprint regionally. It offers a wide range of technologies supporting upstream operators and has been a key services provider to some of Nigeria's biggest oilfield projects.

As of 2022, RusselSmith's areas of activity include oilfield operations management and maintenance, oilfield equipment leasing, IRM and life extension solutions for oil and gas assets and other industries, manufacturing, and gas commercialization.

A Foremost Technology Solutions Provider

RusselSmith has always been at the forefront of innovation in the Nigerian oil & gas industry, first introducing rope access technology to the market several years ago and following it up with the introduction of other innovative solutions, especially in subsea services. By collaborating with industry-leading technology providers around the world, RusselSmith is indeed able to offer highly effective and field-proven solutions to some of Africa's toughest energy challenges.

In cooperation with Kongsberg Ferrotech of Norway, RusselSmith is notably offering a unique underwater robotic pipeline repair technology that is now approved and certified by the Nigerian Upstream Petroleum Regulatory Commission (NUPRC). It complements the company's proven expertise in subsea services which includes inspection, repair, maintenance, and surveys. In a bid to strengthen its offshore deep-water operations, RusselSmith has also grown a solid fleet of remotely operated underwater vehicles (ROVs) that make it a serious player in the subsea services space.

The company has also successfully introduced the Non-Contact Magnetometry (NCM) technology to the Nigerian market, enabling it to offer rapid inspections of buried subsea or onshore pipelines without requiring excavation. The technology has seen considerable adoption, with work already executed in Nigeria, Ghana, Gabon and other countries.

RusselSmith also provides drilling and well optimization technologies to help operators improve oilfield production, in addition to offering exciting digital solutions and Unmanned Aerial Vehicle (UAV) technologies that boost its capabilities for aerial surveys and asset inspections even in the most remote areas.

Seaeye Cougar-XT

The Cougar-XT is ideal for survey work, IRM, drill support, light construction projects and salvage support operations.



Seaeye Falcon

The Falcon is very versatile and can be configured to carry out numerous subsea tasks.



VideoRay Mission Specialist Defender

The VideoRay MSS Defender is depth-rated for up to 1,000m and is easy to deploy and well suited for tasks such as UWILD.



VideoRay Pro4

The Pro4 is a capable ROV solution for underwater inspection tasks such as UWILD. It is depth rated for 305m (1,000 ft).

RusselSmith

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Marginal Fields.

M&A RFTSAs
Drilling Wells
Gas Finance



HAWILTI VIEW

- Output from marginal fields in Nigeria continues to be largely driven by a selected number of players but the segment is expected to diversify following the close of the 2020 Marginal Fields Bidding Round in 2022 and the entry of an additional 50 new operating consortia in the market;
- Access to capital remains a major challenge for the segment, especially for newly-incorporated SPVs. This is supporting M&A activity and the signing of several Financial and Technical Services Agreements (RFTSAs/FTSAs) with competent investors and operators;
- Marginal field operators, who have for now mostly been onshore, are not spared from crude theft and have had to increasingly look for alternative crude evacuation options. Most modular refinery projects are currently driven by marginal field owners seeking to monetise their crude oil on site rather than injecting it into an export line;
- Several new fields awarded in 2022 are rich in gas and are expected to further drive the development of small-scale gas projects across the Niger Delta, especially when it comes to the production of LNG, LPG, and CNG;
- New fields owners from the 2020 Bidding Round are for the most part coming from the local services industry with no track record of field development experience. Their ability to develop capacity and seal technical collaborations will be crucial to redevelop their fields.

Monthly liquids production from Nigerian marginal fields, bbls



Chart: Hawilti • Source: NNPC

An uneven progress over the past 20 years

Nigeria started awarding marginal fields to its local players back in 1999, and concluded its first Marginal Fields Bidding Round in 2003. By 2010, a total of 30 marginal fields had been awarded to new local E&P entities in a bid to build local content and redevelop discoveries that IOCs had deemed too small to be worth the investment.

However, results were mitigated as only about half of these fields are producing as of 2022. Several assets got caught up in legal disputes or operational challenges that prevented their redevelopment and maintained the fields undeveloped for years.

On the other side, operators who did manage to raise capital and re-enter wells embarked on true success stories that continue to be until today a reference for the rest of the continent.

Producing marginal fields are currently able to pump over 50,000 bopd, with output largely dominated by a selected few like Oriental Energy Resources (Ebok), Midwestern Oil & Gas (Umusadege), and Green Energy International (Otakikpo).

In 2020, Nigeria embarked on another phase of marginal fields auction with the launch a second Marginal Fields Bidding Round that resulted in the award of 50 more fields to local entities. However, the process ended up taking two years to complete and was marked by significant challenges. Very few established E&P companies participated, with only Energia securing another field on top of the Ebendo marginal field it had been awarded in 2003.

For the most part, new marginal fields owners are issued from the local services and local downstream industry. A clear winner is Vhelberg E&P Development Co., a venture led by former PETAN Chairman Bank Anthony Okoroafor. The company won three different fields with interests ranging from 15 to 20%.

A few notable names from the country's downstream sector are also present amongst winning teams, including Ardova, NIPCO, Matrix Energy, Northwest Petroleum & Gas, A.A. Rano, and Virgin Forrest among others. Because of their established presence in the market and existing relationships with financiers and stakeholders, these companies are expected to move forward rather quickly with their redevelopment plans.

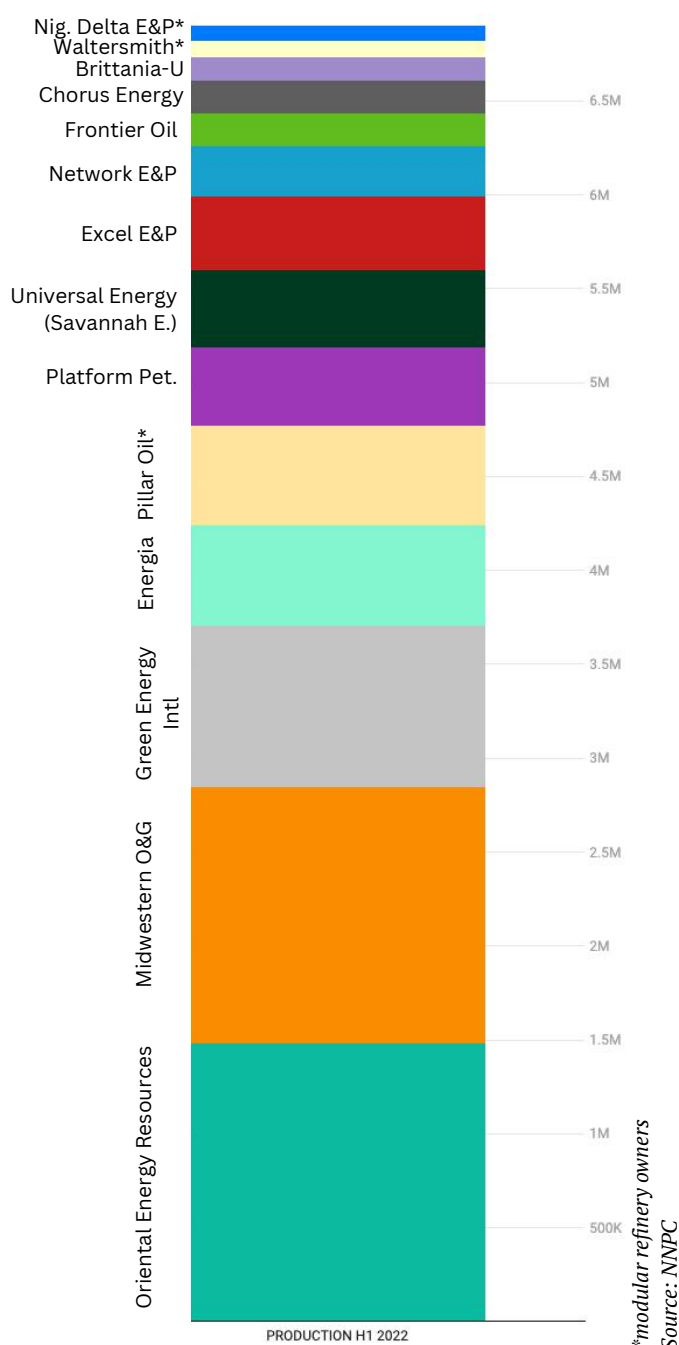
However, some consortia include as many as six different local entities, and the ability of PPL awardees to get along and work together has been repeatedly mentioned as challenge by stakeholders interviewed by Hawilti.

The end of marginal fields since 2021

The adoption of the PIA in 2021 put an end to marginal fields in Nigeria. The segment is now regulated under Petroleum Prospecting Licence (PPL). Nigeria will not be holding any more Marginal Fields Bidding Round moving forward, as future PPLs would only be granted following an open and competitive process.

PPLs awarded in 2021 are for a duration of only 3 years, with an option to extend by another 3 years. The timeline is expected to be an incentive for new owners to drill and re-enter wells quickly, or face losing their license for inaction.

Marginal Field Operators' Liquids Production, bbls (Jan-June 2022)



Ahonsi Unuigbe

CEO, PETRALON ENERGY



"We have successfully initiated remedial initiatives on Dawes Island in 2022 and achieved a startup flow rate rate of ca. 550 bopd. This is projected to increase to over 6,000 bopd as the well count increases in the near future."

Ahonsi Unuigbe,
Founder & CEO
PETRALON ENERGY.

Over 2021 and 2022, Petralon Energy imposed itself as a serious upstream player within the Nigerian energy landscape. After years of investing in the Dawes Island Marginal Field, it was formally awarded Petroleum Prospecting License 259 (PPL 259), giving it operatorship of the Dawes Island Field in accordance with the PIA 2021. Over the past two years, Petralon Energy also successfully raised capital to acquire a combined indirect interest of 6.06% in Prime Oil and Gas, giving it exposure to some of Nigeria's biggest deep-water producing fields.

What is the current extent of Petralon Energy's operations at Dawes Island?

Our operations at Dawes Island are now regulated by the Petroleum Prospecting License (PPL) 259, which was officially awarded to our subsidiary Petralon 54 Ltd in 2021. Because we are familiar with the asset, we were able to quickly engage with the local community there and commence technical and operational activities.

Our remedial initiatives focused on surface wellhead checks and first line maintenance, platform refurbishment and mobilisation of the early test equipment.

As a result, we started producing in the second half of 2022 with a startup rate of some 550 barrels per day (bopd). While we put in place our evacuation system, we are also considering a phased drilling plan of two additional producer wells to execute in the near future. We expect to ramp up production to over 6,000 bopd as our well count increases, and will transit from leasing to owning the early production facility (EPF) at the field to maximise our operational efficiency.

About Petralon Energy Ltd

Petralon Energy Ltd is a growing African E&P company headquartered in Nigeria with a demonstrated capacity to acquire, develop, finance, and operate oil and gas assets.

The company notably holds a 100% interest in the Dawes Island Field (PPL 259) and a combined 6.06% interest in Prime Oil and Gas Cooperatief (Prime), which itself holds an 8% interest in OML 127 and a 16% interest in OML 130. Both blocks are located in deep-water and are operated respectively by Chevron and TotalEnergies. They contain the producing hubs of Agbami, Akpo, and Egina.

As of 2022, Petralon Energy's indirect interest in Prime translated into a net reflective production of over 3,000 boepd for the company.

How is Petralon Energy maintaining successful relationships with its host community?

Our commitment to our host communities extends beyond just mere financial considerations and CSR spending. We liaise closely with communities, listening to and understanding what their concerns are and identifying opportunities that will help add value. This is a philosophy we have adopted at Dawes Island since being part of the field's redevelopment in 2014. In fact, over 40 indigenes and youth of our communities were engaged as workers during the Dawes Island well re-entry project and we will continue to explore opportunities where we can provide tangible sustainable benefit to the communities.

We are also committed to ensuring that we minimise the effect our activities on the host communities and society. We balance our business with sustainable social investment while driving growth and value for all stakeholders.

Upon the award of PPL 259 in 2022, Petralon 54 immediately restarted active engagements with its host community while commencing technical and operational activities at the Dawes Island Field.

In October 2022, we notably held our 'Dawes Island Community Launch' at the Ogoloma Town Square to formally present the license given to us for the operation of the field by the Federal Government of Nigeria. The initiative was aimed at building mutual understanding between our organisation and the Ogoloma, Okochiri and Koniju communities in Okrika Local Government Area, Rivers State.

The event was a remarkable show of acceptance for our organisation as it was widely attended by the youths, community elders, members of the Council of Chiefs, top government functionaries and traditional rulers.

Amidst a challenging access to capital for E&P companies, how has Petralon Energy financed the growth of its portfolio?

Since its incorporation in 2014, Petralon Energy has demonstrated its capacity to acquire, develop, finance, and operate oil and gas assets in Africa. The company has notably raised over \$85m since its inception and has further received historical financing commitments of up to \$1bn from leading global financing and trading entities to support specific strategic new venture initiatives.

While access to capital has become more challenging, we believe that putting in place solid governance frameworks and sustainable development models can ensure that capital remains available to credible E&P players.

Our most recent transaction involved securing an indirect interest in Prime Oil and Gas, and gaining in the process exposure to some of Nigeria's biggest producing deep-water assets. This was done in two separate transactions, for which we raised debt and equity funding amidst some tough market conditions for the oil & gas industry.

In October 2021, we raised \$45.65m in debt and equity for the acquisition of the initial 45.56% interest in Prime Oil and Gas, including debt of \$33.15m provided by Standard Bank SA and Banco BTG Pactual, and equity of \$12.5m lead funded by Coronation Capital. In March 2022, Petralon Energy raised another \$14.85m in debt and equity financing, including debt of \$11.85m from Banco BTG Pactual.

We will continue to maintain productive engagements with local and foreign investors as we pursue our mission to grow true indigenous ownership within the African oil & gas sector and seek to grow our assets portfolio further over the coming years.



Growing activity across Nigeria's marginal fields portfolio

2022 saw increased activity across Nigerian marginal fields, especially focused on further development of producing assets or undeveloped discoveries awarded over the past few years.

Established players like Green Energy International, Waltersmith PetromanOil, and Energia all executed drilling campaign on the respective Otakikpo, Ibigwe, and Ebendo marginal fields. The three assets have already been producing for several years, and fresh drilling activity is expected to maintain and increase output moving forward. Waltersmith notably reported good drilling performances from its three-well campaign (1 exploration, 2 development wells) and expects additional output of up to 2,500 bopd and 2 MMscf/d.

Other marginal fields that have remained undeveloped for years are also seeing some positive movement. At Oza on OML 11, operator Millenium Oil & Gas Co. and its technical partner Decklar Petroleum have successfully started flowing oil again. The partners started loading and trucking oil from the field in the second half of 2022 and are currently exploring several storage and evacuation options to grow output. Beside the re-entry of Oza-1, future development activities could focus on one or two more existing well re-entries and additional development drilling, with the potential for 8 to 10 wells in total to achieve full field development.

Decklar Petroleum is notably imposing itself as a serious investor and developer of marginal fields in Nigeria. The company holds the RFTSA over the Oza marginal field, but is also in control of the RFTSA over the nearby Asaramatoru marginal field operated by Prime E&P. As a new technical partner, Decklar is notably planning on running cement bond logs and cased hole reservoir saturation logs and running new dual-string completions in both existing wells, ASR-1 and AST-2.

Finally, Decklar closed in mid-2022 its acquisition of Westfield E&P, the RFTSA holder over the newly-awarded Emohua Field (PPL 201). It is now working with operator Erebiina Energy Resources on re-entering the existing Emohua-1 well before re-completing it and doing flow testing.

Additional fields have also made good progress in 2022, including at Dawes Island (PPL 259) where Petralon Energy successfully initiated remedial initiatives and started flowing oil while implementing its phased drilling program and working on the setting up of its evacuation system.

Marginal fields operators are driving investments into associated infrastructure

Marginal fields operators in Nigeria are not spared from crude theft and pipeline vandalism. However, the small nature of their operations means that even the smallest losses have a severe impact on their balance sheet.

As a result, operators have been increasingly driving the development of storage and refining infrastructure in Nigeria. Three of the country's commissioned modular refineries have been developed by marginal fields operators, including Niger Delta Petroleum Resources (NDPR) at Ogbele (11,000 bpd), Waltersmith PetromanOil at Ibigwe (5,000 bpd) and Pillar Oil at Kwale (10,000 bpd).

The construction of modular refineries not only aligns with Nigeria's vision for energy security, it also allows these producers to monetise their oil directly on site instead of losing it to thieves along the export line.

Additional modular refineries are expected to take off over the coming years. Waltersmith PetromanOil has embarked on a significant expansion of its Ibigwe complex, while Energia selected in 2022 its technical partners and contractors for its own refining facility at Ebendo with a targeted capacity of at least 5,000 bpd.

The expansion of storage capacity is another avenue explored by producers to minimise losses and store their oil in periods of pipeline outage. Platform Petroleum, operator of the Egbaoma Marginal Field, is notably expected to approve in 2023 a significant expansion of its storage capacity from 40,000 barrels to over 100,000 barrels. The company also completed in 2022 the installation of a third gas compressor at the field and is now able to fully compress and inject its lean gas into the OB3 pipeline, which has enabled it to completely end routine flaring at Egbaoma this year.



Flaring.

Regulations

Methane

Gas Commercialisation

CDMs

Carbon credits



A significant amount of Nigerian gas remains flared

Nigeria flares, on average, 7 to 8% of the natural gas it produces. While flaring volumes vary from month to month, Nigerian operators burn on average 530 MMscf/d of gas into the atmosphere. Put to good use, such volumes could support about 2,000 MW of power generation but end up wasted because of a lack of processing and off-take infrastructure.

Flaring Volumes in Nigeria, MMscm (2012 - 2021)

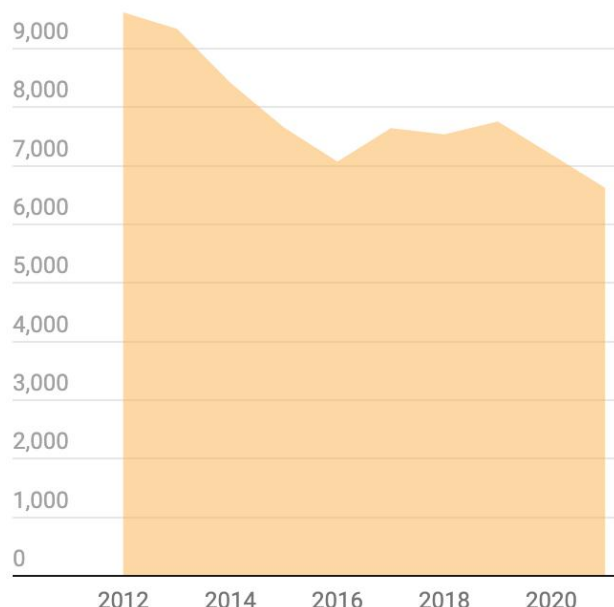


Chart: Hawilti • Source: World Bank

Nigeria's approach to flaring reduction

Like most African oil & gas producing countries, Nigeria has recognized the need to reduce flaring and mitigate methane emissions by cutting venting and fugitive emissions.

The country's efforts to cut flaring go back to the 1990s with the development of the Bonny LNG export terminal by Nigeria LNG. Most feedstock for LNG production comes from associated gas that was previously flared, to such an extent that the commissioning and expansion of Nigeria LNG had led to a reduction of gas flaring in the country from 65% to 20% by 2019, according to Nigeria LNG estimates.

The country eventually joined the Global Methane Pledge and endorsed the Zero Routine Flaring by 2030 (ZRF) Initiative, and is committed to reducing methane emissions. But flaring became part of a much more official country agenda in 2015 when Nigeria included specific commitments on flaring and venting within its Nationally Determined Contributions (NDCs).

This led to the approval of the Flare Gas (Prevention of Waste and Pollution) Regulations by President Buhari in 2018, which provided the basis for the implementation of the Nigerian Gas Flare Commercialization Program (NGFCP) and set up strict penalty mechanisms.

Under the regulations, flare payment penalties were increased to \$2 per 1,000 standard cubic feet (scf/d) of gas for companies producing 10,000 barrels of oil per day (bopd) or more, and to \$0.50 per 1,000 scf/d for companies producing less than 10,000 bopd. Such penalties have successfully managed to cut some of the country's flared gas volumes since 2018. Efforts to cut flaring were further strengthened with the adoption of the Petroleum Industry Act (PIA) in 2021, which lightened fiscal provisions around the monetary sanctions.

Consequently, flaring has been on a downward trend in Nigeria for years and reached approximately 6.6 Bcm in 2021 against 9.6 Bcm in 2012. However, flaring reduction is also due to a drop in the country's overall oil output; flaring intensity has actually increased by 10% over the past decade. Moving forward, efforts must be focused on addressing flaring across hundreds of smaller and disparate fields.

Operator	Flaring volumes, MMscf*
Mobil JV	17,267
SPDC JV	11,236
Addax Pet. Dev.	9,493
Chevron JV	8,042
Agbami FPSO	7,125
First E&P	6,696
TotalEnergies JV	5,789
Erha FPSO	4,324
Bonga FPSO	3,730
Usan FPSO	2,935

*Jan-Sept. 2022

Table: Hawilti • Source: NNPC (provisional data)



The rebirth of the Nigeria Gas Flare Commercialization Program (NGFCP)

Nigeria announced a net zero target by 2060 at the COP 26 UN Climate Change Conference in Glasgow in 2021. President Buhari subsequently signed into law a Climate Bill committing Nigeria to produce a carbon emissions reduction plan, adapt to climate change, and fix annual five-year carbon budgets.

But for Nigeria to embrace a low-carbon development model, tackling gas flaring is a necessity.

While Section 104(4) of the newly-adopted Petroleum Industry Act (PIA) provides environmental remedy and relief to host communities affected by gas flaring, a deeper commitment to a sound environmental management plan is required. In that regards, the PIA does provide some positive grounds, especially through tax incentives given to investors in gas processing.

For now, the country's ambition mostly relies on its 2018 regulations, which provided further impetus for the roll out of the Nigeria Gas Flare Commercialization Program (NGFCP), a competitive bid process first launched in 2016 to auction strategic flare sites to technically and commercially competent third-party investors.

The program suffered severe delays over the years and managed to close bid submissions only in April 2020. The newly established Nigerian Upstream Petroleum Regulatory Commission (NUPRC) announced in September 2022 that it was relaunching it, and a new Request for Qualification (RfQ) was issued the same month. Previous bidders are still pre-qualified but the programme has opened to new investors as well. Preferred bidders will be announced at the end of December 2022.

Up until today, the successful elimination of gas flaring by third party investors has been done outside of the NGFCP.

Carbon finance has offered attractive yet unexploited avenues to finance the monetisation of Nigeria's associated gas.

Following the launch of Europe's carbon market in 2005, Nigeria looked into the opportunities to attract financing into flare reduction projects that would generate carbon credits. In 2008, the Federal Government notably requested support from the World Bank to strengthen the performance of its energy sector, which included the development of a carbon finance programme to develop its gas and power sectors.

Via the implementation of Clean Development Mechanisms (CDMs), Nigeria was able to get several of these projects off the ground, with mixed results.

In the power sector, both Shell and Eni successfully managed to get projects off the ground, including the capture of flared gas at the Kwale OGPP to feed the 480 MW Okpai gas-to-power plant (Eni), and the construction of Shell's 650 MW Afam VI gas-to-power facility.

Upstream, TotalEnergies and the NNPC successfully implemented a flare reduction project at Ofon-2, where flare out was achieved in 2015. By 2021, the parties had already earned over a \$1m from the sale of their carbon credits.

According to the Second Biennial Update Report (BUR2) to the UNFCCC submitted by Nigeria in June 2021, 11 CDMs were actually registered in Nigeria, including 7 pertaining to its gas sector and the reduction of gas flaring.

Steps to implementation of carbon credits:

- Qualify your project as a certified CO₂ emission reduction project;
- Define your project's baseline scenario (what the emissions would have been without it);
- Demonstrate the additionality of your project;
- Qualify it with the relevant regulatory authorities;
- Develop the monitoring plan for the emissions reduction;
- Commercialise your carbon credits within a regional carbon market.

While Nigeria has gained some benefits from the implementation of CDMs so far, these have remained limited first because of low carbon prices in the early 2010s, second because of a general lack of awareness about how carbon markets really work.

Moving forward, the Paris Agreement is expected to simplify the process to get such projects off the ground. "The Rulebook of the Paris Agreement for Nationally Determined Contributions is not very different from that of Clean Development Mechanisms under the Kyoto Protocol," said James Ogunleye, Managing Director at Carbon Limits Nigeria.

"However, we can expect a simplification of the process to register projects and subsequently trade carbon credits," he added.

With carbon prices rising to historic records this year, hopes are that a new wave of emission-reduction projects could be financed across the world and in Africa. In Nigeria in particular, the launch of the Decade of Gas is providing a new momentum to boost gas consumption across the country, with a significant potential to monetise associated gas and cut flaring.

Large-scale, gas-based carbon credits projects in Nigeria

Project	Objective	Implementing entity	CDM Registration	Status	GHG reductions, Gg*
Recovery of associated gas that would otherwise be flared at Kwale oil-gas processing plant	Capture and utilize AG previously flared at the Kwali Plant (Kwali OGPP).	Nigeria Agip Oil Company (NAOC) - Eni	9-Nov-06	Completed and successful.	1,497
Pan Ocean Gas Utilization Project	Eliminate gas flaring at the Ovade-Ogharefe and Obi-Anyima fields.	Pan Ocean Corporation (Nigeria), NNPC	1-Feb-09	Completed and successful. Crediting period lasted from October 2010 to October 2020.	2,627
Recovery and marketing of gas that would otherwise be flared at the Egbaoma (Asuokpu/Umutu) Marginal Field (OML 38)	Recover flared gas at the Egbaoma Marginal Field (OML 38) for domestic deliveries and productive use as an energy product.	Platform Petroleum Ltd, Newcross Petroleum Ltd	16-Oct-10	Completed. Crediting period started in 2021.	257
Afam Combined Cycle Gas Turbine Power Project	Build a 650MW grid-connected combined-cycle gas turbine CCGT fuelled by natural gas.	Shell Petroleum Development Corporation (SPDC JV)	29-Oct-12	Completed and successful.	550
Recovery and Utilization of Associated Gas from the Ebendo and Umusadege marginal fields (OML 56)	Build infrastructure to utilize AG from two oil fields in OML56 and cut flaring.	Midwestern Oil & Gas Company Plc; Xenergi Oilfield Services Limited	24-Dec-12	Completed. Crediting period started in February 2022.	288
OML58 IPP Gas Fired Generation Project	Construct a combined cycle, gas-powered and grid-connected IPP.	Total E&P Nigeria Ltd (TEPNG), NNPC	16-Dec-14	Registered but not implemented.	265
Ofon-2 Upstream Emission Reduction project (OML 102)	Recover and utilize AG from the Ofon 2 fields.	Total E&P Nigeria Ltd (TEPNG), NNPC	N/A. Ofon-2 was registered under the EU UK market (EU Fuel Quality Directive).	Completed and successful.	224

*Gg = 1,000 tonnes. Source: FGN 2nd Biennial Update Report (BUR2)

Nigeria Upstream Market

Hawilti would like to thank the following companies for their support and participation in this research programme.

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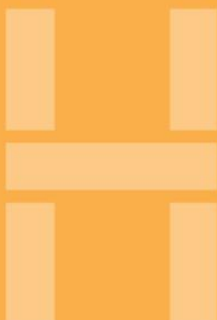
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