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Africa's Giant Fields: Faster and Greener

16 November 2023



Africa's Giant Fields: Faster and Greener

Etienne Kolly; Upstream Solutions Africa; Associate Director

Analene Enslin; Upstream Solutions Africa; Technical Research Principal

Nicholas Waters; Upstream Solutions Africa; Sr Technical Research

Rebecca Vyse; Upstream Solutions Europe; Director

Tasnika Goorhoo; Upstream Solutions Africa; Sr Technical Research

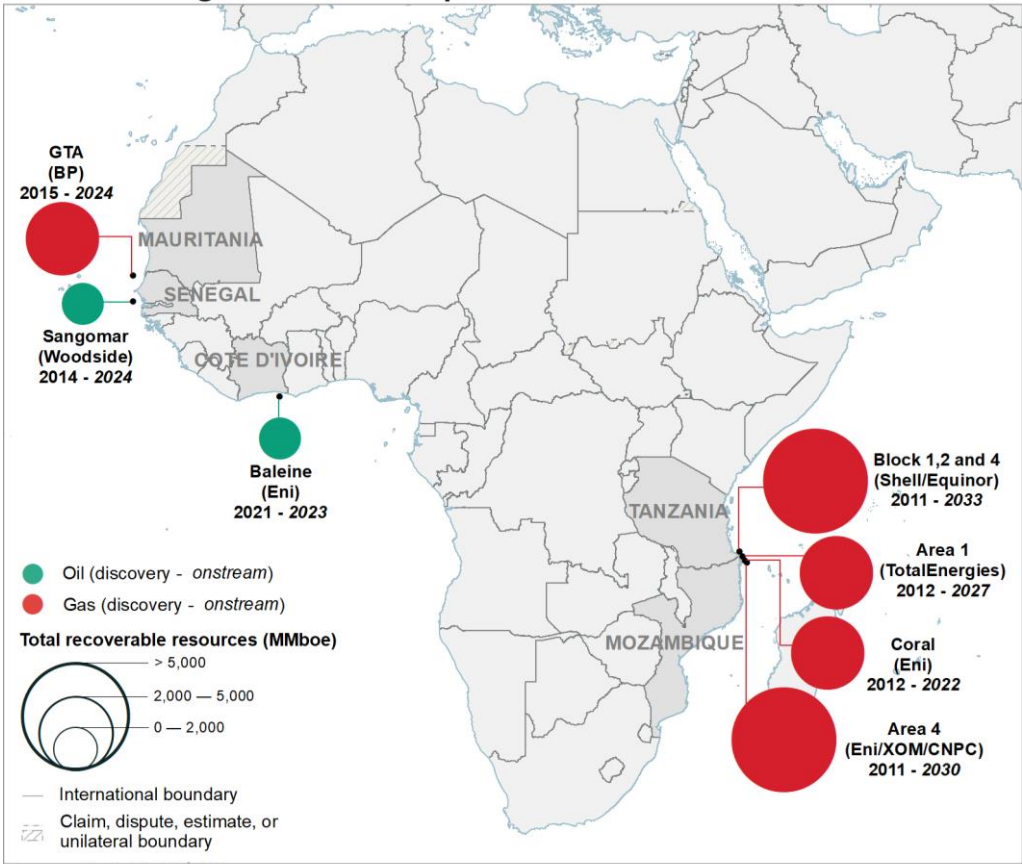
November 2023

Introduction

- Developing an oil and gas field in Africa in 2023 presents several new challenges when compared to the challenges that would have been faced two decades ago. Perhaps the most challenging aspect of any new development is related to energy transition. The environmental reality makes access to capital for fossil energy projects more complicated, particularly if the operator makes no effort to decarbonize production (Scope 1 and 2).
- In this webinar, we will discuss the timelines of several key upstream projects in Africa, from discovery to first production, and what has been committed to ensure the following development projects are as green as possible.
 - Eni plans to demonstrate that an offshore net-zero oil development is possible in Cote d'Ivoire and expects to do so from the 780-MMboe Baleine field.
 - In Mauritania and Senegal, BP and Woodside respectively expect reaching first gas at GTA (16.2 Tcf) and first oil at Sangomar (620 MMboe) in 2024.
 - In Mozambique, TotalEnergies, Eni and ExxonMobil with partners are developing multi-Tcf gas reserves from giant complexes through innovative mid-scale LNG plants.
- All the above African projects include elements to decarbonize production.
- However, to inspire IOCs in their future oil developments in Africa, we will briefly discuss some of the most impressive decarbonization success stories in Europe.

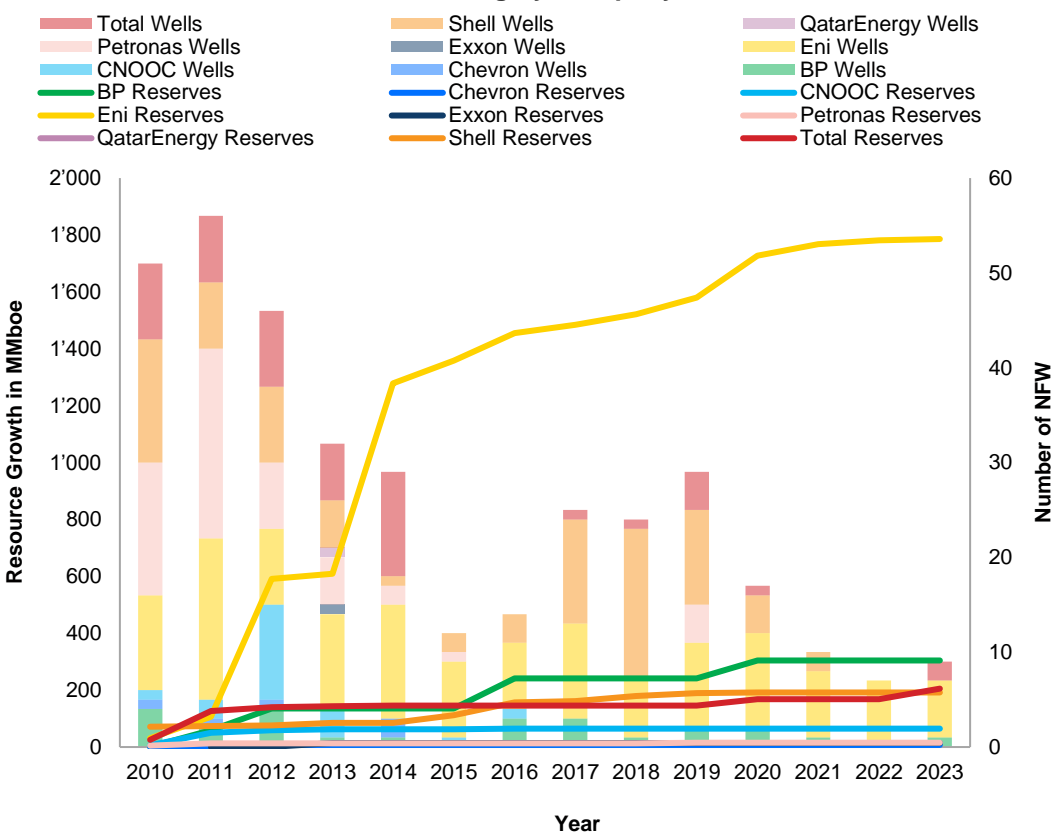
Selected cases of the largest African oil and gas discoveries made since the early 2010's, now under development with recent or imminent first oil and gas

Africa's next generation of elephants



Data compiled: Jul. 25, 2023.
Source: S&P Global Commodity Insights upstream E&P content (EDIN/GEPS)
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Cumulative Resources and NFW Drilling by Company



Data compiled October 2023
Source: S&P Global Commodity Insights upstream E&P content (EDIN/GEPS).
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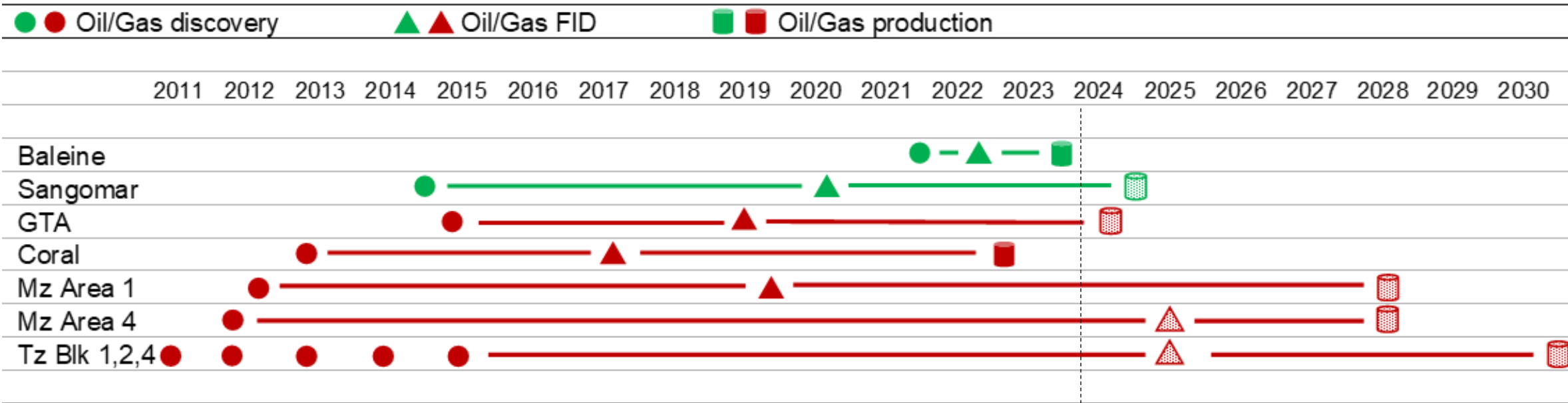
Projects timelines from discovery to production



Projects' timelines significantly differ from each other, ranging from two years to two decades from discovery to production

Africa's next generation of elephants

Projects timelines comparison, from discovery to (planned) production



As of Sep 2023.

Acronyms: FID = Final Investment Date, GTA = Greater Tortue Ahmeyim, Mz = Mozambique, Tz = Tanzania, Blk = Block

Source: S&P Global Commodity Insights upstream E&P content (EDIN/GEPS)

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Cote d'Ivoire

Eni benefited a series of positive factors which helped achieving a remarkable fast-track development at Baleine oil giant

Advantages

- ✓ Eni inherited a *privileged long-term partnership* with *contractor* Saipem, an Eni subsidiary until 2016, helping the company securing *fast-track* development contracts.
- ✓ The *deepwater* location in a *stable country* aided Eni in mobilizing drilling and production vessels quickly and safely.
- ✓ The *local authorities* proactively supported Eni in expediting this development decision resulting in the green light for the project being obtained within four months after discovery

Hurdles

- !! A possible challenge in developing Baleine would be linked to its *carbonate structure* (Cenomanian to Albian); the first drilled and being developed in the Cote d'Ivoire basin.



Senegal – Mauritania

Both Sangomar and GTA projects have longer timelines, however acceptable, given the countries' emerging position in the oil and gas industry

Advantages

- ✓ *The unitized GTA contract (50%-50%) took only a few months to be established. The project timeline was not impacted thanks to the **effective collaboration** between Mauritania and Senegal authorities.*
- ✓ *The relatively **short E&P history of both countries** did not restrain such a major development project*
- ✓ *Operators will be able to benefit the **attractive Senegalese fiscal terms (2019)** before the authorities revise them for new players.*



Hurdles

- !! *FID for Sangomar might have been taken earlier, around 2018, but **ownership conflicts** emerged when partner FAR contested Woodsides' entry in the project and became operator in place of Cairn Energy. An arbitration lasted almost two years and delayed the project's sanction to 2020.*
- !! *The **complexity of the infrastructure** to be built for the BP-operated GTA gas project required extra time (contractor change). The onstream date for Phase 1 was therefore pushed back from late 2021 to 2024 for this \$5.8-billion floating LNG project.*

Mozambique – Tanzania

Thirteen years after discoveries, only 7% of the East-African offshore gas reserves have just started to be commercialized, and the remaining 93% is still largely unsanctioned

Advantages

- ✓ *In East Africa, the enormous offshore gas discoveries (176 Tcf in total) made one after the other between 2010 to 2015 generated **unprecedented excitement**.*
- ✓ *Mozambique and Tanzania initially hoped to quickly develop a regional LNG hub, ideally located to serve the **Asian market**.*



Hurdles

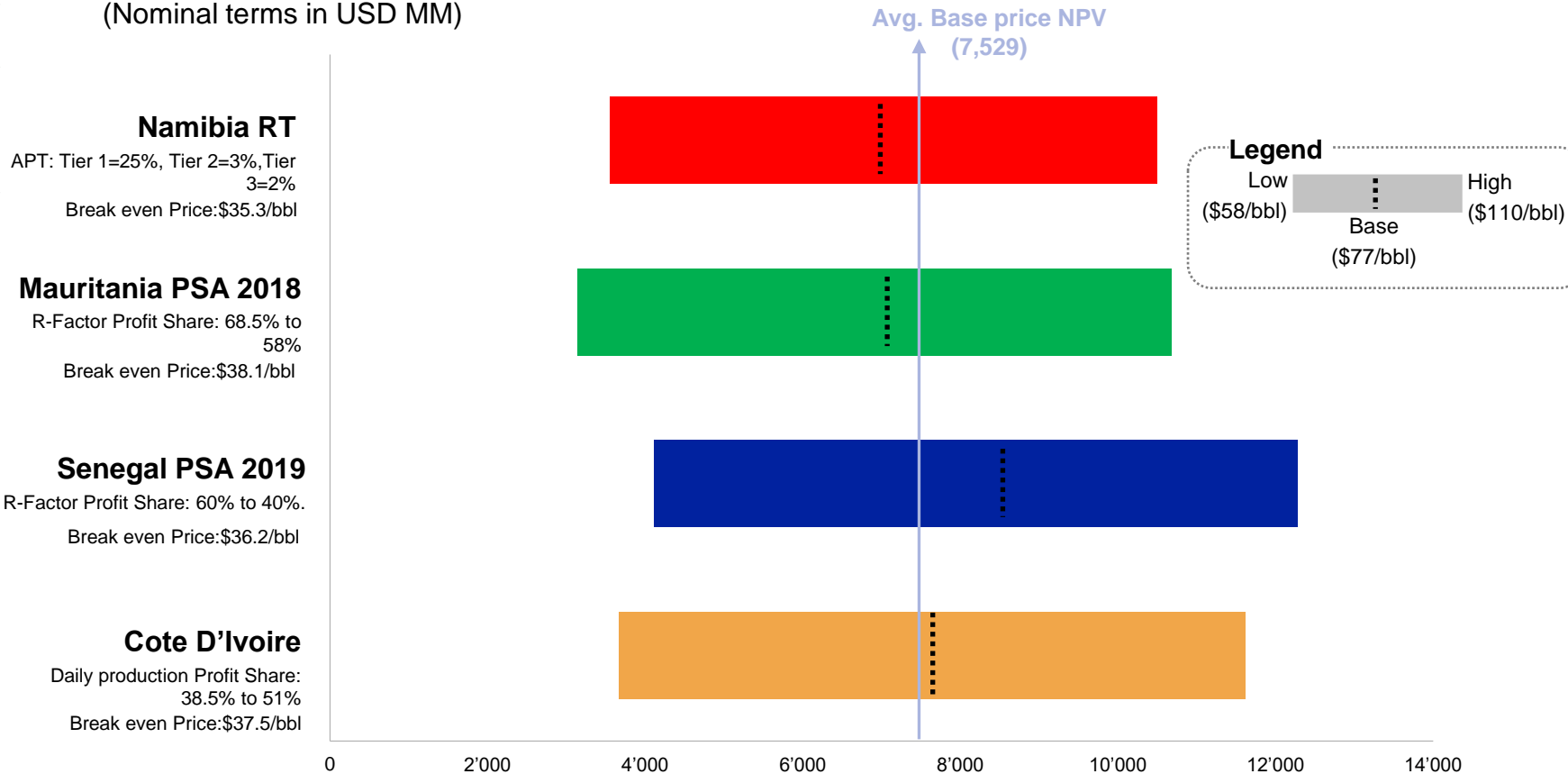
- !! *In Mozambique, **operatorship transfers** slowed down operations. Anadarko/Oxy acquisition in Aug 2019. TotalEnergies took over in September 2019.*
- !! ***Governmental approval** for Area 1 only obtained in 2018, four years after appraisal, and FID in 2019.*
- !! *In 2020, the **COVID-19 pandemic** has hit the industry.*
- !! ***Security situation** is volatile. Construction of onshore LNG plants in Cabo Delgado halted due to terrorist attacks in 2021 which led TotalEnergies to declare force majeure (decision to be made before year-end).*
- !! *Until 2021, Tanzania had **tough fiscal terms**, among the least attractive model contract globally, with average government take up to 88%. A revision is ongoing.*

Country fiscal attractiveness key to encouraging investment

Fiscal comparison carried out to see how a large oil project's (640 MMbbls) valuation would change under different regimes

After tax NPV @10% Fiscal terms analysis under 3 prices scenarios¹

(Nominal terms in USD MM)



Comments:

- Fiscal regimes compared are relatively comparable
- Namibia APT applied at Tier 3 capping the NPV growth. Introducing fiscal terms more in line with those of other emerging producers
- Mauritania adopted cautious fiscal terms given the country's development stage
- Valuation would be stronger in all price scenarios under Senegal's 2019 PSA terms – evolution from the frontier to the de-risked frontier has been helped with favorable terms
- Cote D'Ivoire: Negotiable and attractive fiscal terms, CIT is paid on behalf of the contractor
- Under the Ivoirian regime seen here in orange on our base price of \$77 it exhibits a slightly higher than average NPV

Data Compiled October, 2023.

1 Point Forward Valuation

Source: S&P Global Commodity Insights upstream E&P content (Vantage)

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Country fiscal attractiveness key to encouraging investment

Fiscal comparison carried out to see how a large gas project's (1.3 Tcf) valuation would change under different regimes

After tax NPV @10% Fiscal terms analysis under 3 prices scenarios¹

(Nominal terms in USD MM)

Mauritania PSA 2018

R-Factor Profit Share: 68.5% to 58%
Break even Price:\$3.1 /Mcf

Senegal PSA 2019

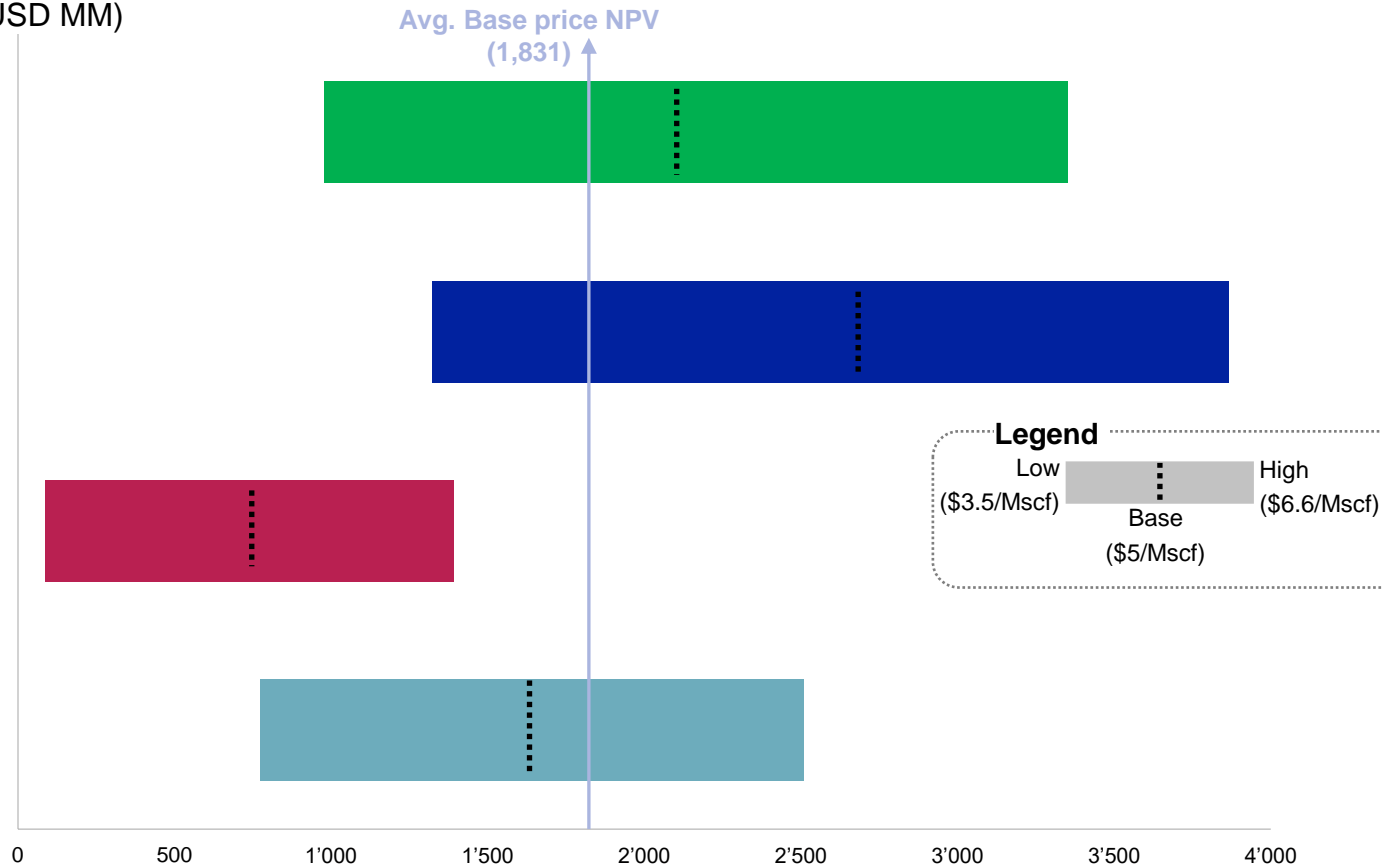
R-Factor Profit Share: 60% to 40%.
Break even Price:\$2.9 /Mcf

Tanzania PSA Deepwater

Daily production profit share: 40% to 15%
Break even Price:\$4.4 /Mcf

Mozambique PSA 2018

R-Factor Profit Share: 85% to 40%.
Break even Price:\$3.2 /Mcf



Comments:

- Mauritania adopted cautious fiscal terms to oversee gas revenues given the country's development stage
- Senegal – most favorable terms, evolution from the frontier to the de-risked frontier has been made possible by favorable terms
- Tanzania – poorest fiscal terms with a much lower base case NPV and the highest BE at \$4.4/Mcf – a revision is underway with terms expected to loosen – looking into improving the gas terms to attract investors. Given the development stage, currently not very favorable terms
- Mozambique – uncertainty concerning the gas terms governing the sector – not fully clear to investors. CIT 32% and 6% royalty were effective. 25% of gas produced goes to the domestic market.

Data Compiled October, 2023.

1 Point Forward Valuation

Source: S&P Global Commodity Insights upstream E&P content (Vantage)

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Projects timelines – summary

What elements can expediate a project and what hurdles can stall a timeline

- ✓ *Solid and long-term partnership between operators and contractor*
- ✓ *Strategic and safe location, close to market*
- ✓ *Politically stable country*
- ✓ *Collaborative authorities*
- ✓ *Attractive and stable fiscal terms*
- !! *Ownership conflicts / transfers, arbitrations*
- !! *Decisional slowness (from both authorities and stakeholders)*
- !! *Complexity of the new infrastructure to be built*
- !! *Insecurity, violence, force majeure*
- !! *Unattractive and volatile fiscal terms*

How to make African upstream projects greener?



Producing oil and gas in Africa in 2023 comprises new challenges. The recent environmental reality complicates the access to capital for a fossil energy projects



May 2023

« France's largest lender, will no longer provide any financing dedicated to the development of new oil and gas fields, the bank said on Thursday, as it reiterated its target of an 80% cut of its oil exploration financing by 2030. »



December 2022

« HSBC will stop funding new oil and gas fields and expect more information from energy clients over their plans to cut carbon emissions, the banking giant said on Wednesday, as part of a wider update of its sector policy. »



October 2021

« La banque française, qui a le statut d'entreprise à mission, ne financera plus ces projets ni les entreprises dont une part significative de l'activité est liée à la production d'énergies fossiles non conventionnelles. Depuis début 2020, Crédit Mutuel a multiplié les engagements pour lutter contre le réchauffement climatique. »

Although Africa needs to access its oil and gas, operators must decarbonize production to fit their GHG strategies and access funds

Senegal

Gas fuel to limit CO₂ emissions

- *Woodside* aims at reducing its net equity scope 1 and 2 greenhouse gas emissions (using gas fuel for its installations) by 30% in 2030.
- The company aims at investing US\$5 billion into new energy products and lower carbon services by 2030.
- Senegalese government might strengthen its regulatory framework, including measures to reduce GHG emissions.

Cote d'Ivoire

Compensatory measures

- *Eni's* novel project *Baleine* has been set to be Africa's first net-zero emissions project.
- By 2040, the company intends to produce with no gas flaring (scope 1) and offset all the residual greenhouse gas emissions.
- In 2022, *Eni* yet started to distribute cookstoves to contribute to the reduction of deforestation (100,000 cookstoves to be distributed in 6 years)

Mozambique

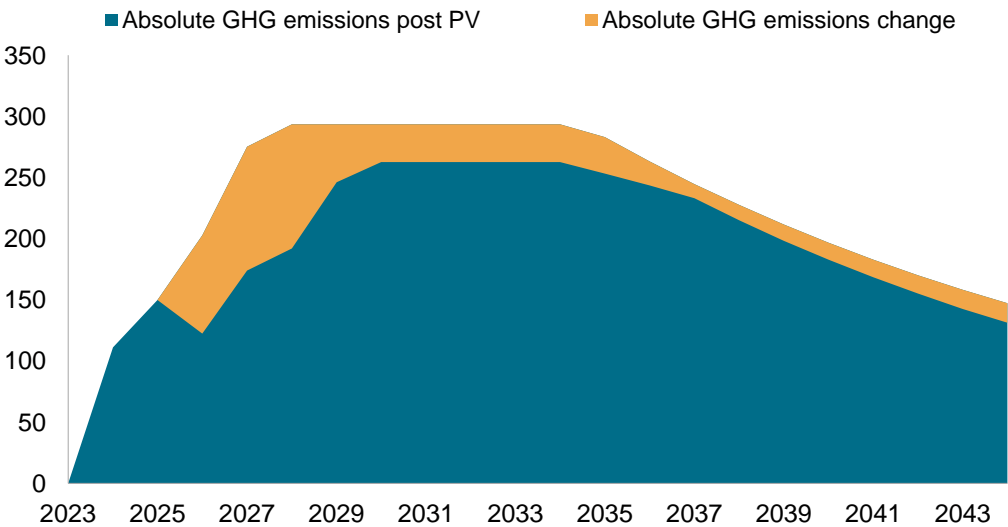
Mid-scale LNG plants

- *TotalEnergies* and *ExxonMobil* to build up to twelve mid-scale trains (1.5 MMtpa) in each country, to reduce the GHG emissions.
- Replacing gas turbines on gas refrigerant compressors on an LNG facility with electric drives reduces total emission by a third.
- Power generation for the facility will likely encompass a combination of buying hydroelectric power, utilising photovoltaics & harnessing an advanced battery system.

North African Oil Fields reduce emissions

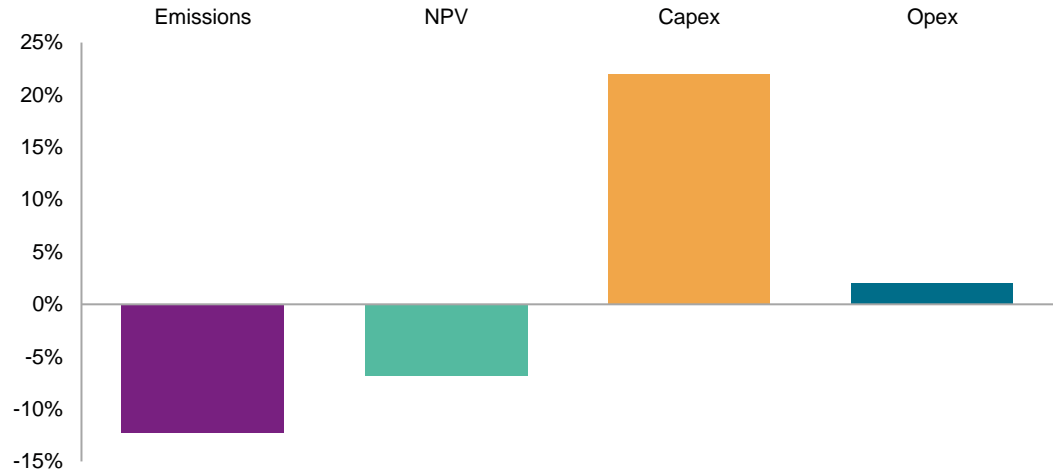
Installation of PV results in significant reduction in emissions

Upstream GHG Emissions (Pre and After PV asset)



Data compiled November 08, 2023
Source: S&P Global Commodity Insights.
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Change in Metrics after installing PV for power generation (%)



Data compiled November 10, 2023.
Source: S&P Global Commodity Insights
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North Africa producers are actively decarbonising their oil fields by installing centralized PV facilities

Overall reduction in the NPV as a result, but significant effect on scope 2 emissions

Centralised shared PV facilities result in improved economics as PV Capex and Opex costs are shared between projects

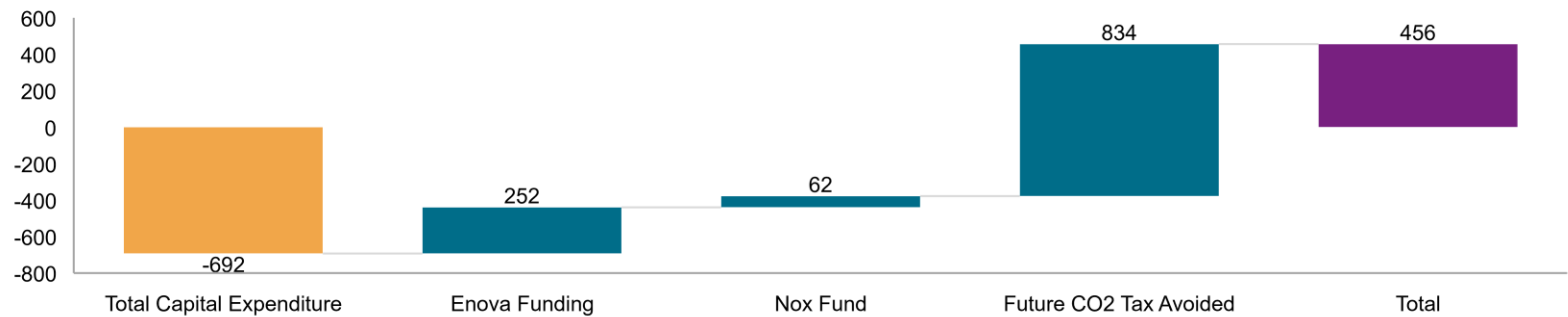
Valuation Metrics	Upstream	Combined
	Stand Alone	PV + Upstream
NPV @ 10% (\$MM)	495.7	461.8

Europe is actively
decarbonizing,
what about Africa?



Norway - Highwind Tampen Economic Impact and Emissions Reductions

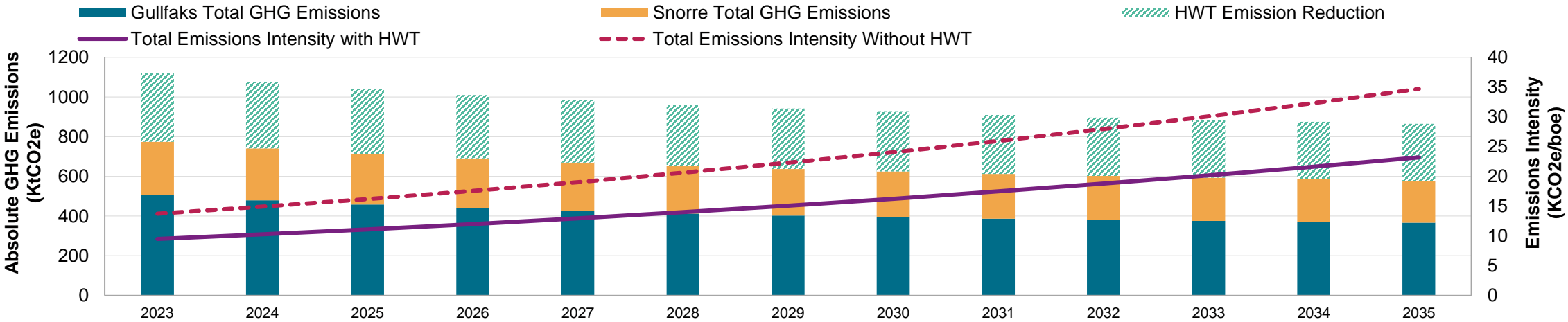
Hywind Tampen Economic Impact (MM USD)



Data compiled July 2023
MM USD = Million US Dollars
Source: S&P Global Commodity Insights.
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Hywind Tampen Emission Impact

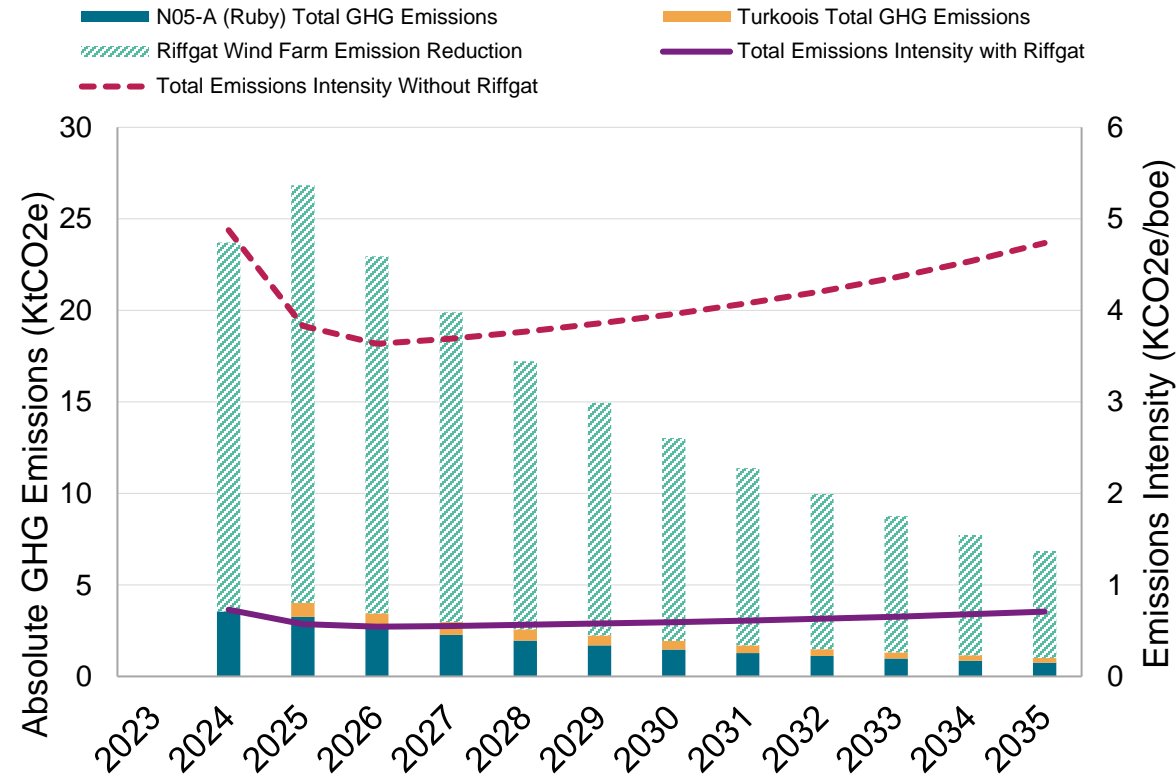


As of November 2023
HWT = Hywind Tampen
Source: S&P Global Commodity Insights.
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Netherlands GEMs Project



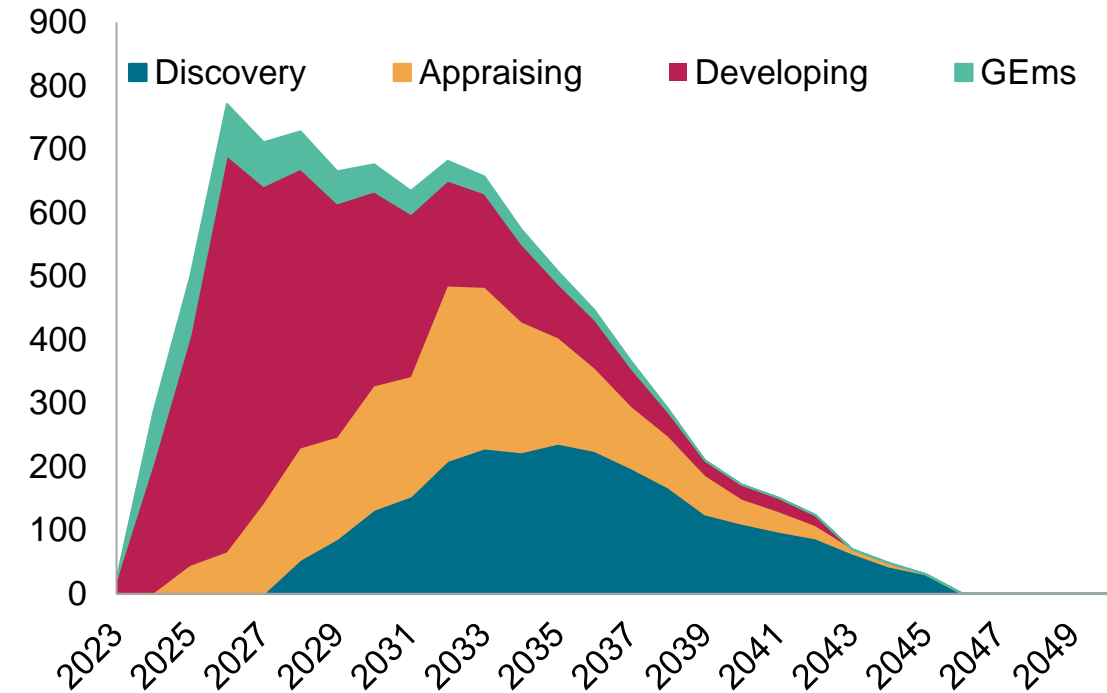
GEMs Emissions Profile



As of Oct. 2023
Source: S&P Global Commodity Insights (Vantage).
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Netherlands production potential 2023-2050) MMcf/d

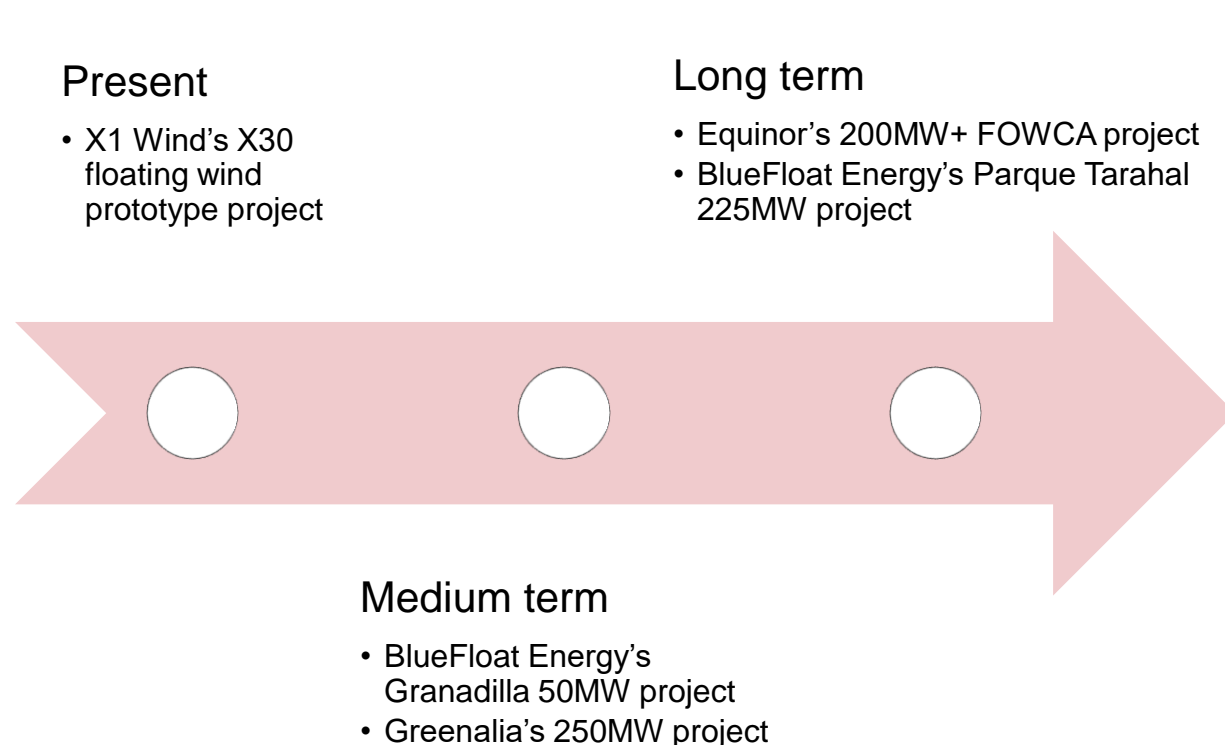
Production forecasts for non-developed/developing fields



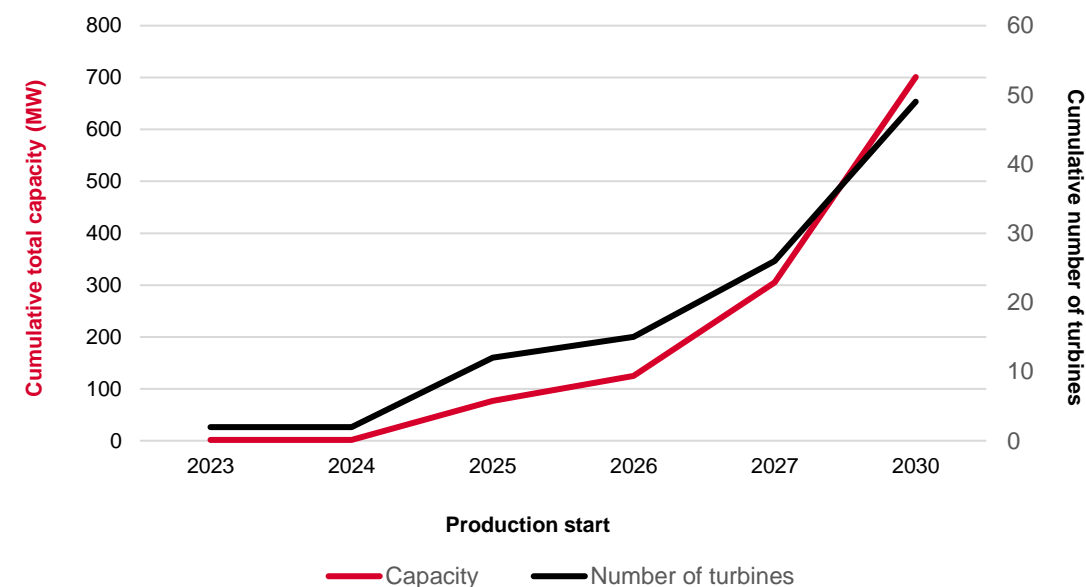
As of Nov. 2023.
Mmcfe/d = Million cubic feet of gas equivalent per day
Source: S&P Global Commodity Insights (Vantage).
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In West Africa, offshore wind farm developments are being explored to support upstream projects and reduce substantial GHG emissions



Cumulative total capacity generated from wind projects starting production between 2023 - 2030



Data compiled October 2023

Source: S&P Global Commodity Insights Petrodata FieldsBase

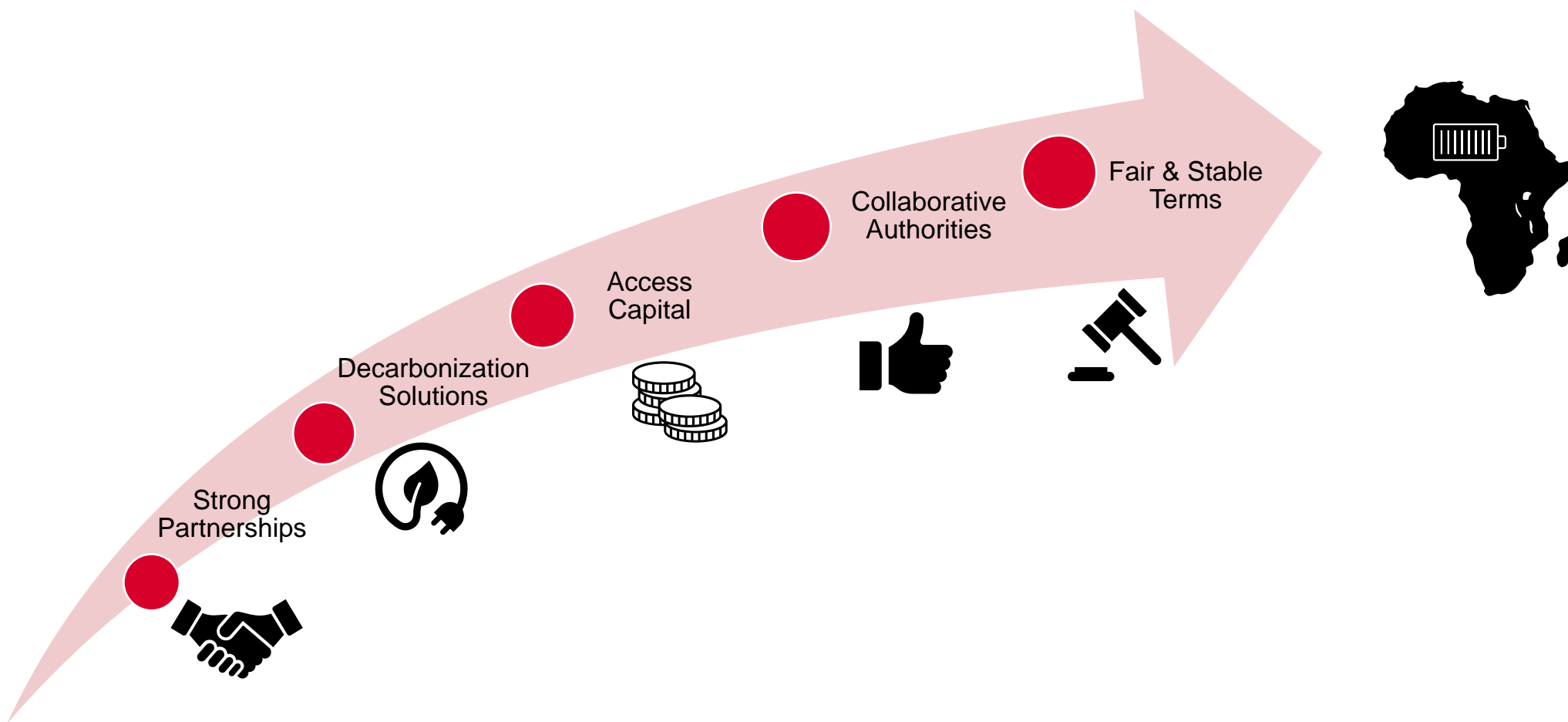
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Conclusions and Q&A



In a transitioning energy world, Africa can rely on its significant natural gas resources, but it also needs to start decarbonizing production

Both IOCs and Governments have a responsibility in helping Africans accessing energy... a faster and greener energy



Q&A

