



Status Update: E&P Potential Offshore NW Africa after Senegal and Mauritania

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Exploration in North West Africa

Revealing its charms slowly

A long time coming (1960-2014)

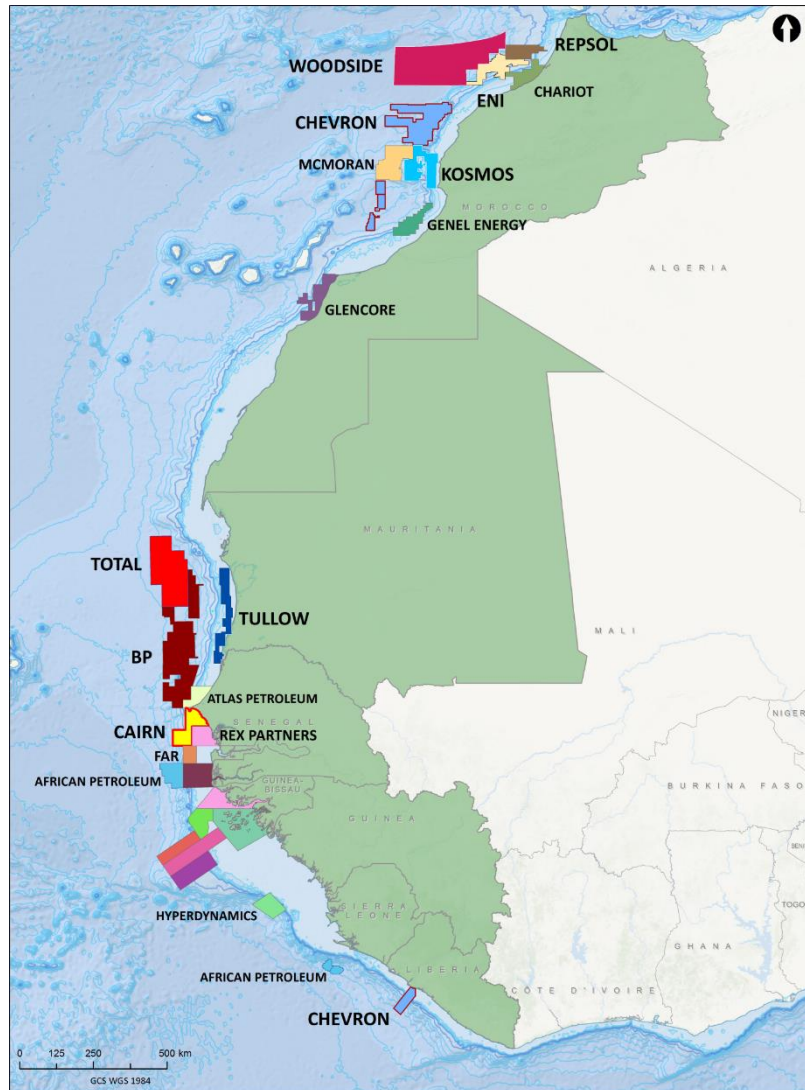
- Offshore starts in 1960s
 - Single commercial discovery Chinguetti
- 2000s-multiple non-commercial discoveries offshore Mauritania
- More, bigger 3Ds, move into deeper water, independents move in....success follows
 - Cairn
 - Kosmos
- World-class developments on the horizon in Senegal and Mauritania
 - SNE Field - oil
 - Tortue Development - gas

By 2018 the field gets crowded

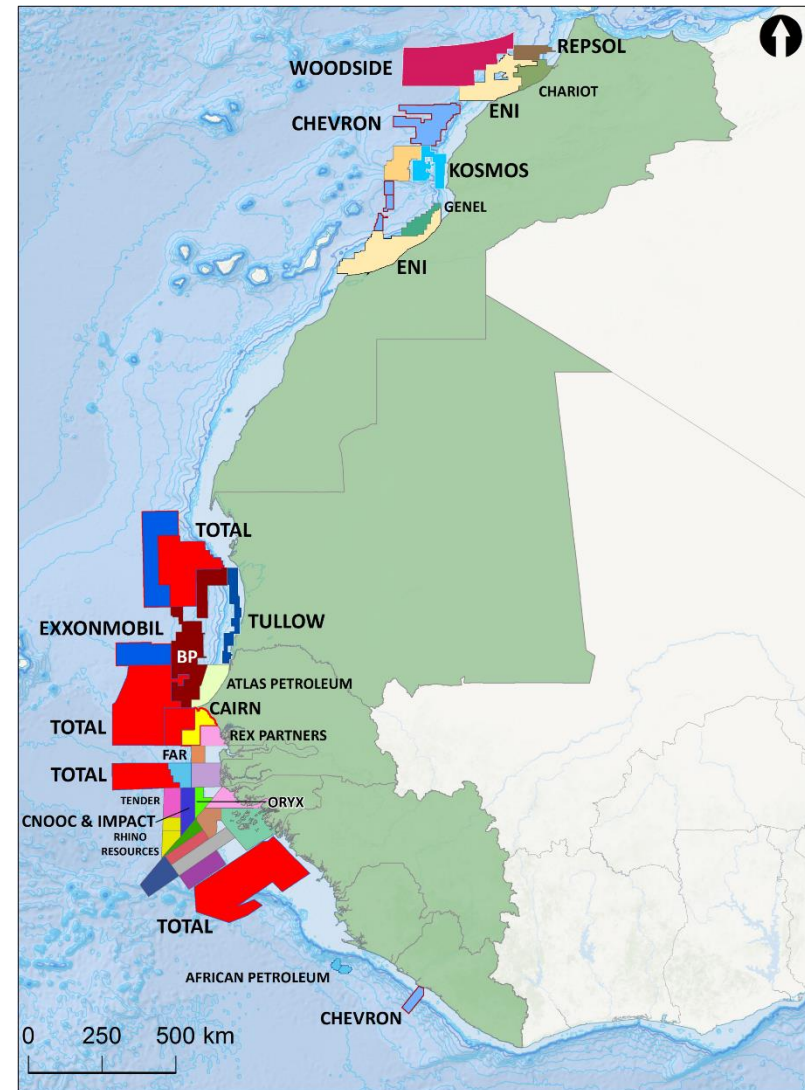
- Majors/Supermajors follow success
 - Woodside re-enters, taking CoP stake
 - BP joins Kosmos
 - Total invests strongly
 - Exxon enters deep water
- Exploration moves deeper....and deeper
- 3D seismic coverage expands dramatically
- Multiple deep water wells on the horizon

Leasehold Position Pre and Post FAN-1 & SNE-1 Discoveries

2014



2018



S



MSGBC Before FAN-1 and SNE-1

Around 150 wells drilled offshore with only one development

Senegal

- 45 wells drilled, all shallow water
- First well in basin Casamance Marine-1 1966
- No commercial success
- First deep water license Vanco, 1999
- RSSD license awarded to Hunt 2004
 - FAR invests in 2006, Cairn invests in 2013

Mauritania

- 69 wells drilled
- Chinguetti only development (Woodside, 2001)
- Dana drills Pelican (2003), Faucon(2005) Aigrette (2006) Cormoran (2010) and Fregate (2014) discoveries
- Kosmos entered in 2012 with 3 licenses
 - 2D and 3D seismic commitment

The Gambia

- One well drilled (Jammah-1 CVX 1979) on 2D seismic data
- No 3D seismic

AGC

- 20 wells drilled
 - Dome Flore and Gea heavy oil discoveries
 - No commercial development

Guinea Bissau

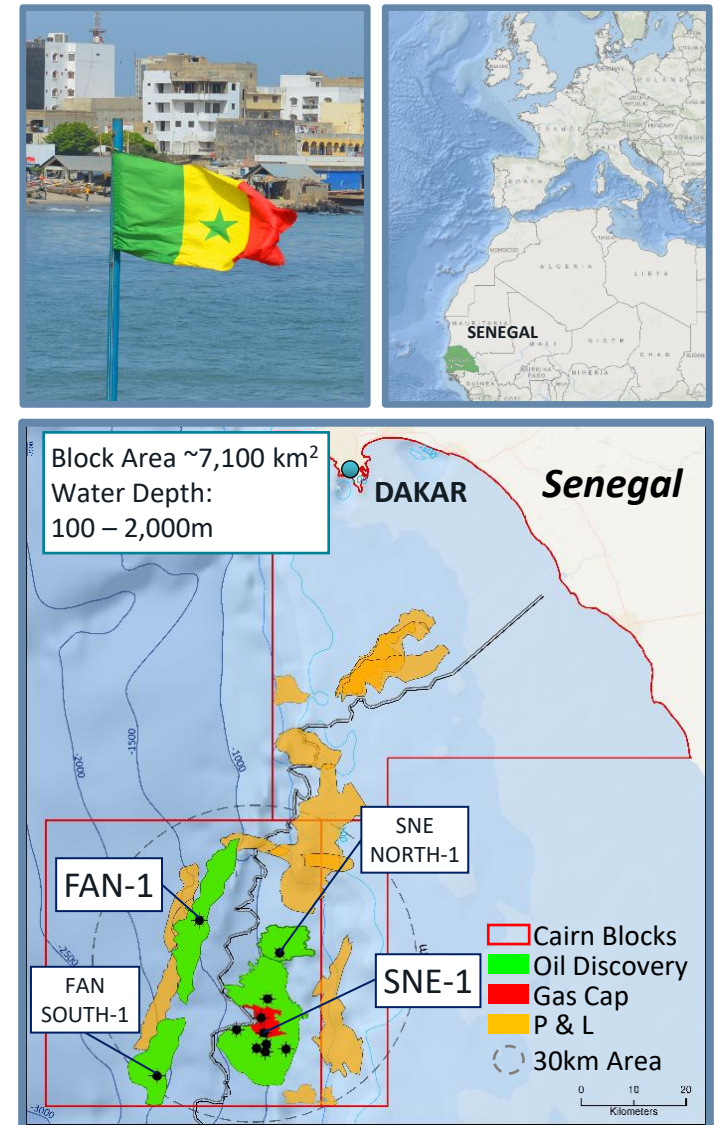
- 10 wells drilled 1968-1990 all with shows
- Sinapa-1 and Sinapa-2 encounter live oil (2001-2004)

Guinea Conakry

- One deep water well Sabu-1 (2012) with shows

Moving a Frontier basin to an Emerging Oil Play

- Strong belief in the potential of offshore Senegal
- Drilled first deep water wells offshore Senegal 2014
 - Two basin opening discoveries, FAN-1 and SNE-1
- Eleven successful E&A wells drilled 2014-2017
- Established a new hydrocarbon basin, attracting the attention of the global industry
- Three phase drilling programme generated an increasing resource base of up to one billion barrels recoverable
- Foundation for multi field, multi phase development plan
- Progressing to first oil between 2021-2023



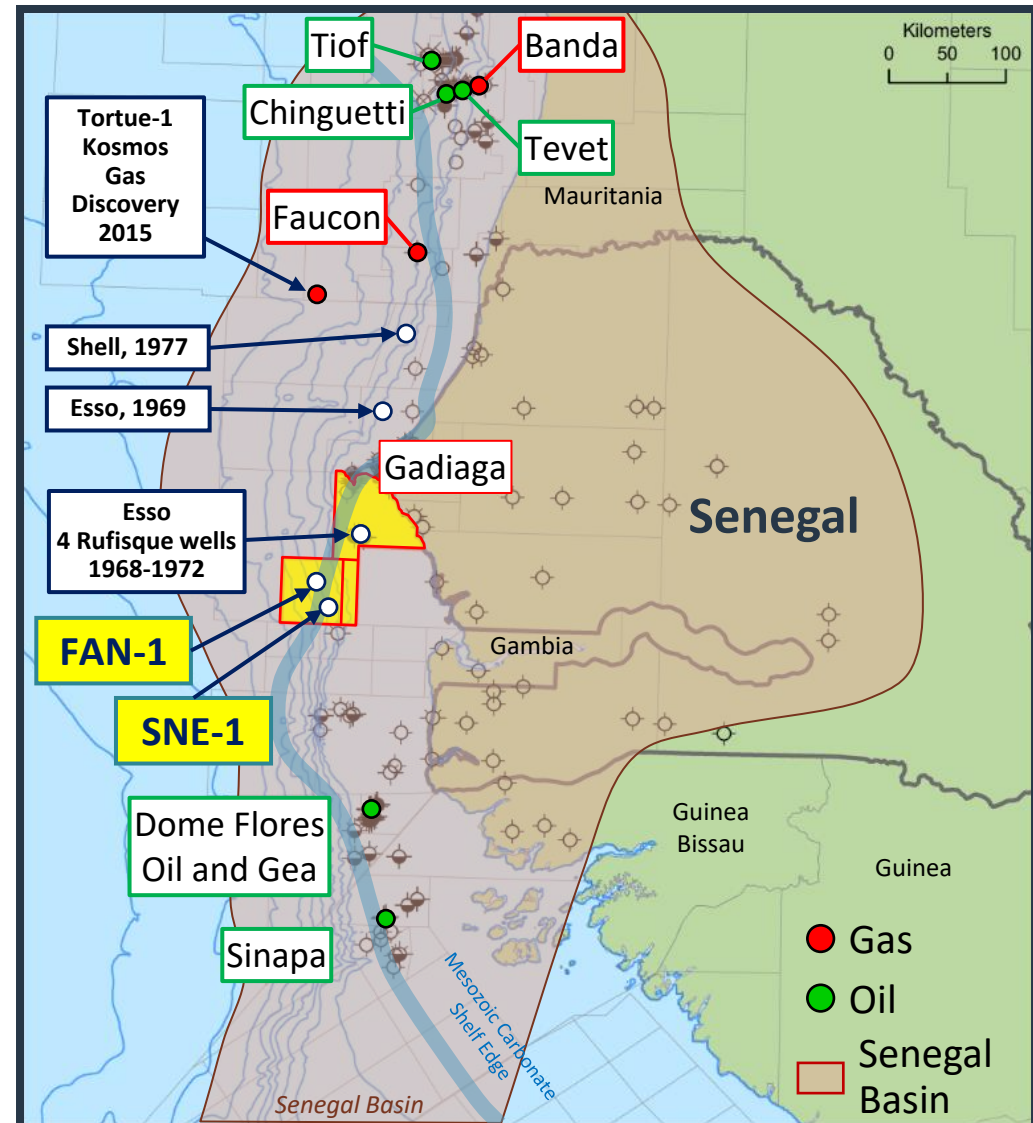
Key Elements: 3D Seismic, Source Basin and Reservoir Models

- Previous offshore wells demonstrated oil on the shelf (Esso 1968-1972, Rufisque dome)
- Seismic indication of hydrocarbons
- DSDP wells further offshore (1970s) demonstrate Cretaceous source rocks
- Cairn basin modelling suggested good chance of a mature source kitchen
- No wells drilled in the deep water

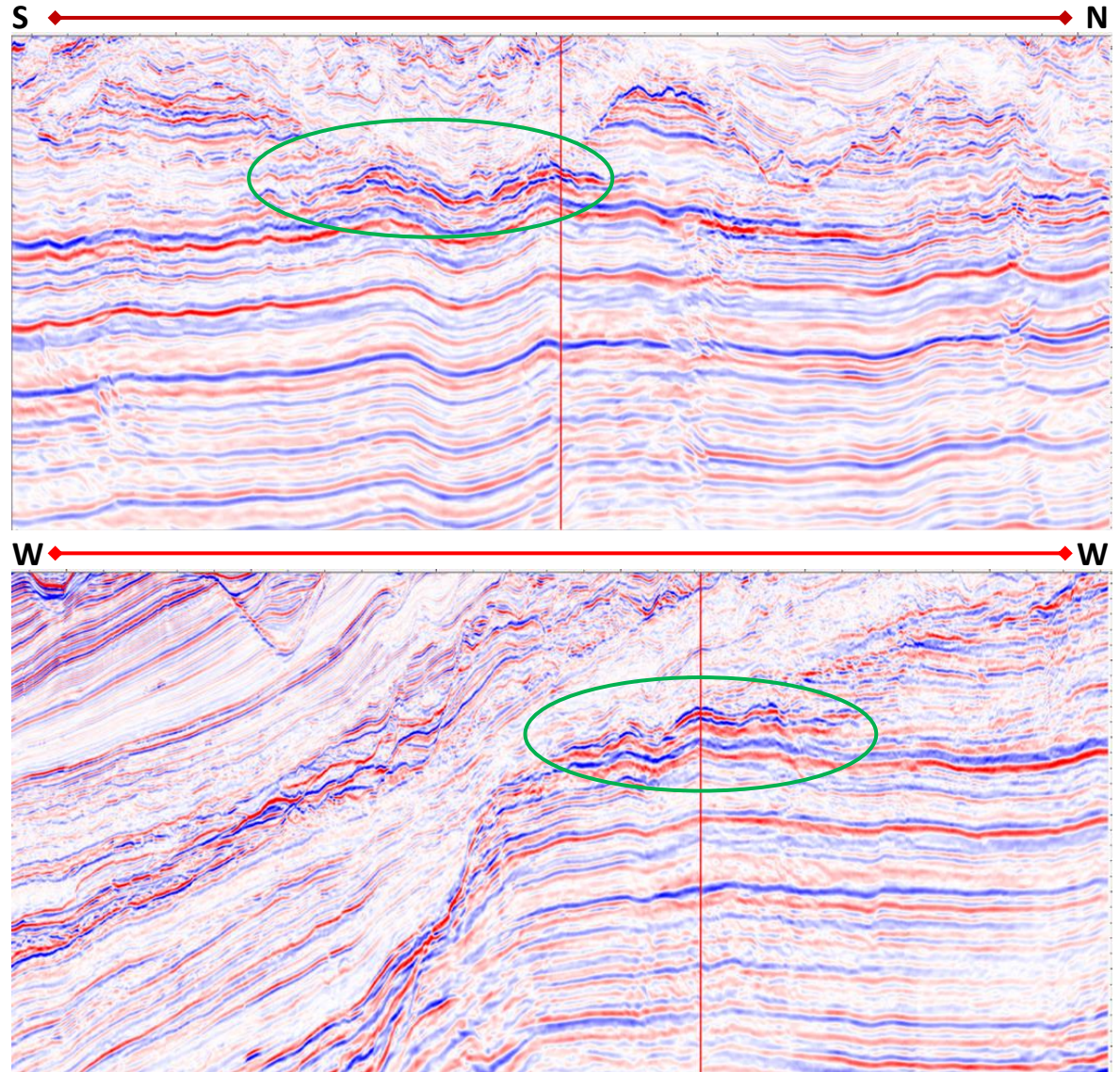
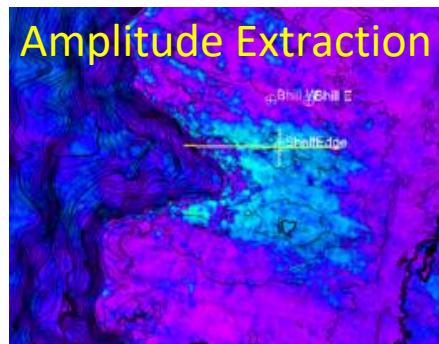
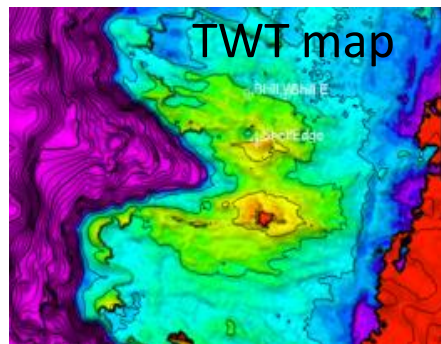
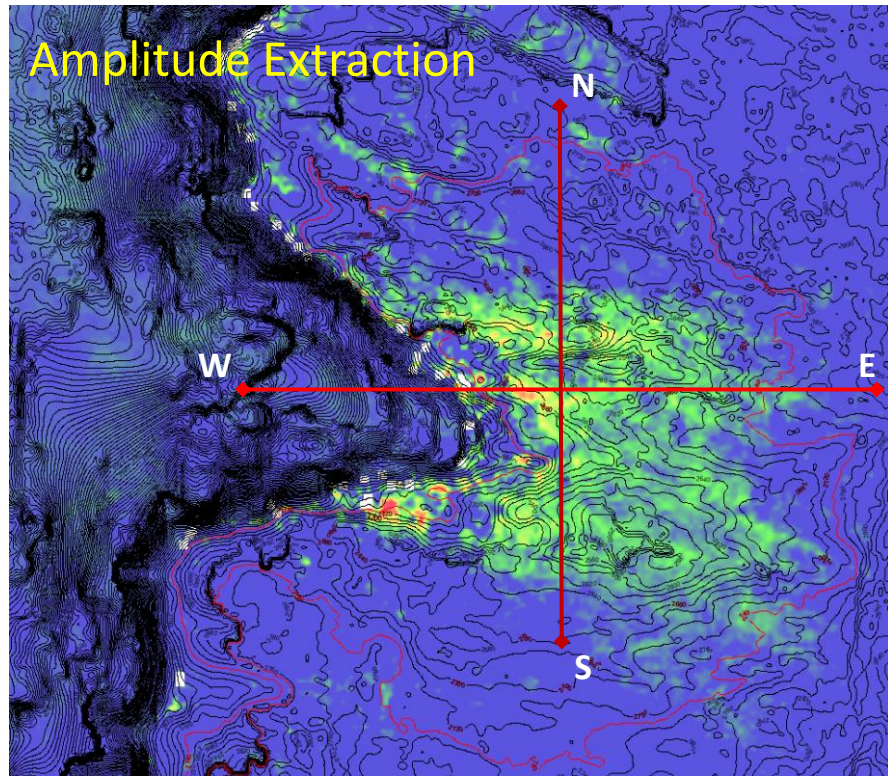
Why RSSD ?

(Rufisque, Sangomar and Sangomar Deep Blocks)

- Cairn's basin modelling suggests mature HC source kitchen within the western part of the RSSD block
- Several prospects and leads identified by Hunt and FAR on 3D seismic
- Seismic attributes suggest sand (and later hydrocarbons)

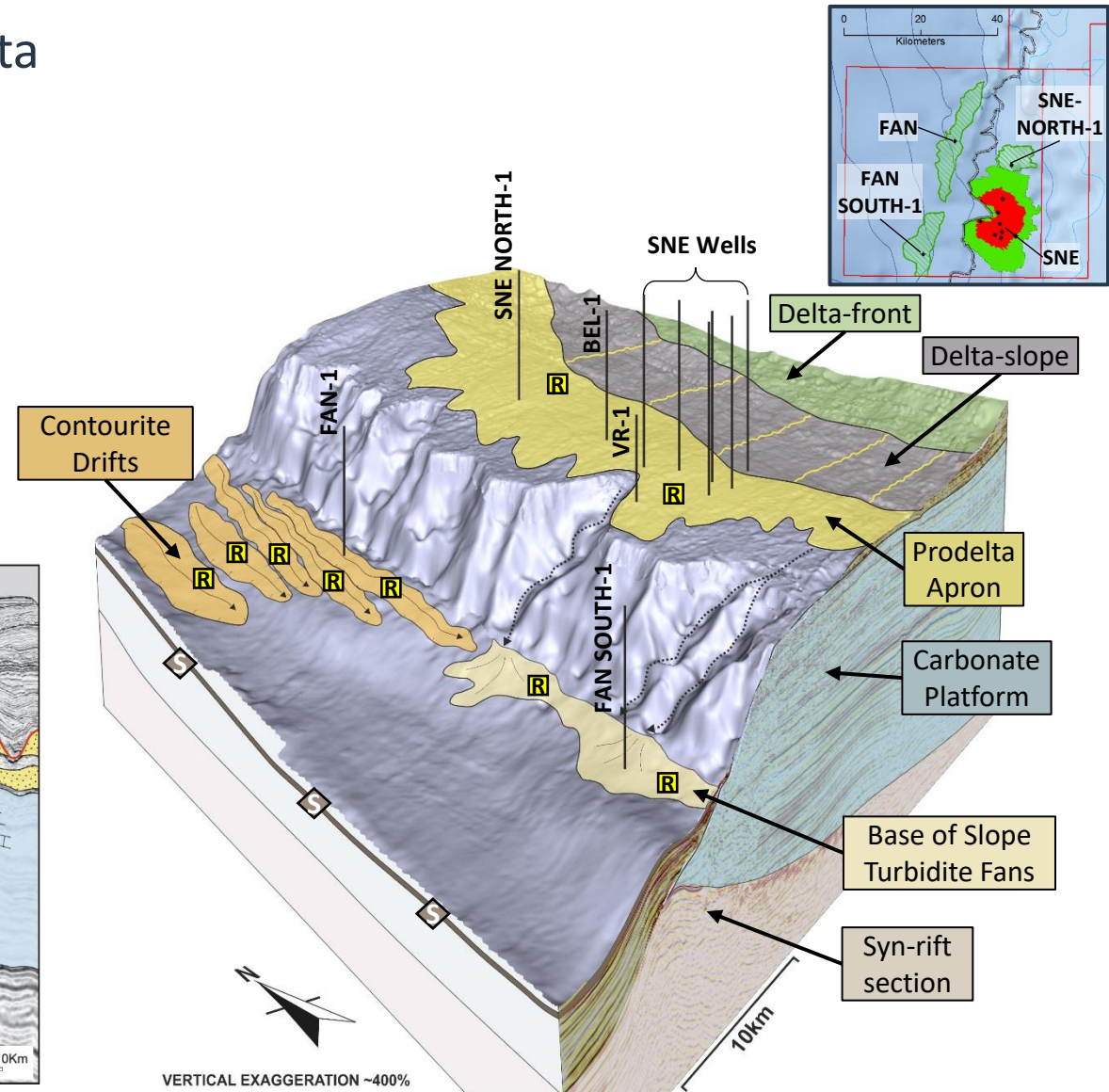
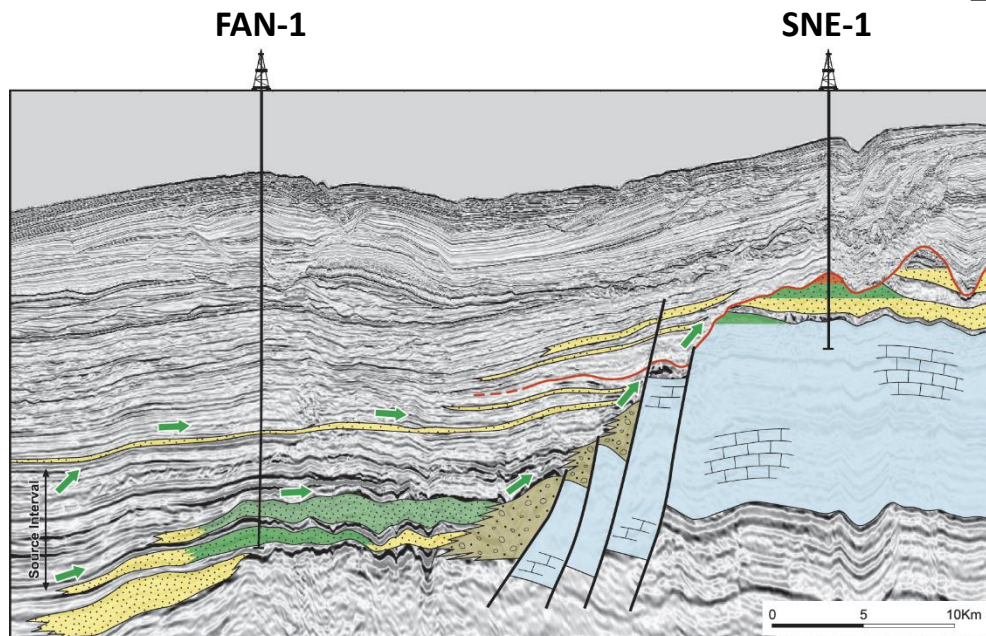


SNE field Lower Albian Shelf Edge (Cairn Farm-in Stage)



Geology of Cretaceous SNE and FAN plays

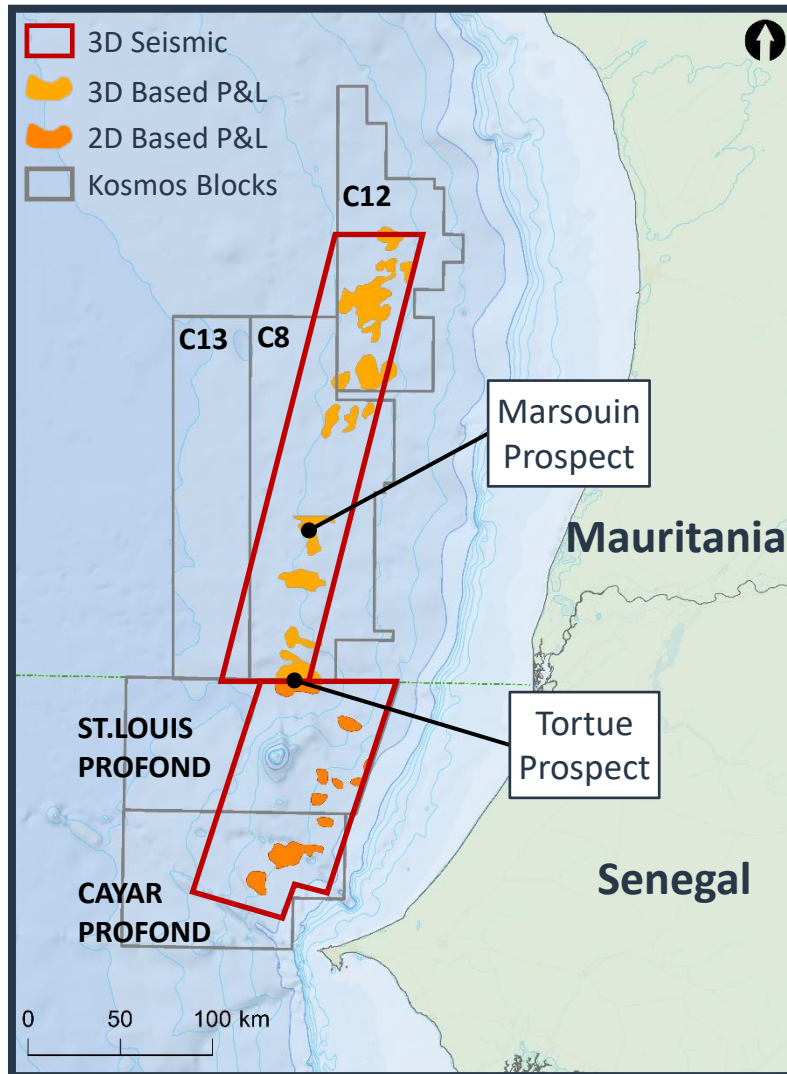
- SNE Field: Early Albian sandy pro-delta turbidite apron and delta-fed ramp
- FAN: Late Albian axially reworked contourites and gravity deposits
- FAN SOUTH: Albian base of slope turbidite fans shed off the shelf



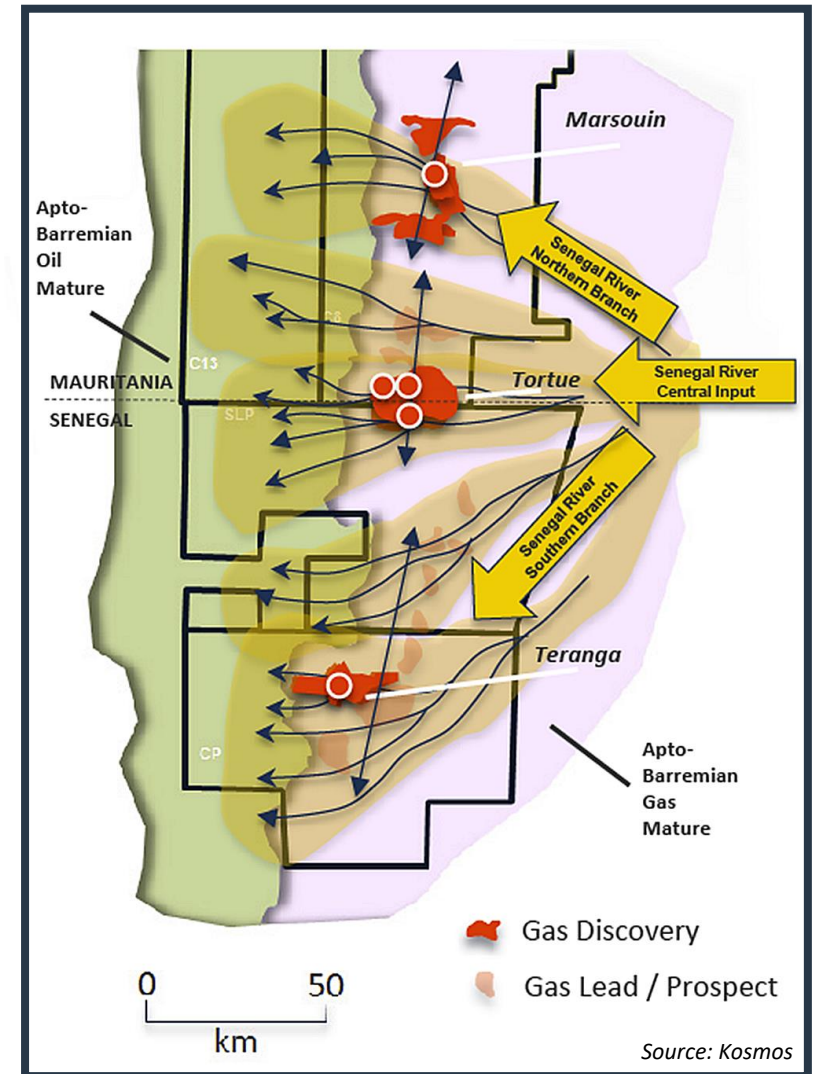
2015 Kosmos Discovers Gas Offshore Mauritania & Senegal

PreCenomanian sands along structural trend deliver world-class volumes-Drill

Pre-Drill



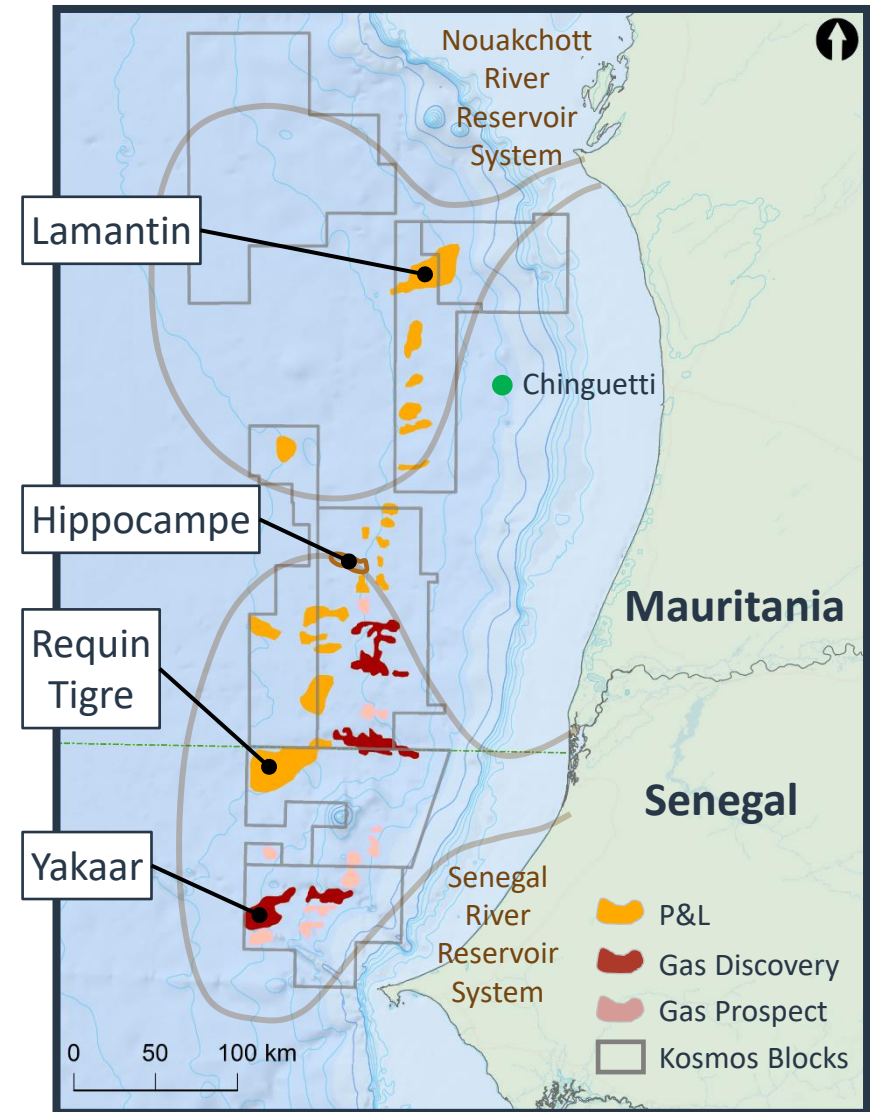
25 Tcf Gas Discovered



Basin Floor Fan Play has Limited Success

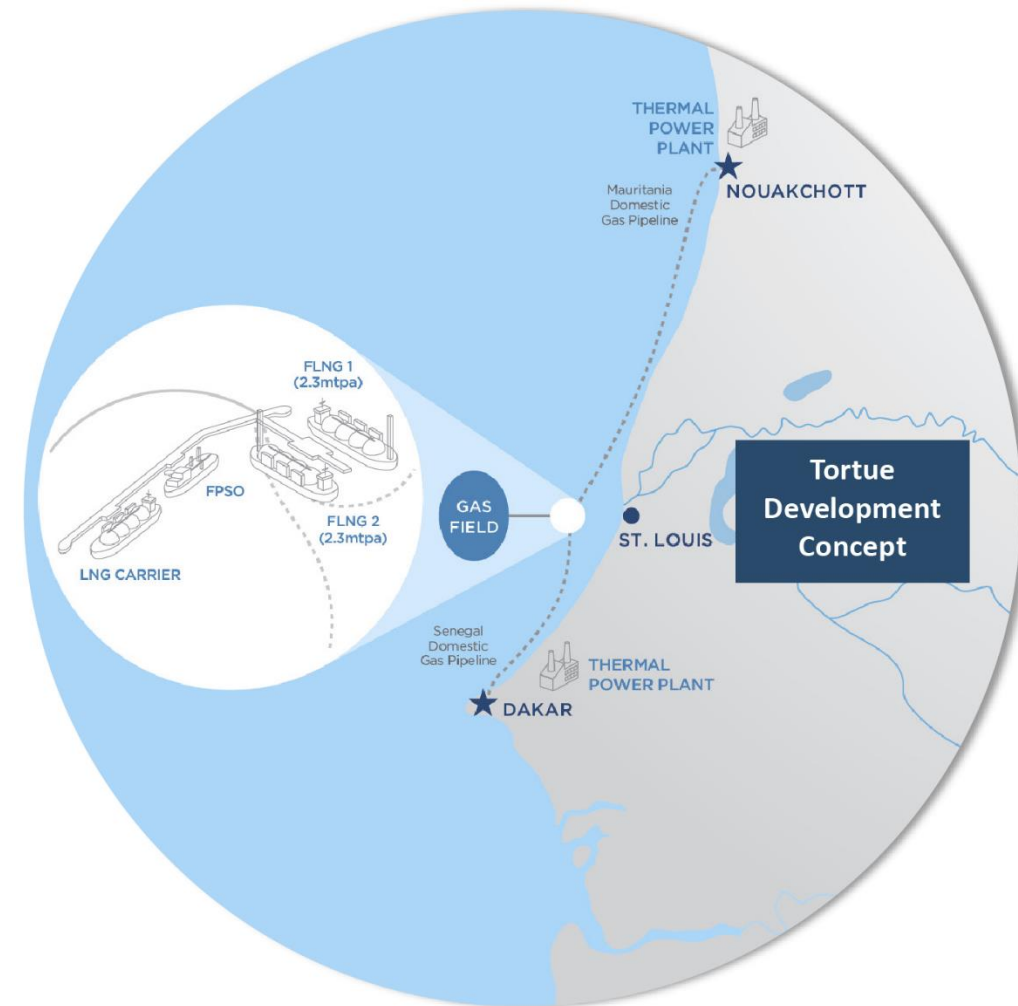
Liquids remain elusive

- **Yakaar-1** discovery reported 8th May 2017
 - Lower Cenomanian basin floor fan play
 - Combination structural-stratigraphic trap
 - Reported 15 TCF gas
- **Hippocampe-1** reported dry 30th Oct 2017
 - Lower Cenomanian and Albian sand targets
 - Well-developed, wet reservoir
 - Reportedly lack of charge
- **Lamantin-1** reported dry 12th Dec 2017
 - Campanian base of slope fan target
 - Combination structural-stratigraphic trap
 - Reportedly failed due to lack of trap/seal
- **Requin Tigre-1** reported dry 5th Feb 2018
 - Cenomanian and Albian basin floor fan targets
 - No failure mechanism reported



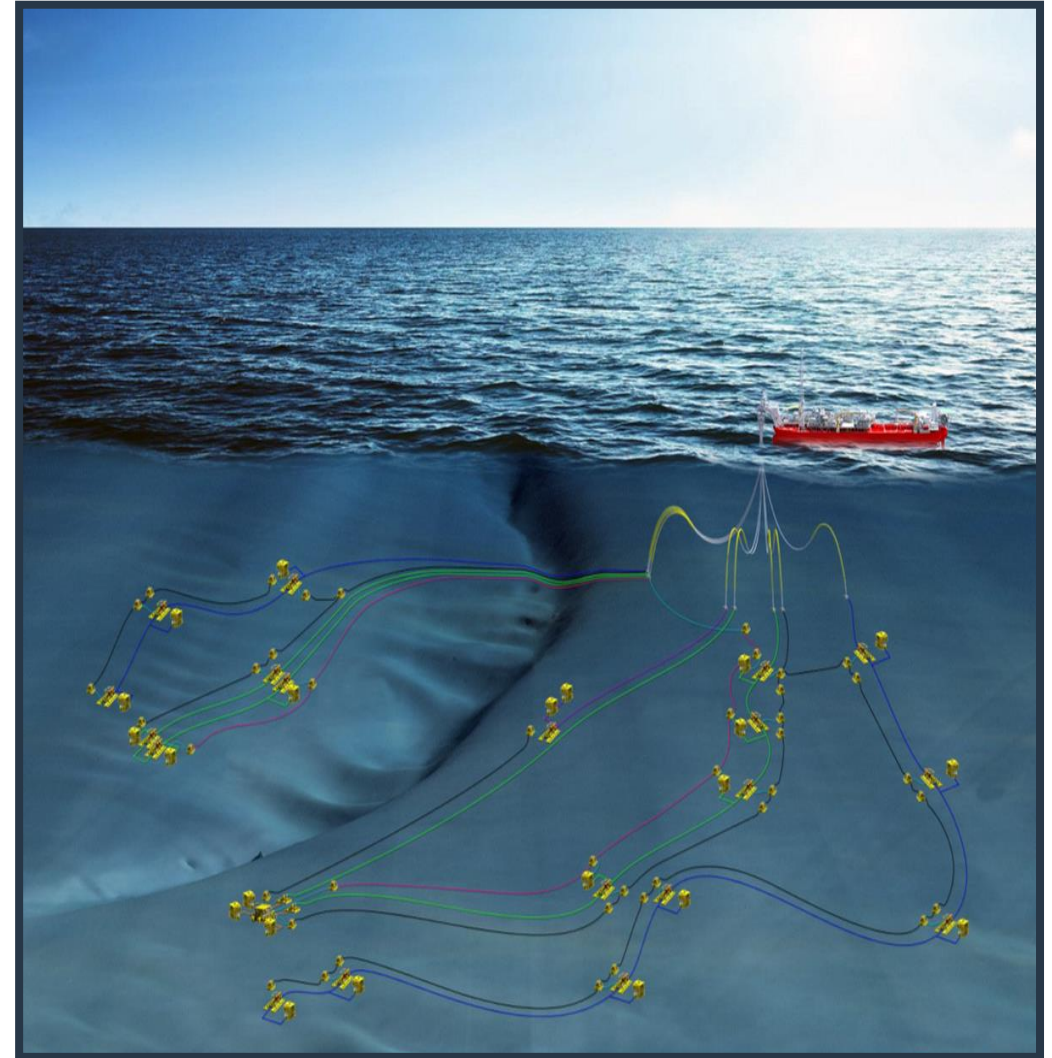
World Class Developments Taking Shape

Tortue Development Concept



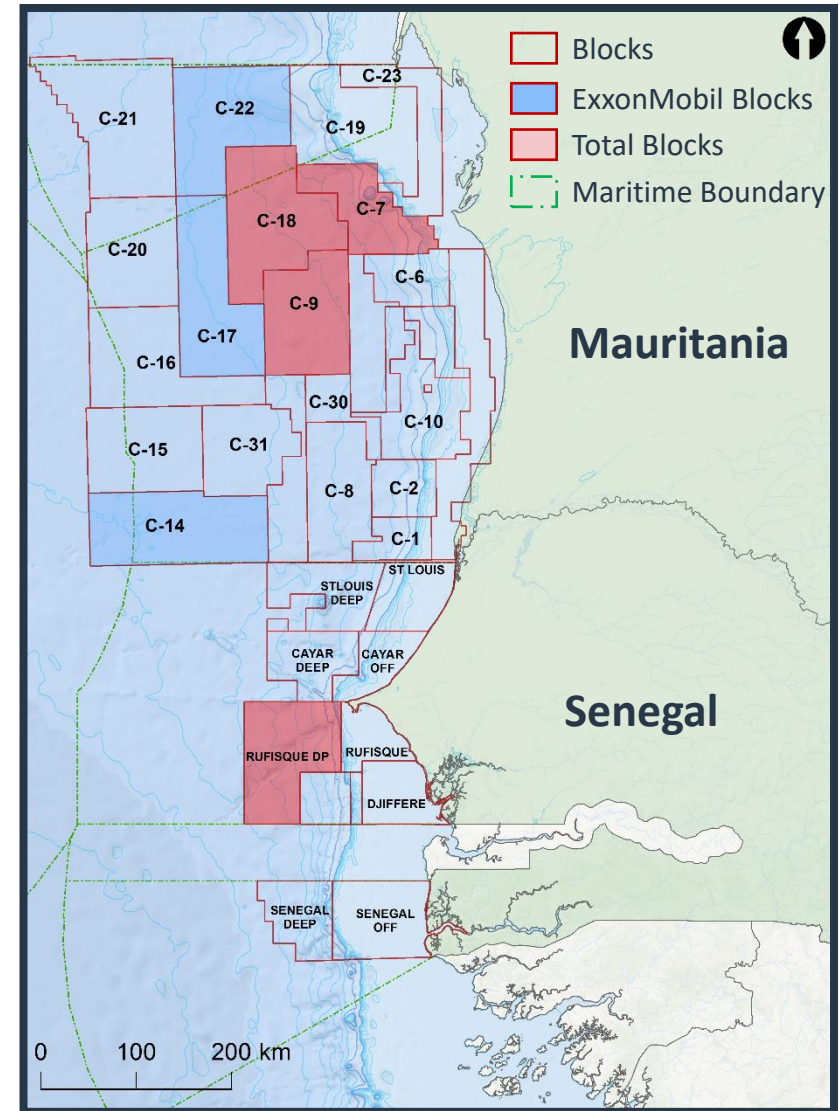
Source: Kosmos, September 2017

SNE Full Field Development Schematic



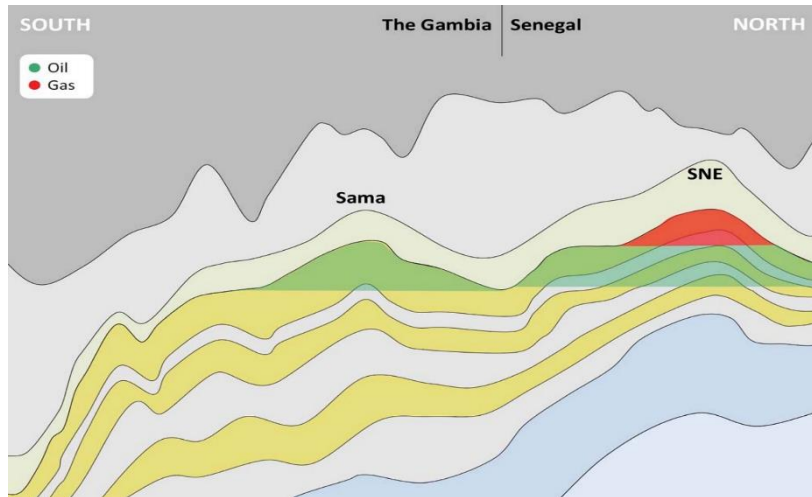
Opportunities Ahead – Mauritania and Senegal

- **Total** expands in a big way
 - Mauritania
 - Licenses C7 for 3D, and renews C9 with a well 2019
 - Farm-in to C18 and takes operatorship
 - Senegal
 - Licences Rufisque Offshore Profond (ROP)
 - Work commitment 3D seismic and a well
- **ExxonMobil** enters Mauritania (90% WI)
 - Blocks C22, C17 and C14
 - Water Depth 1,000 to >3,000m
 - Plays include Paleocene and Cretaceous turbidite, basin floor fan plays
 - Fluid type and trap are key risks

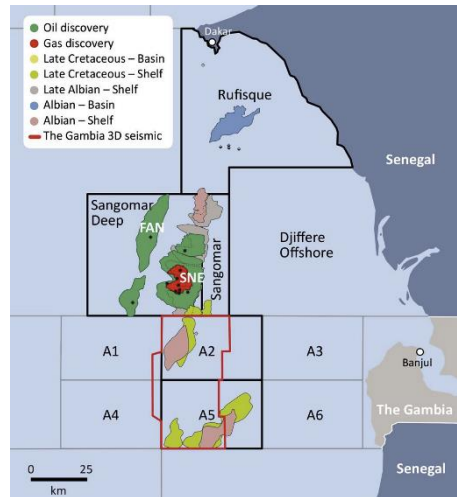


Opportunities Ahead – The Gambia

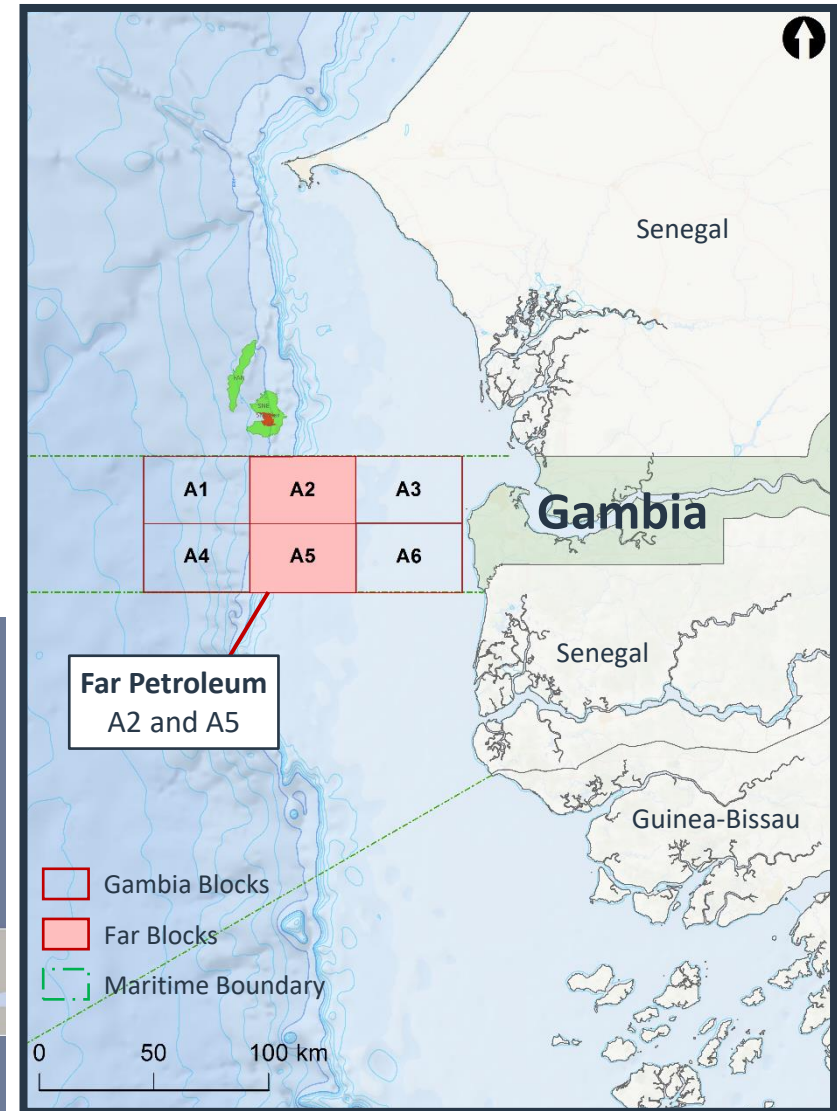
- FAR acquired 80% WI and operatorship in blocks A2 and A5 from Erin Energy (20% WI)
- FAR has farmed down 40% WI to Petronas
 - On a promoted basis
- Plan to drill a well in Q3 2018



Source: Far, September 2017

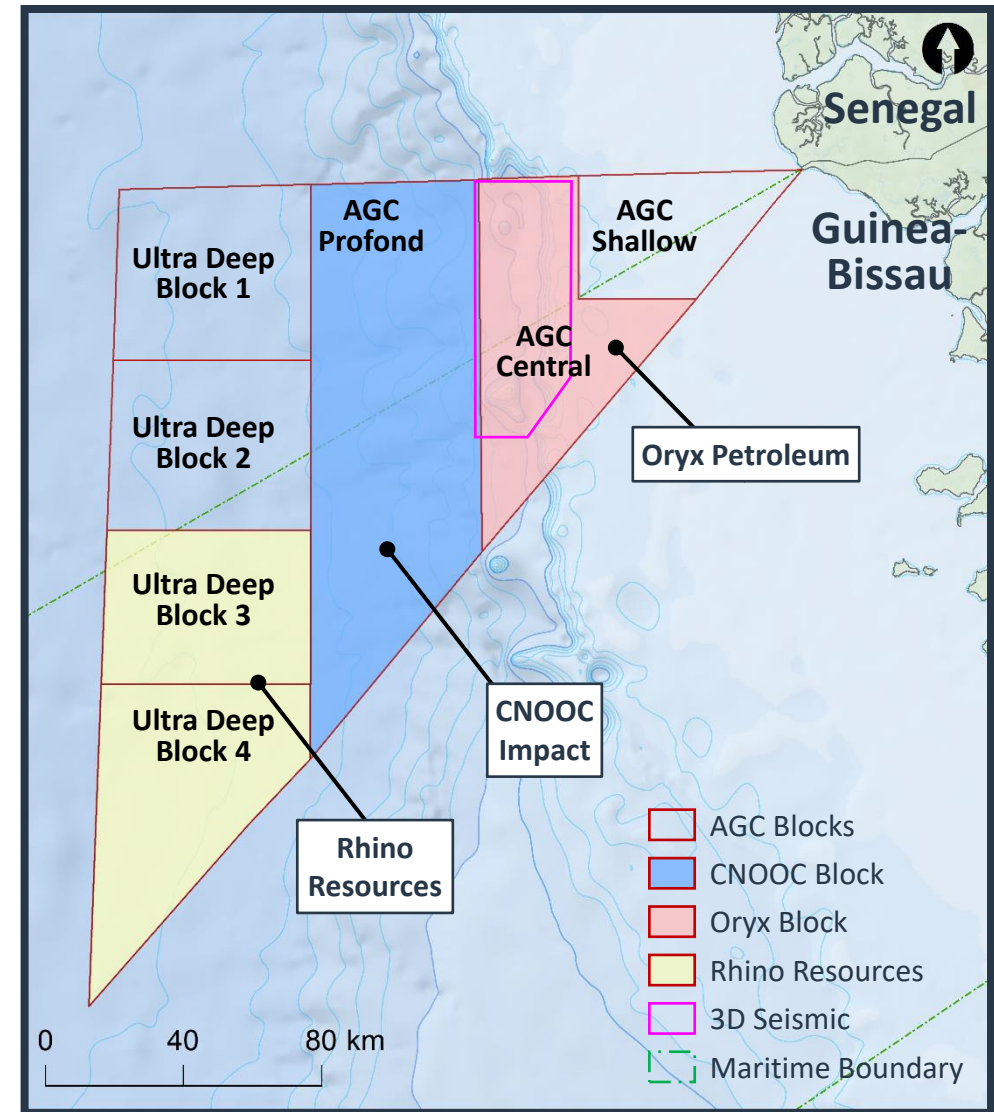


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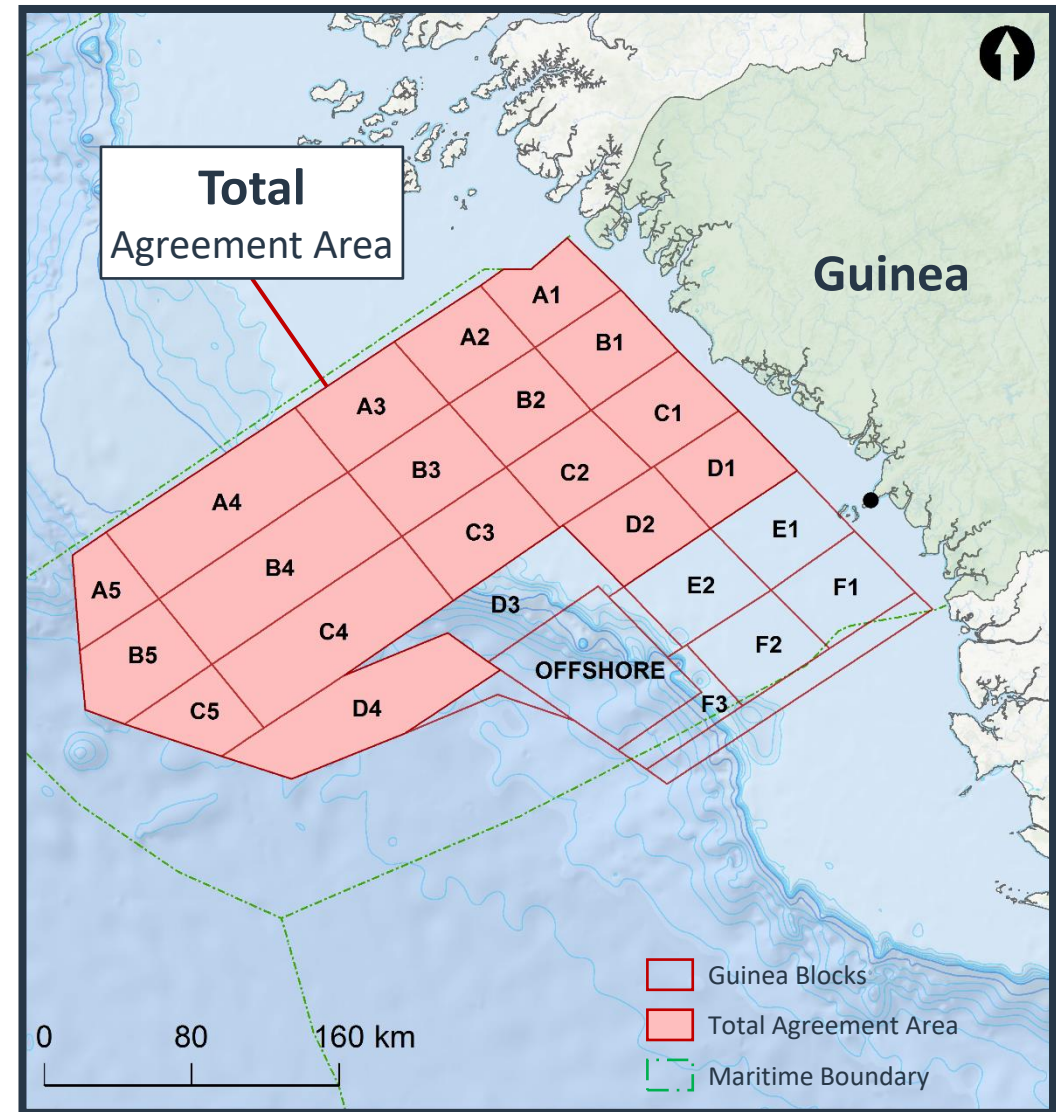
Opportunities Ahead – AGC

- Oryx Acquires AGC central 2014
 - Portion of block covered by GeoPartners 3D seismic
 - Similar play concept to SNE
 - Drill or drop October 2018
- Impact farm out AGC Profond to CNOOC in 2017



Opportunities Ahead – Guinea Conakry

- Total enters Guinea Conakry
 - Acquire one year study agreement covering 55,000 km² in October 2017
 - After one year Total will select three licenses to start an exploration program
- Guinea reportedly aspiring to run a licence round for all blocks
- WGC planning a major seismic reprocessing job



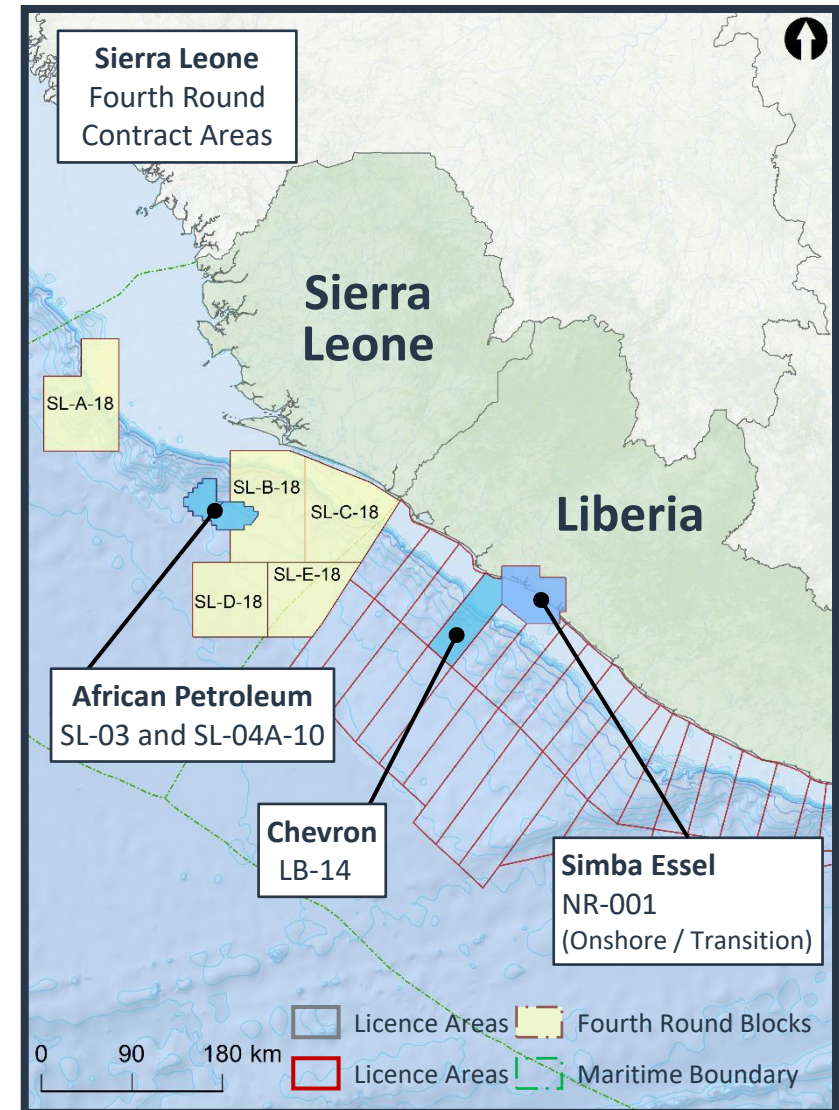
Opportunities Ahead – Sierra Leone and Liberia

Sierra Leone

- 16 wells drilled Since 2010: none commercial
- All but 3 licences exited at end 2017
- Sierra Leone Licencing round June 2018
 - 3 Deepwater and 2 mid/shallow water blocks offered
- African Petroleum reportedly plan to drill deep water prospect 2019

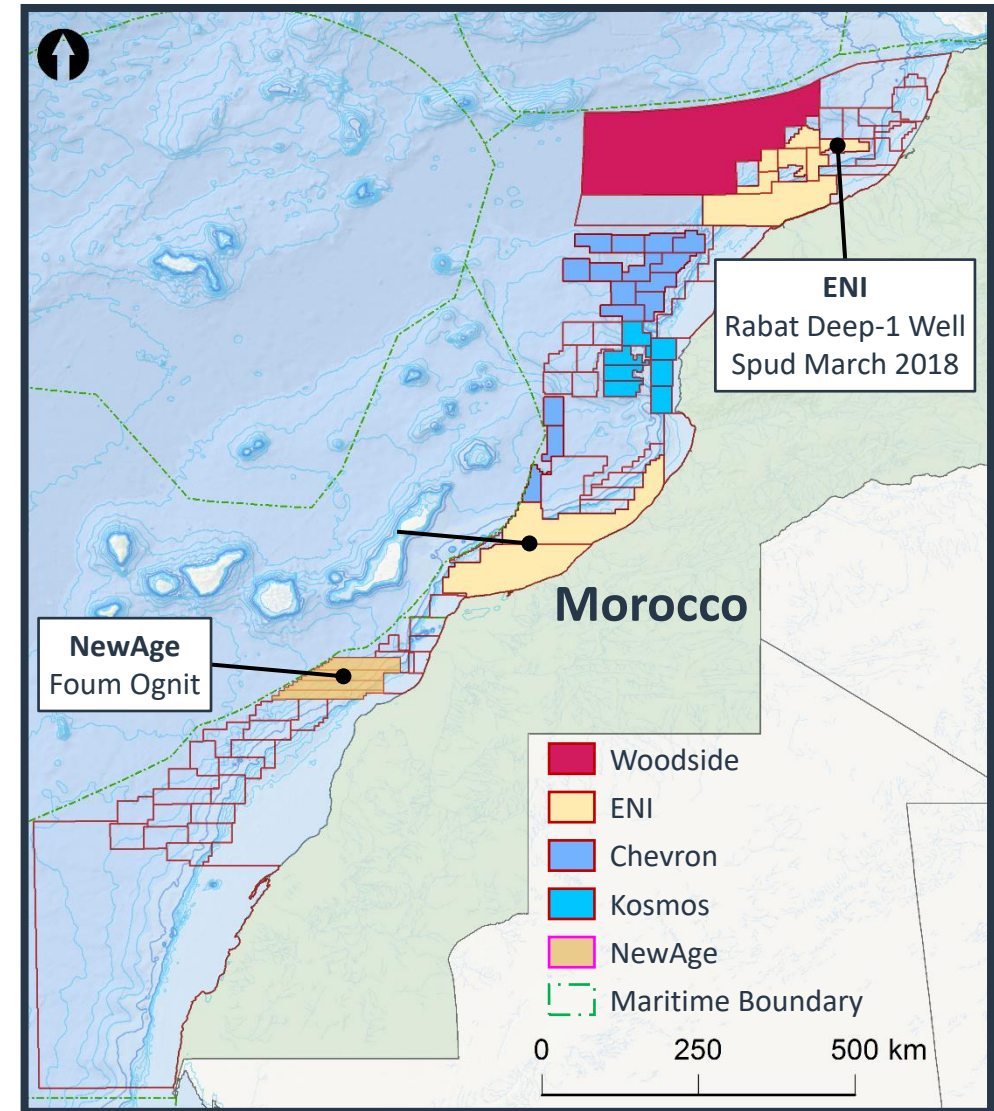
Liberia

- Only one onshore player
 - Simba Essel in the Transition/Onshore basins
- Chevron licence will expire June 2018
- Impetus needed to attract international firms
- Frontier Acreage (eg Harper Basin still untouched)

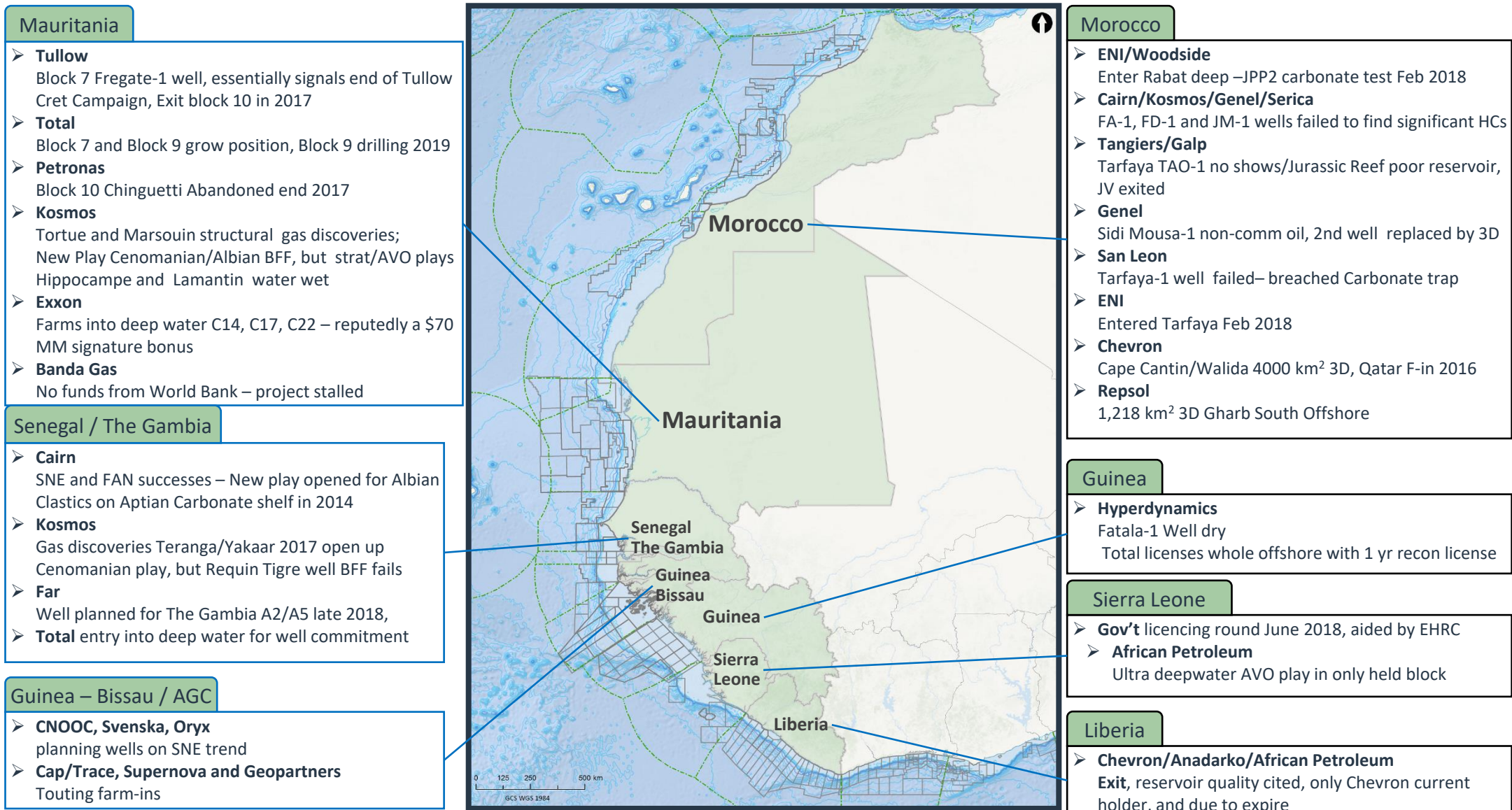


Opportunities Ahead – Morocco

- ENI to Spud Rabat Deep-1 Carbonate play 1H 2018
- NewAge Foum Ognit drill or drop Aug 2018, drilling Late 2019?
- Chevron, Woodside, ENI and Kosmos still have extensive acreage holding and active in area, (ENI awarded Tarfaya Shallow Dec 17)
- ONHYM initiating new regional 2D



Regional Offshore Activity North West Africa 2018



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