

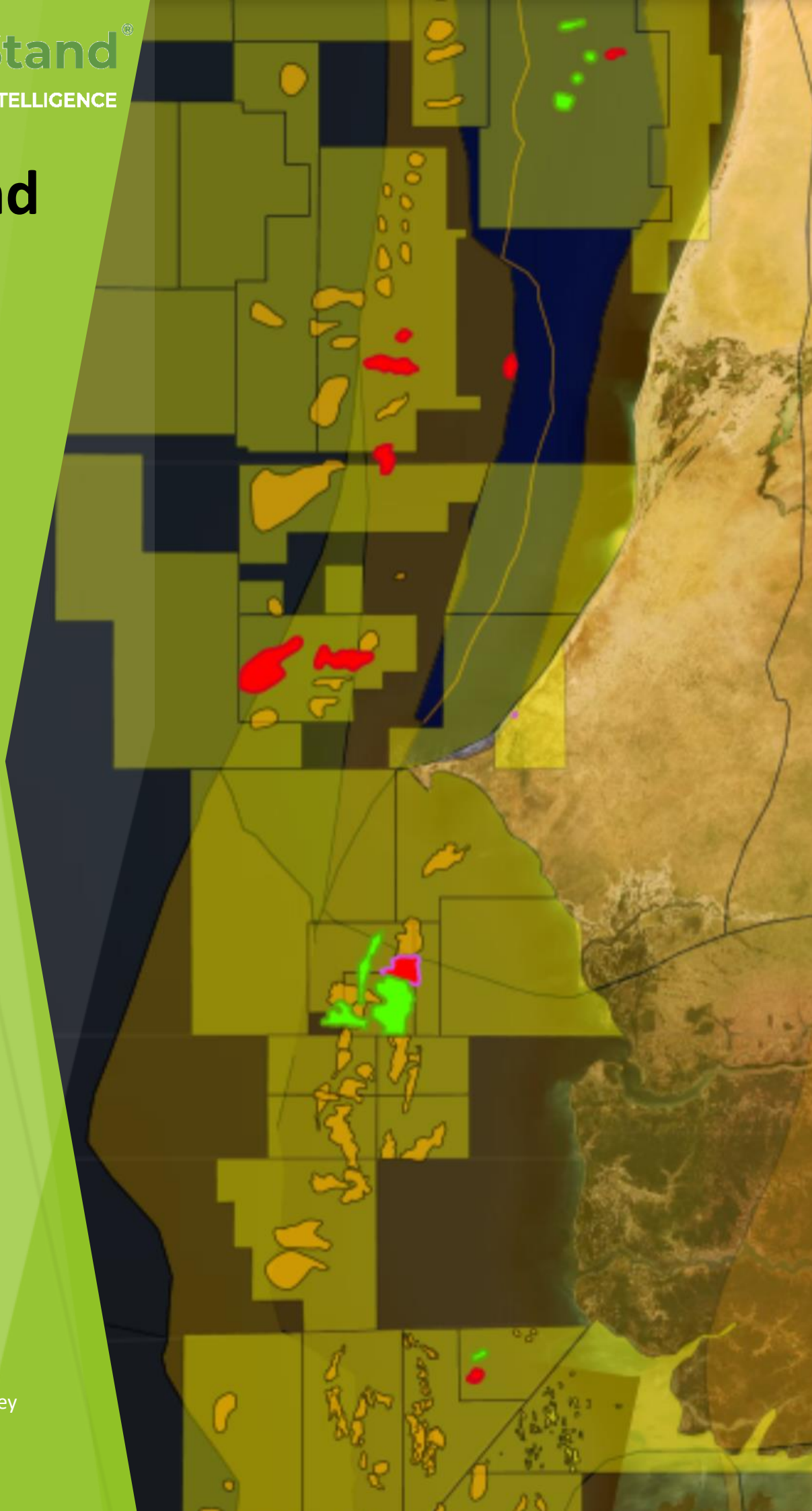


MapStand
LOCATION INTELLIGENCE

MapStand Monthly Mashup

July 2020

A monthly round up of key
developments and insight



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Europe

Norway

Atlantis

Following the announcement at the end of June from [Neptune Energy](#) of a discovery at the Dugong prospect, [Equinor](#) and its partners [Wellesley Petroleum](#) and [Source Energy AS](#) announced a gas and condensate discovery at the Atlantis prospect, located in PL878.

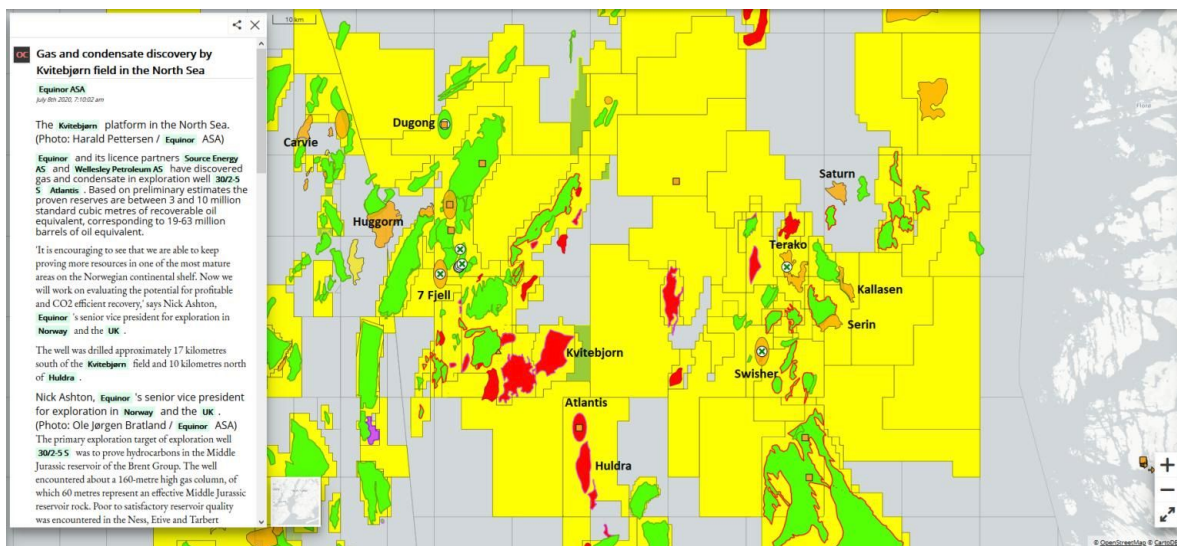
Well 30/2-5 S was drilled using the West Hercules to a total depth of 4359m, encountering a 160m high gas column, of which 60m represent an effective Middle Jurassic reservoir.

Based on preliminary estimates the proven reserves are between 3 and 10 million standard cubic meters of recoverable oil equivalent, corresponding to 19-63 million barrels of oil equivalent.

With the well plugged and abandoned, the West Hercules has moved on to drill the Swisher prospect in PL248 C [Equinor](#) (Operator - 35.0%), [Wellesley Petroleum](#) (25.0%), [Petoro](#) (40.0%). The well was spud on July 13th and is currently drilling.

Mist

There was less success for Equinor in the Barents Sea however where well 7219/9-3 was drilled to test the Mist prospect. Despite good quality reservoir in both the primary and secondary targets, the well was dry.



Norway - Recent discoveries and prospects to yet to be drilled (Orange)

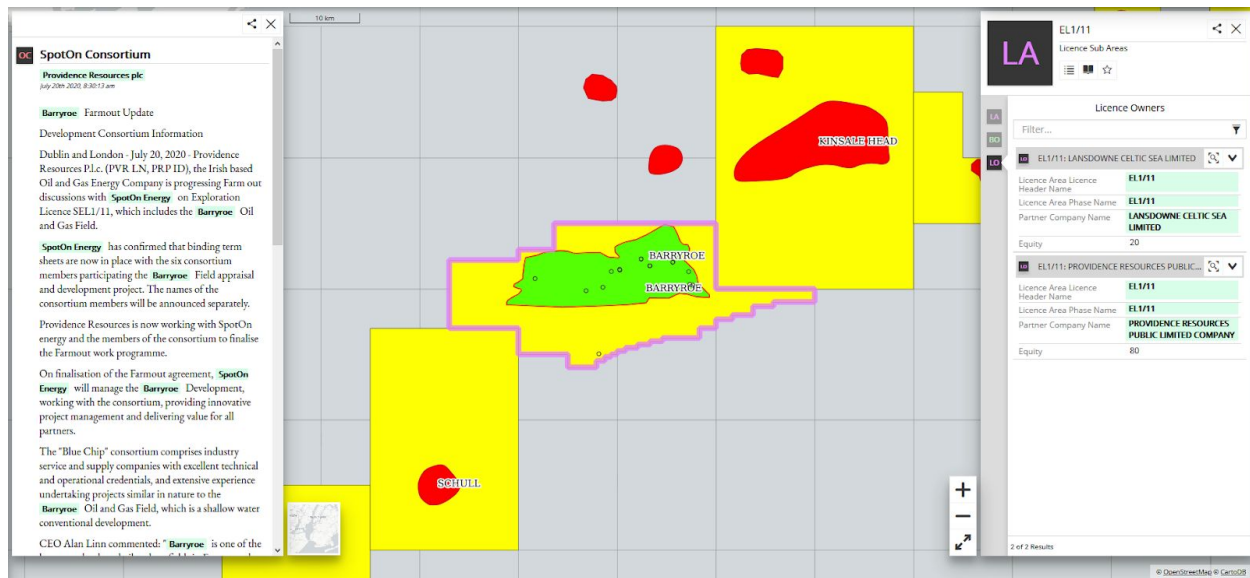
Ireland

Could we finally see the development of the Barryroe field, offshore Ireland?

[Providence Resources PLC](#) is close to finalising a farmout agreement with SpotOn Energy for Exploration Licence 1/11, containing one of the largest undeveloped fields in Europe, Barryroe.

EL 1/11 is located in the North Celtic Sea Basin, ~50 km off the south coast of Ireland and is adjacent to the giant Petronas-operated Kinsale Head Gas Field. Through its wholly owned subsidiary Exola DAC, the Providence currently holds an 80% working interest in and is operator of EL 1/11 with Lansdowne Oil and Gas holding a 20% WI.

On completion of the deal, SpotOn Energy will manage the Barryroe Development on behalf of a 6 company 'blue chip' consortium. These were revealed on 31st July as Schlumberger, Aker Solutions, AGR, Maersk Drilling, Keppel FELS and Aibel.



Barryroe Oil and Gas Field, located in EL1/11 and proximal to the giant Kinsale Head gas field

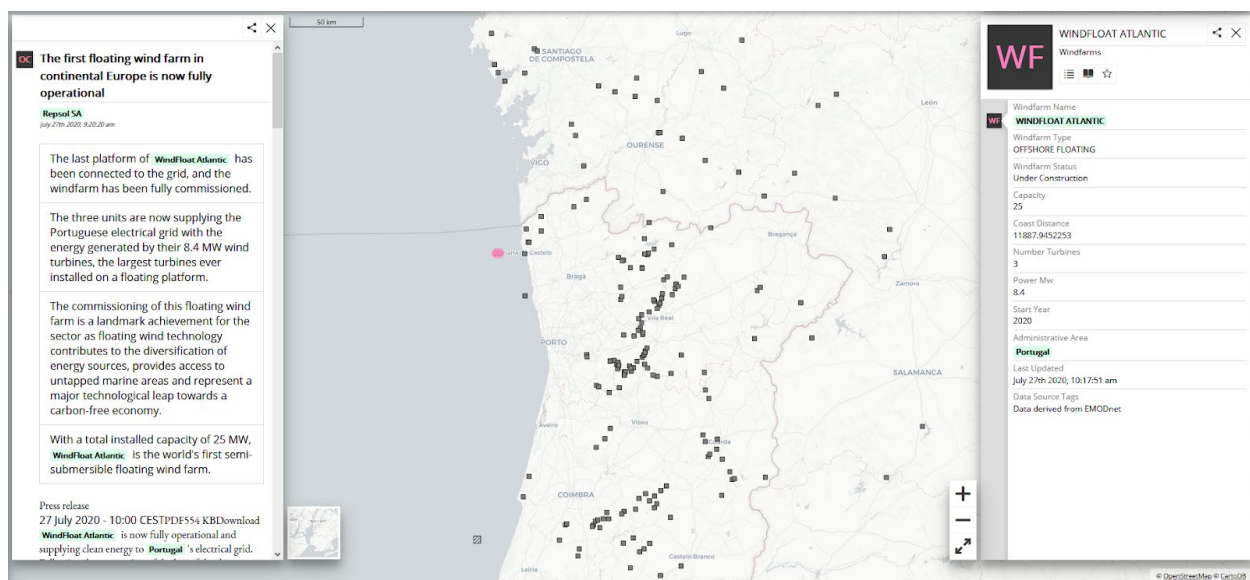
UK

Union Jack Oil has had approval from the Oil and Gas authority for its acquisition of a further 3% in PEDL253 from Montrose Industries Limited. The licence, operated by Egdon Resources contains the Biscathorpe prospect. UJO now hold a 30% interest alongside operator Egdon Resources UK (35.8%), Humber Oil and Gas (15%) and Montrose Industries (19.2%).

[UK Oil & Gas Investments plc](#) has recently secured a 2-year planning extension to further test the Broadford Bridge oil discovery. The planning extension expiry date is 31st March 2022. New methods/technology are expected to occur during this extension period to achieve higher sustainable oil rates and commercial viability from the naturally fractured Kimmeridge. UKOG holds a 100% interest in PEDL234 which is operated by wholly-owned subsidiary [KIMMERIDGE OIL & GAS LIMITED](#) and contains the Broadford Bridge oil discovery.

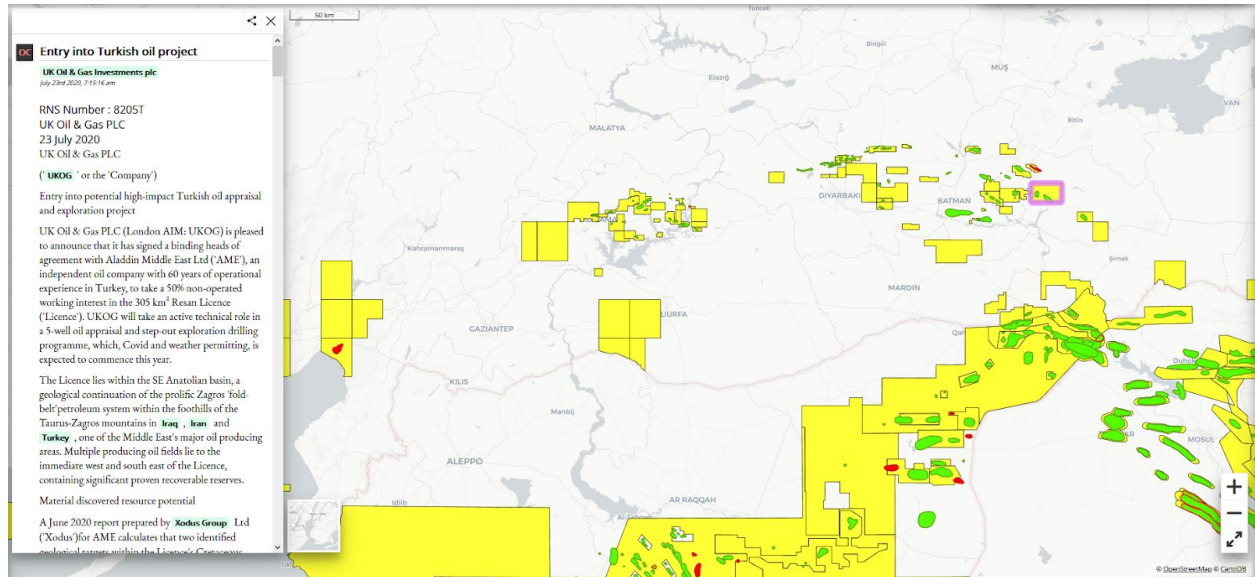
Portugal

WindFloat Atlantic is now fully operational and supplying clean energy to Portugal's electrical grid. Following the connection of the last of the three platforms to the 20 km export cable connecting the wind farm to the substation at Viana do Castelo, Portugal, the construction of the wind farm is now complete. WindFloat Atlantic, which has a total installed capacity of 25 MW, is the world's first semi-submersible floating wind farm, and it will generate enough energy to supply the equivalent of 60,000 users per year, saving almost 1.1 million tons of CO₂.



Turkey

[UK Oil & Gas Investments plc](#) has added an exploration licence in Turkey to its portfolio after announcing that it had signed a binding heads of agreement with Aladdin Middle East Ltd to take a 50% non-operated working interest in Resan exploration licence. UKOG will take an active technical role in a 5-well oil appraisal and step-out exploration drilling programme which is expected to commence this year.



Resnan Licence - Highlighted in purple

Africa

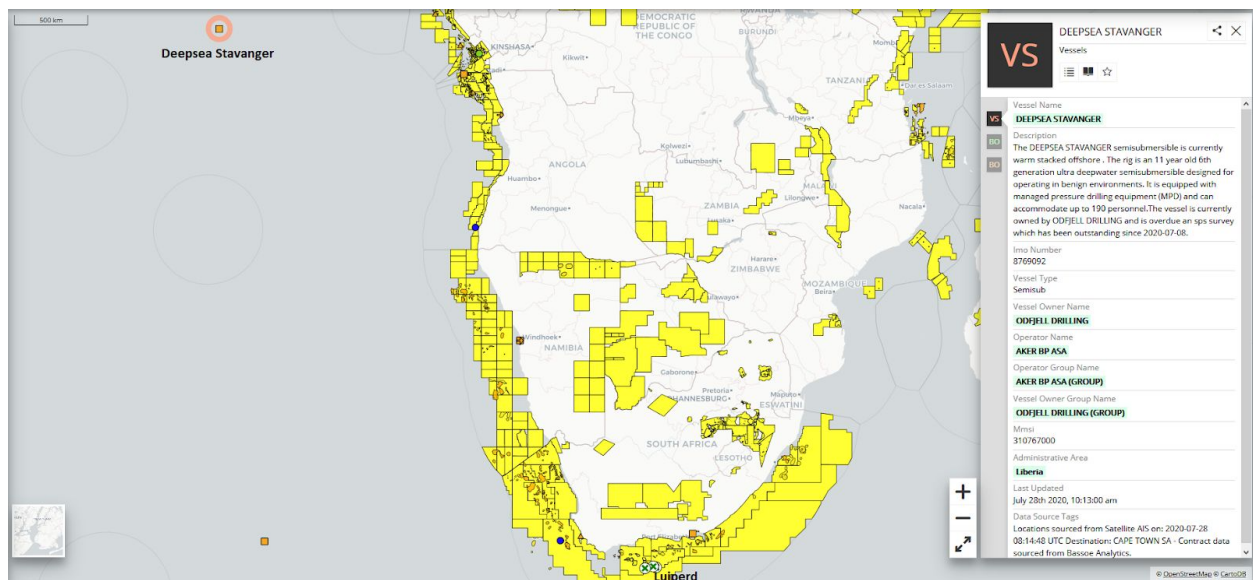
South Africa

The Deepsea Stavanger started its mobilisation from Norway to South Africa this month, for [Total](#)'s exploration programme on Block 11B/12B.

The first follow-up well to Total's 2019 Brulpadda discovery, Luiperd-1 is targeting ~500 MMboe of mean prospective resource and is set to cost partners Total (45%), Qatar Petroleum (25%) and CNRL (20%) ~\$150 MM.

Total's first attempt to drill Brulpadda in 2014 was cut short due to difficulties experienced with the strong Agulhas current. For the second attempt, an anchor-handler tug had to be used to help keep the rig in position.

The Stavanger was recently overhauled in dry dock and given a new paint job on its pontoons, reducing friction in strong currents.



Deepsea Stavanger (top right) is currently being mobilised to drill the Luiperd Well (bottom left)

Senegal

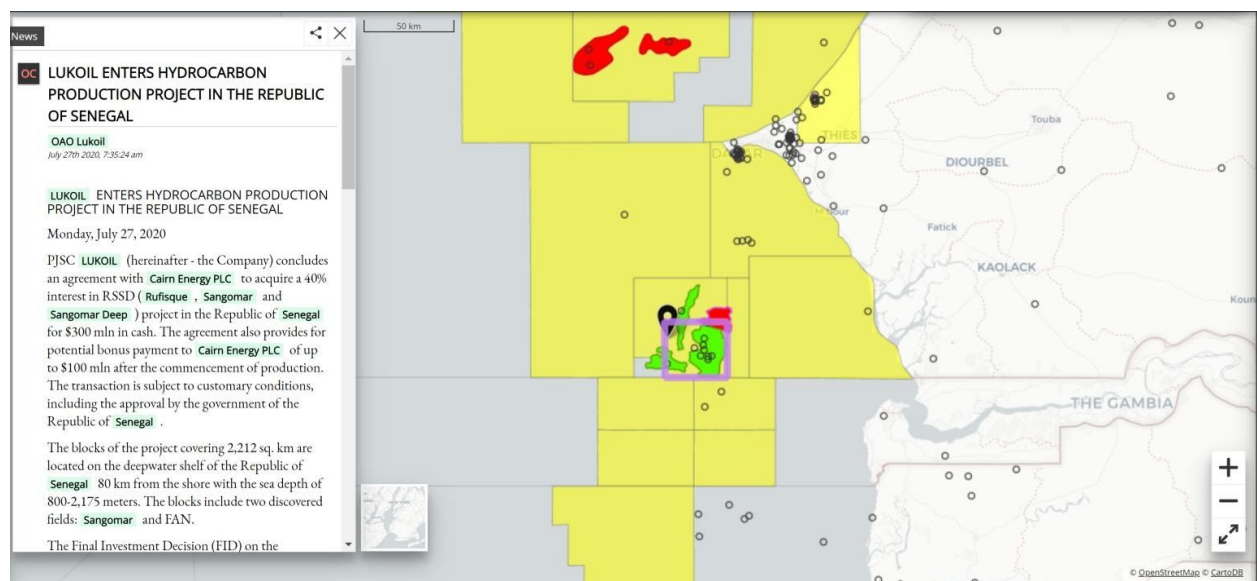
[Cairn Energy PLC](#) has entered into an agreement to sell its entire 40% interest in the Senegalese Sangomar project to [LUKOIL](#) for \$300m.

Cairn could also receive a bonus of up to \$100m, subject to commencement of production. The deal awaits government and partner approval.

FID for Phase 1 of the project was taken in January 2020 and is set to cost the partners \$1.1bn for the first 231 MMbbl's.

[FAR LTD](#) who are also on the licence with a 15% interest, stated earlier in the year that it would struggle to finance its portion of the development costs (\$163 million) and are still seeking to farmout its share in the project.

The deal represents a strategic decision by Cairn to reduce its exposure to significant capex outflow over the next four years, maintaining a strong balance sheet should commodity price fluctuations persist.



Sangomar Project - Offshore Senegal

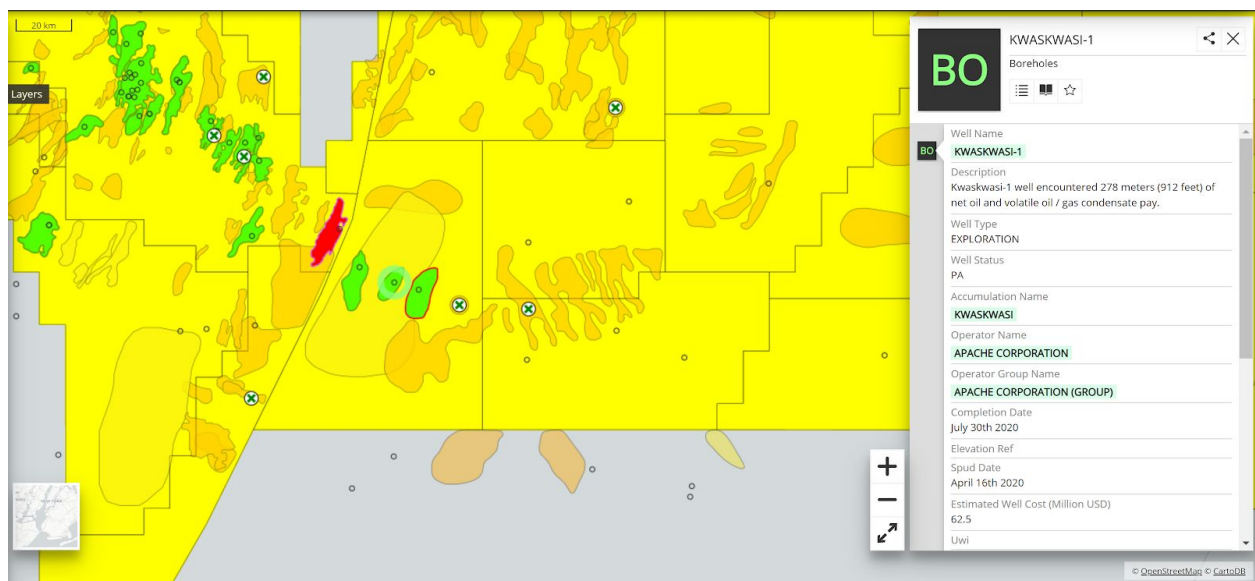
Latin America

Suriname

[Apache Corporation](#) maintained its winning streak in Suriname's Block 58 with their third consecutive discovery, Kwaskwasi.

The well encountered at least 278 metres of net oil and volatile oil/gas condensate pay over two intervals and is slated as the biggest on the block so far.

The partners will now be moving the rig to their fourth well, Keskesi. After which they then hope to move on to an appraisal drilling programme in 2021, operated by TOTAL.



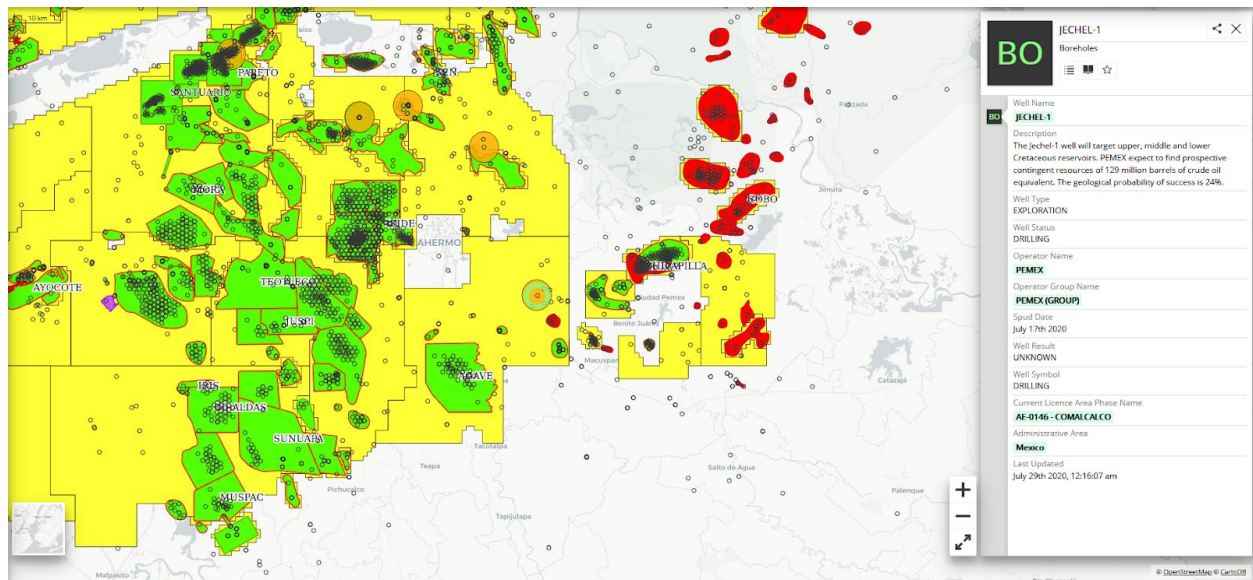
Mexico

The Comisión Nacional de Hidrocarburos (CNH) approved three onshore exploration wells in July, all to be drilled by PEMEX. These were Jechel-1 (AE-0146 - Comalcalco) , Tuplico-3001 (AE-0140 - Comalcalco) and Tepaxtli-1 (AE-0125 - Llave).

The Jechel-1 well was spud on 17th July and will target upper, middle and lower Cretaceous reservoirs. PEMEX expects to find prospective contingent resources of 129 million barrels of crude oil equivalent. The geological probability of success is 24%.

Tuplico-3001 was spud on 23rd July and will target a Kimmeridgian reservoir. Contingent prospective resources of 53 million barrels of crude oil equivalent with a geological success of 39%.

Tepaxtli-1 was spud on 27th July and will target a mid-Cretaceous aged reservoir. Contingent prospective resources of 129 million barrels of equivalent crude oil with a probability of geological success of 27%.



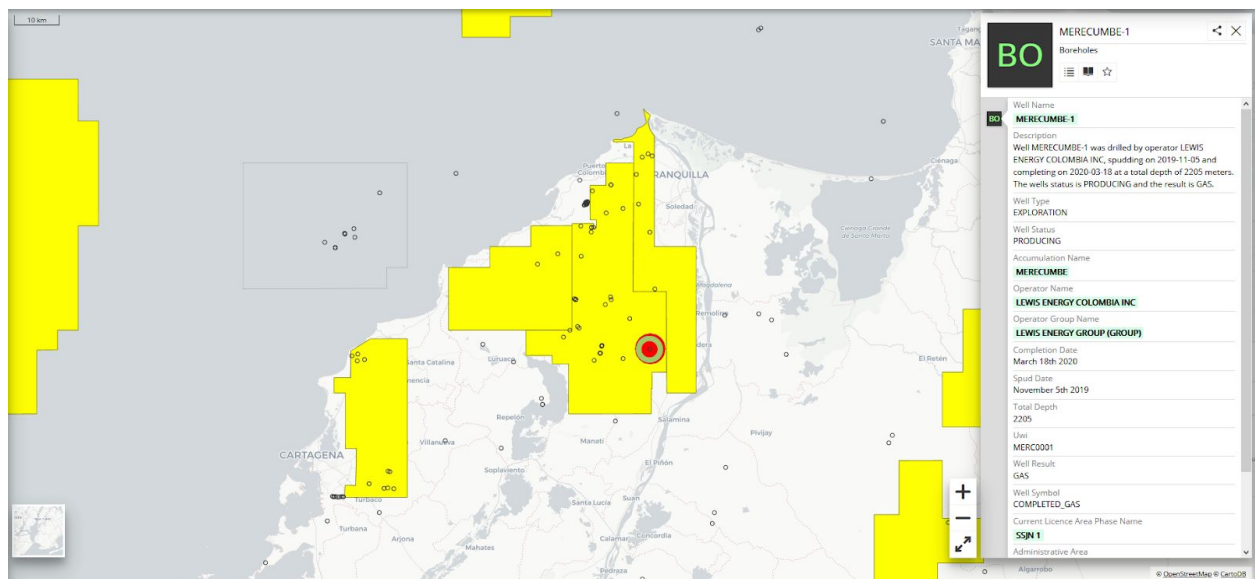
Jechel-1 well - Currently drilling the Jechel Prospect (129mmboe), drilling expected to complete 13/11/2020

Colombia

On 16 July 2020, [Hocol](#) announced a gas discovery for the Merecumbé-1 Exploration Well, in the SSNJ-1 area, onshore Colombia. The well was spud on 5 November 2019, targeting Eocene carbonates of the Chengue Formation, and tested during Q1 2020.

This new discovery confirms the potential of the Sinú San Jacinto folded belt, one of the focus areas of Hocol SA's exploratory strategy, where it seeks to increase gas reserves and strengthen exploration in Colombia.

Block SSNJ-1 exploration licence is split between [Lewis Energy Group](#) (operator +50%) and [Hocol](#) (50%).



Merecumbe exploration well and gas discovery

Acquisitions and Mergers

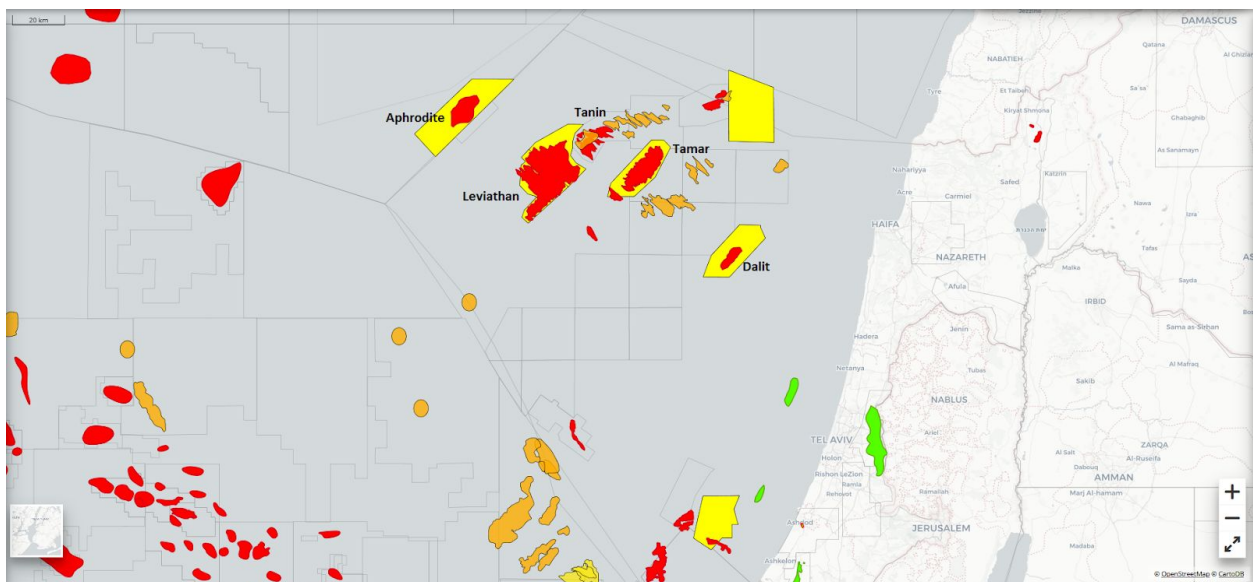
Chevron - Acquisition of Noble Energy

Chevron has completed the first major deal of 2020 with a \$5 billion all-stock acquisition for Noble Energy.

The deal provides Chevron with low-cost, proven reserves and attractive undeveloped resources, whilst further diversifying its global footprint and increasing the companies exposure to gas.

This includes low-capital, cash-generating assets offshore Israel (including the giant Leviathan and Tamar gas fields) alongside a strong position in Equatorial Guinea. Noble also enhances Chevron's leading U.S. unconventional position with de-risked acreage in the DJ Basin and 92,000 largely contiguous and adjacent acres in the Permian Basin.

Will this set the benchmark and trigger more deals across the industry?



Noble Assets - Offshore Israel including the giant Leviathan and Tamar fields

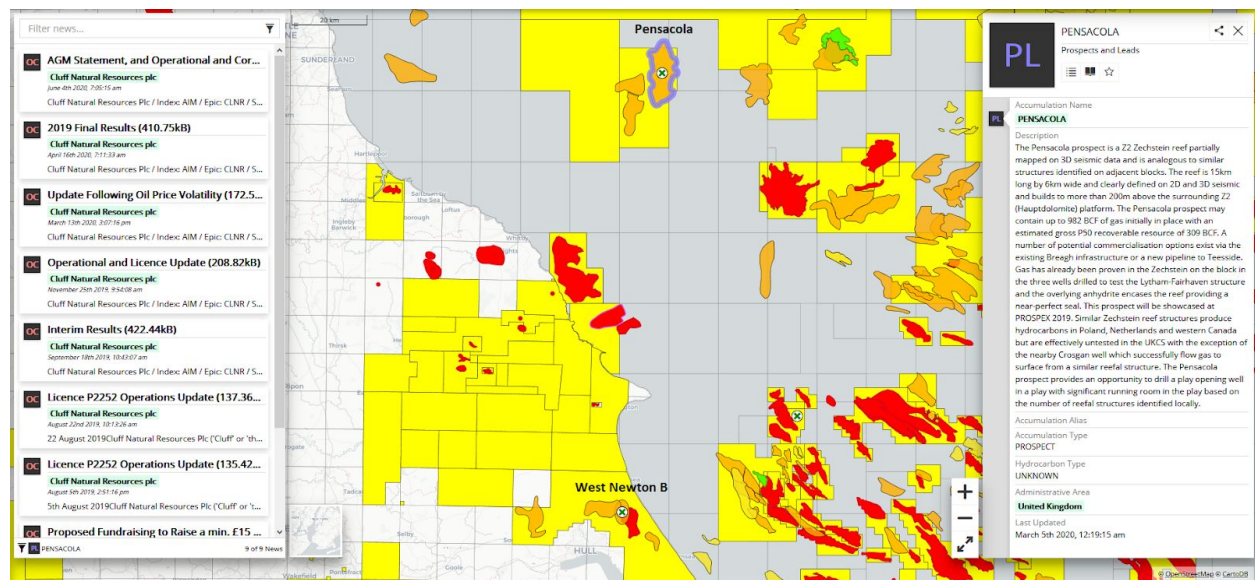
Reabold Resources offer for Deltic Energy

Reabold Resources has proposed an all-share offer for Deltic Energy (Formerly Cluff Natural Resources), which at the time of the offer valued the company at approximately £12.3mIn / 0.87p per share.

This was swiftly rejected by Deltic who stated that the offer does not even reflect its existing cash balance £13.2mIn and said it also had concerns over Reabold's portfolio, particularly the West Newton project.

Deltic has had recent success following the farm-in by Shell at two of its Southern North Sea licenses, P2437 and P2252. The latter (P2252) contains the Pensacola prospect, estimated to hold 50mmboe.

Reabold must now either make a firm offer for Deltic or make clear it does not intend to do so by 12th August.



Pensacola (Shell/Deltic Energy) and West Newton B (Reabold (Rathlin)/Humber Oil and Gas/UJO) Prospects

Predator Oil & Gas offer for FRAM

The proposed acquisition of Columbus Energy by Bahamas Petroleum Company continues to progress with both Bahamas and Columbus shareholders approving the deal at their respective court and general meetings.

Predator Oil and Gas Holdings added some complexity into the mix however with a \$1.75mIn cash offer for the outstanding share capital of FRAM exploration on the 14th July, valid for 5 days. That deadline has expired as Columbus, the parent company of FRAM, is in the middle of the proposed BPC deal as mentioned above, preventing the sale of any material asset. Predator will now wait for the merger between BPC and Columbus to complete before seeking to complete the deal.

Senegal 2020 oil and gas licence round. What to expect from the areas on offer?

Chronosurveys has developed a comprehensive regional prospectivity report and GIS project for the MSGBC Basin. This includes an overview of the political and economic situation of each country, exploration and production history and in-depth analysis of the petroleum systems. Here is our summarized view on the 2020 Senegal licence round.

Exploration and production history

Senegal has attracted the attention of oil and gas companies since the 1950's. The initial work was done onshore and shallow offshore by the Société Africaine des Pétroles and Société des Pétroles du Senegal (later to become Petrosen) that drilled nearly 40 wells onshore. These were concentrated in the Dakar peninsula and N'Diass anticline (East of Dakar) mostly with disappointing results, but led to the discovery of the small oil and gas accumulation of Diam Niadio in 1961, followed by several appraisal and development wells. The Diam Niadio gas field started production in 1977 and has produced 7.6 Bcf of gas and 62k bbl of light oil, until it was shut-in during 2000.

COPETAO (later Total) shot the first seismic surveys offshore the Casamance region and drilled several wells (Casamance Marine 1 to 8) in 1966 and 1967 resulting in the discovery of the Dome Flore accumulation – ca. 1B bbl of heavy oil in place, in Oligocene unconsolidated carbonates. Shell, in their onshore block Tamna (Northeast of Dakar), drilled the Gadiaga-1 well in 1966, a gas discovery, only appraised in the 1990's by Petrosen. Fortesa International brought the field on stream in 2002. The field has produced ca. 12 BCF of gas and is now in the decline phase.

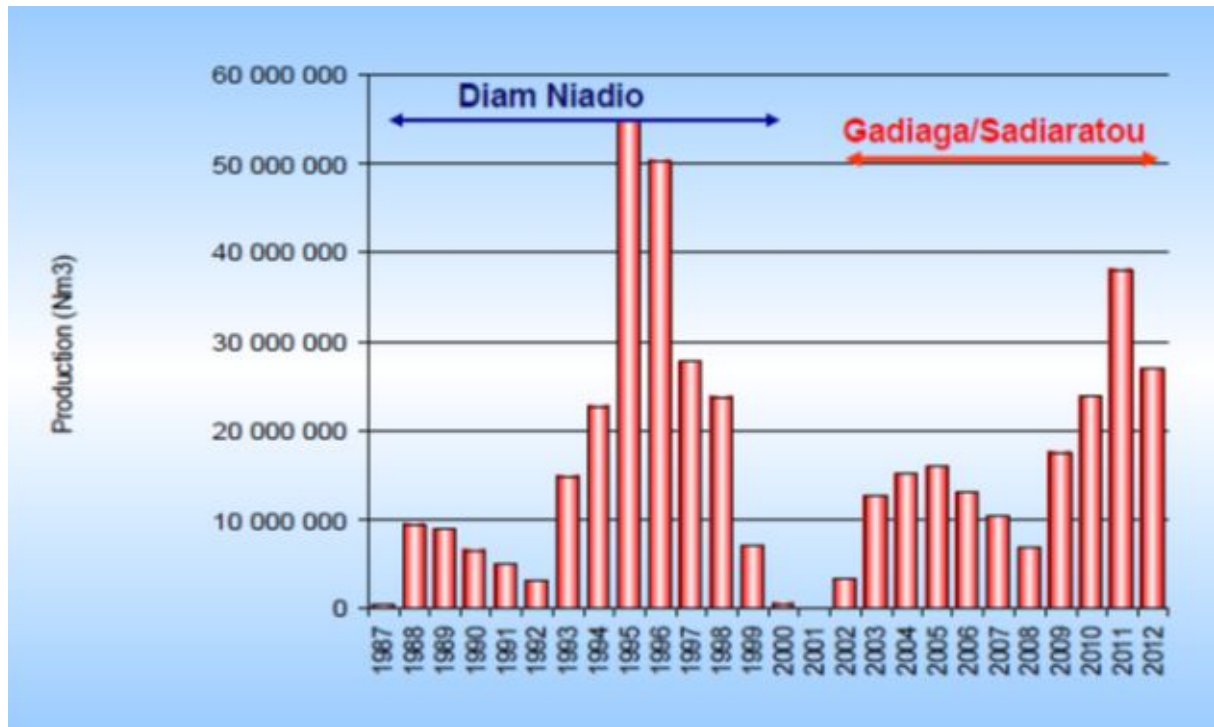


Figure 1- Production from onshore Senegal gas and oil fields. Adapted from Petrosen.

The 2010's brought a renewed interest of several small to mid-sized companies to Senegal and other areas of the MSGBC Basin. Cairn Energy drilled the FAN-1 and SNE-1 exploration wells during 2014 in their Sangomar deep block, both resulting in oil discoveries. SNE discovery was a play opener for the basin, with untested exploration potential to the North (into Mauritania) and South (into Guinea-Bissau). 7 appraisal wells were successfully drilled and current 2C contingent resources are estimated at 563 mmbbls. FID was made in January 2020 and first oil is expected in 2023. The field was renamed as Sangomar and Woodside Petroleum Ltd that had farmed-in (35%) will be the development phase operator.

With existing and newly shot 3D surveys Kosmos Energy made a massive gas discovery in Mauritania during 2014 with wells Tortue-1 (Ahmeyim-1) and Aymeyin-2. Soon after Kosmos Energy drilled the southern part of the same accumulation in the Saint Louis Profond block in Senegal during 2015, (Geumbeul-1) confirming the gas discovery. BP farmed-in after the discovery in late 2018. The discovery is now in the development stage.

Further exploration wells by Kosmos Energy in Cayar offshore Profond block during 2016, testing the same play led to the discovery of the Teranga field (5 Tcf in place), Marsouin field (5 Tcf in place) and Yakaar field (15 Tcf in place). All these discoveries correspond to late Cenomanian-Albian turbidite reservoirs located in subtle anticlines.

Geological setting

The MSGBC basin ranges from southernmost Western Sahara to Guinea-Conakry, along the Atlantic margin, both onshore and offshore. The basin has a similar configuration to other Mesozoic North Atlantic basins, with a non-metamorphosed Palaeozoic basement overlain by Triassic-Lower Jurassic syn-rift clastics with salt in some stretches of the basin; post-rift carbonate-dominated Jurassic and lower Cretaceous sedimentary pile and latest lower Cretaceous to Maastrichtian siliciclastic sediments. The Paleogene was dominated by vast carbonate platforms and the Neogene by siliciclastic sediments in the north and carbonate platforms in the south.

Source Rocks

Despite the several discoveries and historical production, the source rocks in the MSGBC Basin remain elusive. The Cenomanian-Turonian – C-T is the usual suspect, but frequently the geochemical analyses point to a different one or the assumed source-rock is likely immature in that area.

In the MSGBC Basin the Cenomanian interval is, in many wells, composed of a relatively thick shale package, often with high TOC values. Older intervals, notably Aptian and Albian have been penetrated in many wells, but source rock intervals are either absent or very thin. The Valanginian anoxic event which has been described in the Tethyan realm may have been recorded in DSDP-367 well in a poorly dated interval (Valanginian to Early Aptian) containing black shales with TOC values above 2%. Jurassic source rocks may be present, but remain unproven.


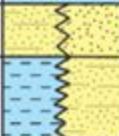




Stratigraphy			Thickness (meters)	Lithology	Description	
Cenozoic	Tertiary	Miocene	300		Limestone -claystone-sandstone	
		Oligocene	150			
		Eocene	300		Limestone-marls, shales*	
		Paleocene	200			
Mesozoic	Cretaceous	Upper	Maastrichtian	600		Sandstone
			Senonian	900		Shale/sandstone
			Turonian	150		Bituminous shales*
			Cenomanian	600		Shales/sandy shales*
		Lower	Albian	650		Shales/siltstone/sandstone
			Aptian	1,100		Limestone/shales/sandstone
			Neocomian	500		Limestone/siltstone/sandstone
			Jurassic	2,000		Limestone/shales/evaporites
	Triassic	2,000		Anhydrite		
				Massive salt		
				Clastics and lacustrine shales?*		
Paleozoic	Devonian	300		Bafata Shale		
		150		Cussetina Sandstone		
	Silurian	400	Buba Shale*			
	Ordovician	1,400		Gabu Sandstone		
				Calum Sandstone		
				Cantari Shale		
				Pirada Shale		
Precambrian undifferentiated				Metamorphic rocks		

Figure 2 - Summarized lithostratigraphic column of the MSGBC Basin in the Senegal area. Adapted from Brownfield and Charpentier (2003).

Reservoirs

Most of the discoveries and targeted intervals have been siliciclastic reservoirs. A notable exception to this trend is the Oligocene foraminiferite reservoir of the Dome Gea and Dome Flore discoveries.

Three main reservoirs have been targeted and account for most of the accumulated oil and gas in the basin: Miocene (mostly turbidites); Maastrichtian and Albian (both shelfal clastics and deep-water turbidites).

Typical reported porosities are between 20 and 30% for Albian reservoirs, and slightly higher for Maastrichtian and Miocene reservoirs, depending on the burial depths. The types of carbonate reservoirs vary greatly and include foraminiferites (Dome Gea and Dome Flore heavy oil discoveries), oozes and porcelanites (DSDP wells), and consolidated shelfal limestones (e.g. CM wells)

The Senegal 2020 licensing round

The Senegal government has placed 12 blocks on its 2020 licensing round. Several of them are newly drawn, notably the ultra-deep offshore blocks.

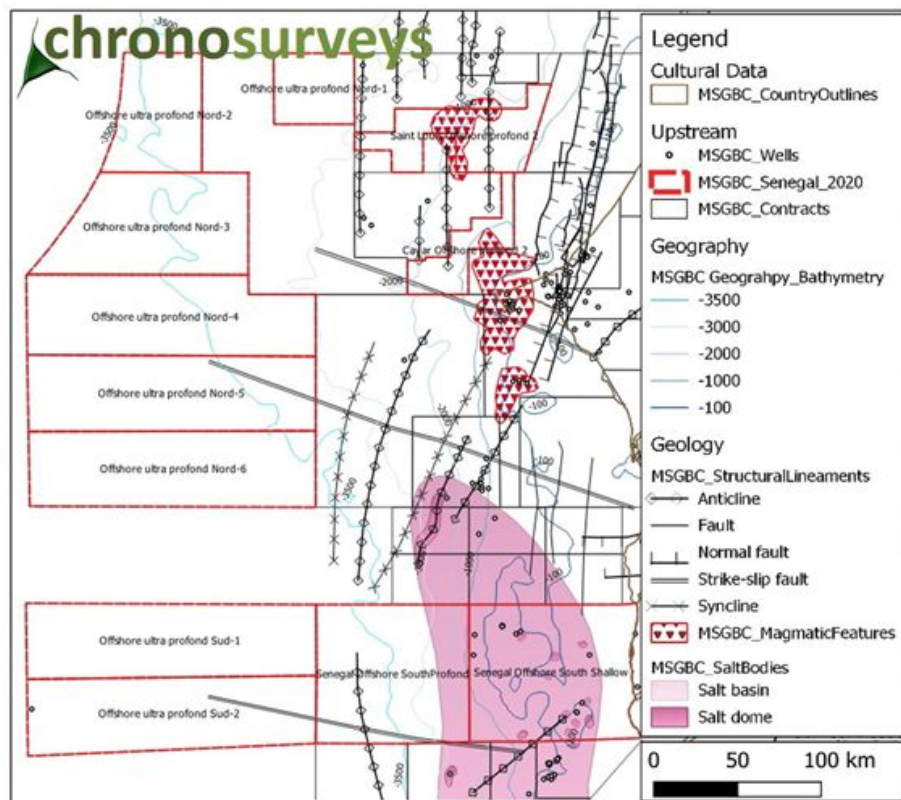


Figure 3 – Senegal offshore blocks offered in the 2020 licensing round and main geographical and geological features. From Chronosurveys' regional project.

Eight of the blocks are in ultra-deep waters, beyond 3000 m or even 3500 m water depths (Offshore Ultra profond Nord and Sud blocks- OUP). With the exception of the OUP Nord-1 and eastern part of the OUP Nord-4, 5 and 6 which have 3D coverage, all the OUP blocks are covered by sparse, yet recent, 2D lines, acquired by TGS. Possible traps include Tortue-like structures and stratigraphic traps such as turbiditic lobes, fans and channels.

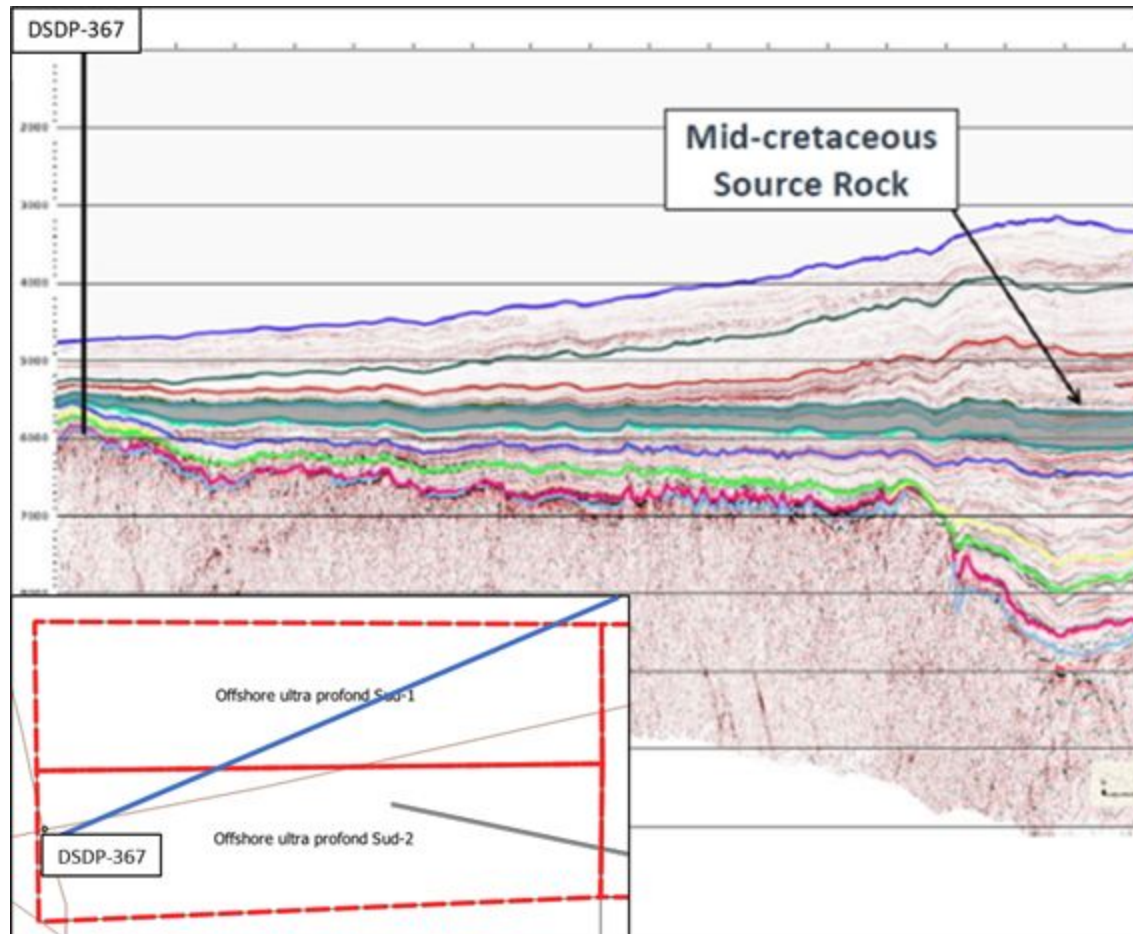


Figure 4 – Seismic section over the OUP Sud-1 and 2. Adapted from Hathon (2018) and Chronosurveys' regional project.

Two other blocks are relinquished areas from previously existing blocks (Cayar offshore profond – COP and Saint Louis offshore profond 2 - SLOP 2). These are located between 1000 and 2000 m water depths. Expected hydrocarbon plays are likely restricted to Tortue-like ones. Two significant Oligocene to recent magmatic bodies cover the subsurface of these blocks – the Cayar dome and the Dakar volcanic complex, which likely impacted the petroleum systems of the area. The two blocks are covered by recent multiclient 2D seismic data and partially by 3D data.

The remaining blocks correspond to licenses where the previous operator was unilaterally removed (Senegal Offshore South Profond – SOSF and Senegal Offshore South Shallow – SOSS blocks). In the SOSS block, the geology is similar to what is observed further North, with SNE-like structures, although the Albian interval is expected to be carbonate-dominated, opposed to deltaic sediments further North and South. Several salt diapirs are known which may constitute further exploration targets. The block is covered by multiclient 2D seismic surveys and the western part by recent 3D data.

The Senegal Offshore South Profond is beyond 1000 m water depths and the westernmost part over 3500m water depths. The eastern part is characterized by a deeply cutting Senonian unconformity, forming SNE analogues, where the reservoirs are older and likely carbonate-dominated (lower Cretaceous and even Jurassic). The Wolverine/Gainde prospect in the AGC area to be drilled later 2020 is a close analogue of these structures.

Cretaceous source rocks are expected to be present oceanward and the burial depth likely to allow generation and migration to more proximal areas, again analogous to the SNE and FAN discoveries. The block is covered by 2D and 3D multiclient seismic data.

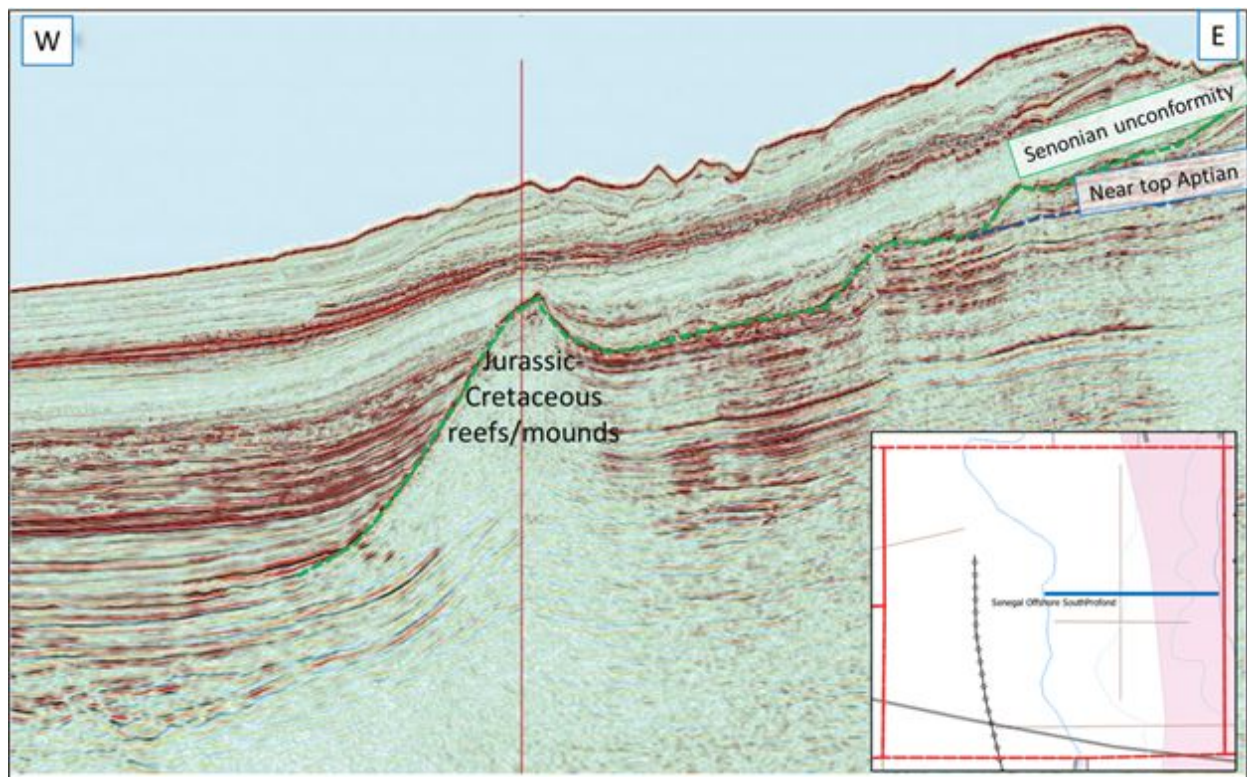


Figure 7 – W-E seismic line over the SOSF block showing the Senonian unconformity and the possible traps formed. Adapted from Hand and Jackson (2015) and Chronosurveys' regional project.

Senegal has attracted the attention of majors and supermajors, which will certainly have their say in the upcoming bid round. Nevertheless, opportunities for other companies are available, especially if they are comfortable with high-risk and technological challenging areas.

Gill Machdo - [Chronosurveys](#)

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