

Mature Basins of West Africa: Still where future production growth lies?

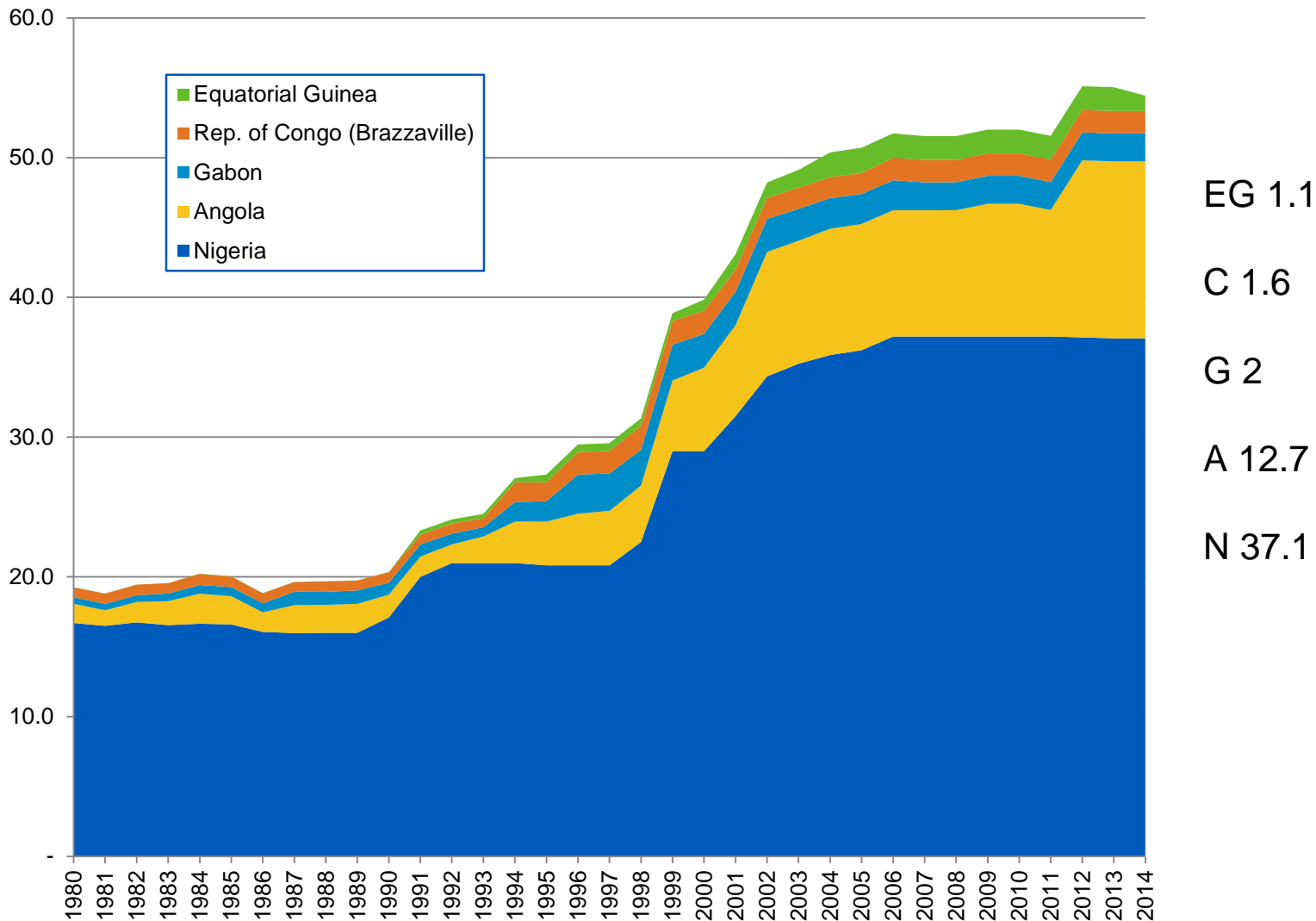
APPEX Global 2016
Wednesday 2nd March 2016

Jeremy Berry

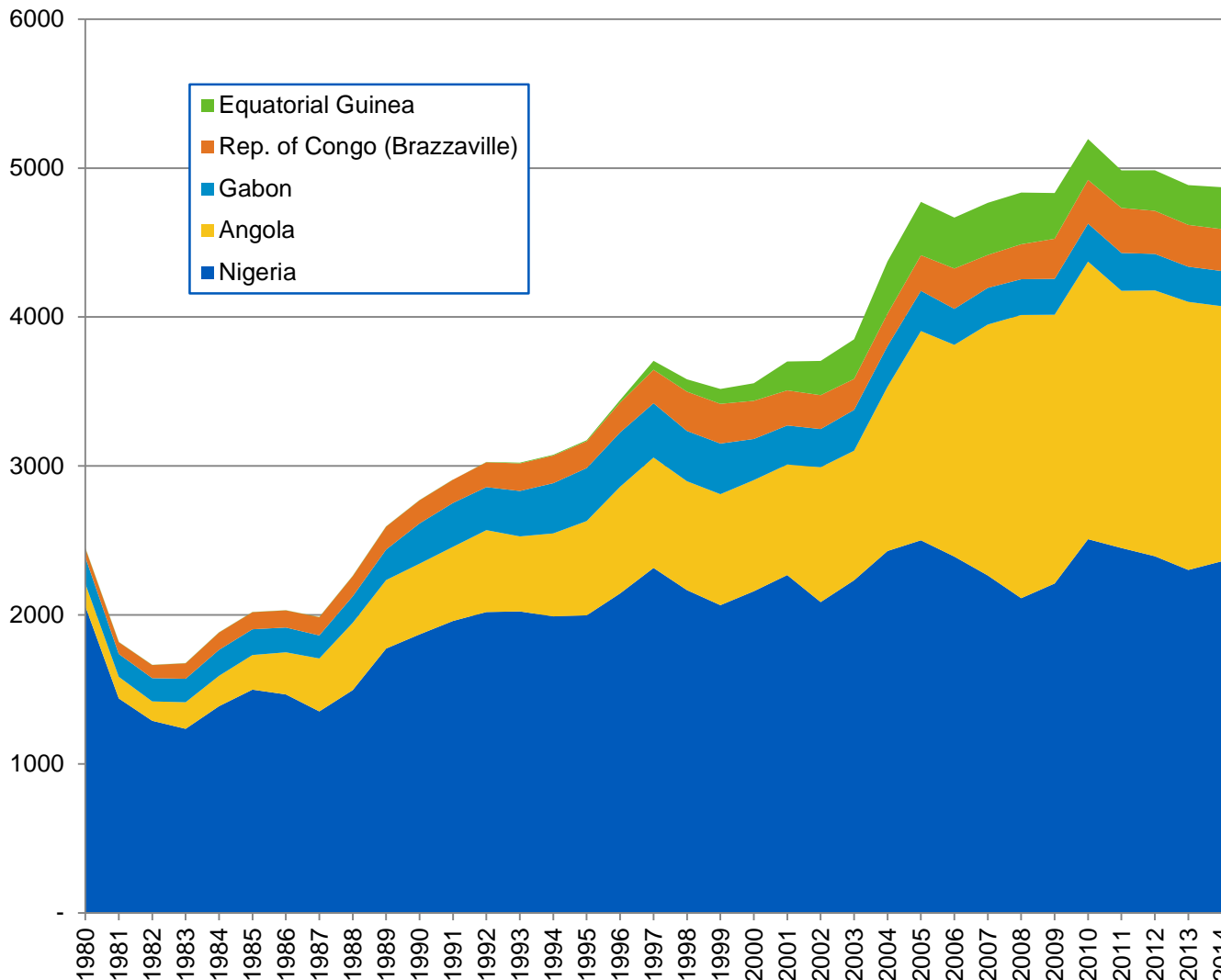
Disclaimer Statement

This presentation has been prepared exclusively for discussion purposes. The materials presented should not be understood as GCA forecasts or predictions oil and gas prices or future industry conditions and they should not be understood as a specific recommendation in respect of any particular decision or course of action.

Proved Reserves (Billion Bbl)



Daily Production (Bopd)



EG 281,000

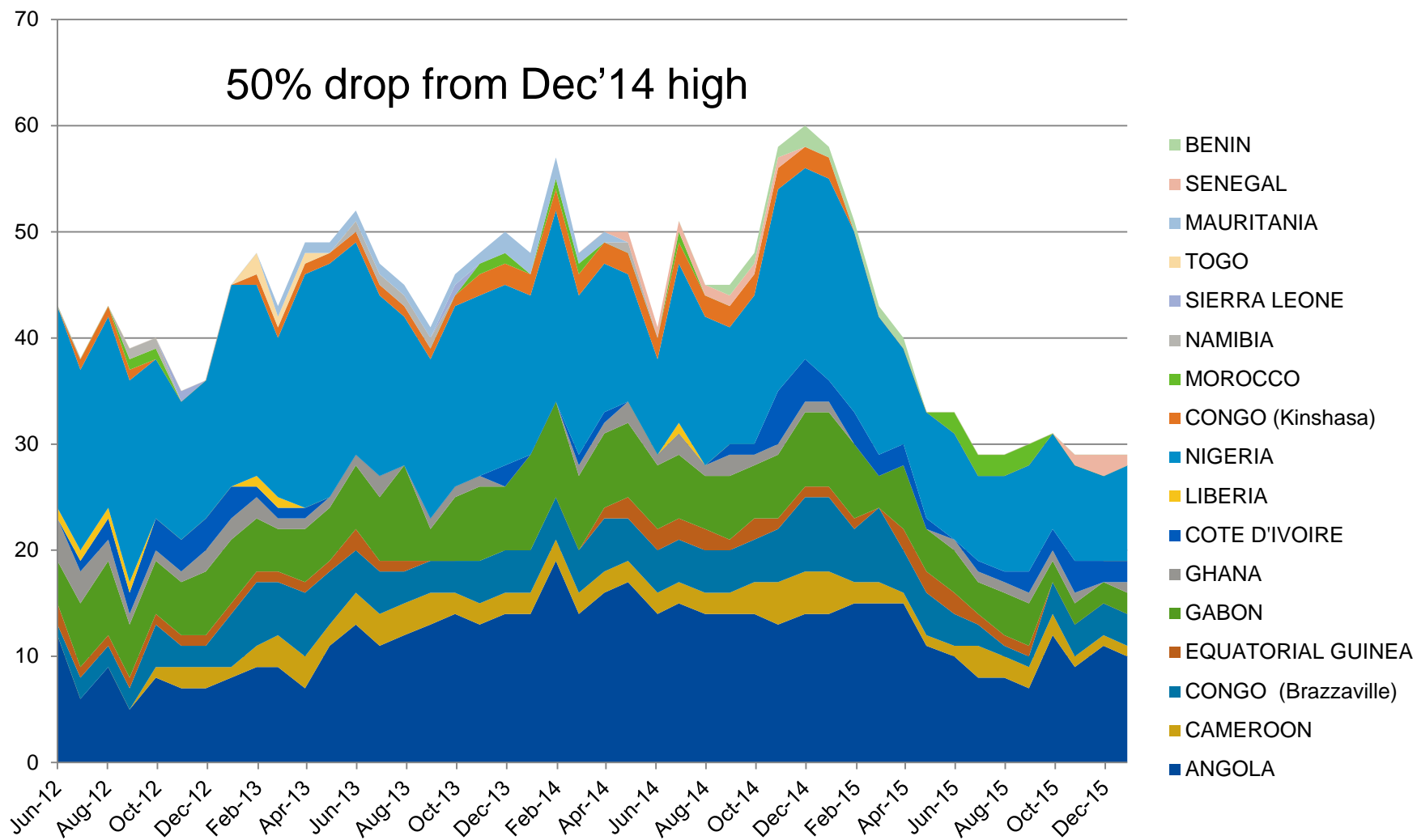
C 281,000

G 236,000

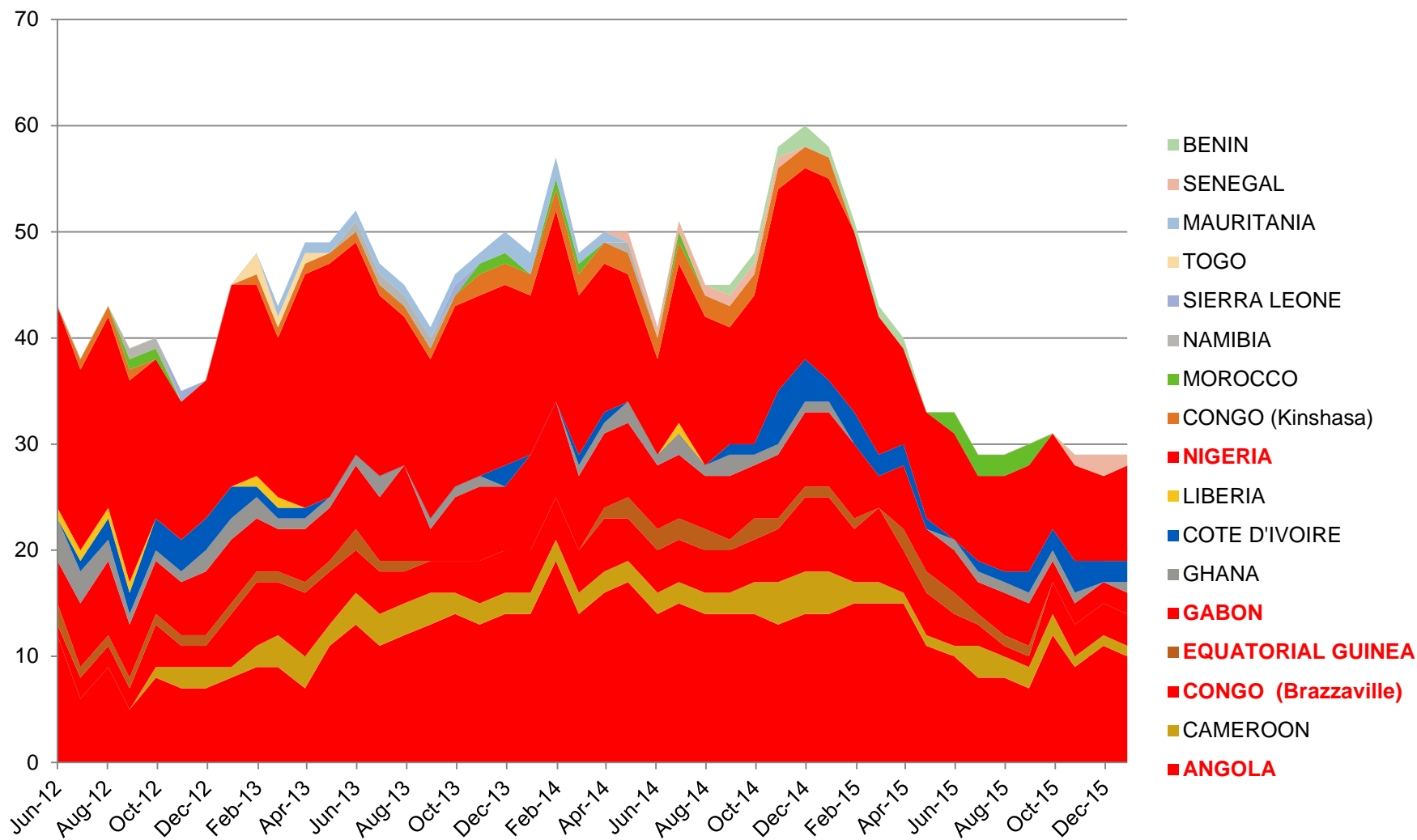
A 1,712,000

N 2,361,000

West Africa Rig Count



West Africa Rig Count

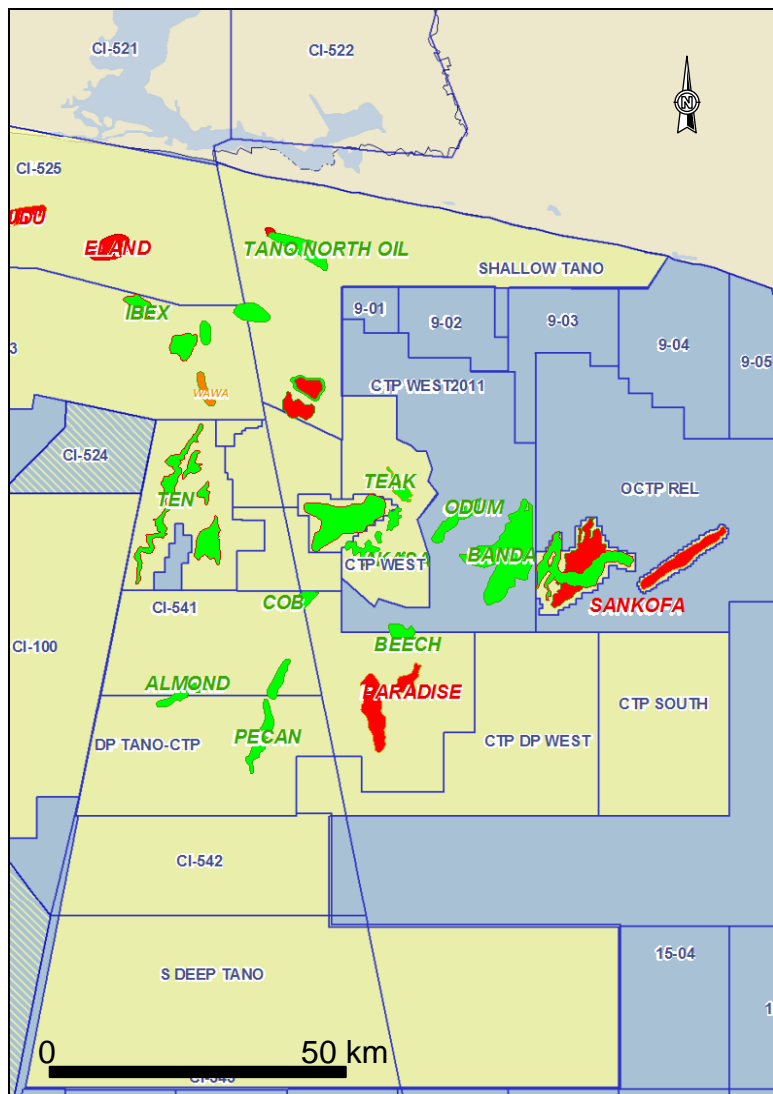


Mature basins flooded in red

Emerging Basins Discoveries and Developments

Ghana

Ghana



Jubilee Field (Tullow):
+370 MMBO reserves. 1st oil 2010.
2016 production 101,000 bopd

GJFFD: Mahogany, Teak. Revised dev plan submitted Dec 15 to maintain Jubilee production.

TEN (Tullow): 240 MMBO + 60 MMBOE gas reserves. Peak prod 100,000 bopd. 1st oil Jul/Aug 2016

Sankofa –Gye Nyame (Eni): 500 MMBO in place. Dev started 2015, 1st oil expected 2017. 80,000 bopd by 2019.

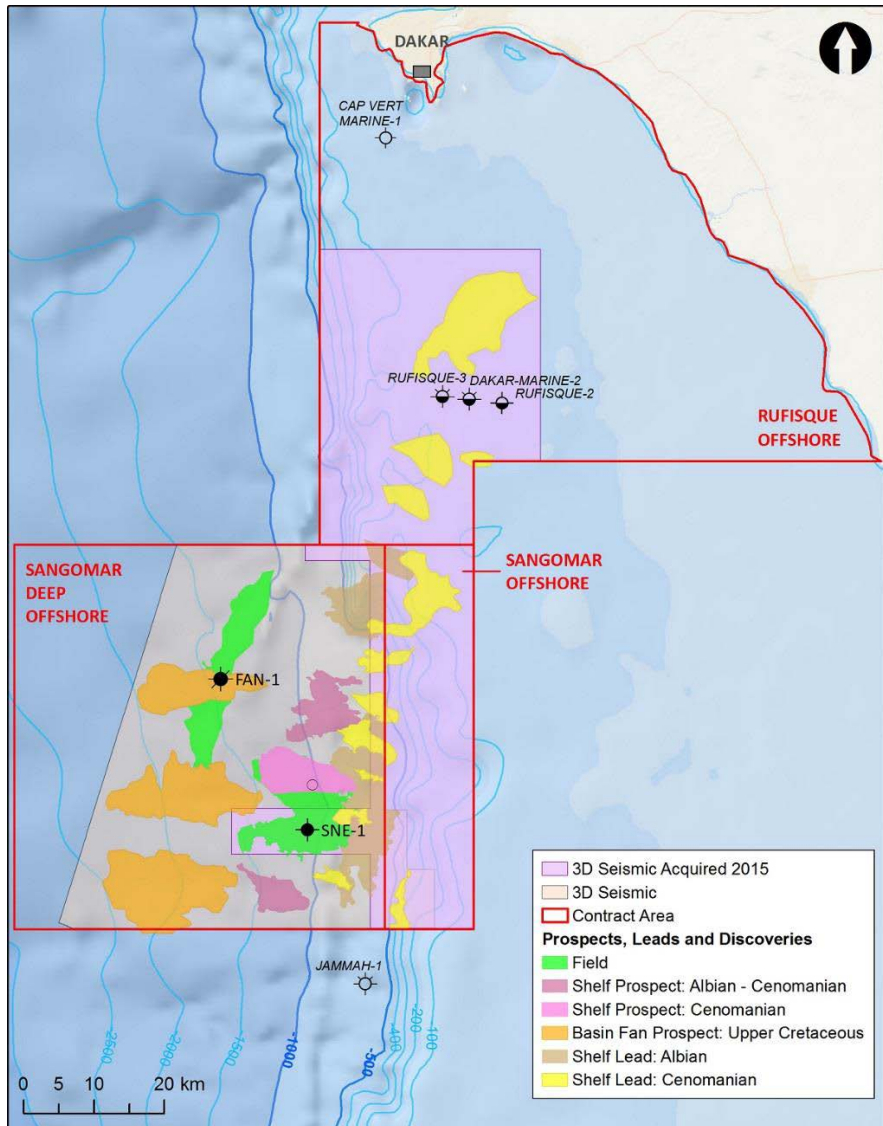
Pecan, Beech, Hickory, Almond, Cob (Hess): awaiting appraisal.

Odum, Banda: Awaiting licencing.

Emerging Basins Discoveries and Developments

Senegal

Senegal – Sangomar Deep Offshore



Cairn (40%)

- SNE-1 Discovery
- Currently 2C resources of 330 MMBO (FAR Feb16: 468 MMBO).
- Appraisal underway, SNE-2 successful.
- FID 2019-2021
- 1st oil 2021-23;
- 50-100,000 bopd.
- Preliminary estimates for 330 MMBO development ~\$1 Bn.

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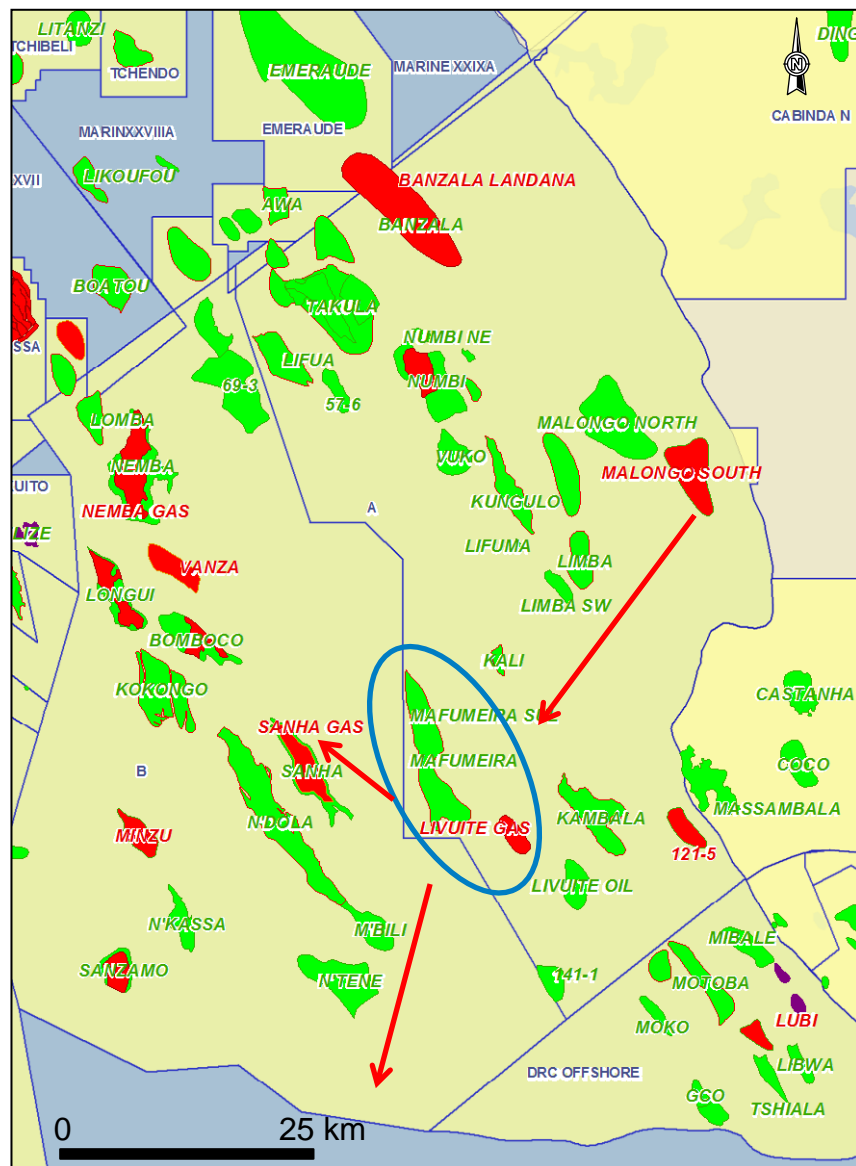


- St Louis Offshore Deep
- Tortue-1 (Ahmeyim) - Mauritania
- Guembeul-1 (Feb16) – Senegal
- 2C resources ~15 Tcf.
- Appraisal drilling continues.

Mature Basin Discoveries and Developments

Angola

Angola – Lower Congo Basin - Prolific



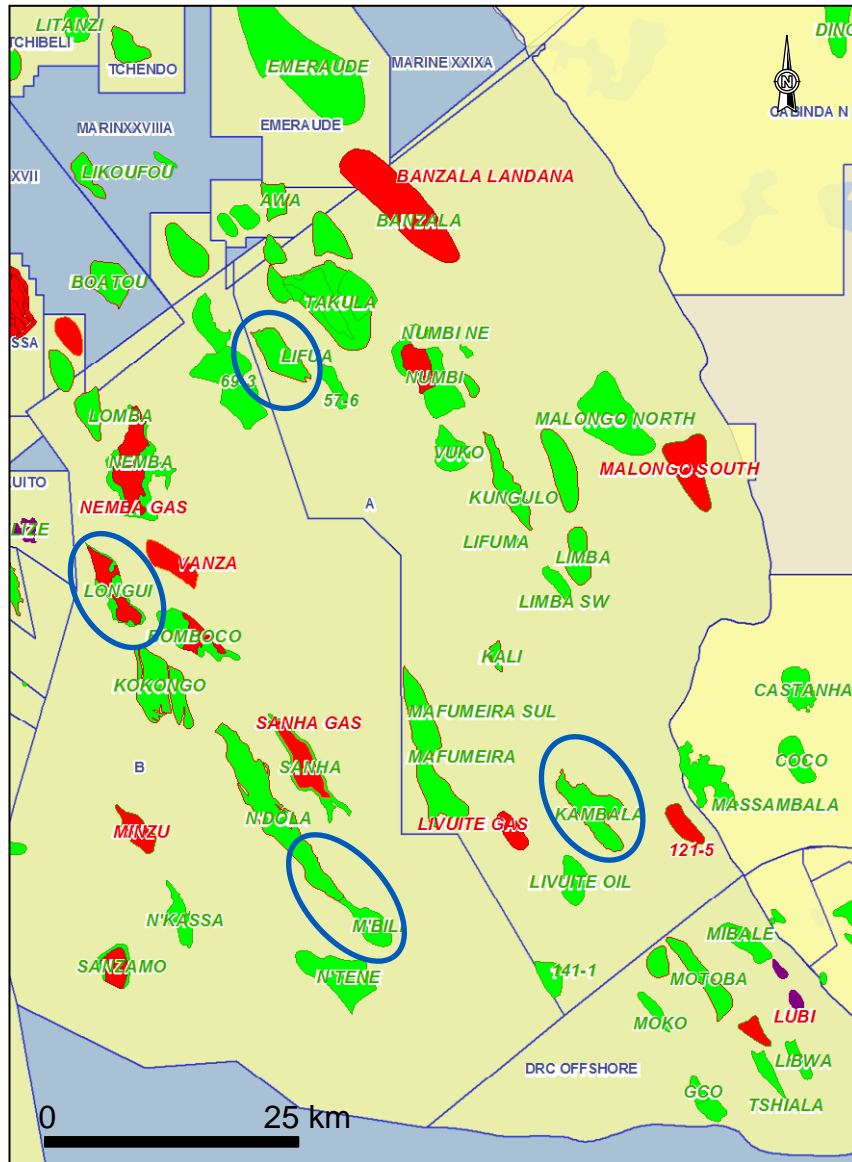
Block 0

MAFUMEIRA SUL

- Chevron operator (39.2%)
- FID Feb 2013
- Phase 2 of Mafumeira development.
- Production planned for 2016.
- 34 production wells, 16 water injection wells.
- Platform based development.
- Peak production 110,000 bopd
- **\$5.6bn investment**
- Future hub for Malongo exports
- LPG export via Sanha
- Gas export to Soyo LNG plant

▪ Source: Chevron

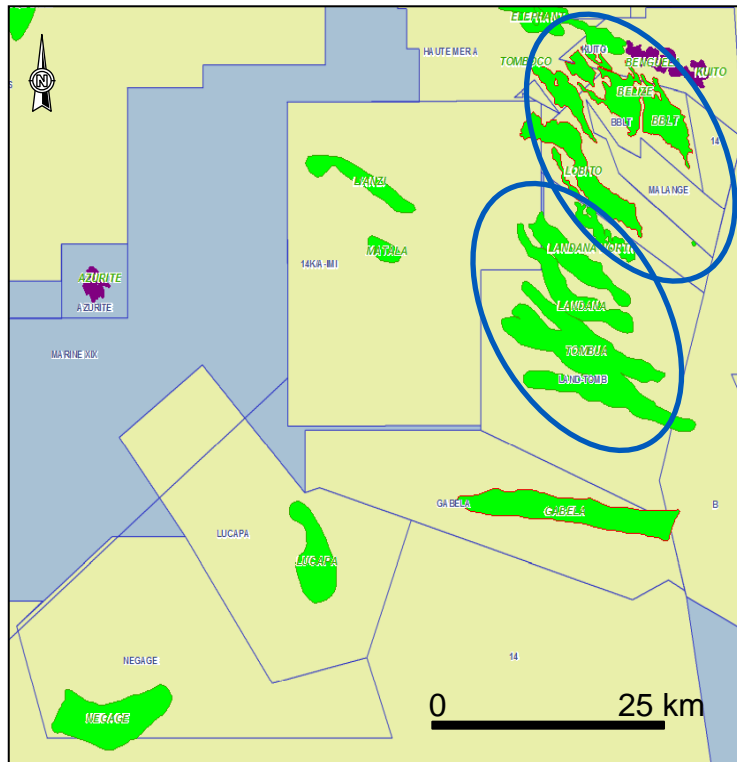
Angola – Block 0



POTENTIAL DEVELOPMENTS Already discovered

- Greater Longui
- Lifua
- Kambala
- N'Dola (southern area)

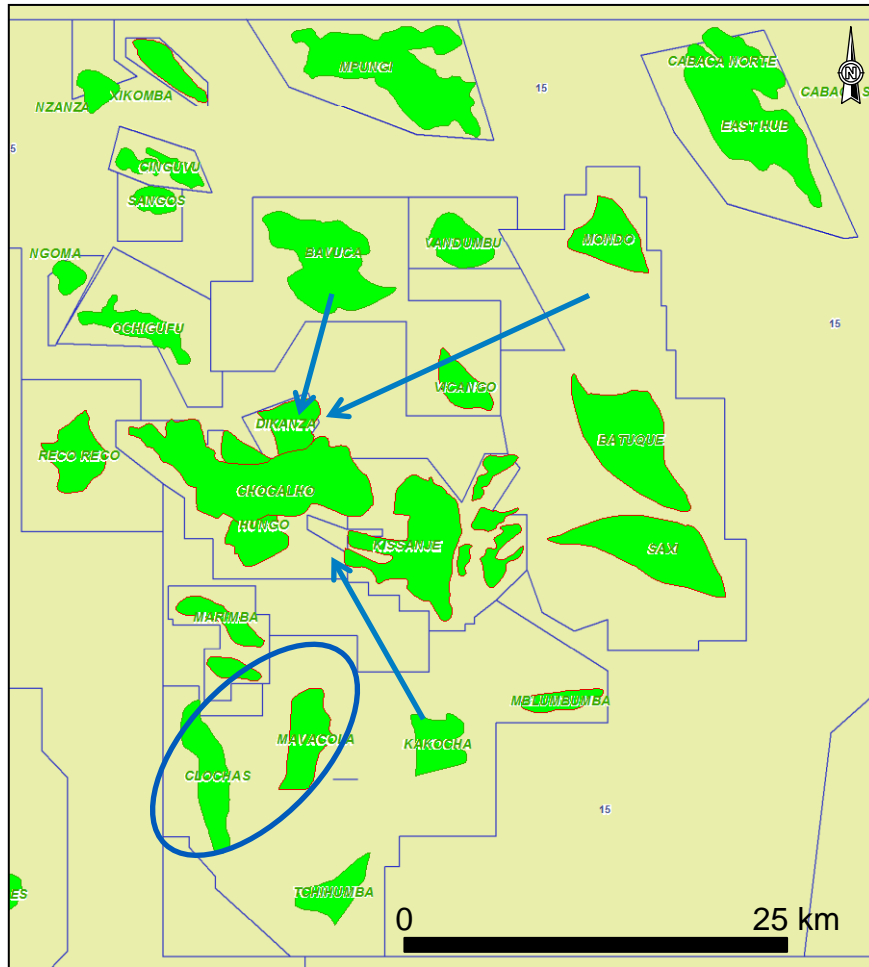
Angola – Block 14



Chevron operator (31%)

- Tombua Landana. STOIIP over 1Bbbl, EUR 350MMbbl. Production commenced Sep. 2009, peaking in 2011 at 100,000 bopd. Investment of \$3.8bn
- Lianzi (jointly with Congo) 1st production Nov. 2015, 40,000 bopd.
- Gabela – possible merge with T-L with 1st production 2018.
- Potential developments in Block 14 at Lucapa and Malange.
- Negage – multiple reservoirs, separated from other Block 14 fields by Congo Canyon. Separate development.

Angola – Block 15



ExxonMobil (40%)

“highest mineral potential of west Africa” reserves of 2,55 Billion Bbl.

Kizomba area:

Hungo/Chocalho 2004

Kissanje/Dikanza 2005

Mondo, Saxi/Batuque 2008

Phase 1 Satellites – Clochas, Mavacola 1st oil Jul '12

Phase 2 – 1st oil May '15 from Kakocho, Bavuca and Mondo South. 190 MMBO peak 70,000 bopd

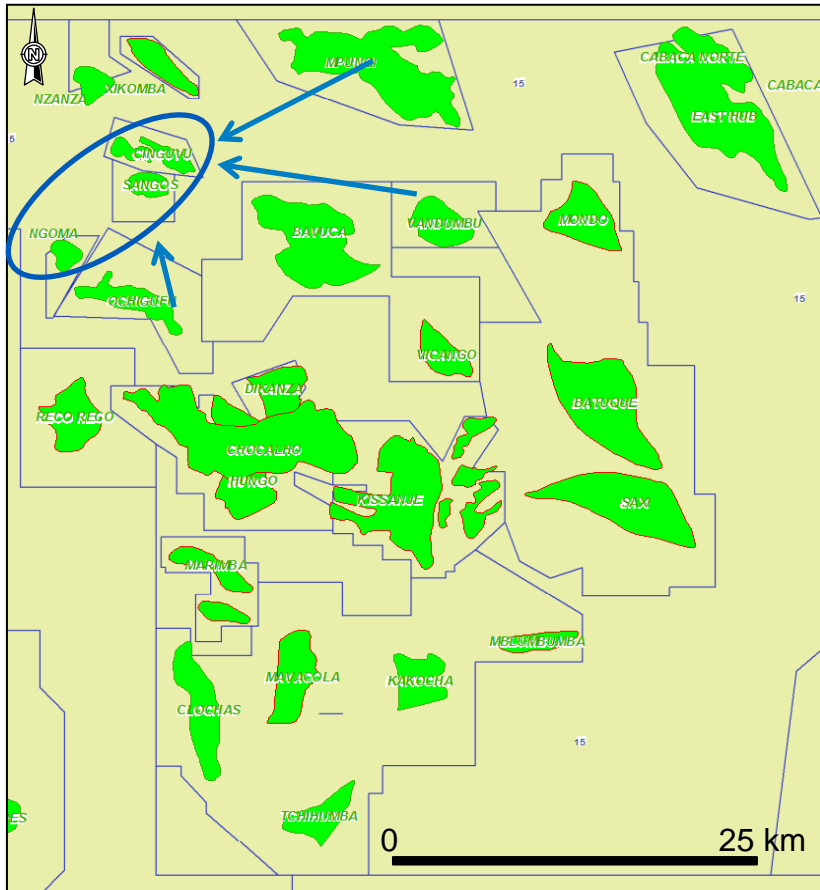
Angola – Block 15/06

Eni (35%)

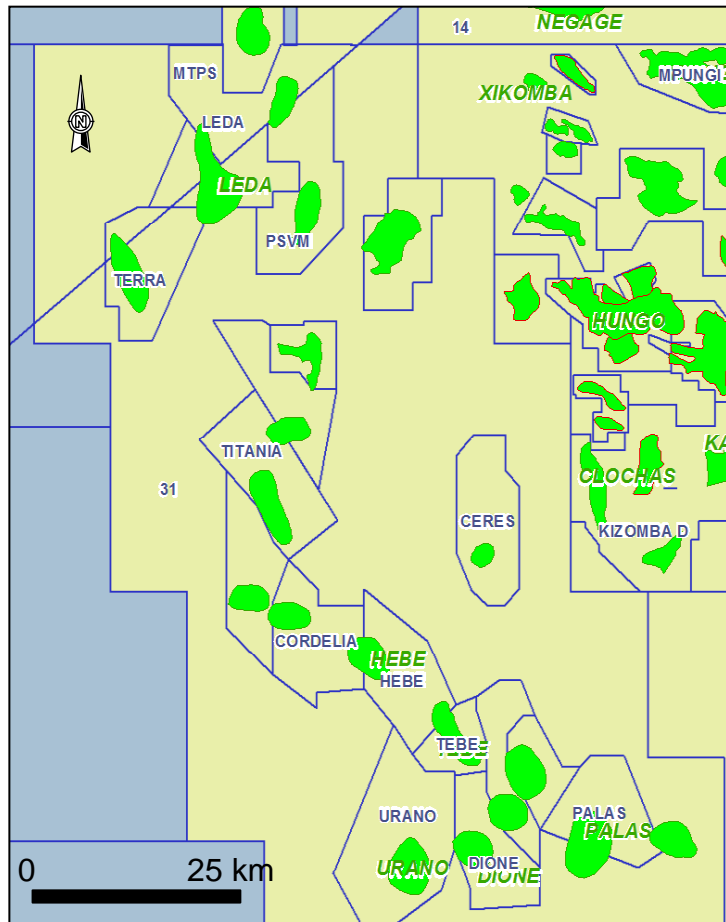
Over 3 Bbbl in place and 850 MMBO reserves discovered.

West Hub Development
Sangos (Dec14), Cinguvu
(Apr15), Ngoma (end 2015),
100,000 bopd.
Vandumbu, Mpungi and Ochigufu
later.

East Hub Development
FID Nov 2013
Cabaca Norte and Cabaca SE
Leased FPSO
230 MM reserves
Peak oil 2017 of 17,000 bopd
1st prod expected Oct16.
Later tie in of Lira



Angola – Block 31



BP operator (26.27%)

Ultradeep water

19 discoveries.

Only PSVM developed to date:

Plutao (Dec 2012), Saturno (2013), Venus (2013), Marte (2014).

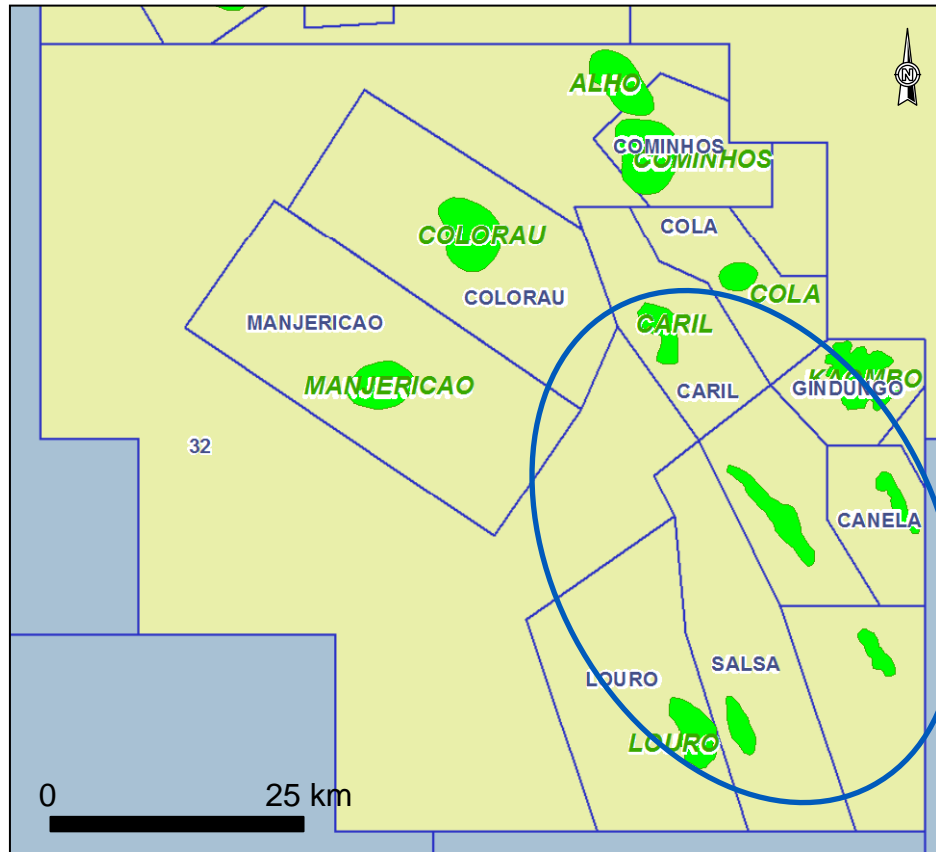
FPSO solution

150,000 bopd plateau rate.

\$14Bn development cost.

Next phase Palas, Ceres, Juno, Astraea, Hebe.

Angola – Block 32



Total operator (30%)

- Kaomba FID April 2014
- 6 of 12 discoveries
- Louro, Caril, Gengibre, Mostarda, Canela, Gindungo
- 660 MMBbl reserves
- 230,000 bopd
- 2 FPSOs
- 1st oil expected 2017
- Undeveloped discoveries: Manjericao, Colorau, Alho, Dominhos, Cola, Salsa.

Mature Basin Discoveries and Developments

Nigeria

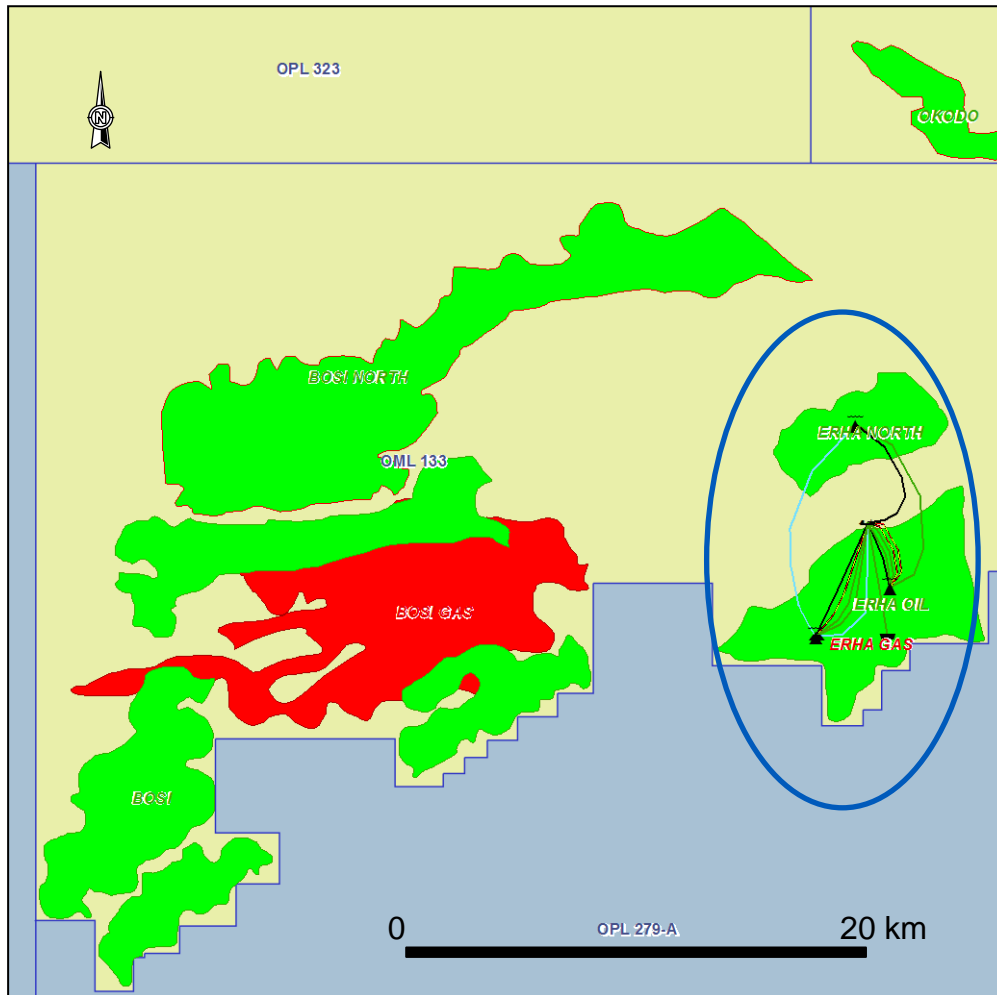
The map displays the Zafiro Complex and surrounding oil fields in the Niger Delta. Key features include:

- Oil Fields:** ENANG, INIM, ETIM NORTH, ETIM, ASASA, INUEN, USOKO, UKPEME, NKAKKA, USONG, EKANGA, SERPENTINA, ZAFIRO, and ZAFIRO COMPLEX.
- Infrastructure:** OML 067, OML 102, and OML 06.
- Scale:** 20 km.
- North Arrow:** Indicated by a compass rose.

Ofon field
350 MMBbl reserves
Initial production 1997
Ph 2 completed 2015 increasing
production to 90,000 boepd

Potential development of
Etisong, Emem, etc. as hubs:
250 MMBbl boe

Nigeria – OML 133



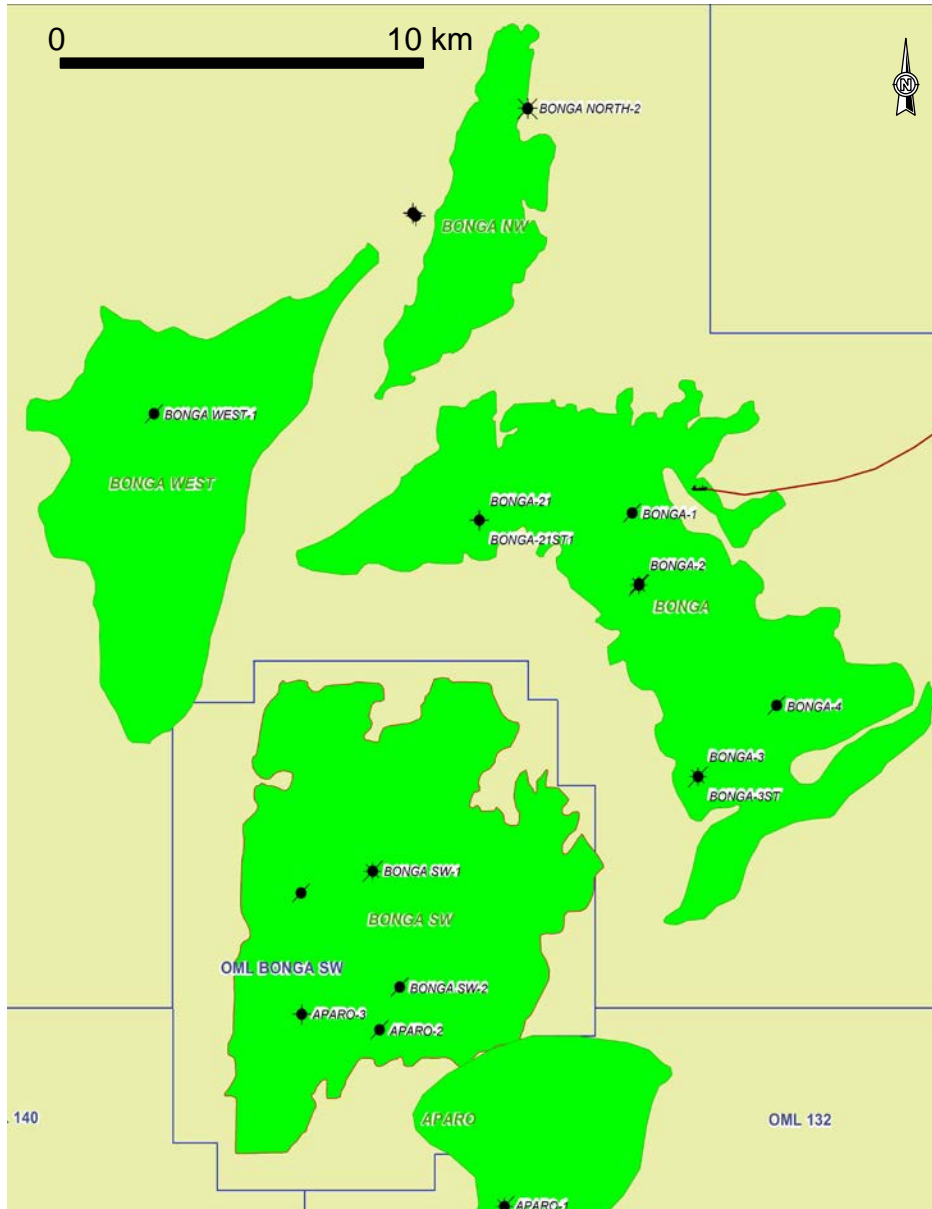
Exxon (56.25%)

Erha Field, started production 2006. \$3.5 Bn cost. 500 MMBO 140,000 bopd.

Erha North Phase II completed Sep 2015 ahead of schedule. Additional 165 MMBO developed at 65,000 bopd

Bosi still waiting to be developed. 683 MMBO 140,000 bopd.

Nigeria – OML 118 (OPL 212)



Shell (55%)

Bonga Field

Nov 2005 production start-up

600 MMBO reserves

FPSO solution

Bonga North West.

Additional 40,000 bopd.

Onstream Aug 2014.

Bonga Main Ph 3,

Oct 2015 start.

Peak production 50,000 bopd

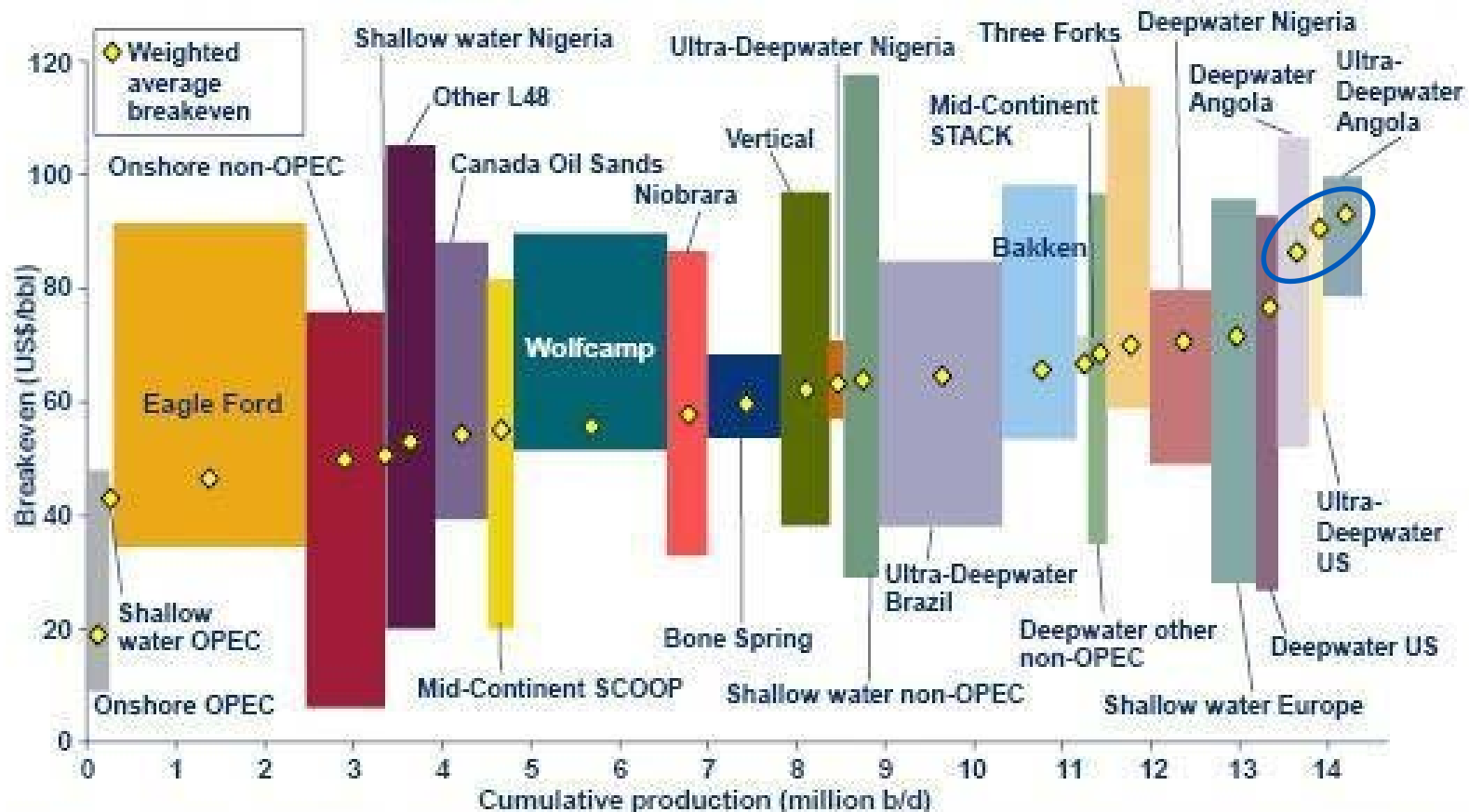
Bonga South West (BSWA).

\$12 Bn. 225,000 bopd

FID postponed

Conclusions

Pre-FID and US L48 future drilling cumulative production by breakeven in 2025 – by resource theme



Source: Wood Mackenzie, onshore breakevens at 10% discount rate, offshore at 15% discount rate, breakevens in US\$ Brent equivalent

Conclusions – West Africa Mature Basins

- Nigeria and Angola dominate the mature basins of West Africa, with many billions of barrels in place discovered but as yet undeveloped oil (and gas).
- Dominated by the majors.
- Deep and Ultradeep water amongst the most expensive environments in which to explore for and develop hydrocarbons.
- Clustered developments accessing large reserve volumes with high production rates necessary to achieve materiality for the majors
- Even before the price collapse, facing increasing internal competition for investment.
- Relatively unfriendly fiscal terms.
- Likely to be the slowest areas to recover.

Conclusions – West Africa Emerging Basins

- Dominated by independents, without the majors' materiality concerns or excessive portfolio of opportunities.
- Recent significant play opening discoveries.
- More appropriate and attractive fiscal terms.
- Development options driven by current market conditions.

But:

- Dominated by portfolio of prospects, so uncertain gross volumes.
- Will majors, and their different priorities, move into emerging basins once established?
- Governments of mature basin may be forced to improve terms to maintain production levels.



Thank you