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Commodity Insights

Driving Infrastructure Led Exploration (ILX): How to Ensure Every Drop is Recovered.

Angola Oil and Gas 2024

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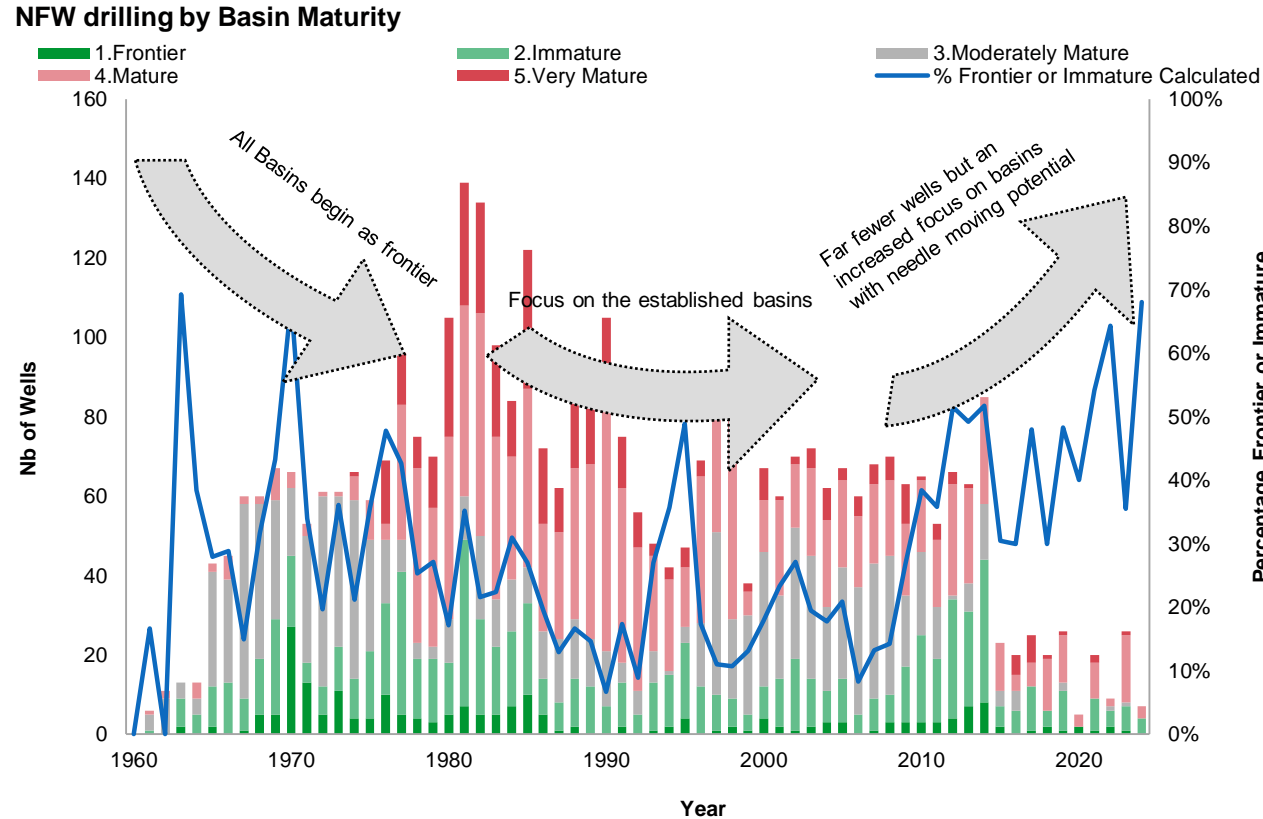
October 2024

Driving Infrastructure Led Exploration (ILX): How to Ensure Every Drop is Recovered.

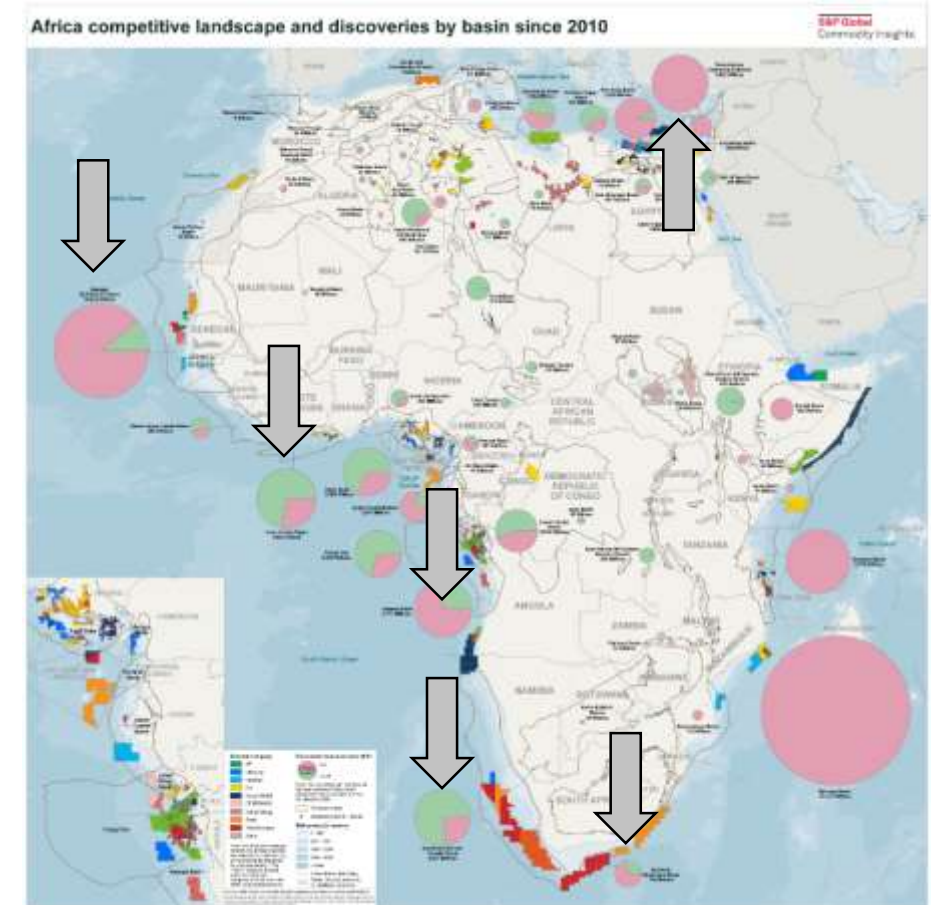
Presentation Outline

- African offshore exploration in general
- How ILX fits into the picture
- Government's contribution
- The last two decades offshore Angola
- A spectacular success story
- Is there more to come?
- Key takeaways

Offshore exploration drilling in Africa – far fewer wells than in decades past but the relative percentage drilled in the frontier and immature basins is increasing.



Data compiled September 2024.
 Source: S&P Global Commodity Insights upstream E&P content (EDIN/GEPS).
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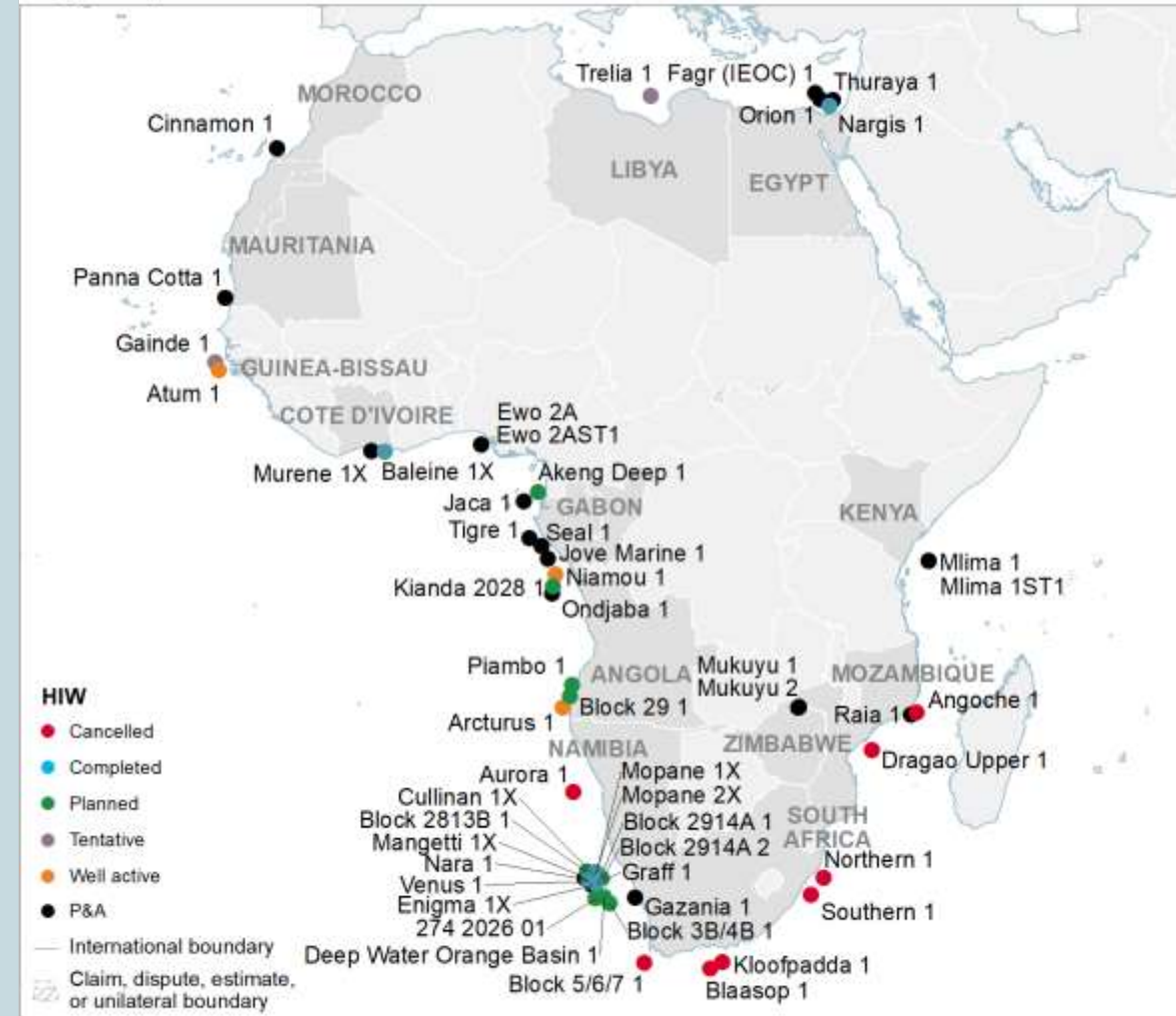
High Impact exploration Since 2021

African Overview

- Since 2021 – more than 40 wells in Africa have been tagged as High Impact.
- At least 9 have been positive – the two hottest areas are offshore Cote D'Ivoire and Namibia. “Everyone wants a Gucci Bag” – Marcio Rocha Mello - success attracts exploration.
- Offshore East Africa disappointment at Raia 1 seems to have contributed to the cancellation of other wells within the Zambezi delta. Failure highlights risk and inhibits exploration.
- Sometimes the allure of the Gucci Bag draws us away from the meat and potatoes.
 - In Block 15/06 since start 2008 almost 70% of the wells drilled have been successful.
- Seeing mature basins with new eyes can produce surprises!
 - Sometimes big fields remain undiscovered for years just look at Agogo and Ndungu.

Just over 20% success rate for African wells tagged as High Impact since star 2021.

High Impact Wells



Data compiled: Sep. 04, 2024.

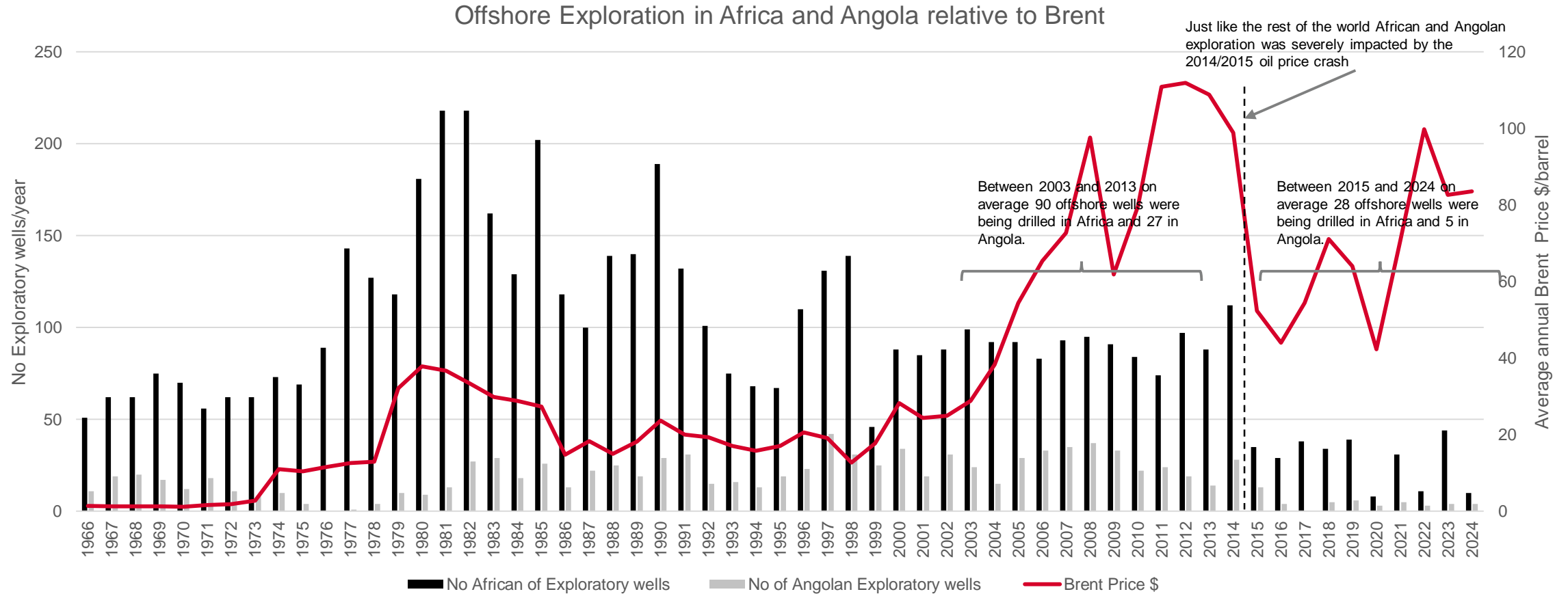
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So, how does Infrastructure Led Exploration fit into the picture?

The 2014/2015 oil price crash had an impact.

Some explores continued to drill in the frontiers and other retreated to known low risk plays – which tend to be in locations with infrastructure.

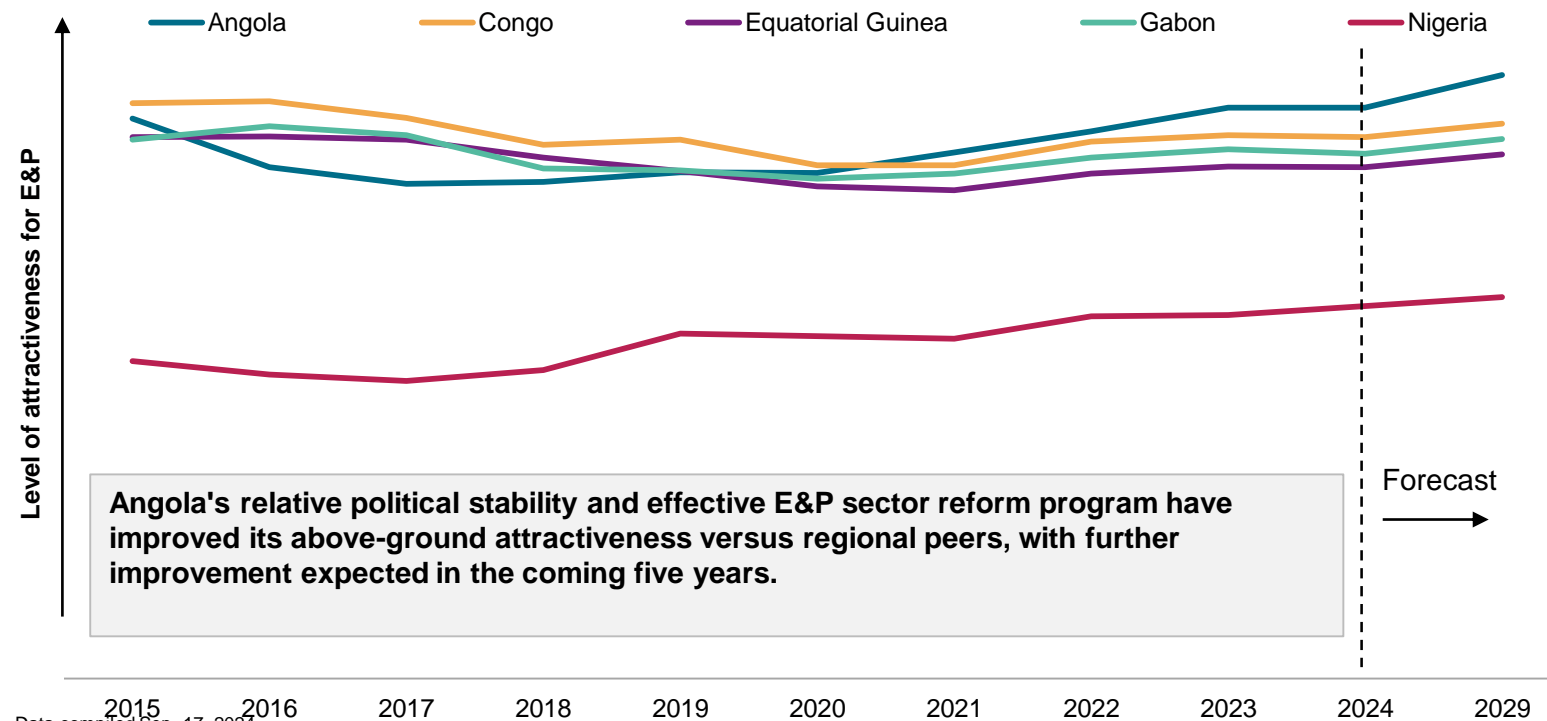


The role of government is critical.

Angola: The most attractive West African maturing producer in terms of Above ground risk.

You can't change the Geology, but you can make a marginal field economic!

Oil & Gas Risk scores: Evolution of Angola's above ground risk relative to West African peers (lower score = higher risk)



Data compiled Sep. 17, 2024.
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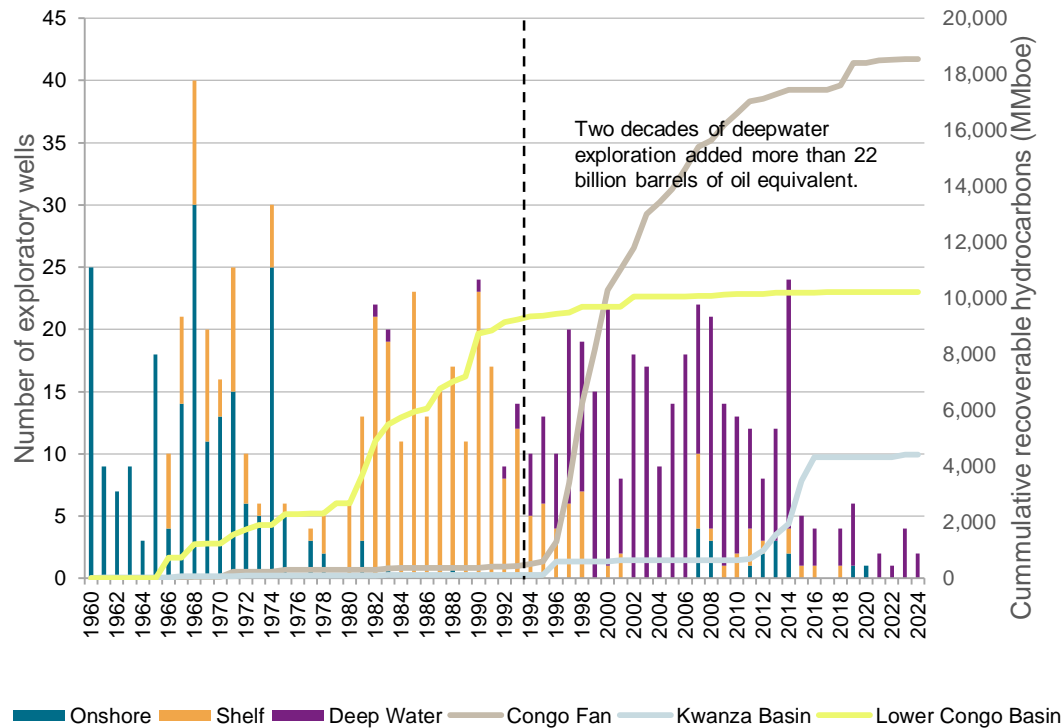
- Government passed legislation to allow exploration within existing development areas.
- New Marginal fields terms were introduced.
- Several operators received improved terms.
- Government has extended production licenses.
- Operators have been allowed to merge development areas.

A Tale of two basins: A look at the last two decades in Angolan exploration.

Since 2004 explores have focused on two basins – The Congo Fan and Kwanza.

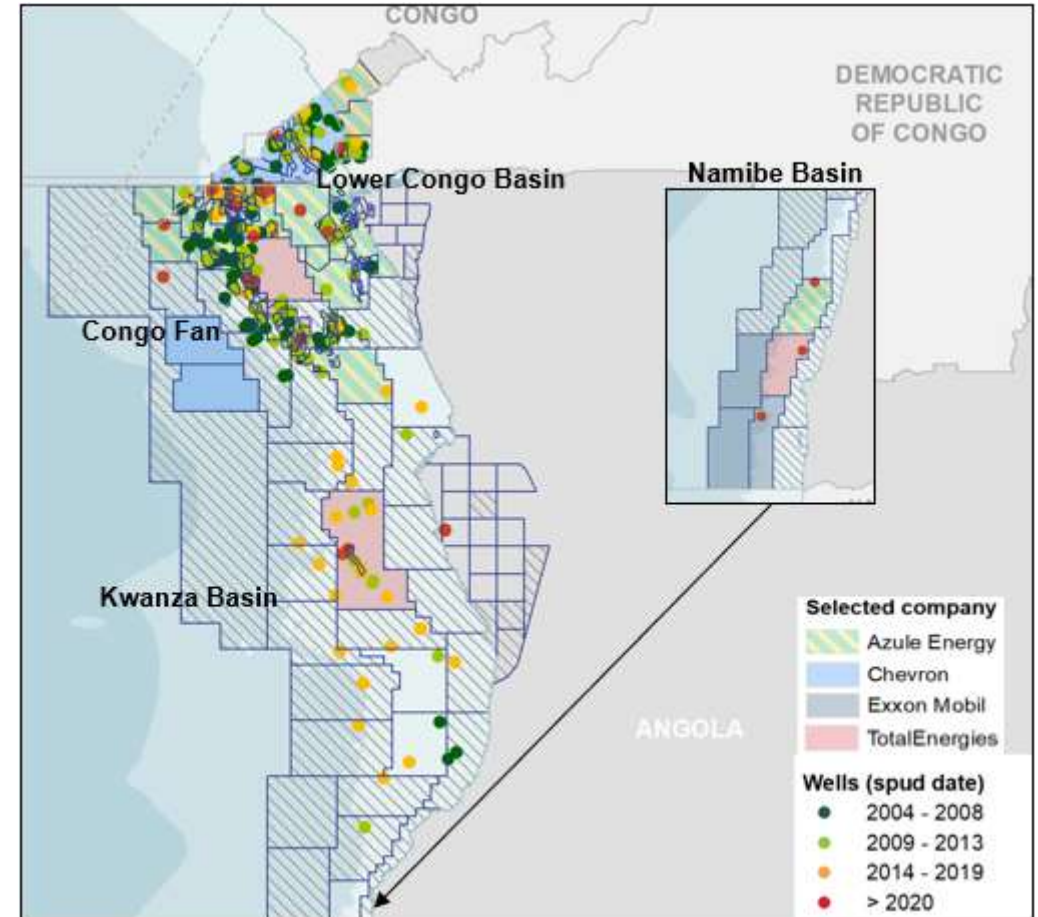
To a degree the exploration of the Kwanza Basin drew explores from the Congo Fan.

Angola basins: exploration wells and resource additions - 1960-2024



Data compiled September 26, 2024.

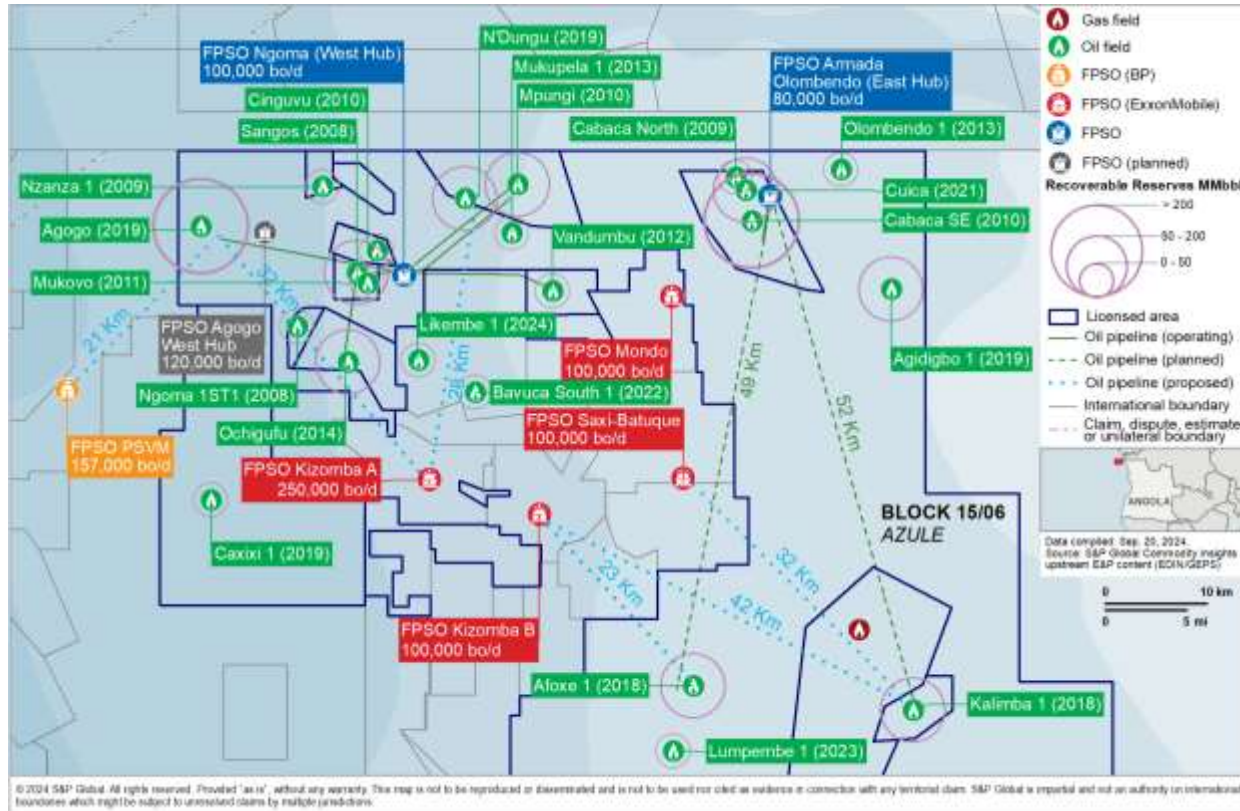
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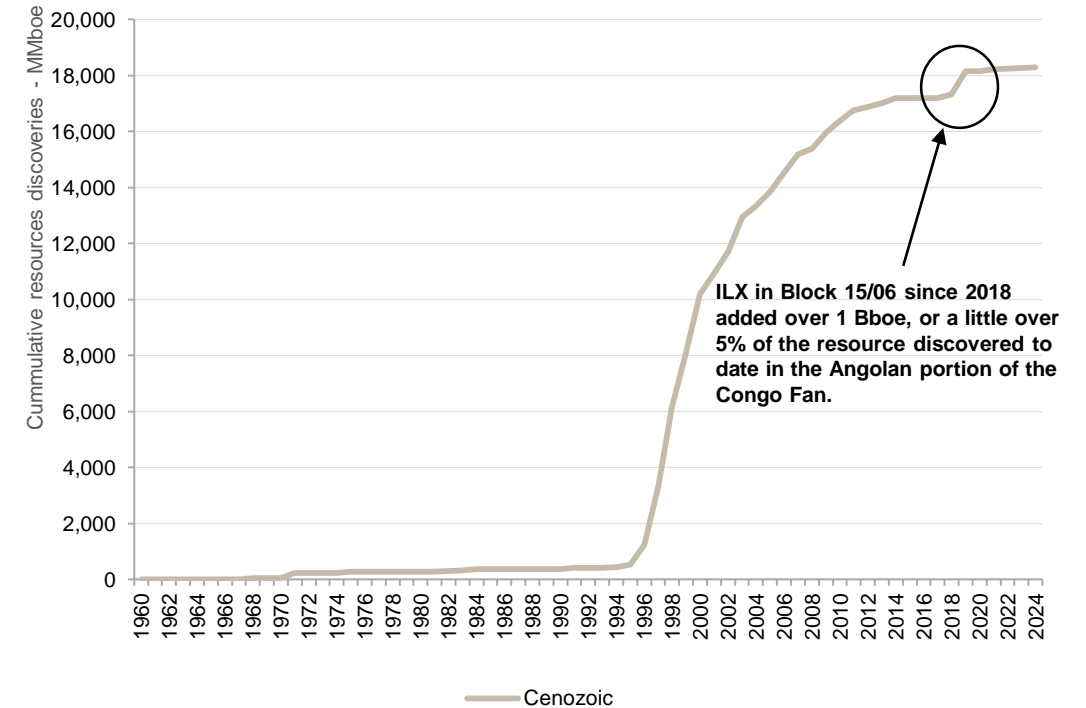
Perhaps the greatest ILX success story in Africa.

The Congo Fan, spectacularly prospective but all good things come to an end – or do they?

Sometimes we are pleasantly surprised – the Agogo discovery will ultimately result in a new production hub.



Congo Fan: play creaming curves



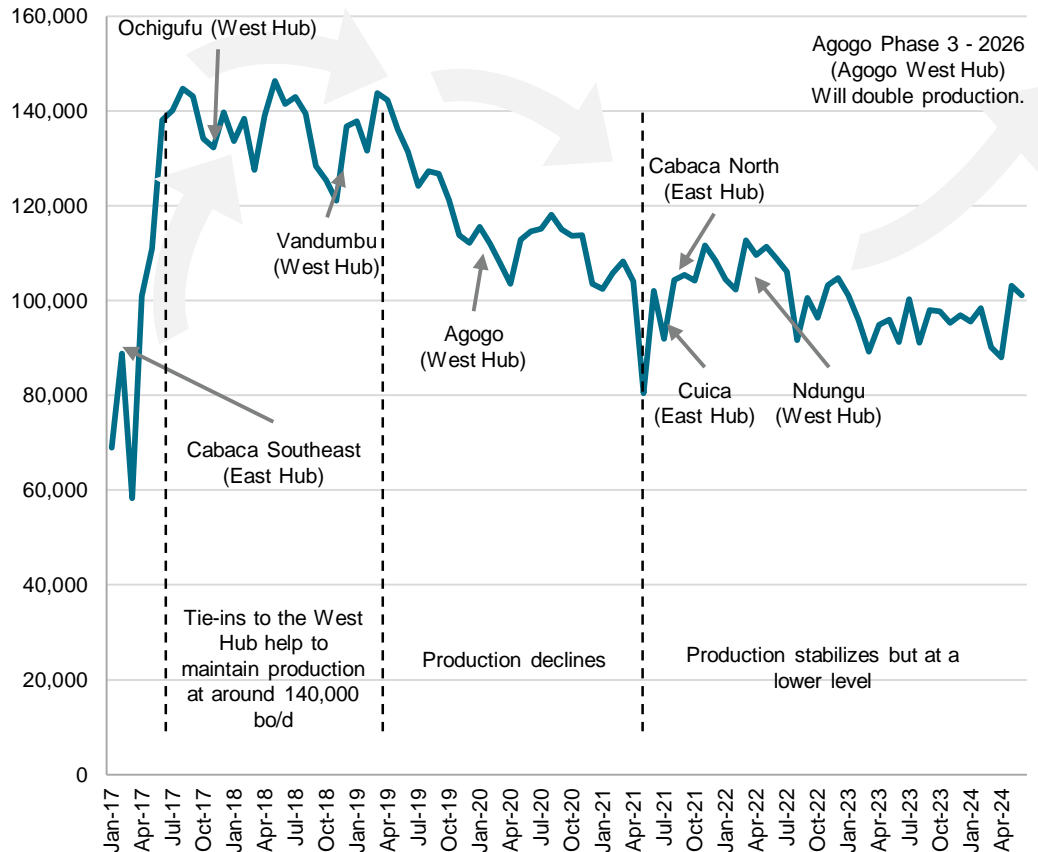
Data compiled September 2024.

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Block 15/06 – what started out as ILX turned into a new development hub.

The recent ILX campaign was so successful - current infrastructure is a constraint.

Total oil production in during 8 past years

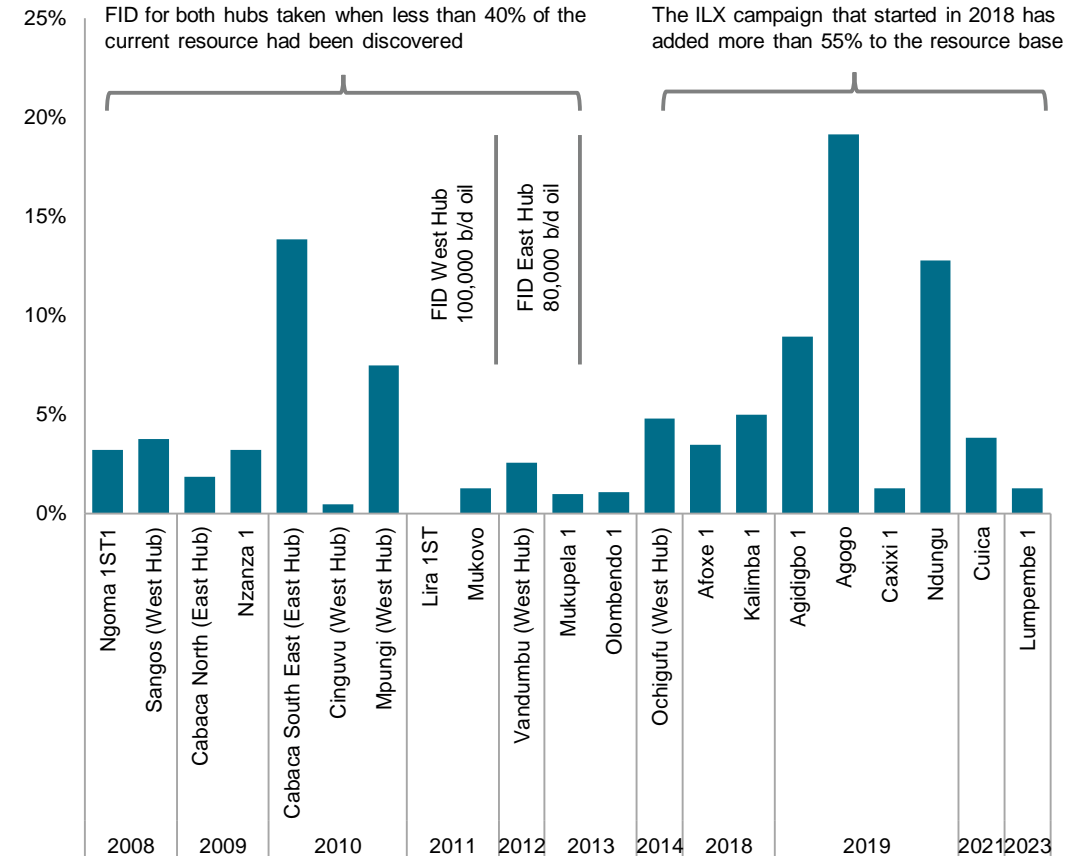


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Discovery resources as a percentage of Block 15/06 total oil recoverable



As of September 2024.

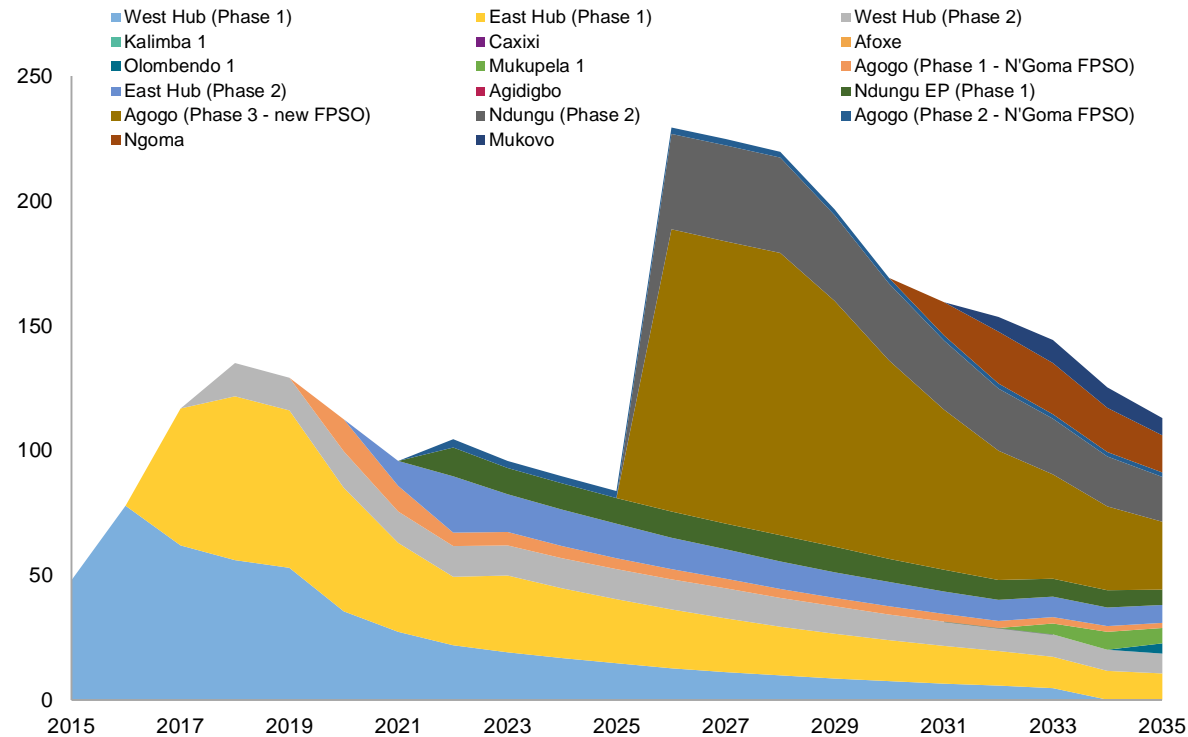
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Block 15/06 – what started out as ILX turned into a new development hub.

ILX within the block has added more than \$ 3 billion in NPV and is expected to double production.

Block 15/06 production (Mbbbl/d)

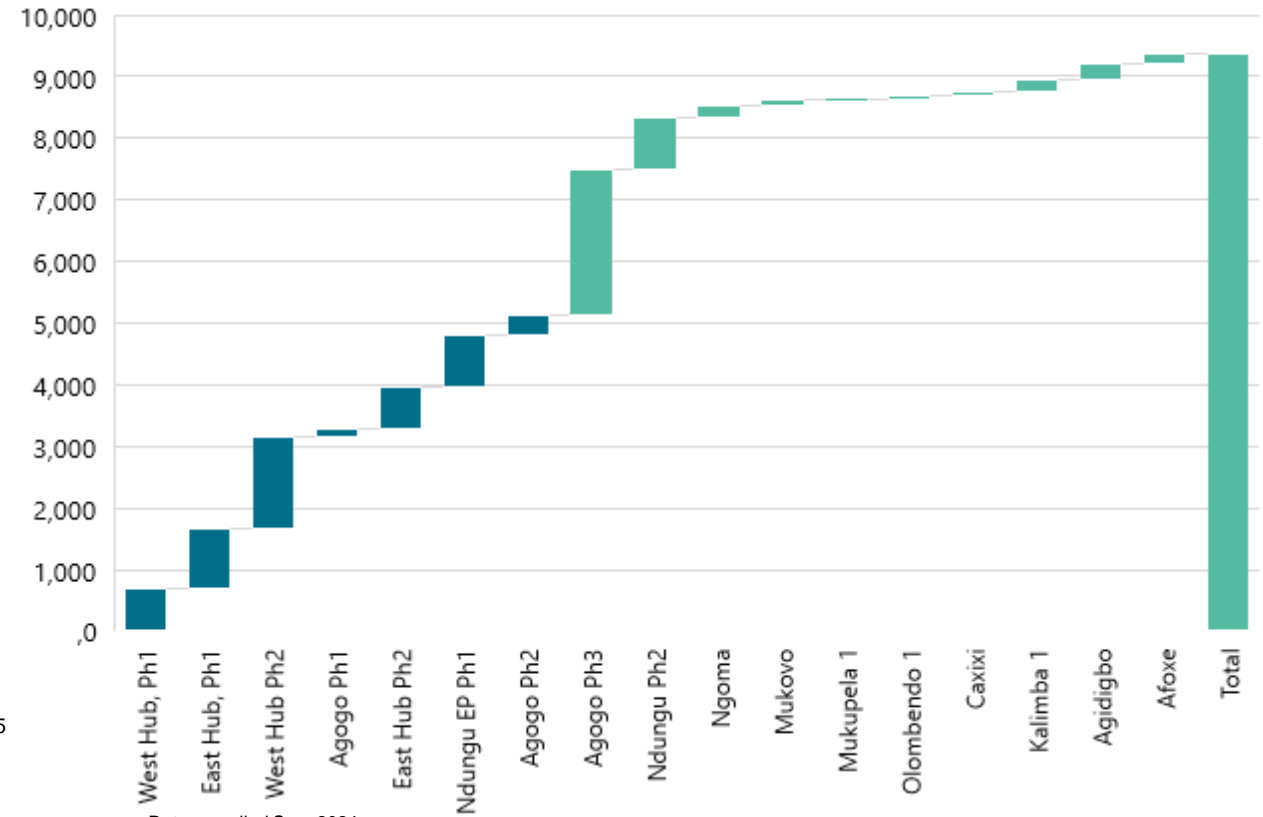


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Block 15/06 Incremental NPV (MMUSD)



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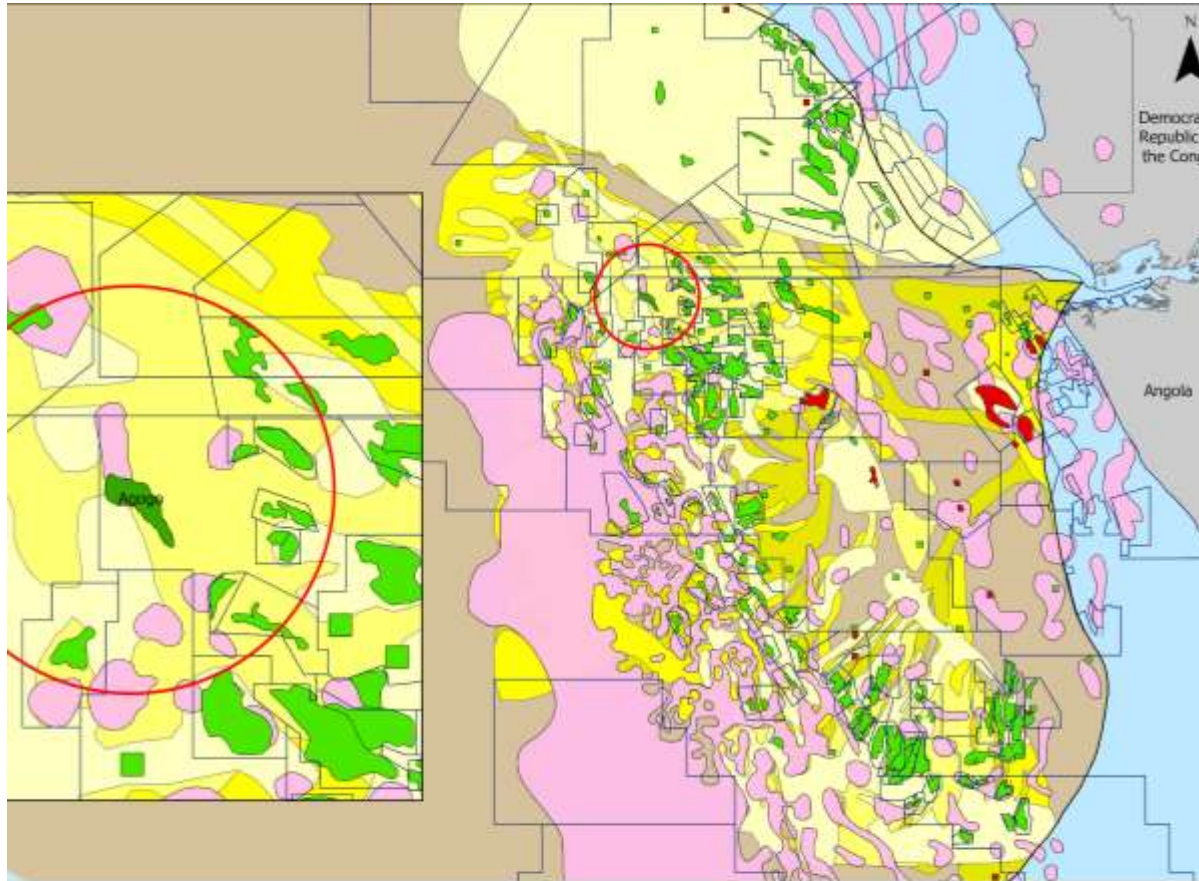
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Perhaps the greatest ILX success story in Africa: Chapter 2.

What if Agogo wasn't an anomaly?

Could there be more to the west with Block 31 and could the existing discoveries in block 31 be bigger than we think?

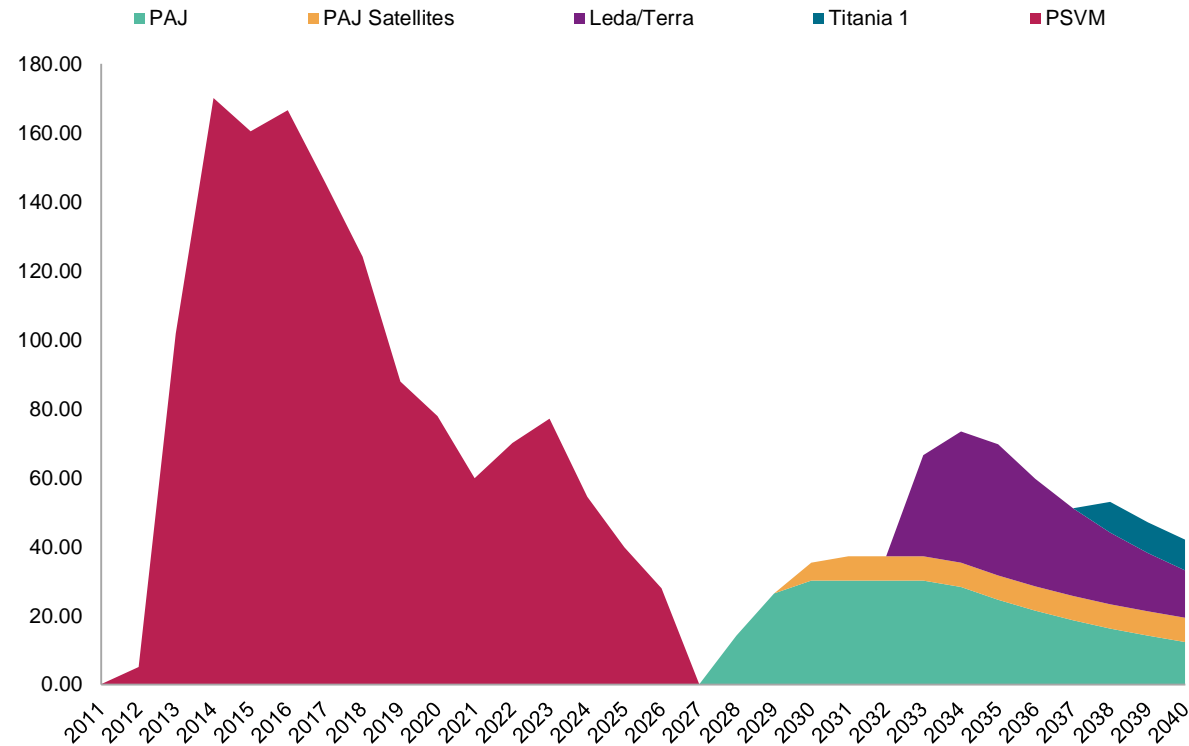


- The Agogo field is the largest discovery in Angola since 2015 and the largest in the Congo Fan since Plutonio was discovered a decade earlier.
- It has been more than a decade since the last exploratory seismic survey over the area.
- Salt tectonism is present throughout the block.
- Seismic technology has improved significantly in the last decade.
- Azure already has infrastructure in the block (PSVM).
- Some of the fields already discovered might be bigger than we believe them to be - this would improve the economics.

Block 31 – Further production opportunities

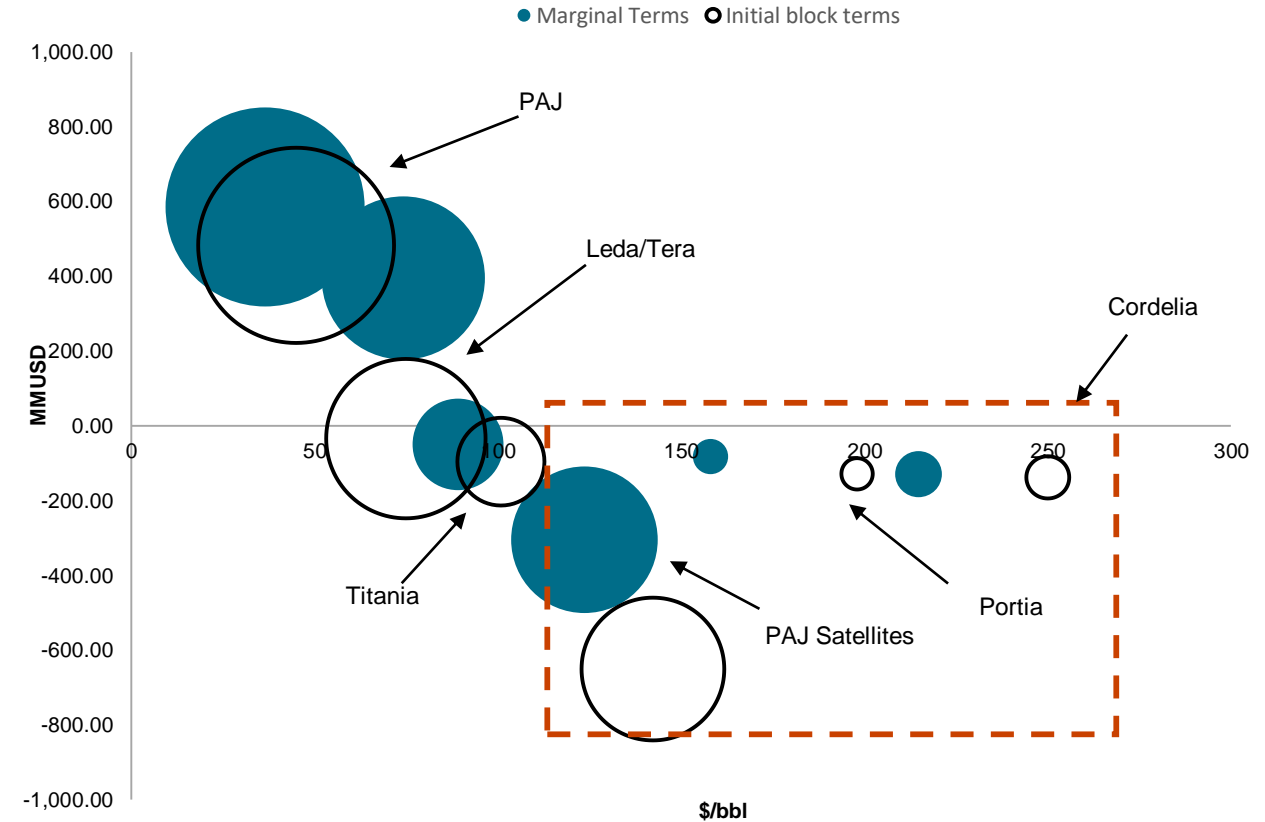
Improved terms can play a key role in bringing on-stream undeveloped discoveries, however fiscal improvement varies depending on size of the project and capex required

Block 31 production (Mboe/d)



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Block 31 - AT NPV Vs Break-even price

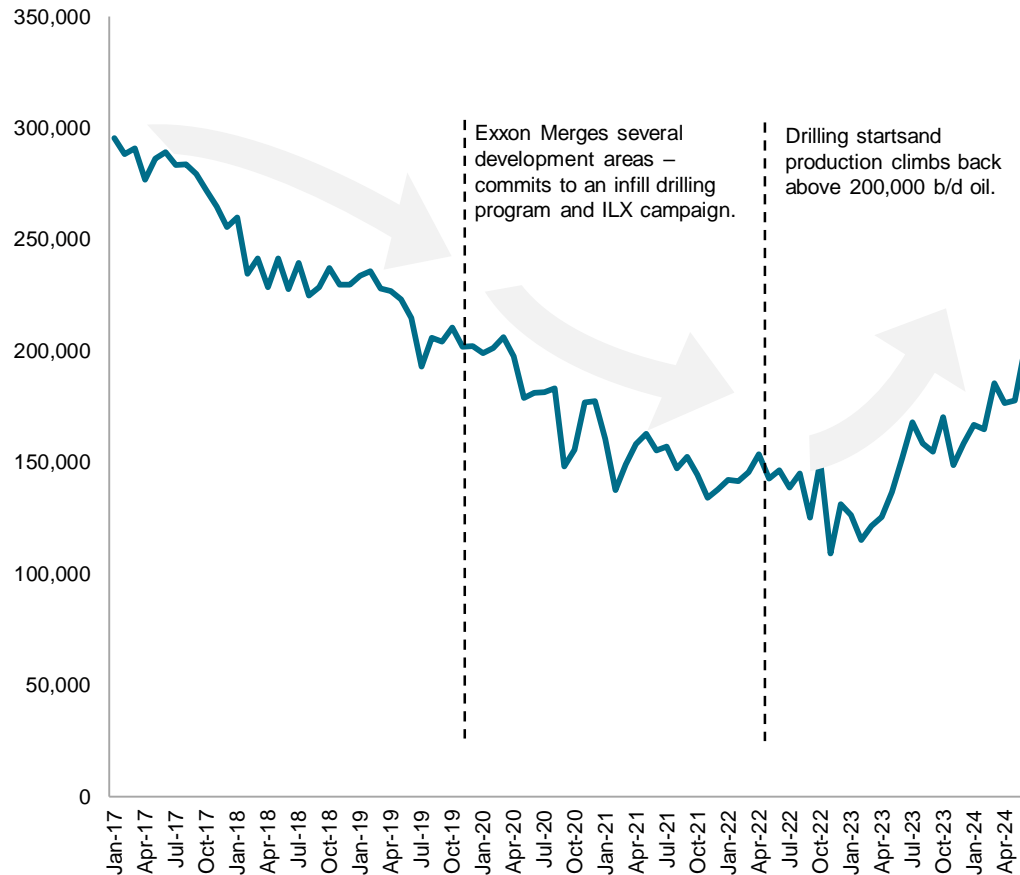


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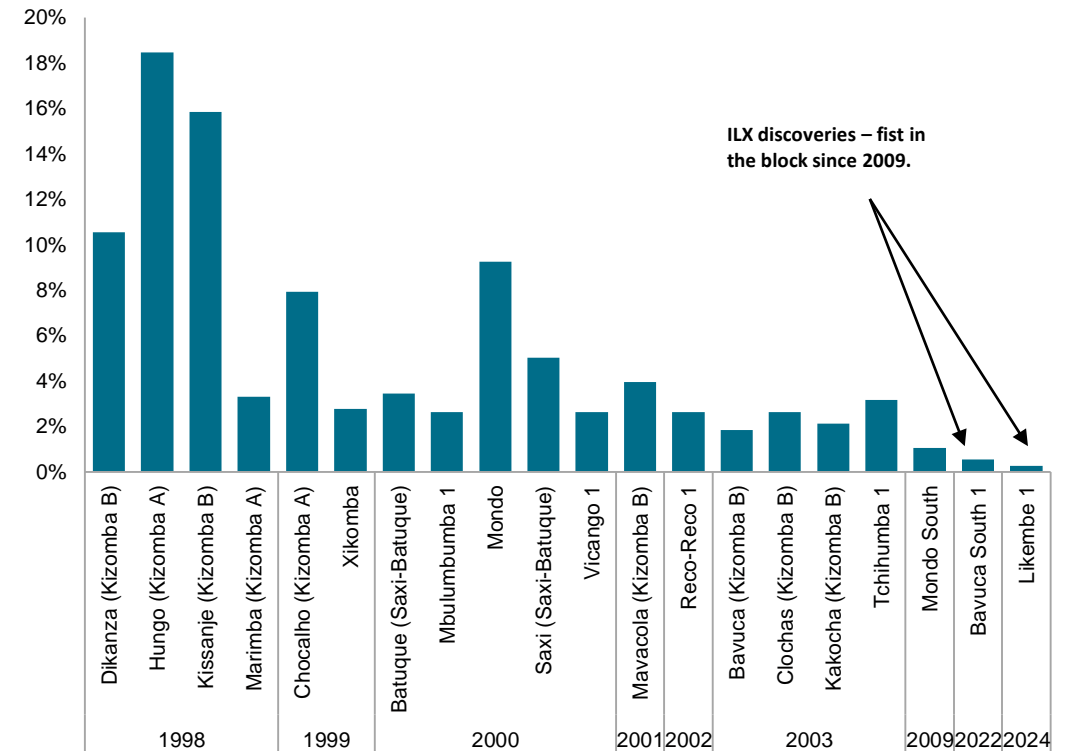
Exxon was able to reverse a production decline from Block 15

The reversal in production decline was not due to ILX, it was related to due to infill drilling and new infrastructure. But Exxon did make two discoveries due to improvements negotiated for.

Total oil production in during 8 past years



Discovery resources as a percentage of Block 15 total oil recoverable



As of September 2024.

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Sometimes improving the terms encourage and operator to explore.

Key Takeaways

Everyone wants a Gucci bag but don't forget the meat and potatoes.

Government's role is fundamental in encouraging ILX.

The geology can't be changed but it is possible to make a marginal field economic.

A wonderful surprise might be hidden in your backyard.

Looking at the same problem with same eyes will likely produce the same result.

Looking at the same problem with new eyes and new technology might yield a different result.

Sometimes a little encouragement goes along way.

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