Richmond Energy Partners

International Exploration Performance 2008-12 and Deep Water Hotspots

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- *E&P Company Valuations*
- *Investment Advice*

Corporate advisory

- *M&A opportunity screening*
- *Exploration Strategy and Benchmarking*

Agenda

1. 4-year International exploration performance of 40 mid-cap and large cap independents
2. Key Trends
3. Deep Water Frontier Hotspots
   - East Africa
   - Namibia
   - South Falklands
   - West Africa Pre-Salt

Study Companies

Large Caps >$10bn Mkt Cap	Mid Caps <$10bn Mkt Cap		
Anadarko	Afren	Heritage	PA Resources
Hess	Aurelian	JKX	Pacific Rubiales
Murphy Oil	AWE	Karoon Gas	Petroceltic
Noble Energy	Beach	Kosmos Energy	Premier
Santos	Bowleven	Lundin	Queiroz Galvao
Talisman	Cairn	Maurel & P.	Roc
Tullow	Coastal Energy	Melrose	Rockhopper
Woodside	Det Norske	Niko	Salamander
	DNO	Noreco	Soco
	Faroe Petroleum	Oil Search	Sterling Res.
	Gran Tierra	Ophir Energy	

Headline exploration performance impressive

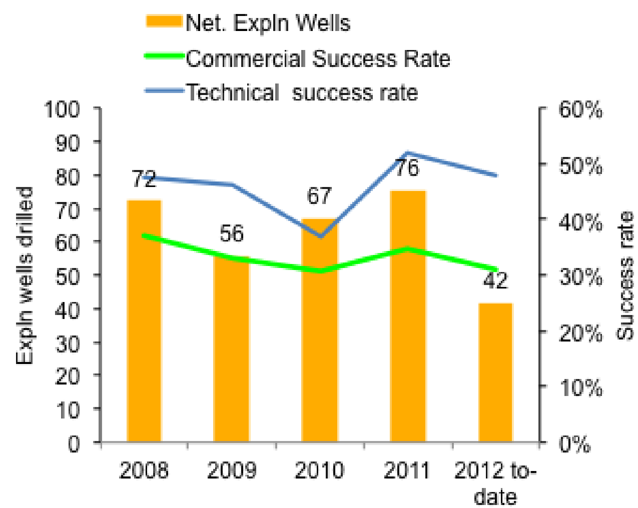
- Commercial success rate of 39% and finding cost <$1/boe over 4 yrs.
- Mid-caps spent 3 times as much on exploration drilling relative to the Large-Caps, adjusted for market capitalisation, finding more oil, but at a higher cost per barrel.
- Excluding the extraordinary 2.5 bnbbl Johan Sverdrup oil discovery in Norway, discoveries were >70% gas.

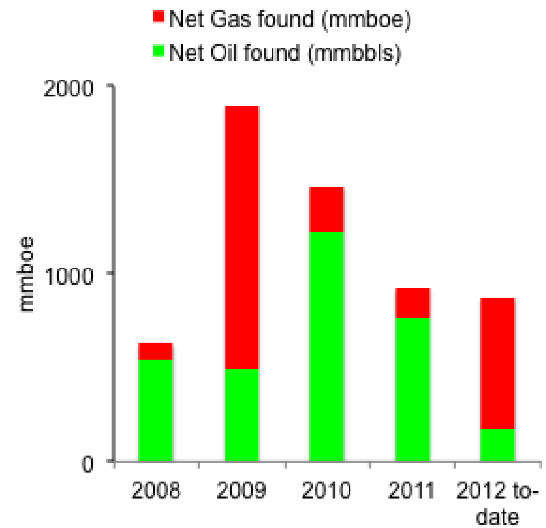
Exploration Performance Overall 2008-2011

E&P Sector	Combined Mkt Cap $bn	Total Spend $bn	Total Net Discovered bn boe	% Oil	Finding Costs $/boe	Commercial Success Rate
32 Mid Caps	66	5.7	4.9	62%	1.2	34%
8 Large-Caps	159	4.2	7.3	31%	0.6	49%

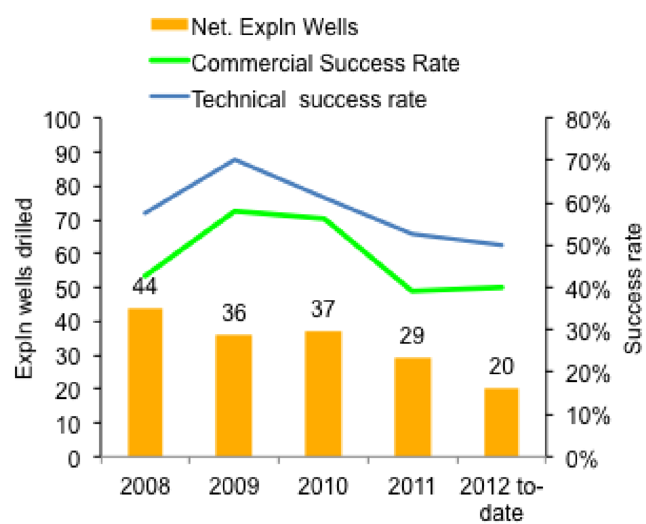
Mid Caps drilling more, finding more oil
Large-caps drilling less, finding more gas

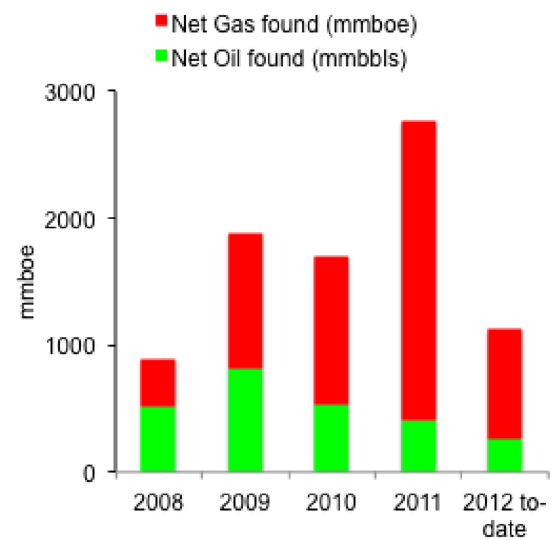
32 Mid-Caps





8 Large-Caps





Most Mid/Large cap 250mmboe+ discoveries since 2008 are gas or condensate

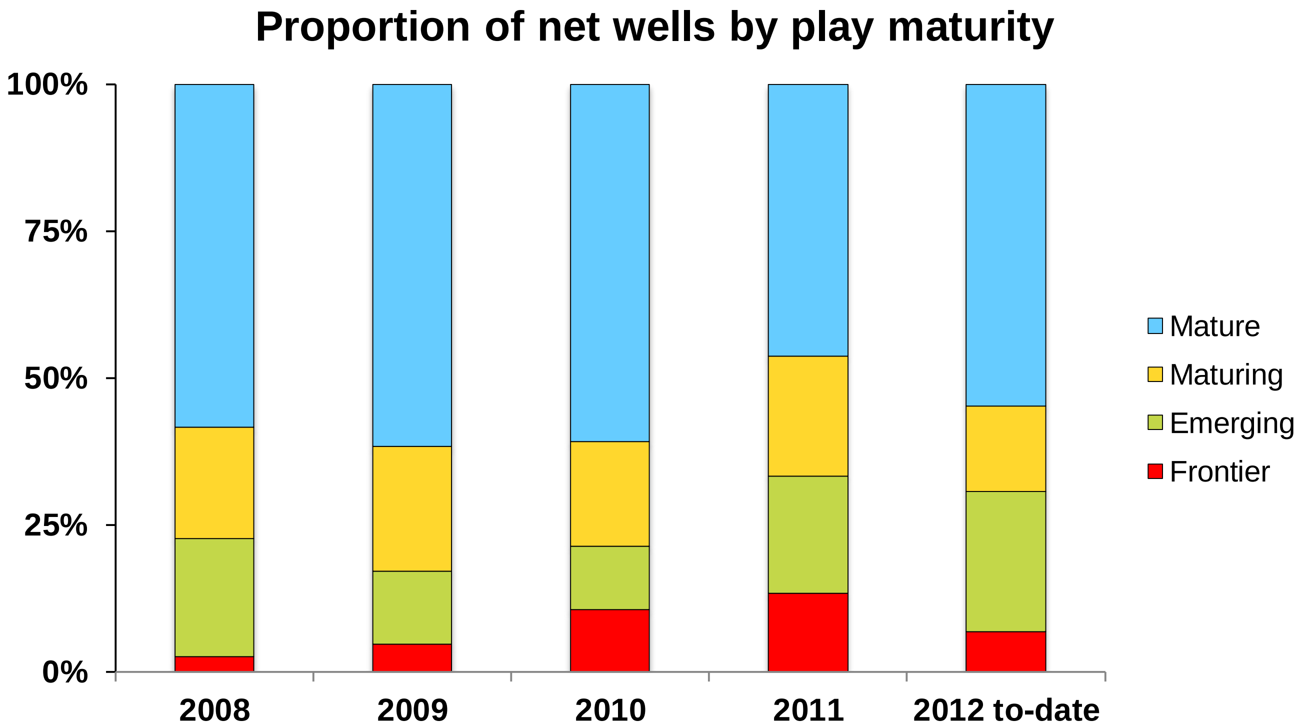
Country	Basin	Water Depth	Well Name	Reservoir Age	Date	Gross Resource mmboe*	Company
Israel	Levantine	Deep	Leviathan-1	Miocene	Apr-11	2833	Noble
Israel	Levantine	Deep	Tamar-1	Miocene	Feb-09	1500	Noble
Norway	C N Sea	Shallow	16/2-6 Avaldsnes	U.Jurassic	Sep-10	1300	Lundin
Norway	C N Sea	Shallow	16/2-8 Aldous Major S	U.Jurassic	Aug-11	1200	Lundin/ Det norske
Cyprus	Levantine	Deep	Aphrodite-1	Miocene	Dec-11	1166	Noble
Australia	Browse	Shallow	Poseidon-1	Triassic	May-09	1166	Karoon Gas
Mozambique	Ruvuma	Deep	Barquentine-1	Oligocene	Oct-10	1000	Anadarko
Iraq	Kurdistan	Onshore	Miran West-1	U.Cret	Jun-09	758	Heritage
Mozambique	Ruvuma	Deep	Lagosta-1	Oligocene	Nov-10	666	Anadarko
Mozambique	Ruvuma	Deep	Windjammer-1	Oligocene	Mar-10	666	Anadarko
Angola	Kwanza	Deep	Cameia-1	L Cret.	Jan-12	650	Cobalt
Tanzania	Rovuma	Deep	Mzia-1	U Cret.	May-12	600	BG/Ophir
Tanzania	Rovuma	Deep	Jodari-1	Oligocene	Mar-12	600	BG/Ophir
Algeria	Illizi	Onshore	Ain Tsila-1	Ordovician	Aug-09	506	Petroceltic
Mozambique	Ruvuma	Deep	Camarao	Oligocene	Oct-11	500	Anadarko
Ghana	Tano	Deep	Tweneboa-1	U.Cret	Mar-09	400	TLW/Kos/Anadarko
Falkland I.	N Falklands	Shallow	Sea Lion	U.Cret	May-10	350	Rockhopper
Brazil	Campos	Deep	Itaipu-1	L.Cret	Dec-09	300	Anadarko
Brazil	Campos	Deep	Wahoo	L.Cret	Oct-08	300	Anadarko
Tanzania	Mafia	Deep	Pweza-1	Paleocene	Oct-10	280	Ophir
Norway	Barents Sea	Shallow	Norvarg	Triassic	Aug-11	260	Det norske
Mozambique	Ruvuma	Deep	Tubarao	Eocene	Feb-11	250	Anadarko
Israel	Levantine	Deep	Dalit	Miocene	Apr-09	250	Noble

Pink = gas, Orange = Gas condensate, Green = oil

**Provisional estimate of 2P based on company reports*

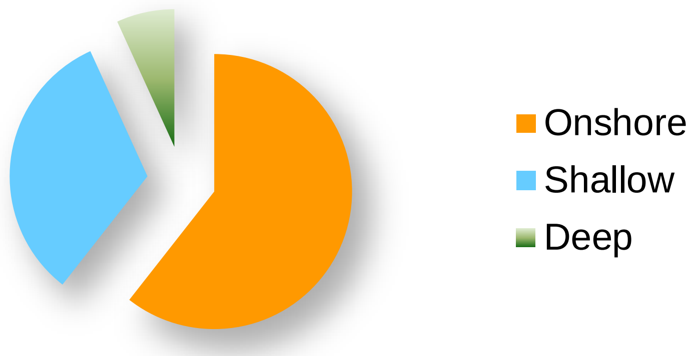
Frontier exploration increased 2008-2011

Chance of Discovering a field >100mmboe				
Play Maturity	**Frontier**	**Emerging**	**Maturing**	**Mature**
Probability	1 in 9	1 in 5	1 in 20	1 in 69

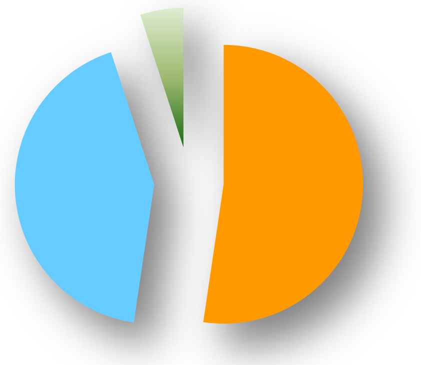


Exploration by Water Depth 2008-2012

Net Exploration Wells Mid-Caps 2008-12

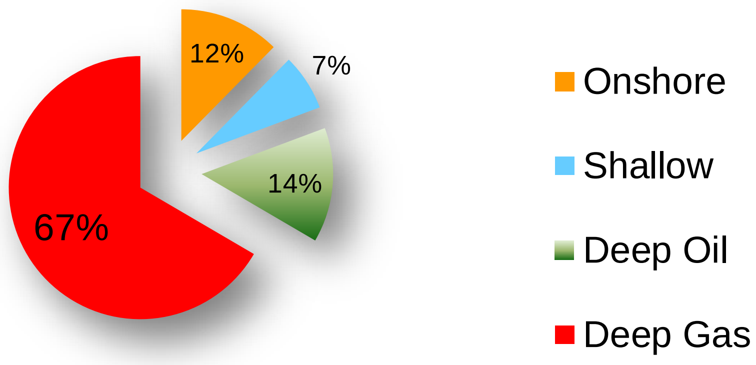


Net Resources discovered Mid-Caps 2008-12 bn boe

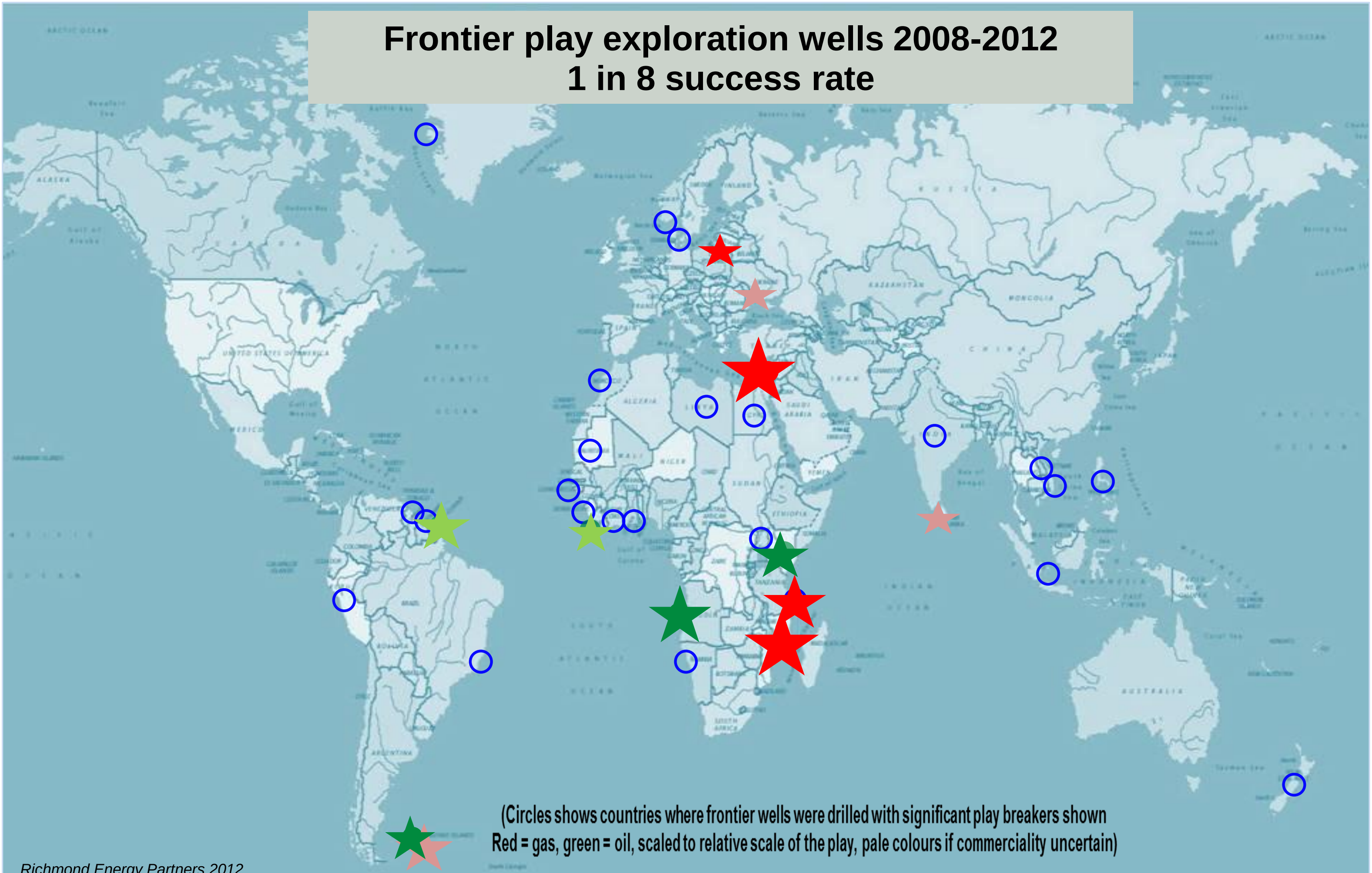


Net Exploration Wells Large-Caps 2008-12

Net Resources discovered Large-Caps 2008-12 bn boe

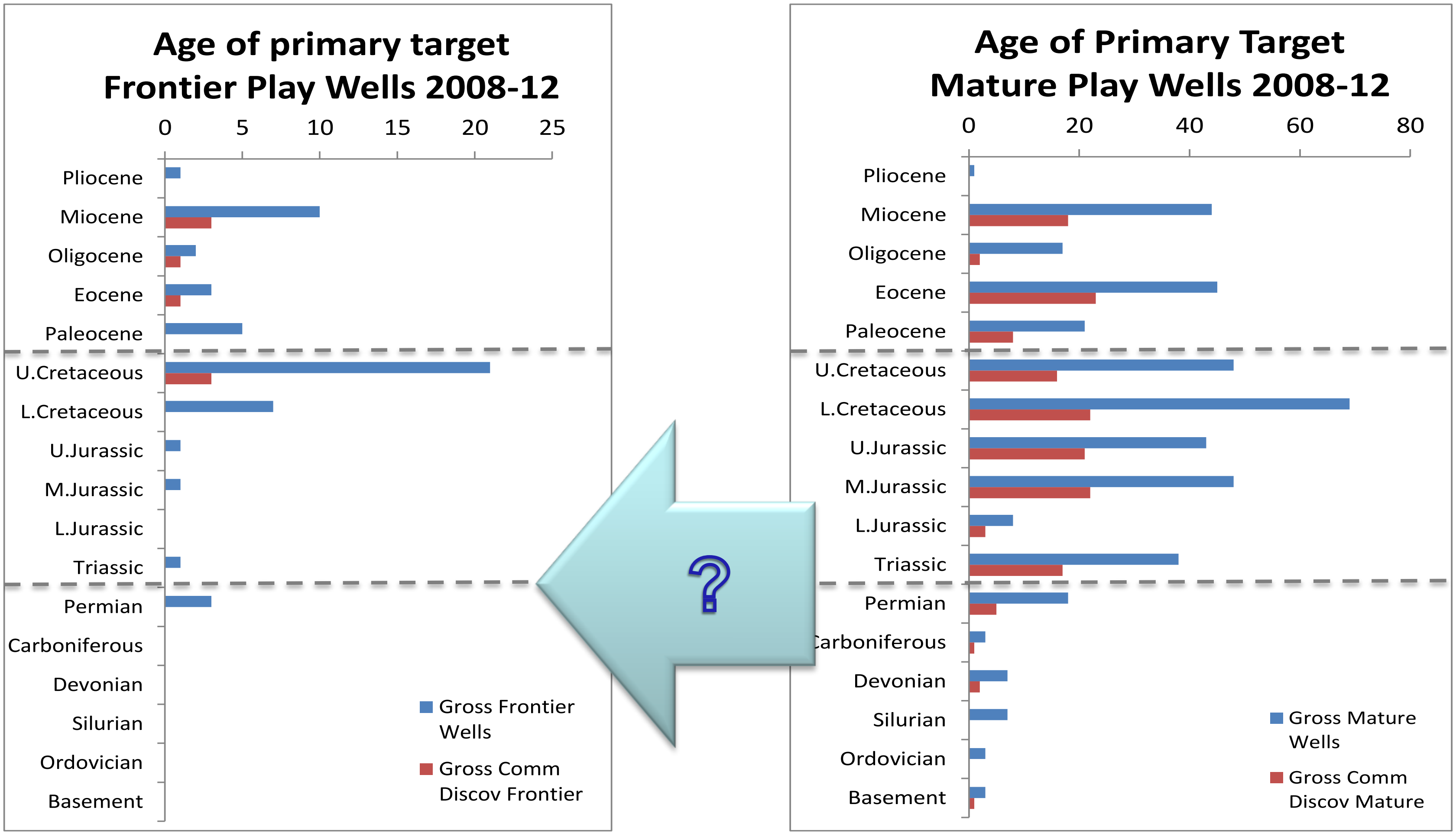


Frontier Exploration has been Successful
1 in 8 success rate – 4 big play breakers all DW

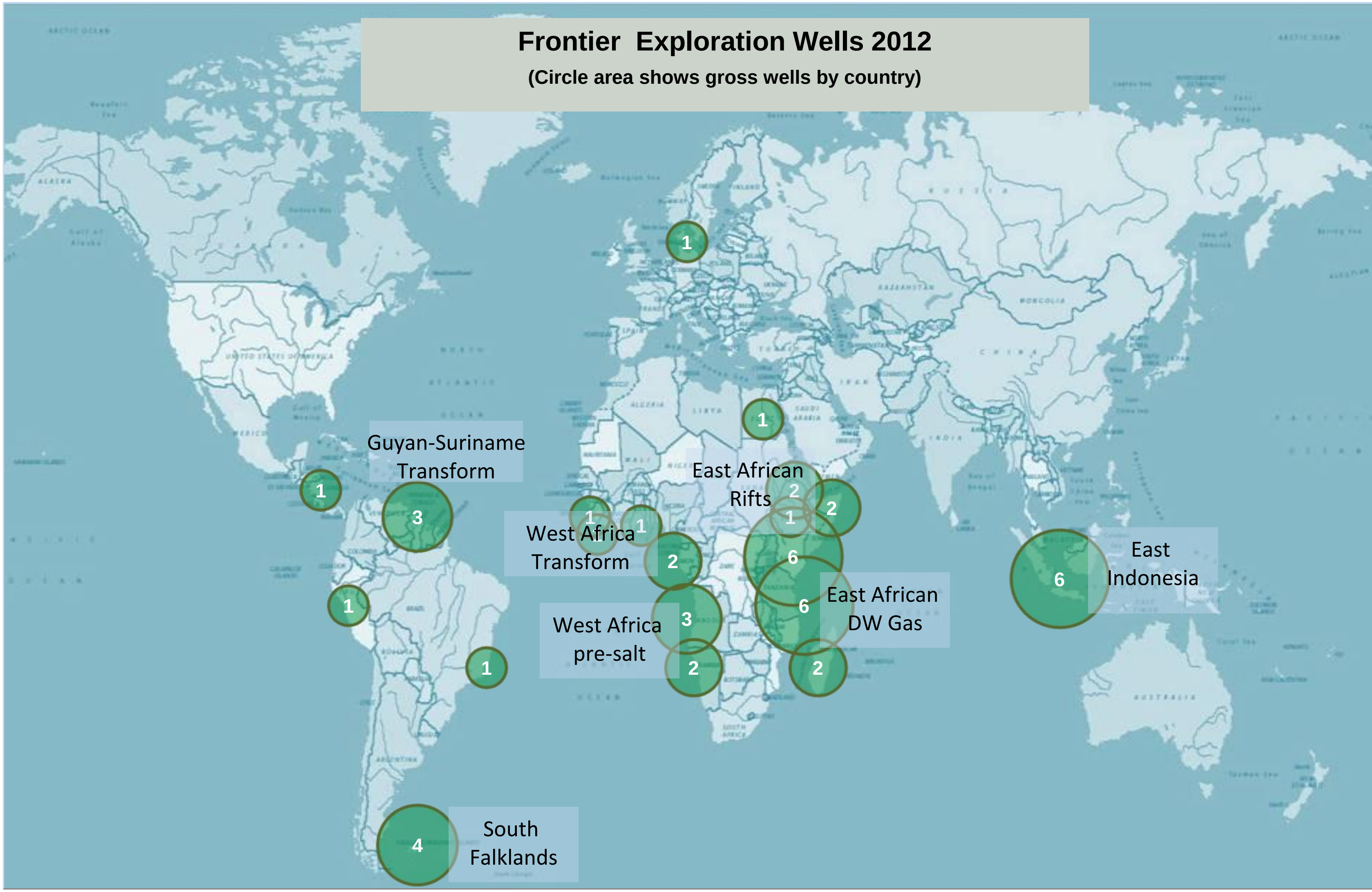


Includes wells drilled by companies outside the REP40

No frontier discoveries in stratigraphy older than Cretaceous – need for breakthrough



Frontier Hot Spots 2012



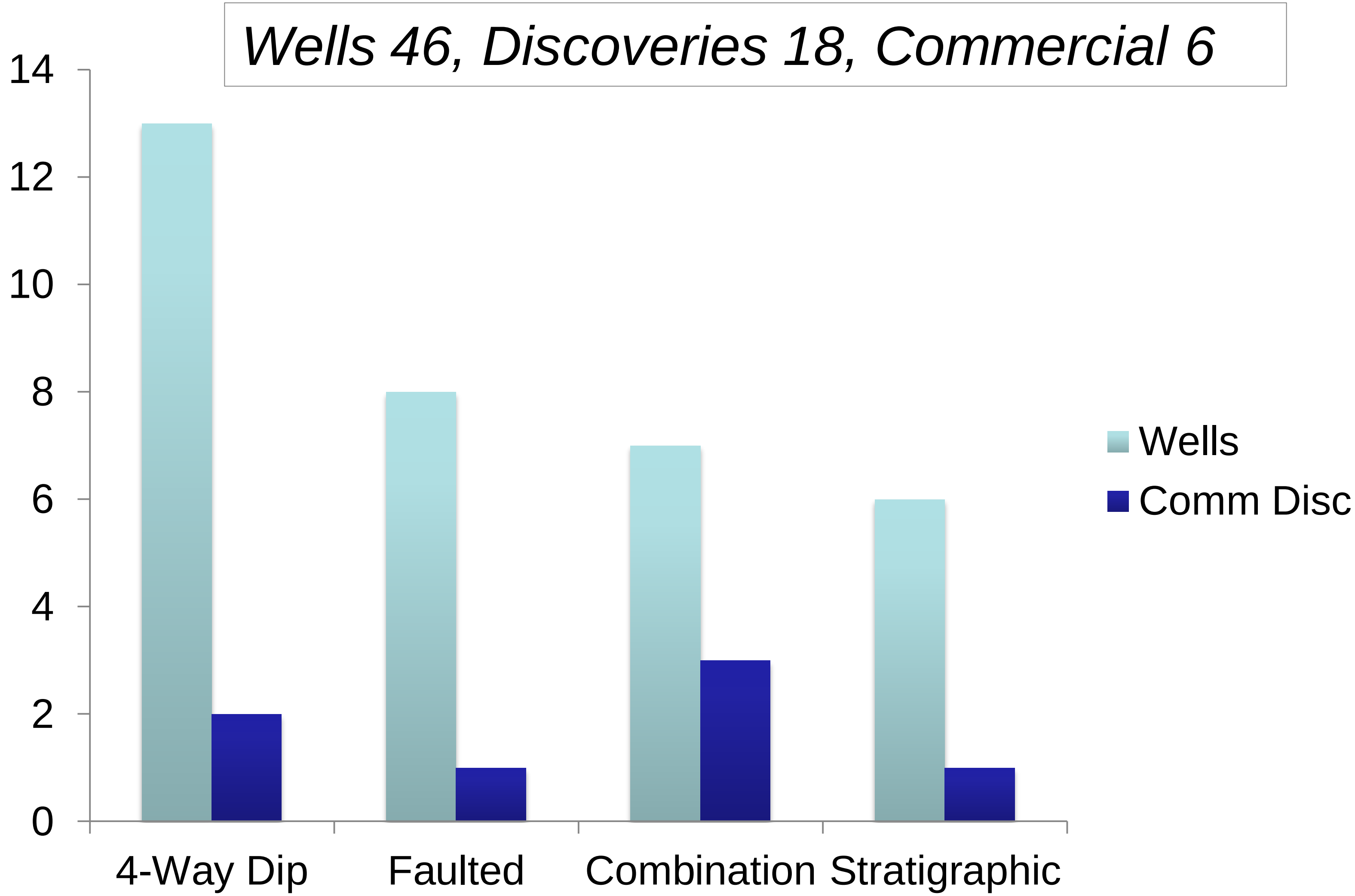
Deep Water Frontier Wells 2012

Technical success – 42%, Commercial success 11%

Country	Well Name	Operator	Prospect Type	Age	Result	Discovered Resource mmboe
Falkland Islands	Loligo	Falkland Oil & Gas	Stratigraphic	Early Tertiary	Gas discovery	-
Kenya	Mbawa-1	Apache	Faulted	U.Cretaceous	Gas discovery	
Namibia	Kabeljou-1	Chariot Oil & Gas	4-way dip	L.Cretaceous	P&A Dry	
Cuba	Catoche-1	Petronas	not known	L.Cretaceous	P&A oil & gas shows	
Falkland Islands	Stebbing	Borders & S.	4-way dip	U.Cretaceous	P&A gas shows	
Liberia	Nighthawk-1	Chevron	Stratigraphic	U.Cretaceous	P&A Dry	
South Korea	Jujak-1	Woodside	not known	?	P&A Dry	
Cuba	Fidel Castro-1	Repsol	not known	L.Cretaceous	P&A Dry	
Namibia	Tapir South-1	Chariot Oil & Gas	4-way dip	U.Cretaceous	P&A Dry	
Ghana	Nunya-1x	ENI	Combination	U.Cretaceous	P&A Dry	
Falkland Islands	Darwin 61/17-1	Borders & S	Faulted	L. Cretaceous	Gas cond discovery	190
Indonesia	Andalan-2	Hess Corporation	4-way dip	M.Jurassic	P&A Dry	
Tanzania	Zafarani-1	Statoil	Combination	U.Cretaceous	Gas discovery	700
Sierra Leone	Jupiter-1	Anadarko	Stratigraphic	U Cretaceous	Oil & Gas Discovery	
Liberia	Narina-1	African Petroleum	Stratigraphic	U.Cretaceous	Oil discovery	
Guinea	Sabu-1	Hyperdynamics	4-way dip	U.Cretaceous	P&A Dry	
Angola	Cameia-1	Cobalt	4-way dip	L.Cretaceous	Oil & gas discovery	650
Indonesia	Lempuk-1	Talisman	not known	Miocene	P&A gas shows	
Angola	Azul-1	Maersk Oil & Gas	Faulted	L.Cretaceous	Oil discovery	

**Provisional estimate of 2P based on company reports*

Deep Water Frontier Well Analysis 2008-2012



Case Studies
Four Deep Water Frontiers Tested in 2012

- Kenya – Mbawa-1
- Namibia – Tapir South and Kabeljou-1
- Falklands – Darwin, Stebbing, Loligo
- Angola – Cameia-1

Cameia-1 appears to have opened up a new billion barrel plus oil play. The commerciality of gas discoveries offshore Falklands and Kenya has yet to be demonstrated.

Conclusions

- Deep water exploration continues to dominate discovery volumes but >80% of deep water discoveries have been gas over last 5 years
- Only two significant deep water oil play breakers in since 2007 – Pre-salt Angola and possibly French Guiana
- Risk reduction through direct geophysical detection of hydrocarbon bearing reservoir in deepwater frontier basins has been largely unsuccessful.
- Start up and early stage E&P companies are acting increasingly as deep water frontier pathfinders