

Atlantic Margin Conference 2014

Ireland: New Data, New Dawn?

John Corr

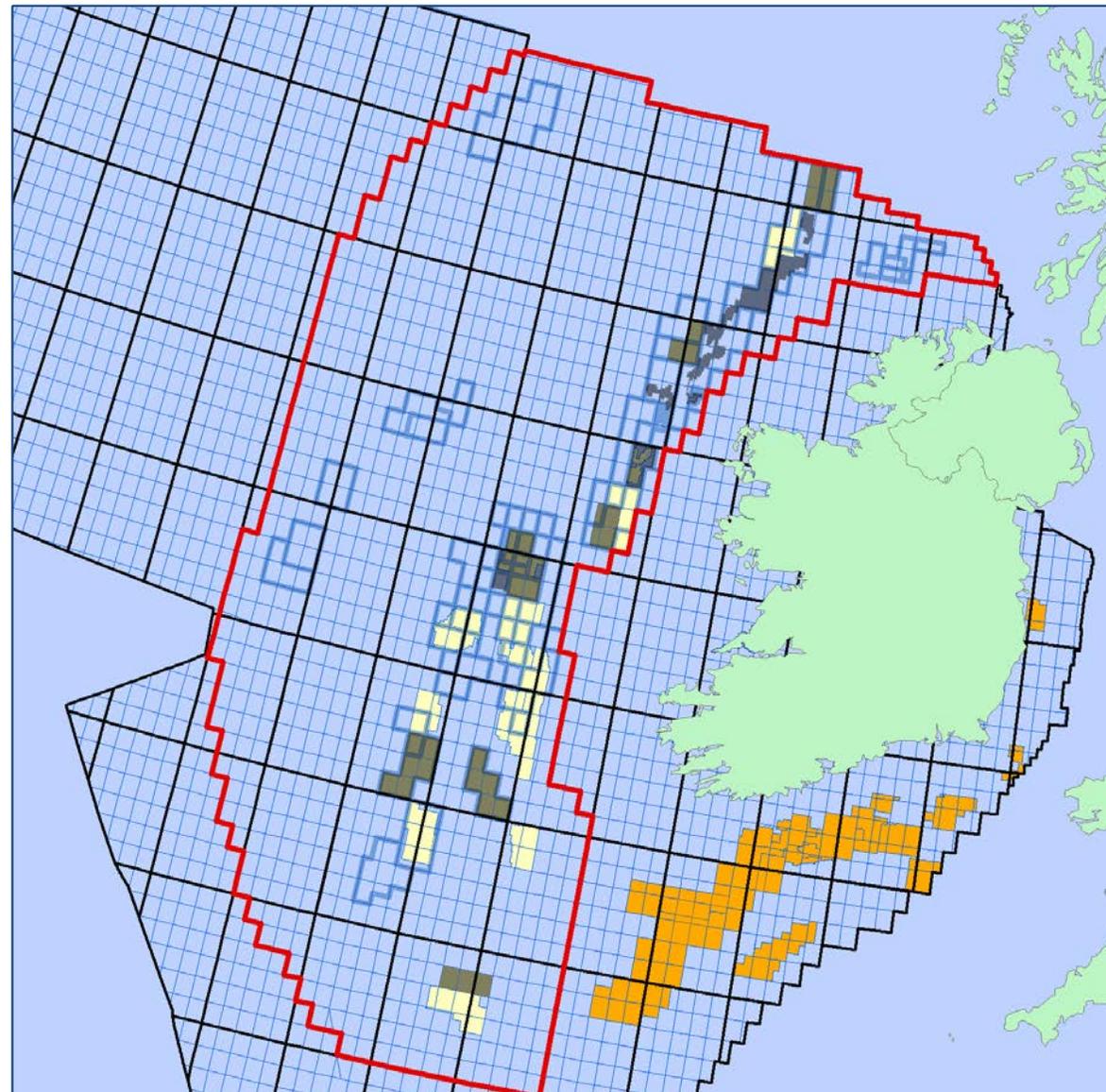
Andrew Vinall & David Moseley

Agenda

- Atlantic Margin Licence History
- Atlantic Margin Exploration History and Trends
- From Past to Present
- Dunquin & Recent Activity
- Seismic Data Improvements (I)
- Seismic Data Improvements (II)
- CSEM Data Acquisition
- New Fiscal Regime and 2015 Licensing Round
- Summary

Atlantic Margin Licence History

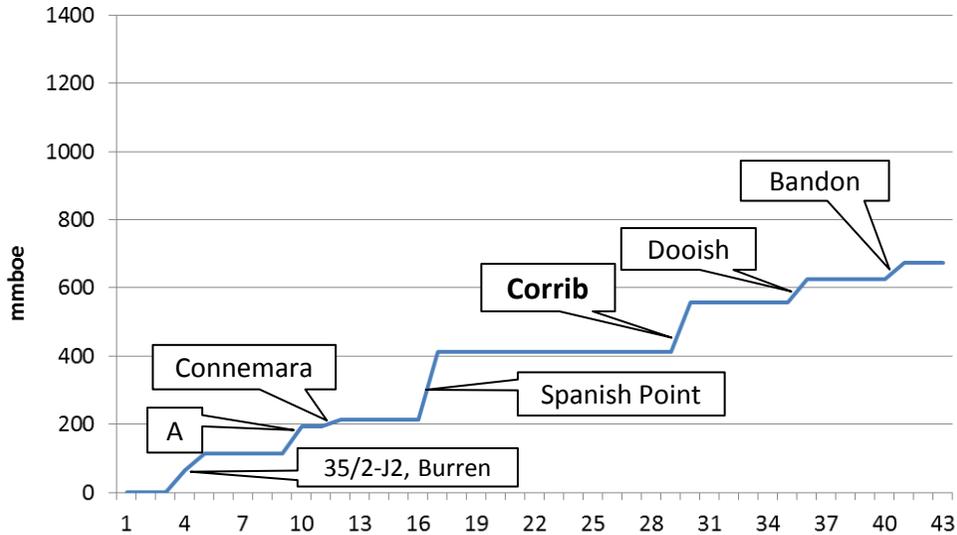
- **Porcupine 2007** Frontier Licensing Round – four licences awarded
- **Atlantic Margin 2011** Licensing Round:
 - **Rockall Basin** – one licence
 - **Porcupine Basin** – nine licences
 - **Goban Spur Basin** – one licence
 - **Slyne Basin** – two licences
- **Atlantic Margin 2015** Licensing Round:
 - Launched in June 2014
 - Increase to the maximum number of blocks per application to ten in the Rockall Basin to stimulate exploration activity



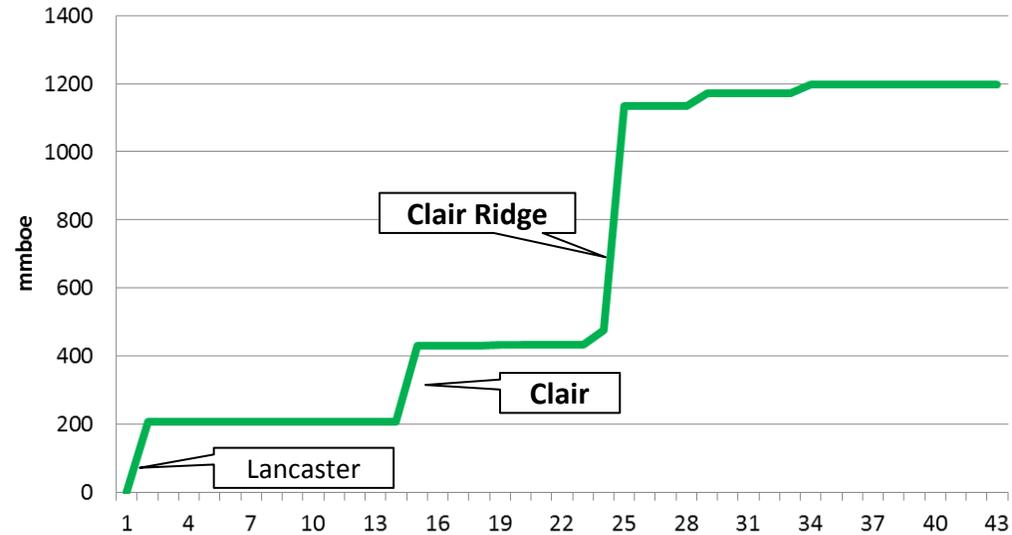
Atlantic Margin Acreage: Licence History

Drilling History 1

Irish Atlantic Margin Creaming Curve



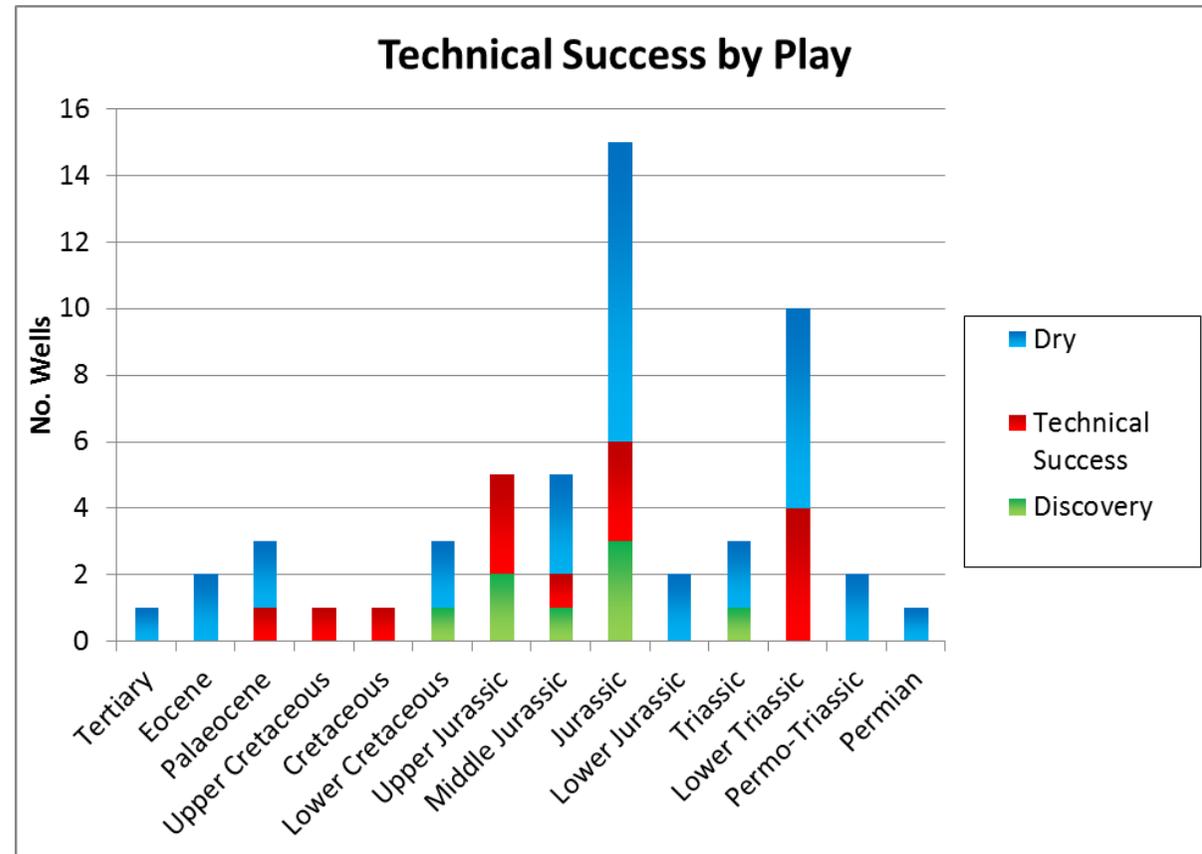
UK Atlantic Margin Creaming Curve



- Corrib is currently the only discovery to be developed and is expected on-stream by 2016
- Other significant discoveries have been made – Spanish Point but have not progressed
- The Irish Atlantic Margin compares favourably to the UK in terms of resource found and number of discoveries made if 43 wells is used as a cut-off point (Clair Ridge being the major difference)

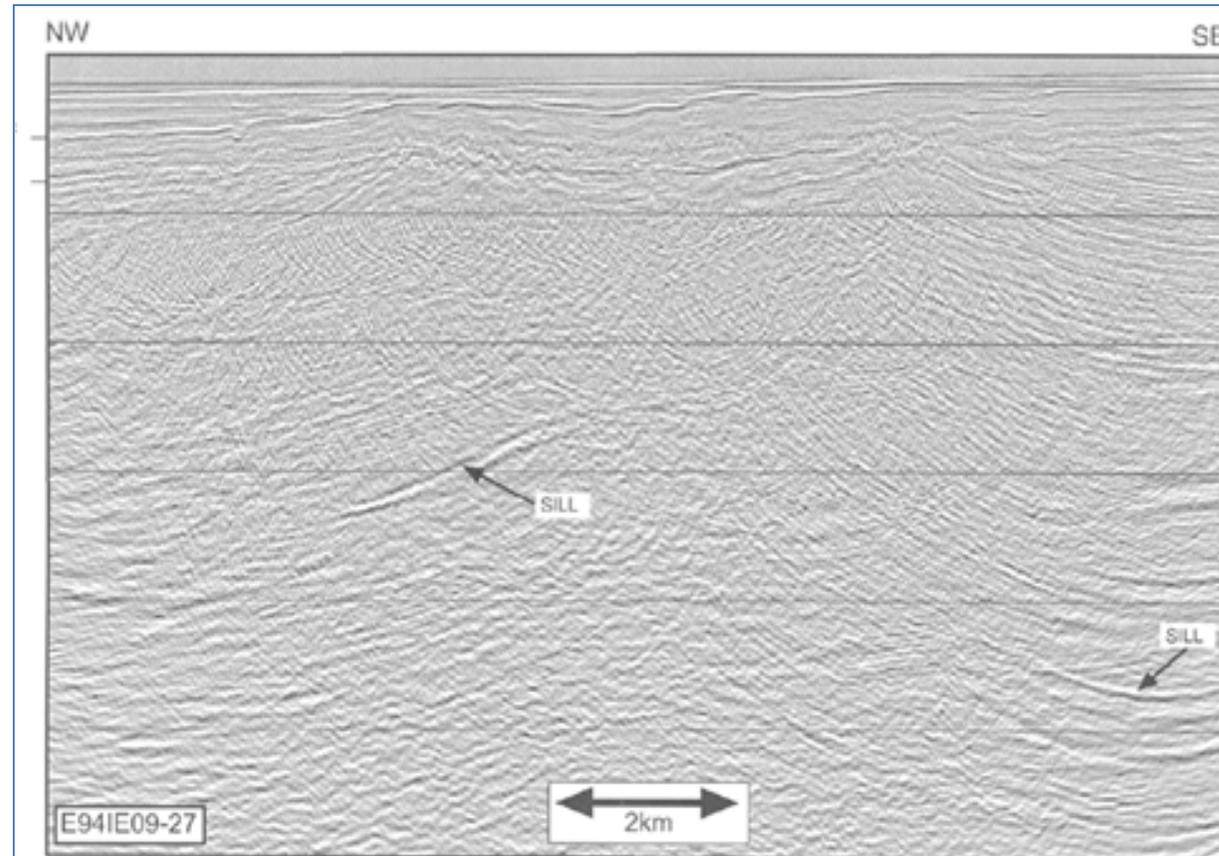
Drilling History 2

- Technical success in the context of this slide means shows rather than necessarily pay, but is used to give an indication of how many wells indicated a working petroleum system
- Majority of wells have targeted the Jurassic (27) and Triassic (13). Of these 17 are classified as having shows or better
- The traditionally deeper reservoirs are associated with large fault blocks that on vintage 2D seismic are easily identifiable, therefore these were the subject of early exploration wells
- Improved high resolution seismic (3D) now allows shallower subtle features to be identified, therefore future exploration activity will likely target these structures – more likely to comprise shallow stratigraphic and pinch-out traps, rather than structural traps (tilted fault blocks)



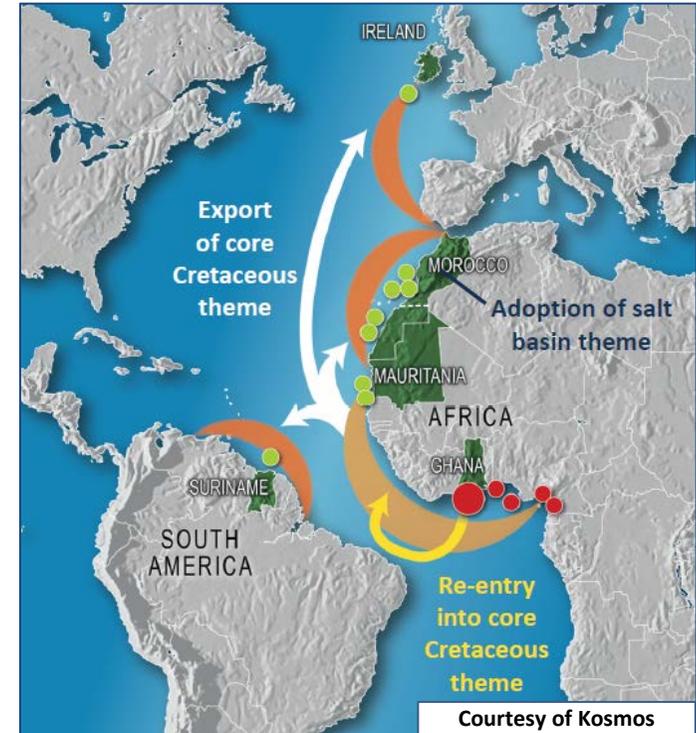
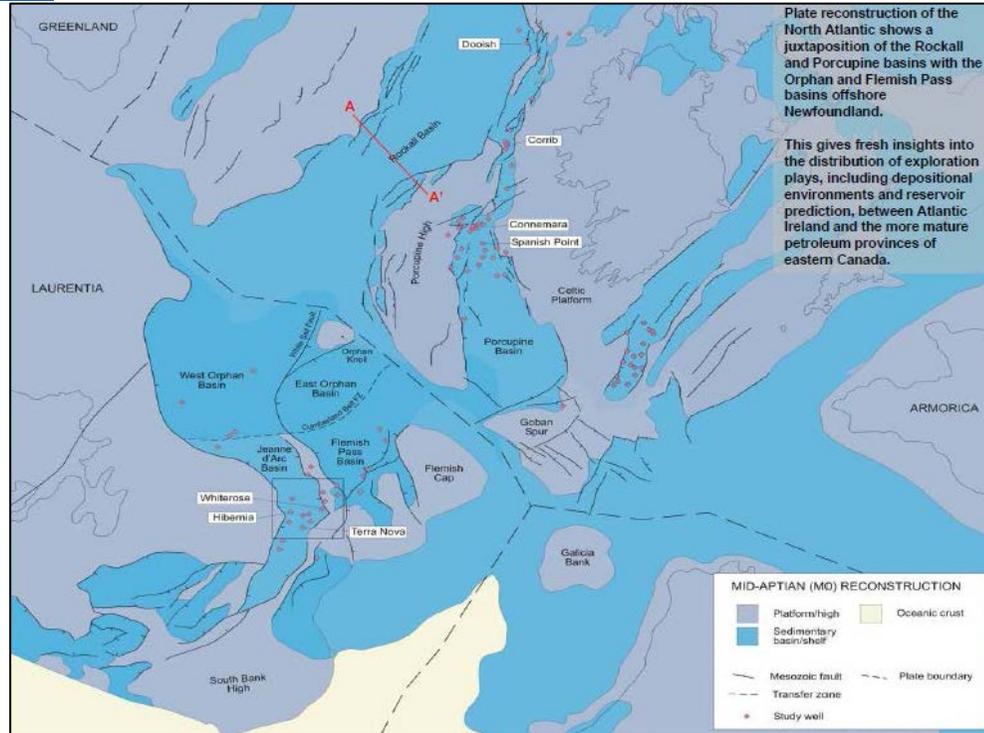
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Corrib Structure on 2D Seismic – From Dancer and Pillar 2001 “Exploring in the Slyne Basin: a geophysical challenge”

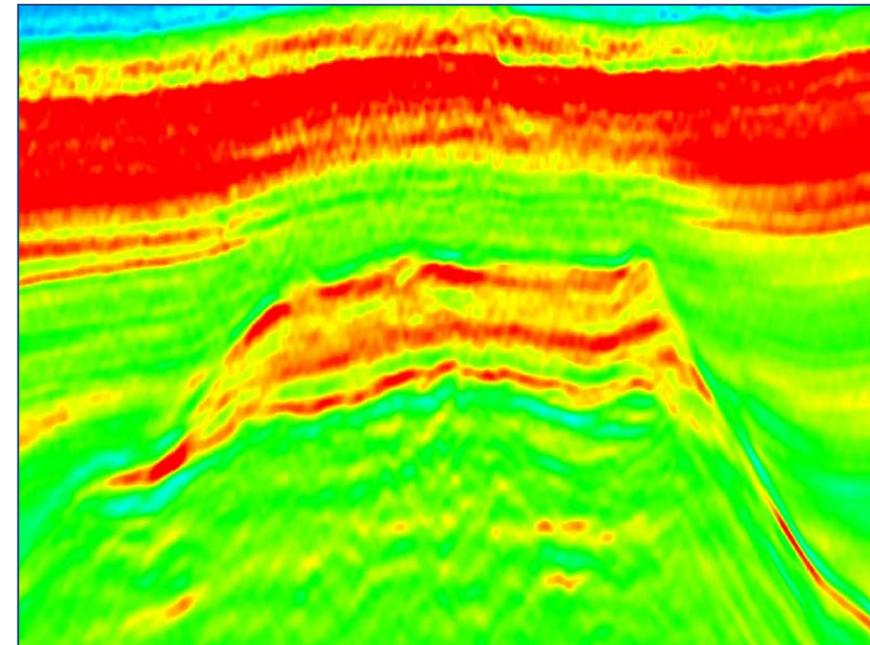
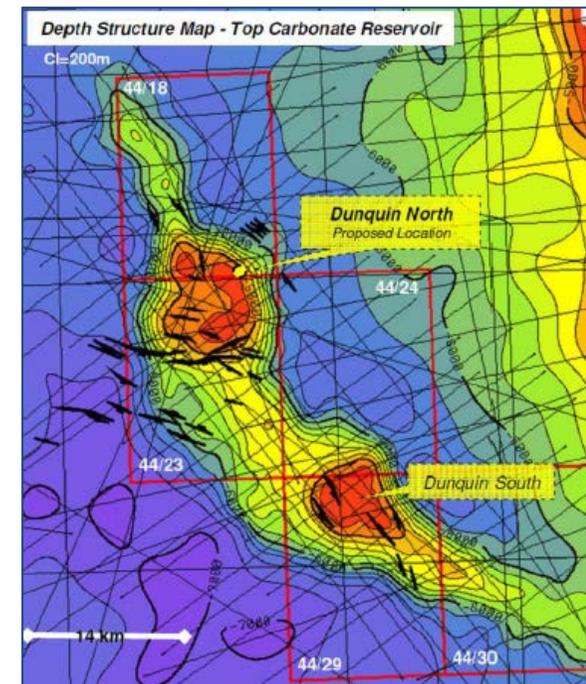
From Past to Present



- Having looked at historic activity it is a good point to see what has changed since the 2011 Licence Round to make Ireland a different place
- New understanding of link geology has encouraged activity in the Irish Atlantic Margin
- West African players are now entering the basin chasing post-rift Cretaceous and Tertiary combination plays
- Success in the conjugate margin has spurred entrance by large aptian companies into Irish waters chasing large Upper Jurassic and Lower Cretaceous structures

Dunquin and Future Activity

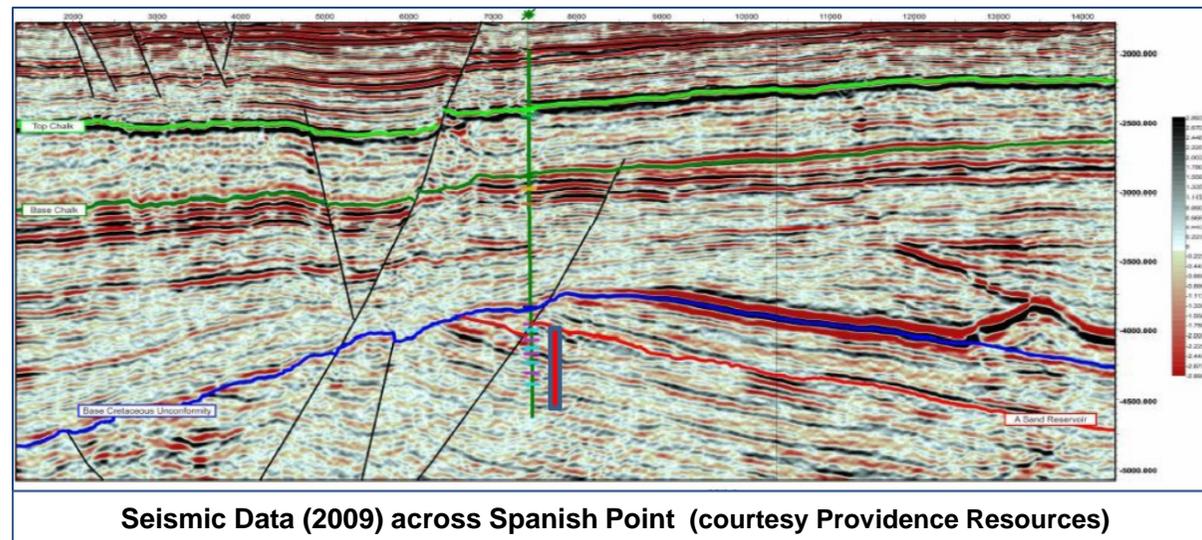
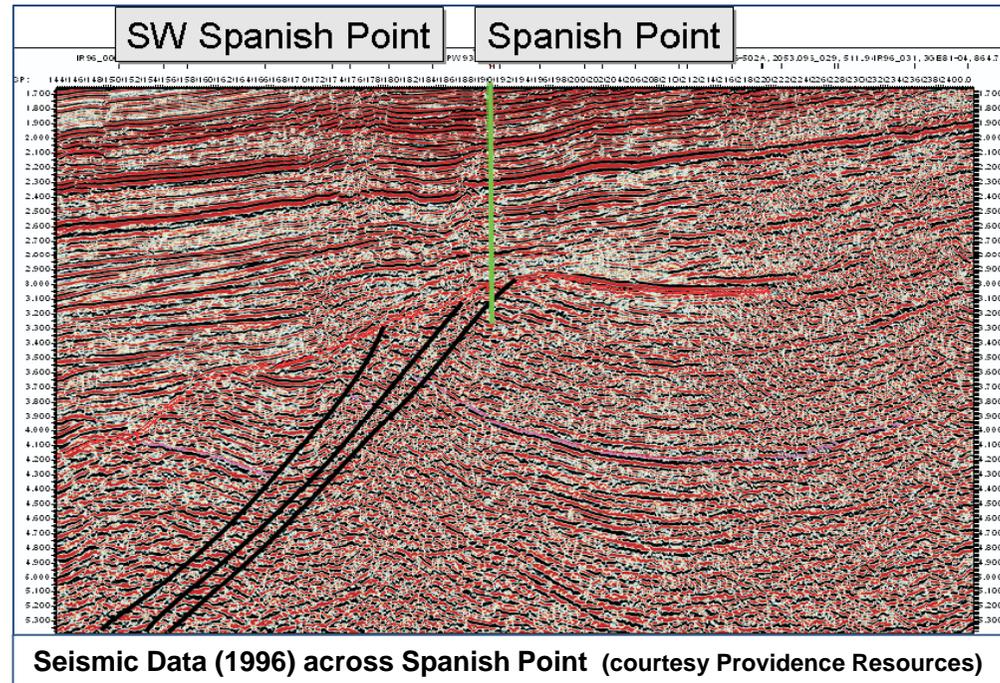
- Dunquin – A play opening prospect
- The level of pre-drill deal activity was encouraging
- Whilst this was an expensive well the result is still seen as being largely positive
- This has de-risked Dunquin South to some degree – still uncertainty about the age of source rock (Mid-Upper Jurassic or Lower Cretaceous?) but importantly the hydrocarbon system works
- Question becomes – what is next?
- Many new techniques and ideas now being applied offshore Ireland for the first time which are enjoying success elsewhere in the world
 - CSEM techniques in Norway - Already acquired in the Celtic Sea Basins
 - High resolution 3D seismic – Being acquired in the Porcupine and Celtic Sea Basins allowing identification of different plays



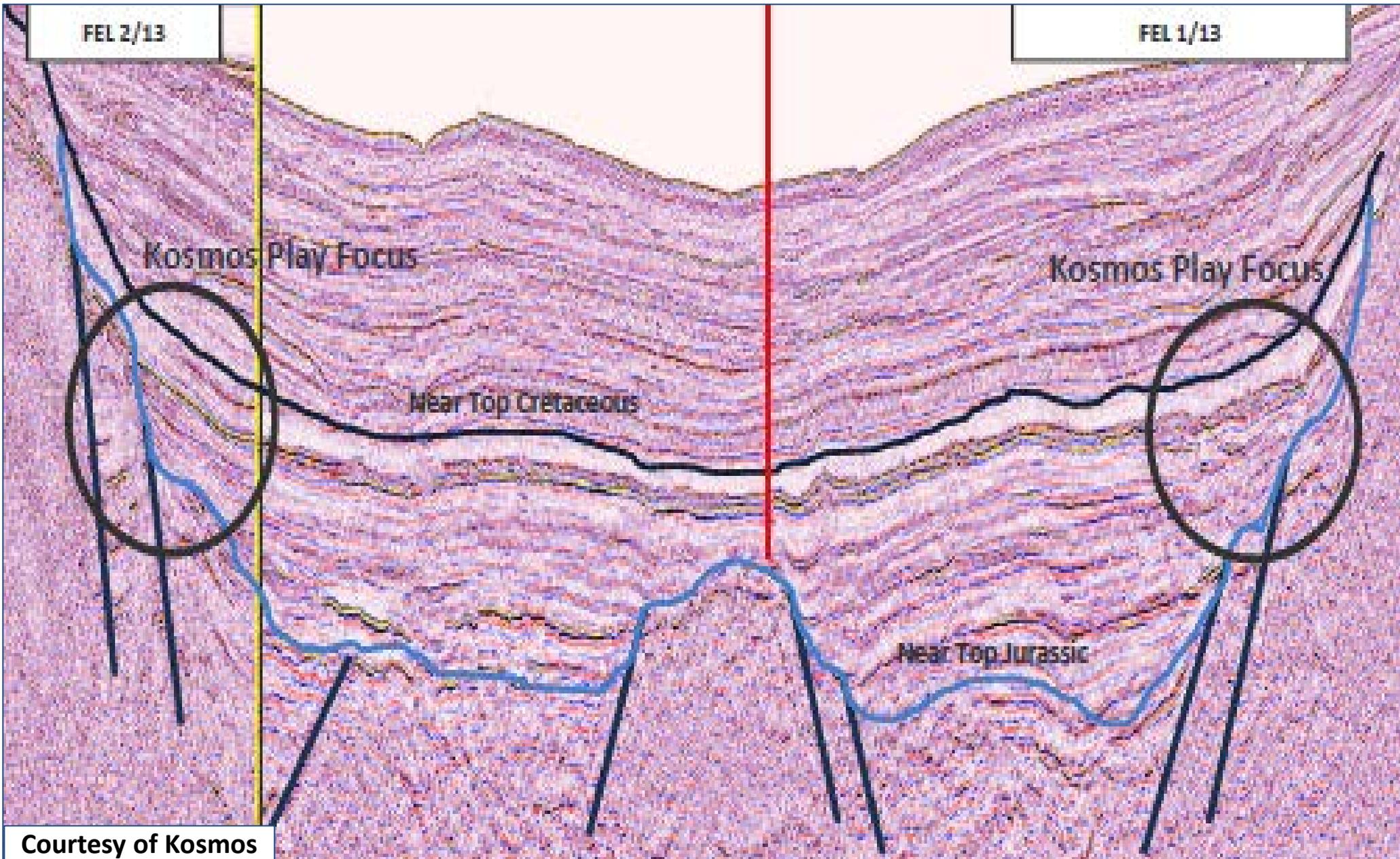
Dunquin North – Courtesy Providence Resources

1: Seismic Data Improvements I

- New 3D seismic data is being acquired with big improvements in terms of both resolution and depth.
- This is **a)** allowing new structures to be mapped – for example in the Porcupine where Cretaceous and tertiary prospectivity is now being mapped and **b)** allowing older structures to be defined with more clarity
- Previously, only the large deeper fault block structures were the subject of exploration. The advent of high resolution 3D seismic allows much shallower and subtle structures to be resolved and interpreted.
- Spanish Point is an example of a structure that has and continues to receive attention by Cairn
- In the Celtic Sea Basin (outside of the Atlantic Margin, granted), recent high resolution 3D seismic acquisition has made the interpretation of the deeper Triassic structures possible, with previous drilling having only targeted the shallower Cretaceous Wealden and Greensand formations.

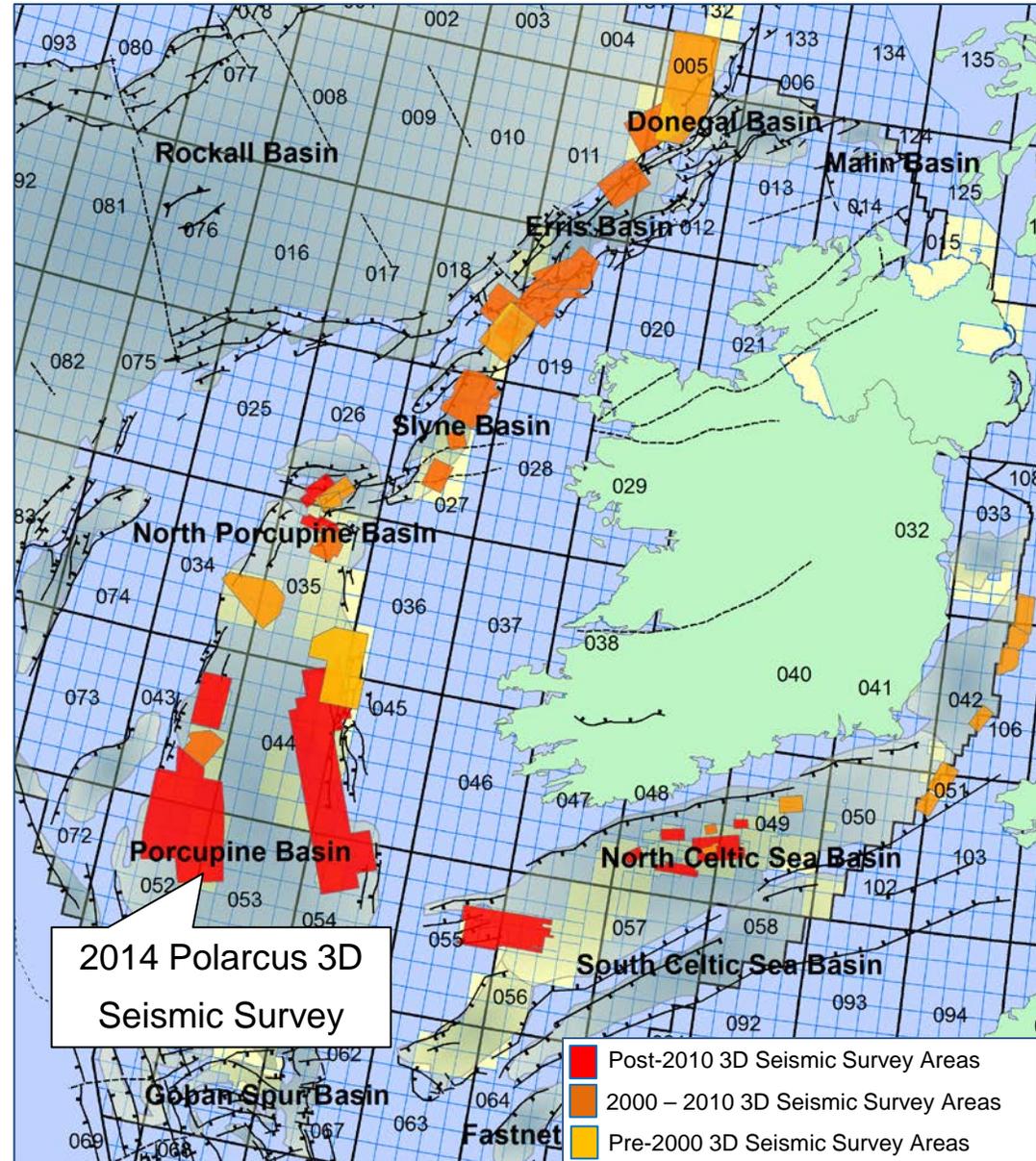
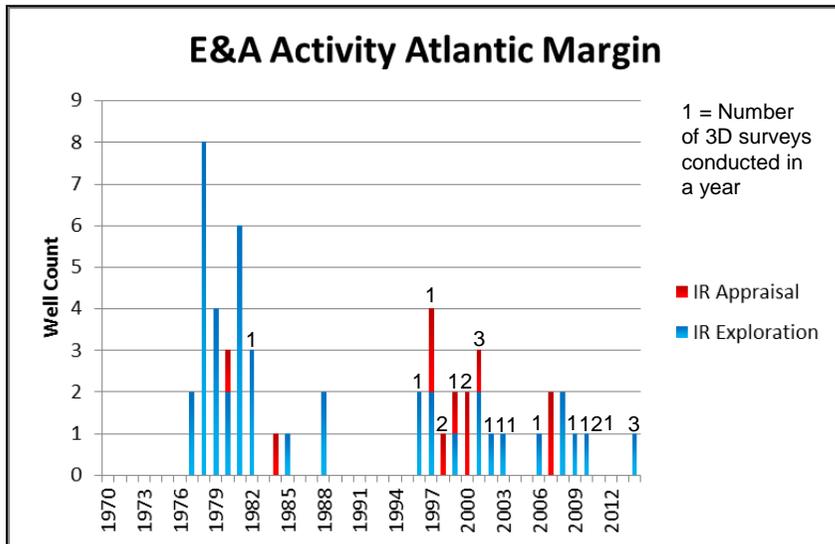


1: Seismic Data Improvements I



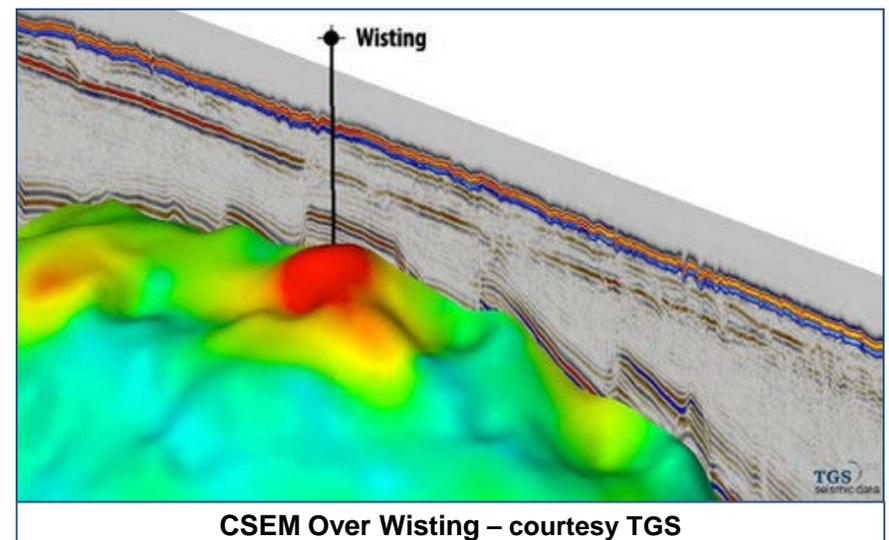
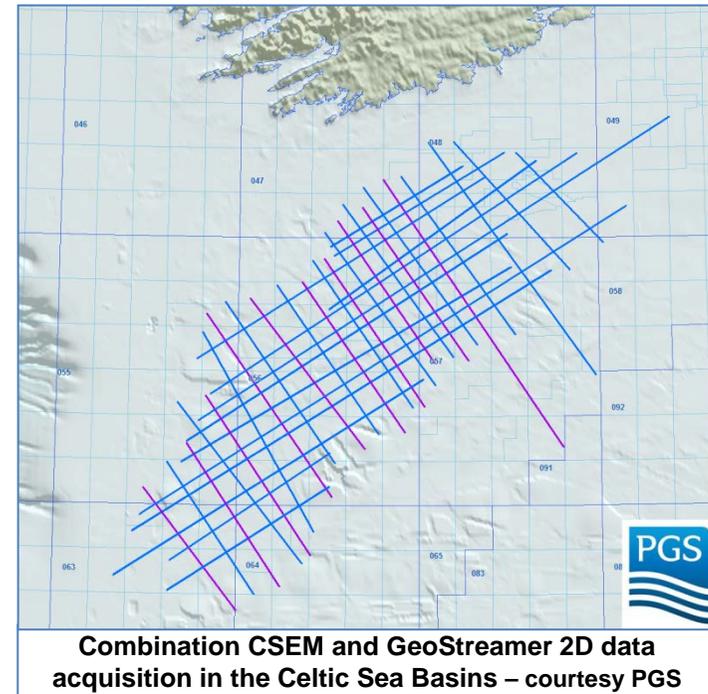
1: Seismic Data Improvements II

- Map indicates those areas that have been subject to 3D seismic data acquisition – with all the main Atlantic Margin basins covered.
- Latest survey in the Porcupine Basin was acquired by Polarcus over Drombeg (Stratigraphic Cretaceous Prospect in Licence FEL 2/14) and surrounding acreage as part of a multi-client survey
- Importantly note the timing of E&A activity and number of 3D surveys per year



2: CSEM Data Acquisition

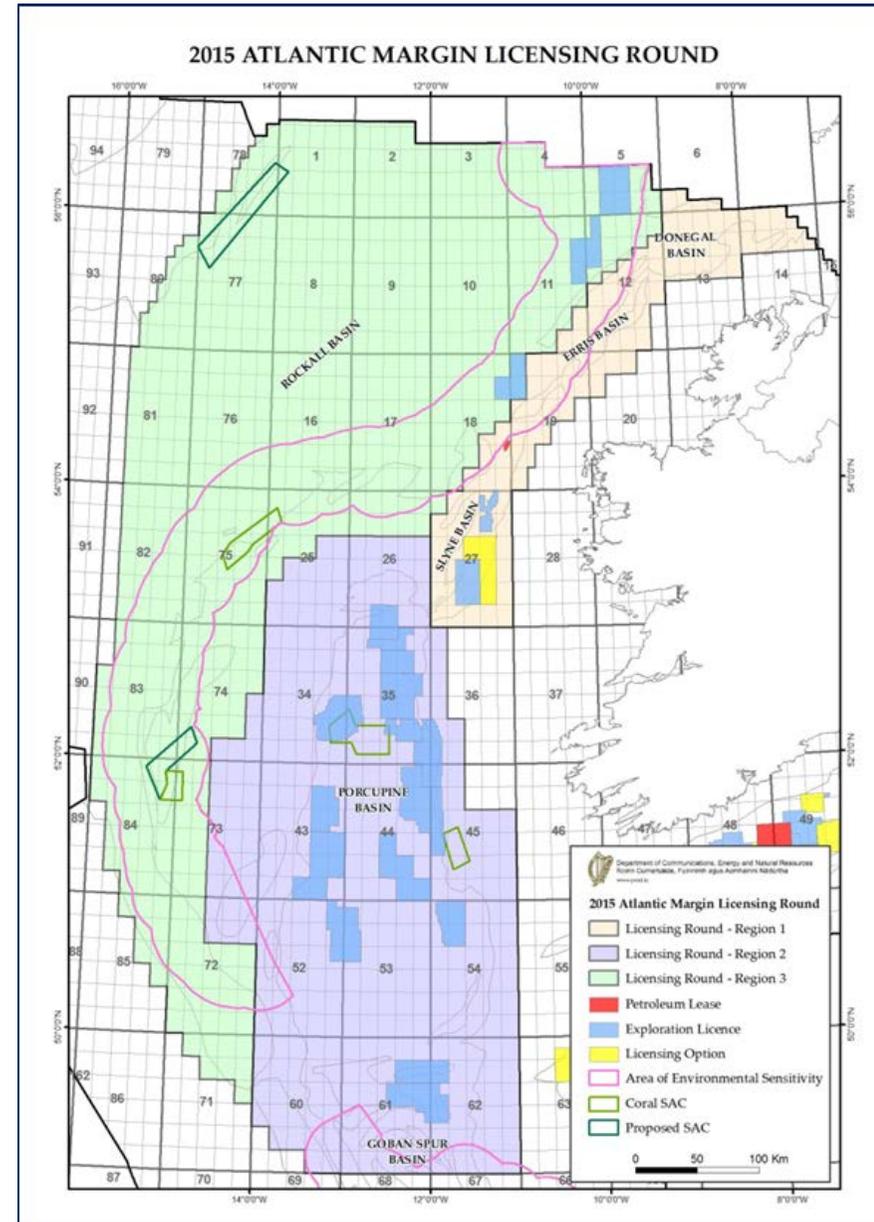
- CSEM utilises the increased electrical resistivity of hydrocarbon saturated rocks to determine potential oil/gas accumulations (often incorrectly referred to as a DHI)
- Comprises a tool with significant potential to better delineate prospects prior to drilling, but also the detect the presence of hydrocarbons in previously drilled structures
- At the end of 2013 PGS completed the first simultaneous acquisition offshore Ireland
- In Norway this technique is now being utilised over many prospects, in particular by companies such as OMV and North Energy and partners to firm-up prospects prior to exploration drilling.
- However care is needed – CSEM must be supported by other geophysical techniques – Well 7218/8-1 (Norway) was a failure and was drilled on the basis of a 2D EM anomaly



3: Fiscal Regime and 2015 Licensing Round

- Both announced at the same time – further encouragement for activity offshore Ireland
- The fiscal regime is designed primarily to encourage deep-water frontier exploration
- New fiscal terms: provides the state with increased share of revenues from each year of production
 - PPT charged on a field-by-field basis, and based on the fields' profitability
- Whilst these will result in overall greater tax take for the State, which may appear initially to serve to reduce any interest from potential new entrants the plan is for greater future stability for both companies with production and for the Irish people

Region	Government Take
North America	42 – 60+
South America	25 – 90
Ireland	25 - 55
UK	62 - 81
Norway	78
Sub Saharan Africa	44 – 85
FSU, Middle East, North Africa	60 – 90+
Asia (excluding Central)	40 – 84



Summary

- Although drilling activity to date has been disappointingly low on the Irish Atlantic Margin there are many reasons to be optimistic – historically the Irish Atlantic Margin compares reasonably to the UK Atlantic Margin
- The majority of wells drilled to date have targeted the deeper Jurassic and Triassic structures which were readily identifiable even on older seismic
- New Entrants are bringing innovative thinking to the Irish Atlantic Margin – The West African players are now chasing similar plays up into the Atlantic Margin & success on the Conjugate Margin is focusing attention on the Irish Atlantic Margin
- Dunquin was a pivotal well for the Irish offshore. The level of pre-drill interest was of huge encouragement for the sector
- Importantly, going forward, wells will be drilled based on post-2000 3D seismic data or better with much of the Southern Porcupine now covered by high quality 3D seismic data. New geophysical techniques are also now being employed
- HW believes that the Irish fiscal regime is suitable, giving an appropriate level of reward to E&P companies, in what is an expensive province to operate, whilst ensuring the Government tax take on future developments remains significant
- Given all of these positive factors it therefore seems that Ireland can look forward to a renewed activity set and potentially a new dawn of exploration