

Lansdowne

oil & gas



IRN Summit

5 June 2014

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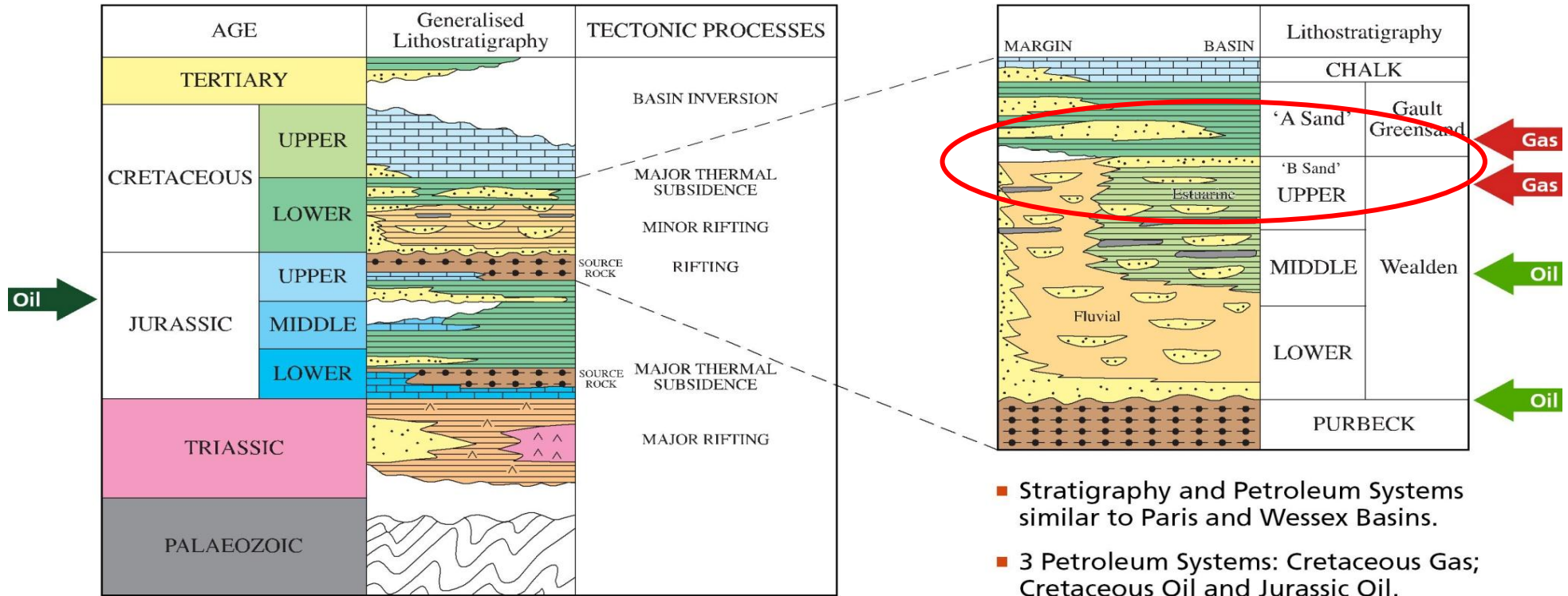
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Cretaceous Gas Play – Celtic Sea

- **Play Analysis**
 - **Source**
 - **Reservoirs**
 - **Traps**
- **Discoveries to date**
- **Additional Prospects**
- **Development Concepts and Infrastructure**
- **Conclusions**

Celtic Sea Petroleum Systems

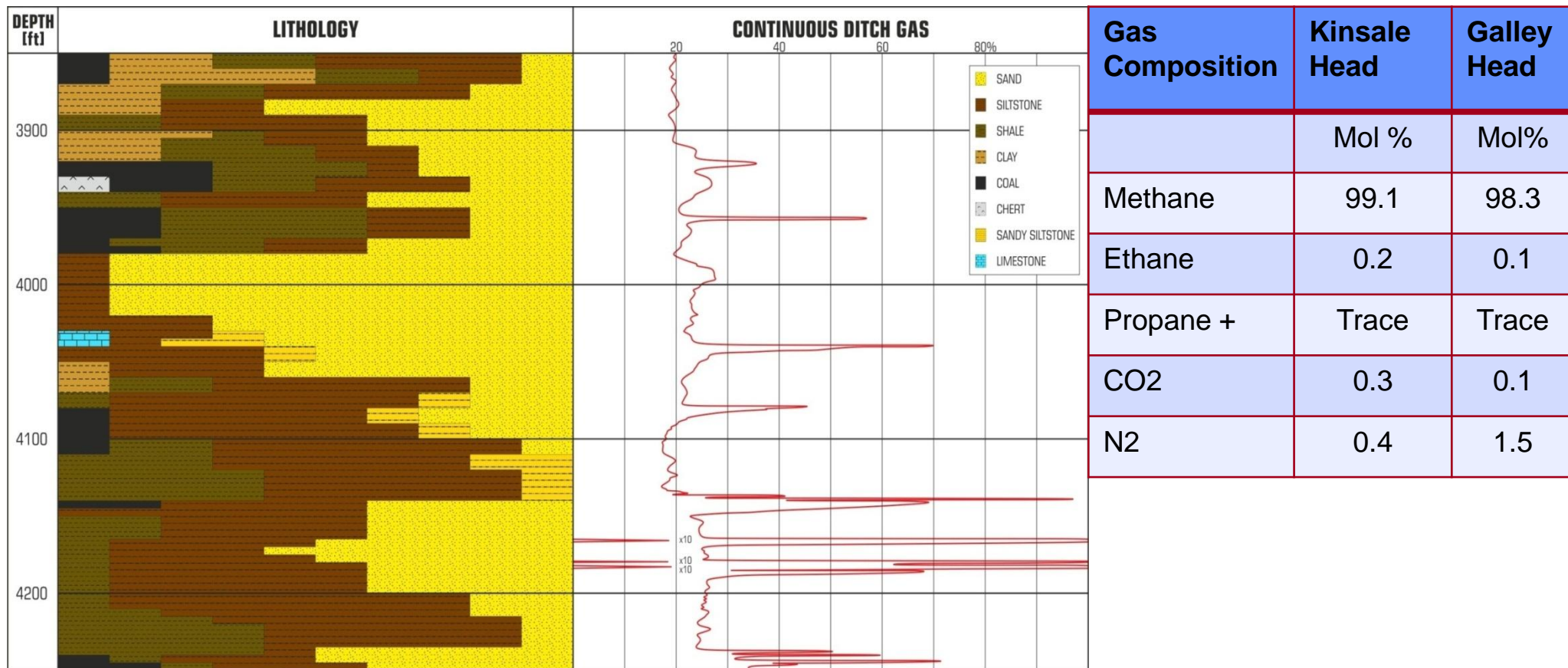
Celtic Sea – Stratigraphy



After Shannon (1991), Rowell (1995) and O'Sullivan (2001)

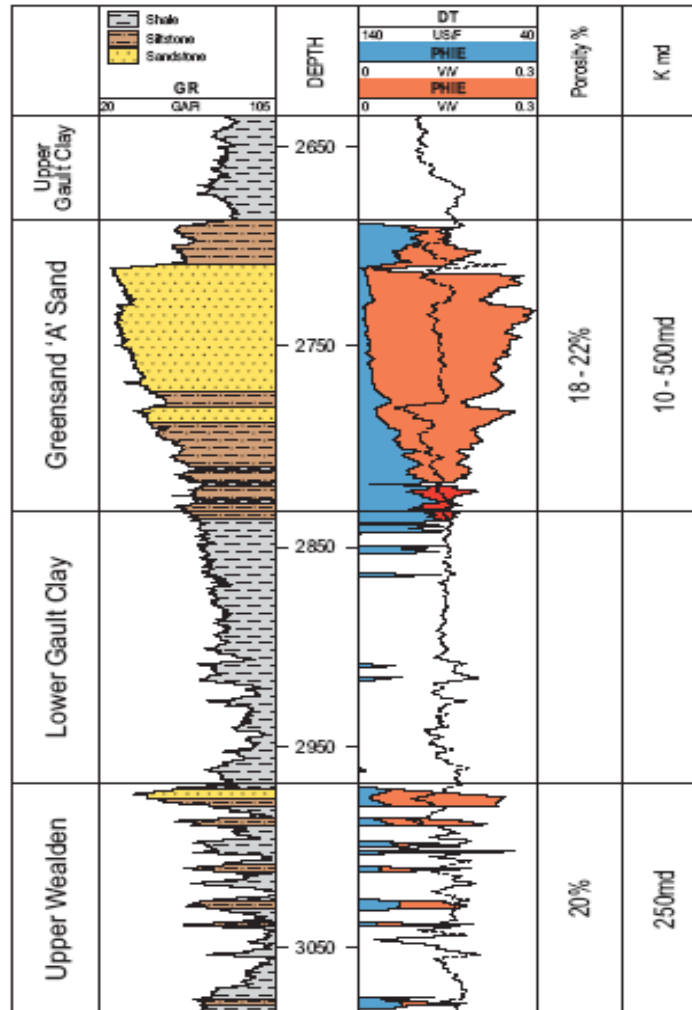
- Stratigraphy and Petroleum Systems similar to Paris and Wessex Basins.
- 3 Petroleum Systems: Cretaceous Gas; Cretaceous Oil and Jurassic Oil.

Source - Well 48/25-2 Mudlog Gas Shows



Cretaceous Gas Play – Reservoirs

Kinsale Area Type Log



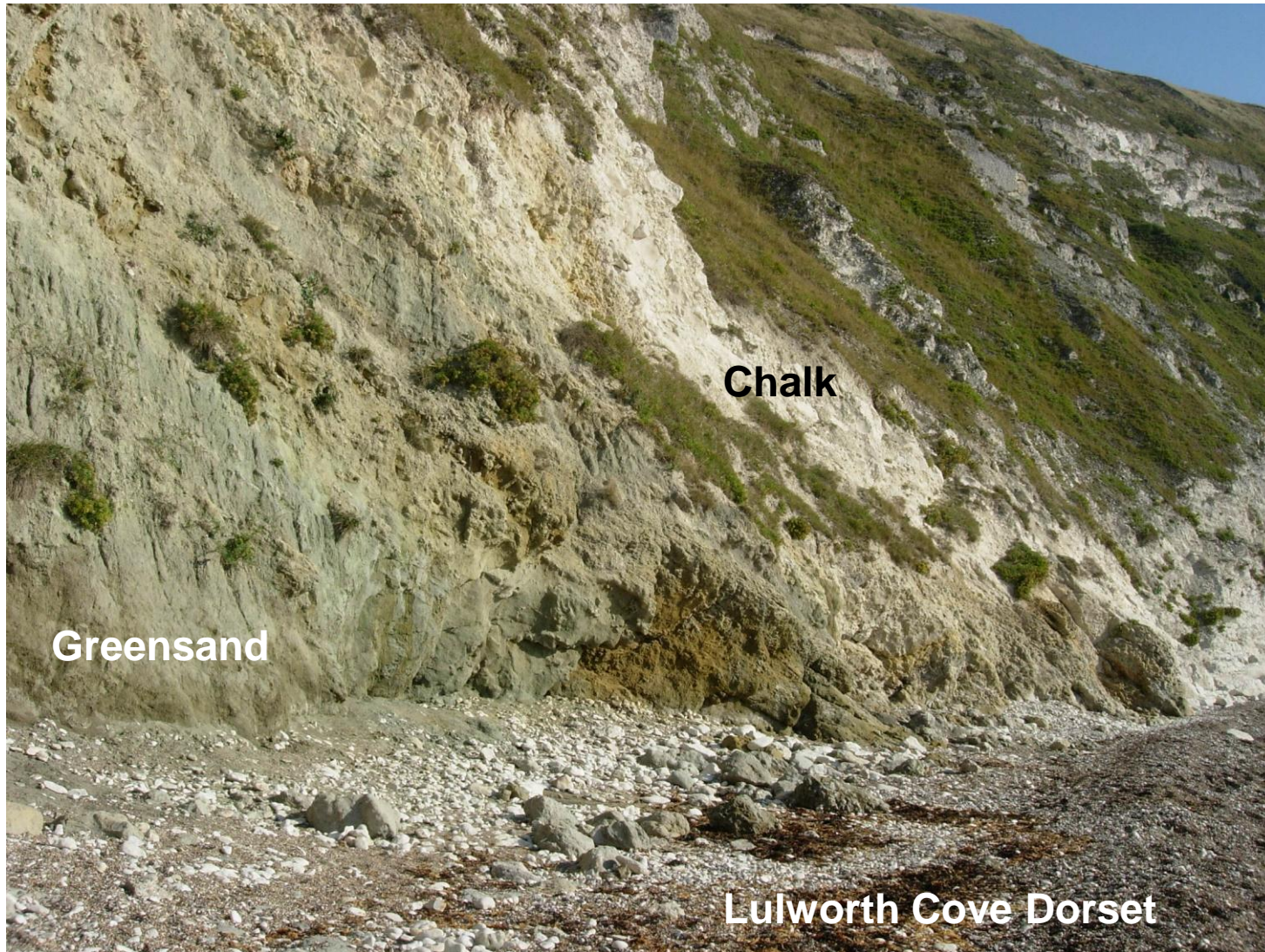
Primary Target

Secondary Target

Greensand or A Sand	
Producing	Kinsale Ballycotton
Discoveries	Galley Head
Target	Rosscarbery Midleton East Kinsale

Upper Wealden	
Producing	Kinsale Seven Heads
Discoveries	Old Head, Schull, Carrigaline, Ardmore
Target	Rosscarbery East Kinsale

Greensand Reservoir Model



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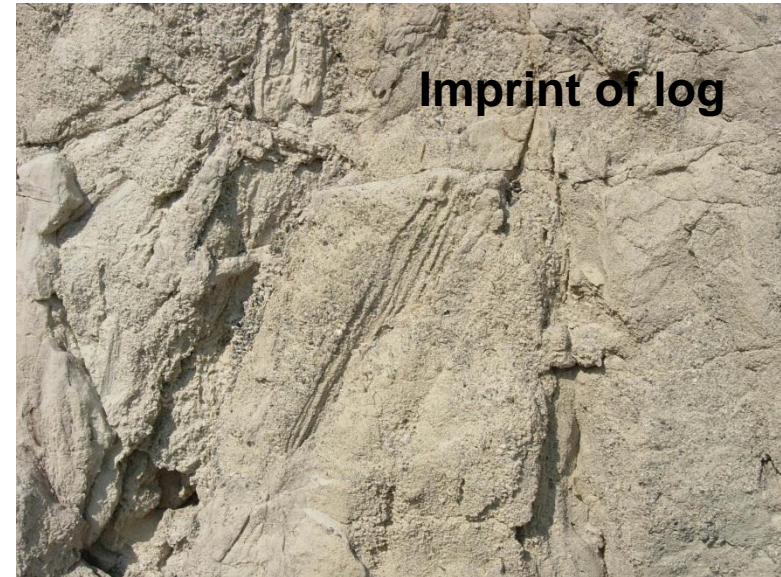
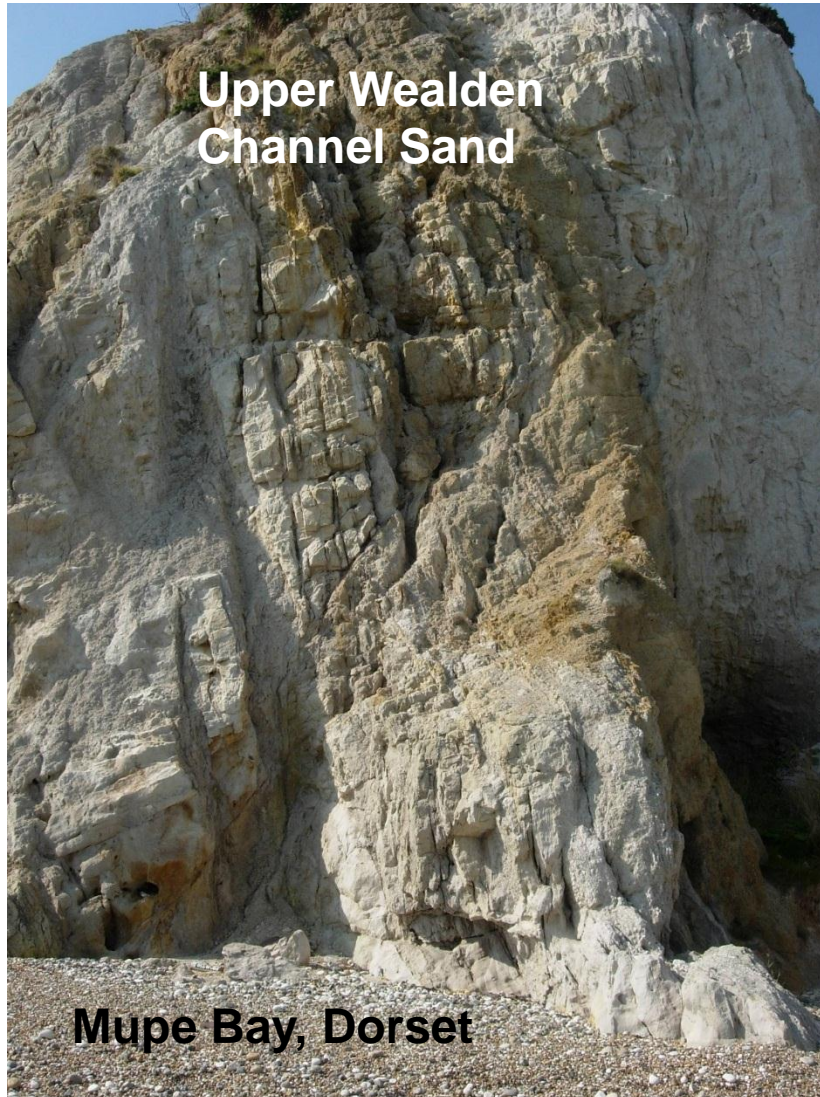
Greensand Reservoir Model



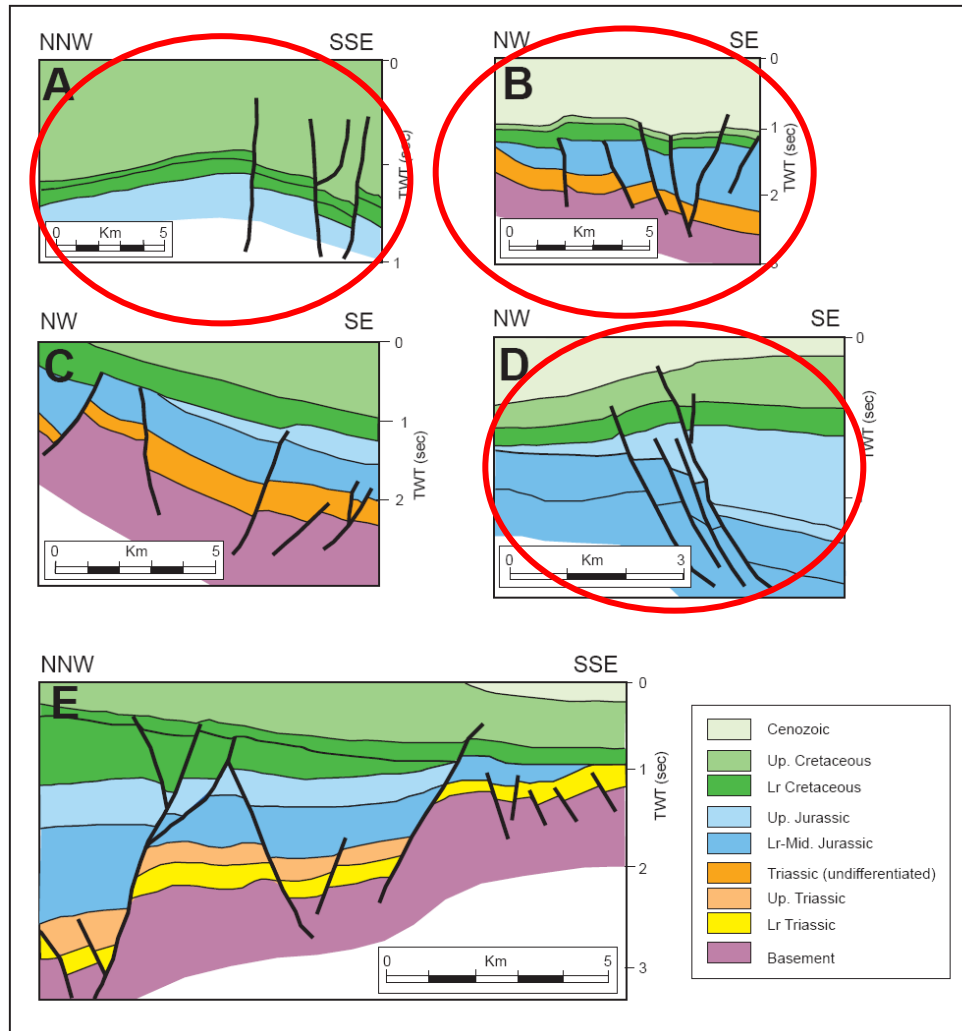
Upper Wealden Reservoir Model



Upper Wealden Reservoir Model



Structures



Schematic Illustration of Play and Traps Types in the Celtic Sea Basins

(Naylor & Shannon 2011)

Showing Inversion Traps A,B and D, formed during compression in the Tertiary

Structures



Stair Hole, Lulworth, Dorset

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Structures



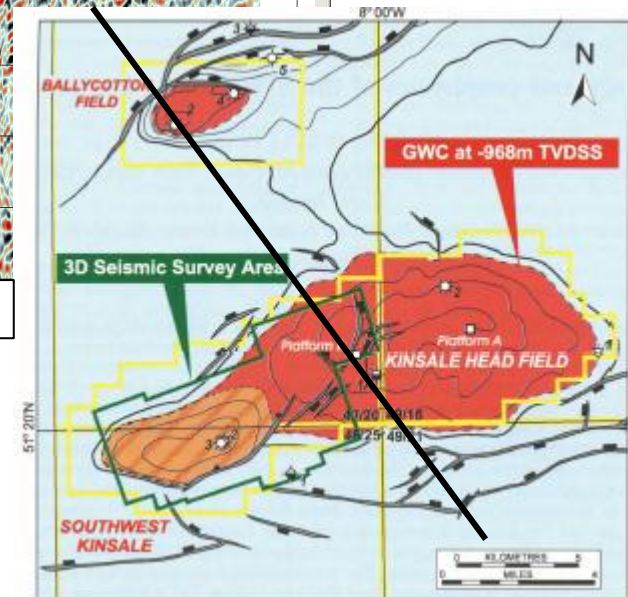
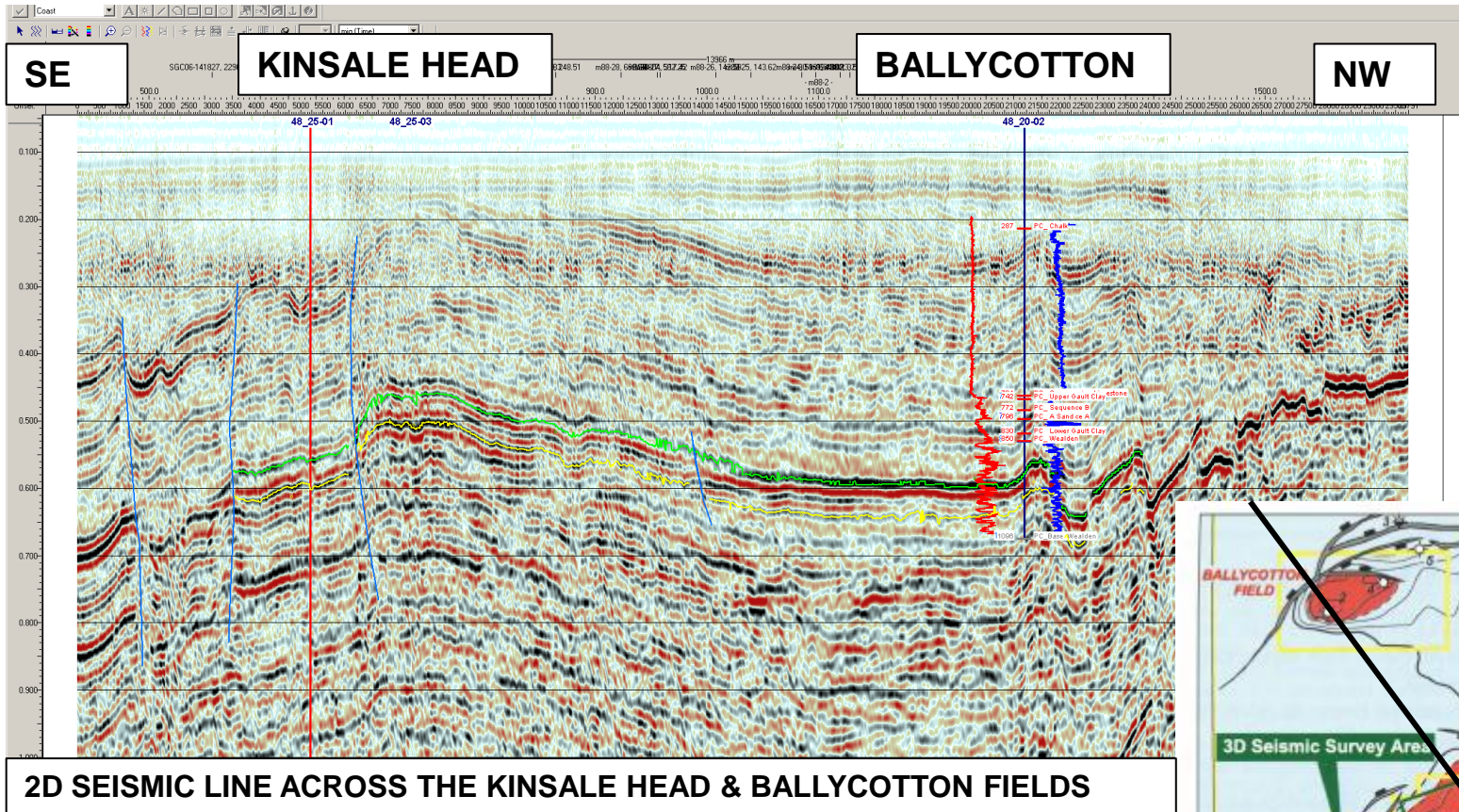
Structures



Dorset looking eastwards across Mupe Bay

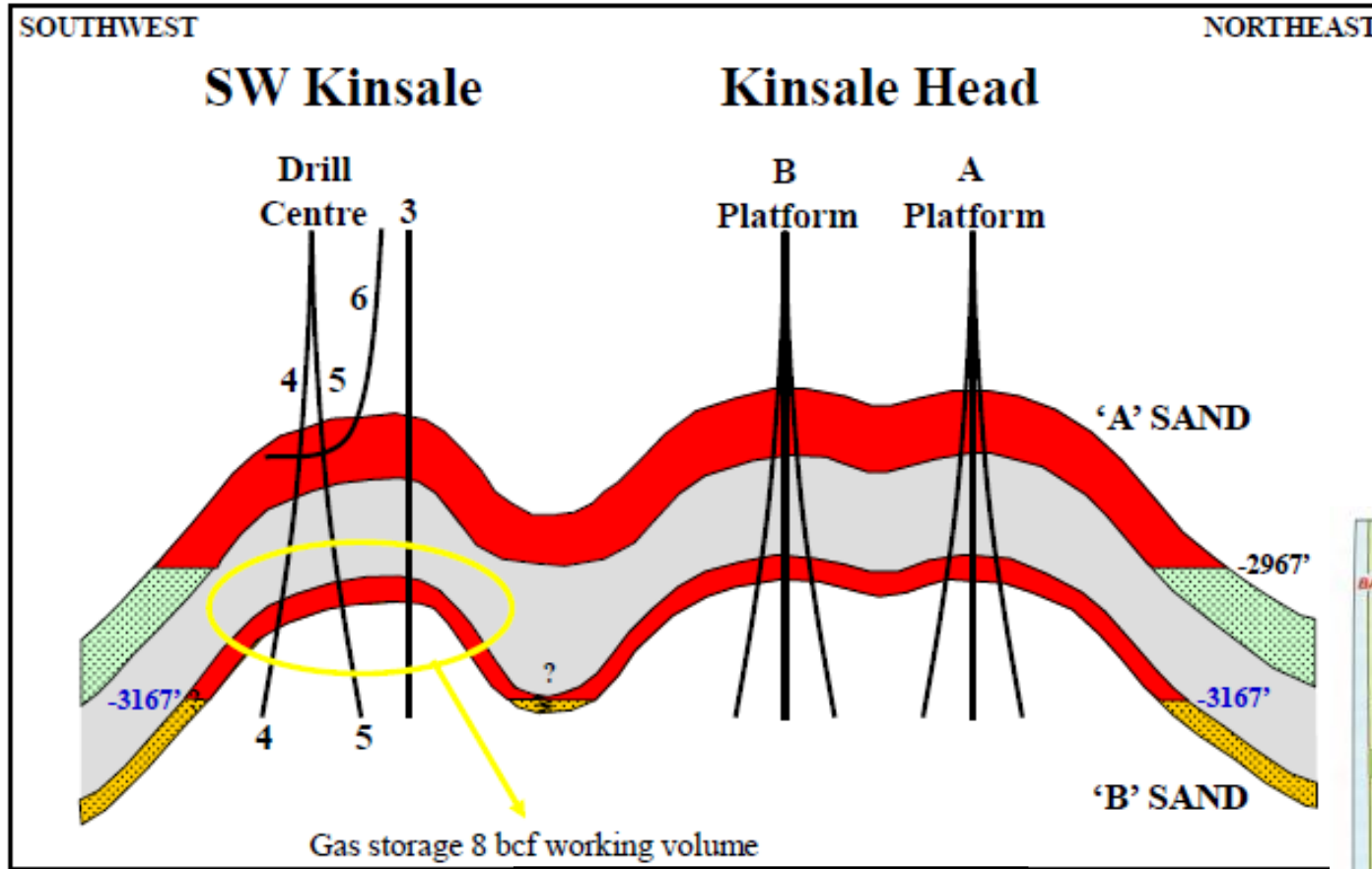
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Structures

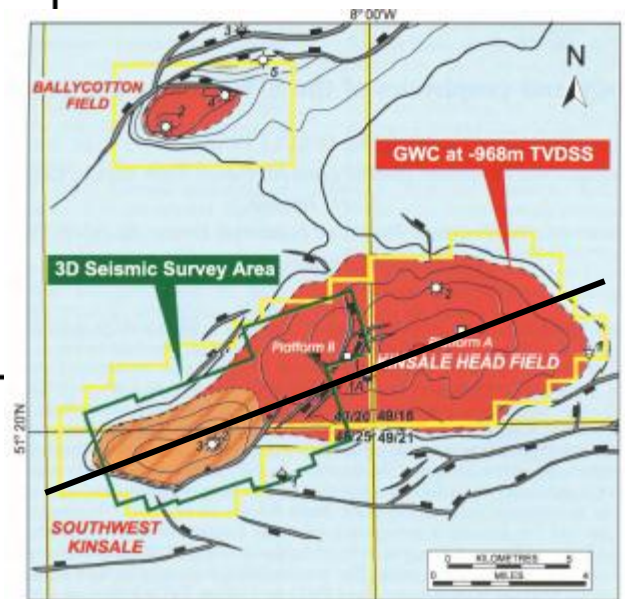


Source: O'Sullivan 2001

Structures – Kinsale Head



Source: Kinsale Energy/PETRONAS

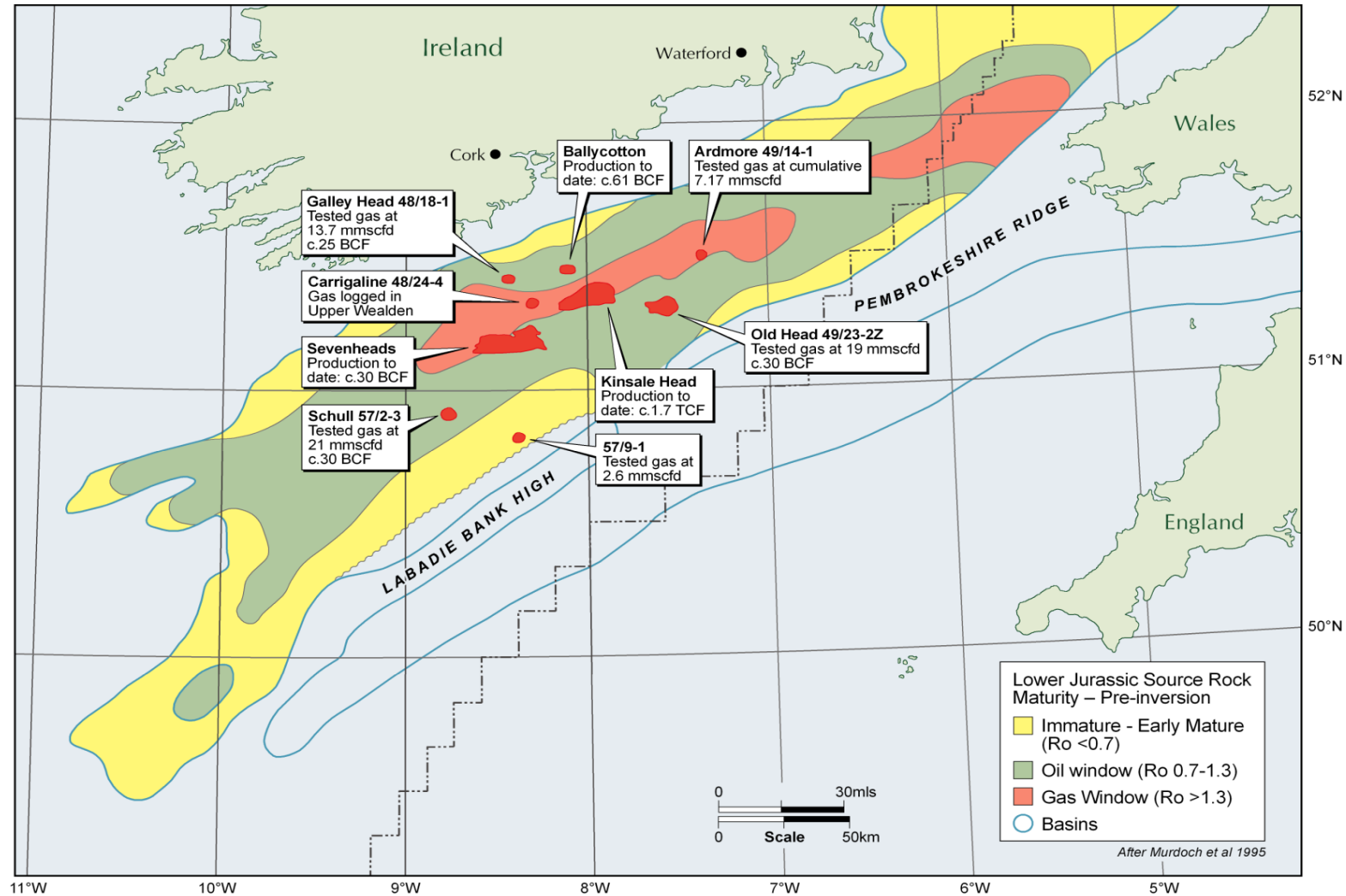


Source: O'Sullivan 2001

Cretaceous Gas Play – Celtic Sea

- **Play Analysis**
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Discoveries



Discoveries – in production

	Kinsale Head Gas Field (bcf)	Ballycotton Gas Field (bcf)	Seven Heads Gas Field (bcf)	Total
Original Gas in Place	1,900	60	40	2,000
Total Produced to end 2013	1,727	57	29	1,813
Future Gas Production	60	1	5	66
Total Gas Recoverable	1,787	58	34	1,879
Life of Field Gas Recovery	94%	97%	85%	

Source: Kinsale Energy/PETRONAS

Discoveries – not in production

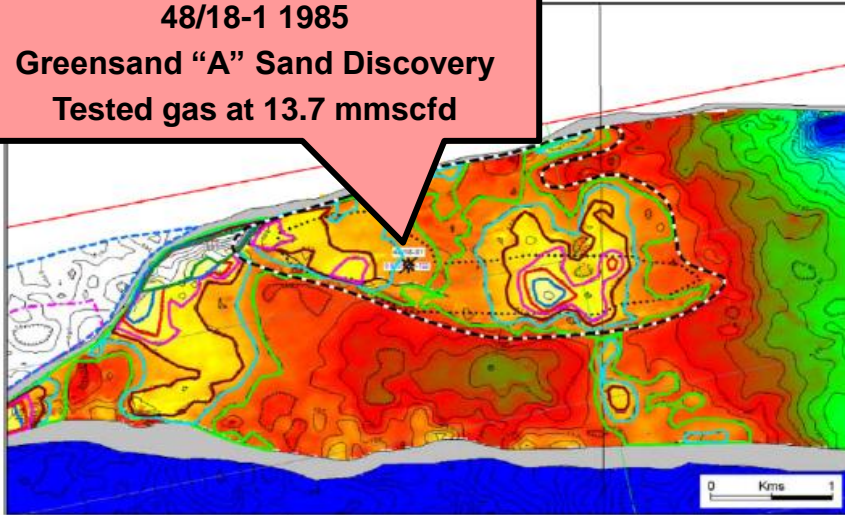
Discovery name	Discovery well	Year drilled	GIIP P90 (bcf)	GIIP P50 (bcf)	GIIP P10 (bcf)
Ardmore	49/14-1	1974	c.20	c.30	c.40
Galley Head	48/18-1	1985	21	30	41
Carrigaline	48/24-4	1990	60	82	108
Old Head	49/23-1	2006	49	57	64
Schull	57/2-3	2007	52	60	69
TOTAL GIIP			202	259	322
Recovery Factor %			65	75	85
Potential recoverable			131	194	274

In bold – covered by 3D Seismic

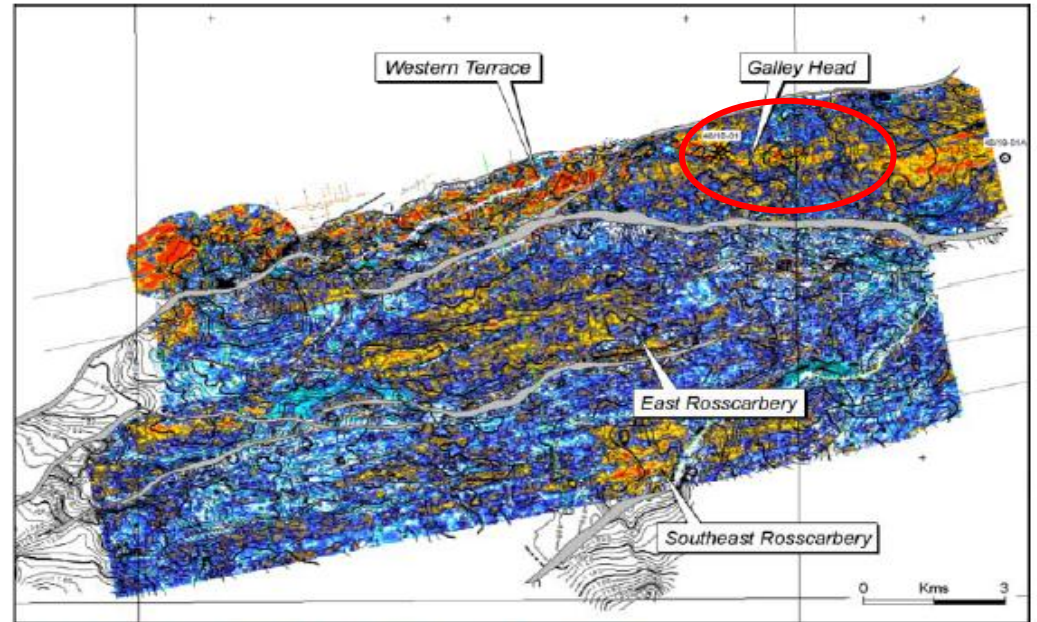
Galley Head

48/18-1 1985

Greensand "A" Sand Discovery
Tested gas at 13.7 mmscfd



Galley Head, 'A' Sand Volumetrics

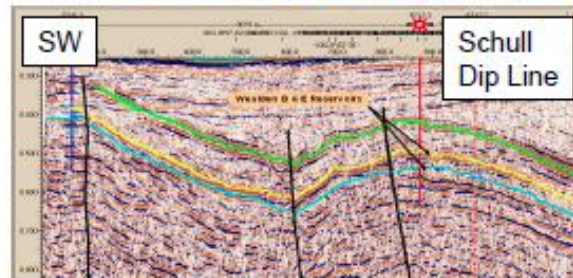
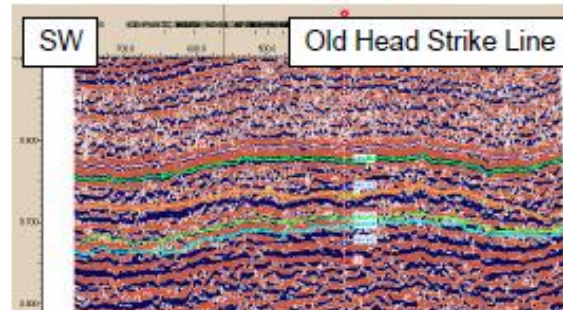
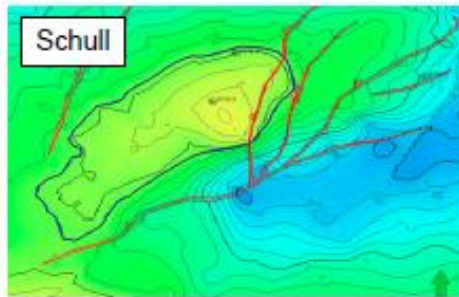
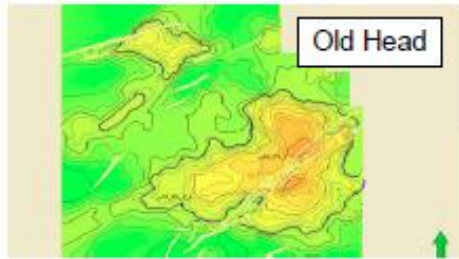


Top A Sand Amplitude Map – 'A' Sand Prospects

Water Depth :	295 feet
Planned Total Depth :	3,200 feet

Reservoir	BCF GIIP/Recoverable		
	P90	P50	P10
"A" Greensand	21/18	30/25	41/35
Total	21/18	30/25	41/35

Old Head and Schull



49/23-2z Tested gas at a rate of 18 mmscfd

57/2-3 Tested gas at a rate of 21 mmscfd

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Cretaceous Gas Play – Additional Prospects

- **Not an exhaustive list**
- **Prospects identified on Lansdowne's acreage and included in Competent Person's Reports (CPR's)**
- **Modified post mapping of 3D seismic**
- **Other prospects on which data has been published**

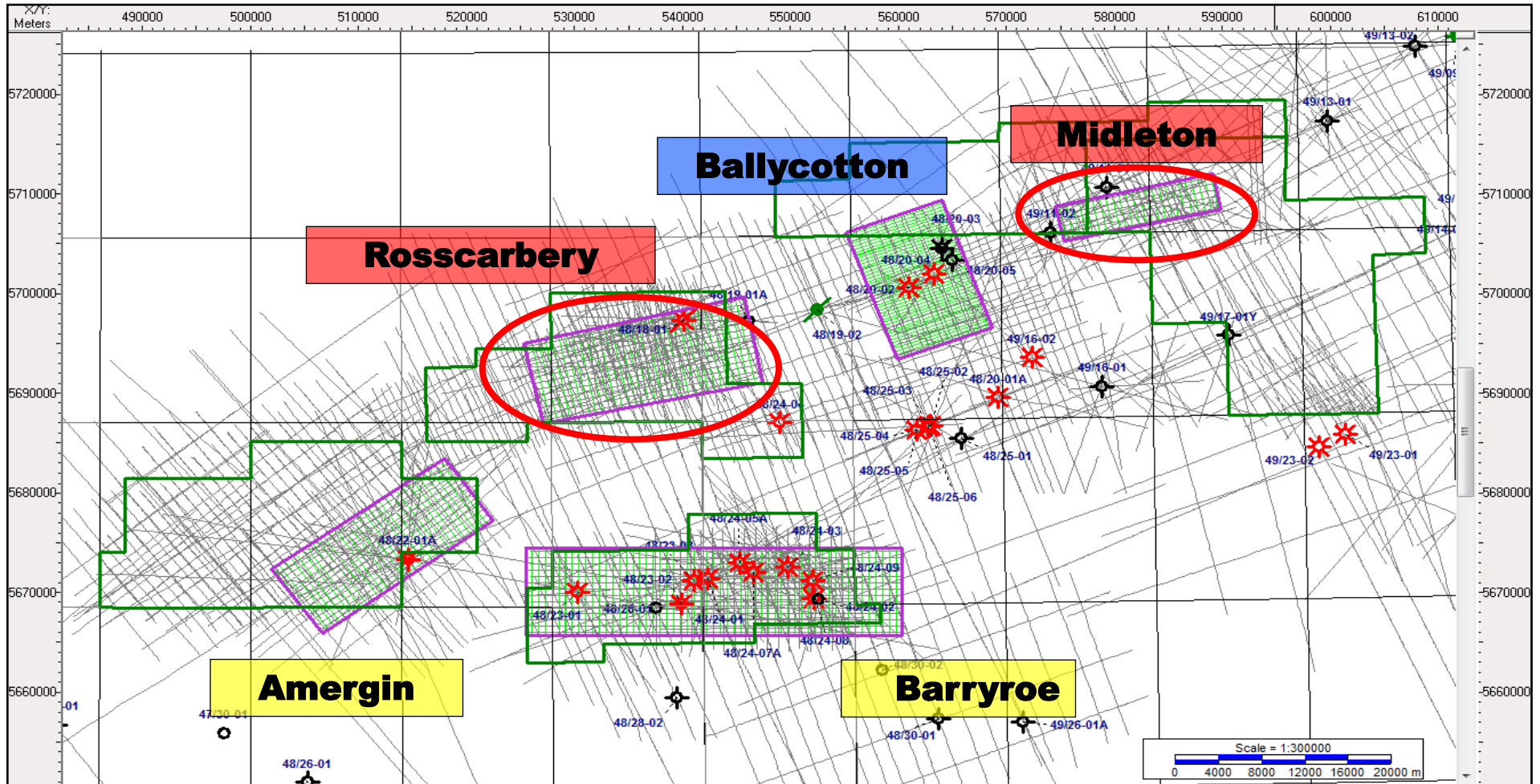
Prospects

	GIIP P90 (bcf)	GIIP P50 (bcf)	GIIP P10 (bcf)
Midleton	269	330	404
Rosscarbery Main	168	202	241
SE Rosscarbery	85	122	159
Western Terrace	27	32	38
East Kinsale	81	155	285
W Rosscarbery	30	74	186
N Horst	32	48	71
NE Horst	19	40	87
West Barryroe	21	34	56
N Schull	25	45	74
C Schull	23	37	57
TOTAL	780	1119	1658

In bold – covered by 3D Seismic

Sources: Lansdowne CPR, Merlin Resources, Island Oil & Gas

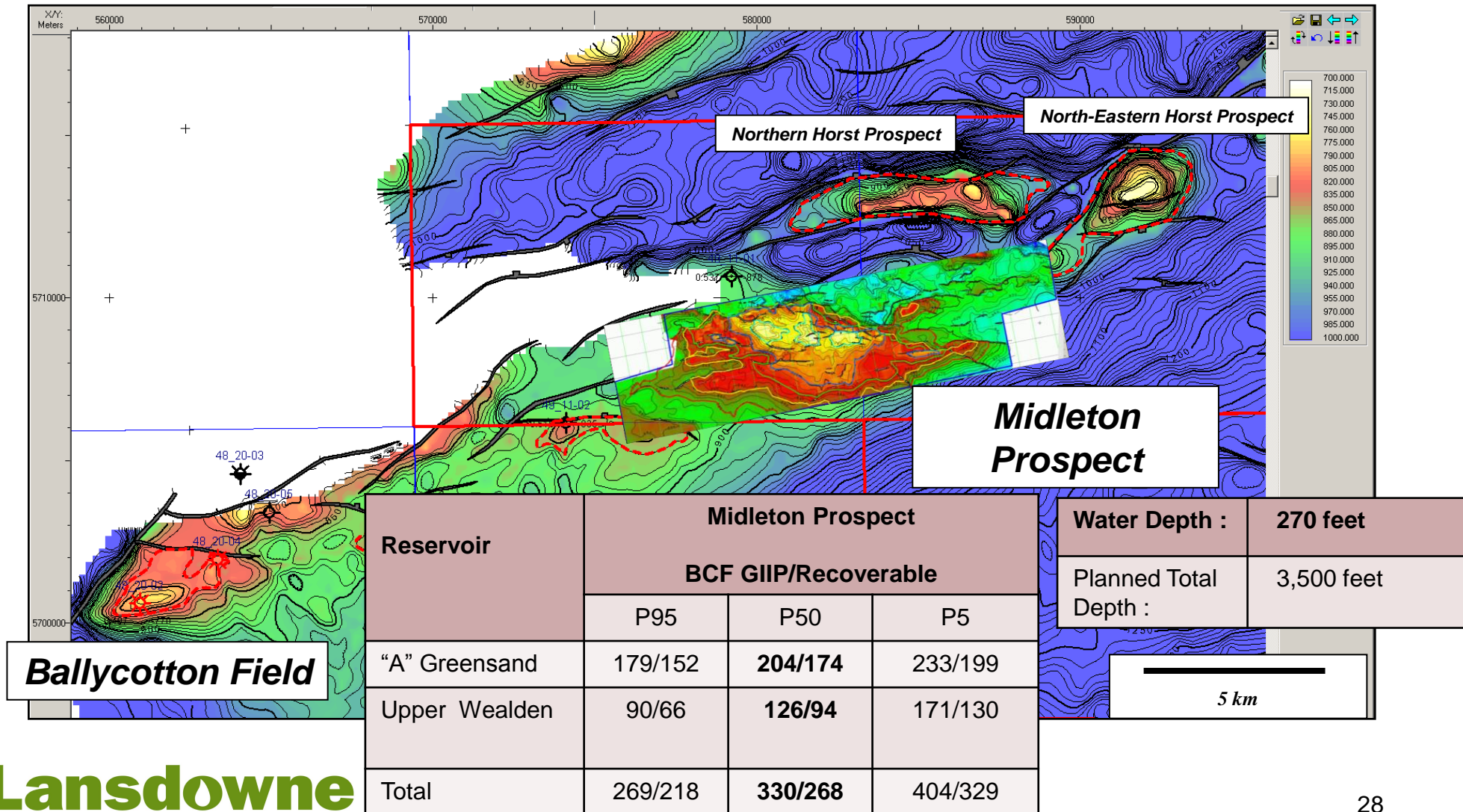
Benefits of 3D Seismic



Cretaceous Gas Play – Celtic Sea

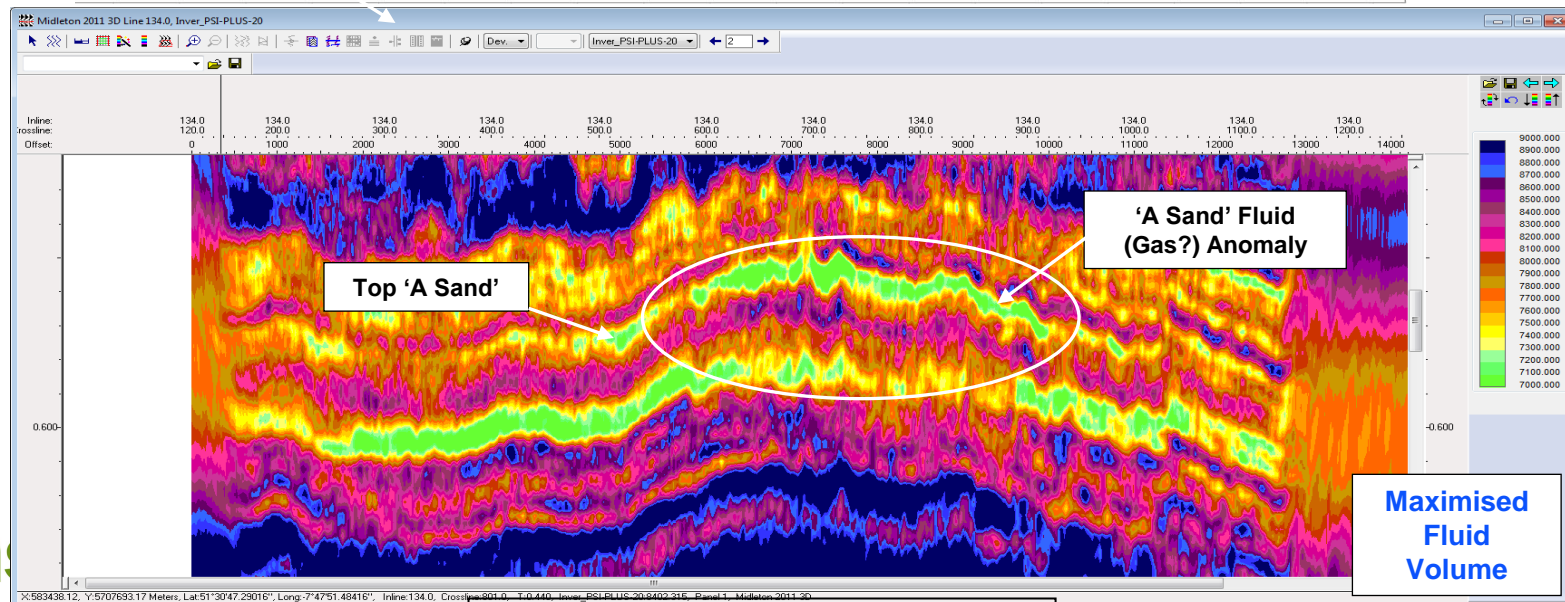
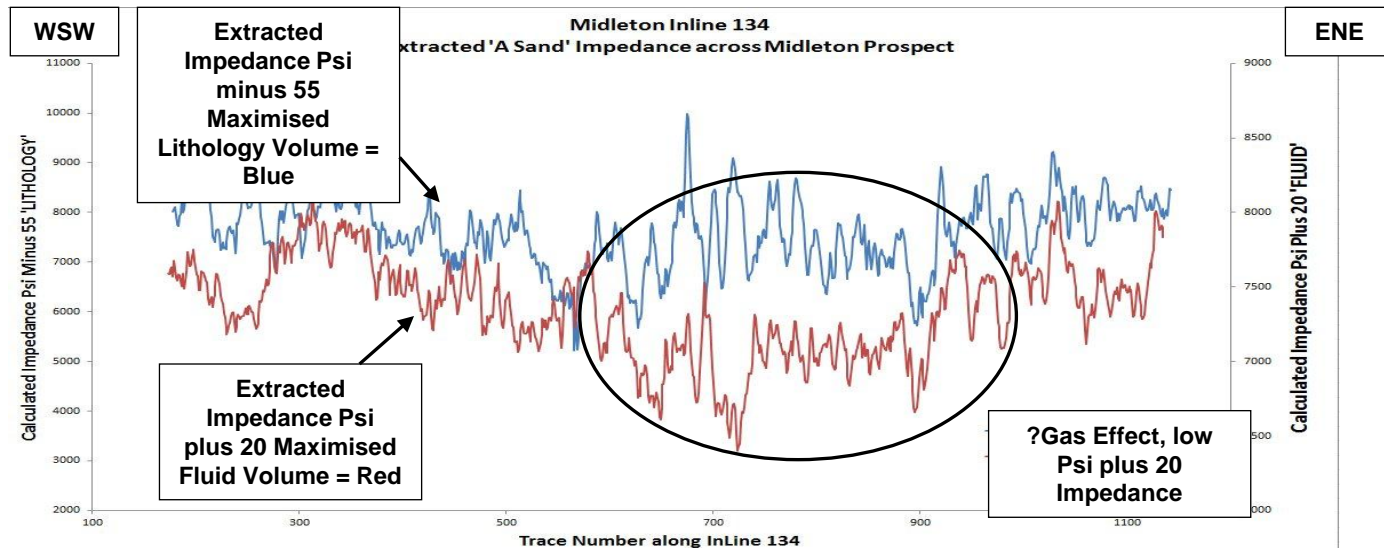
- Fluid substitution modelling work indicates that gas bearing sands in the Greensand and Wealden should generate a characteristic seismic response
- Fluid anomalies, interpreted as gas bearing Greensand reservoirs, identified in:
 - Galley Head gasfield
 - Middleton prospect
 - SE Rosscarbery prospect
- Fluid anomaly interpreted as possible gas bearing Upper Wealden sands identified in Main Rosscarbery prospect

Cretaceous Gas Play – Midleton

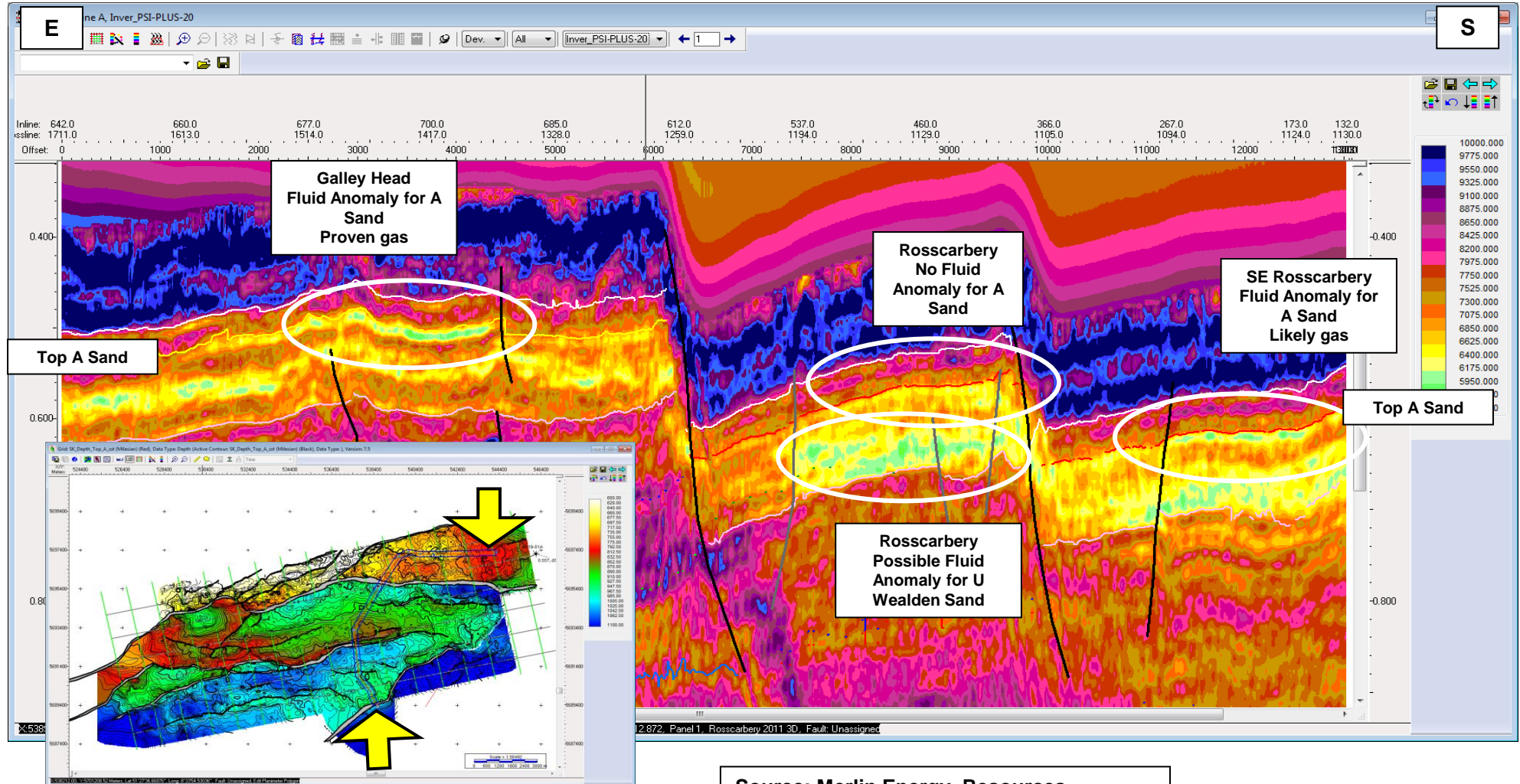


Midleton Prospect (Lansdowne 100%)

Fluid Volume (Psi+20), with Extracted Impedances



Arbitrary Line Crossing Galley Head and SE Rosscarbery – Fluid Volume

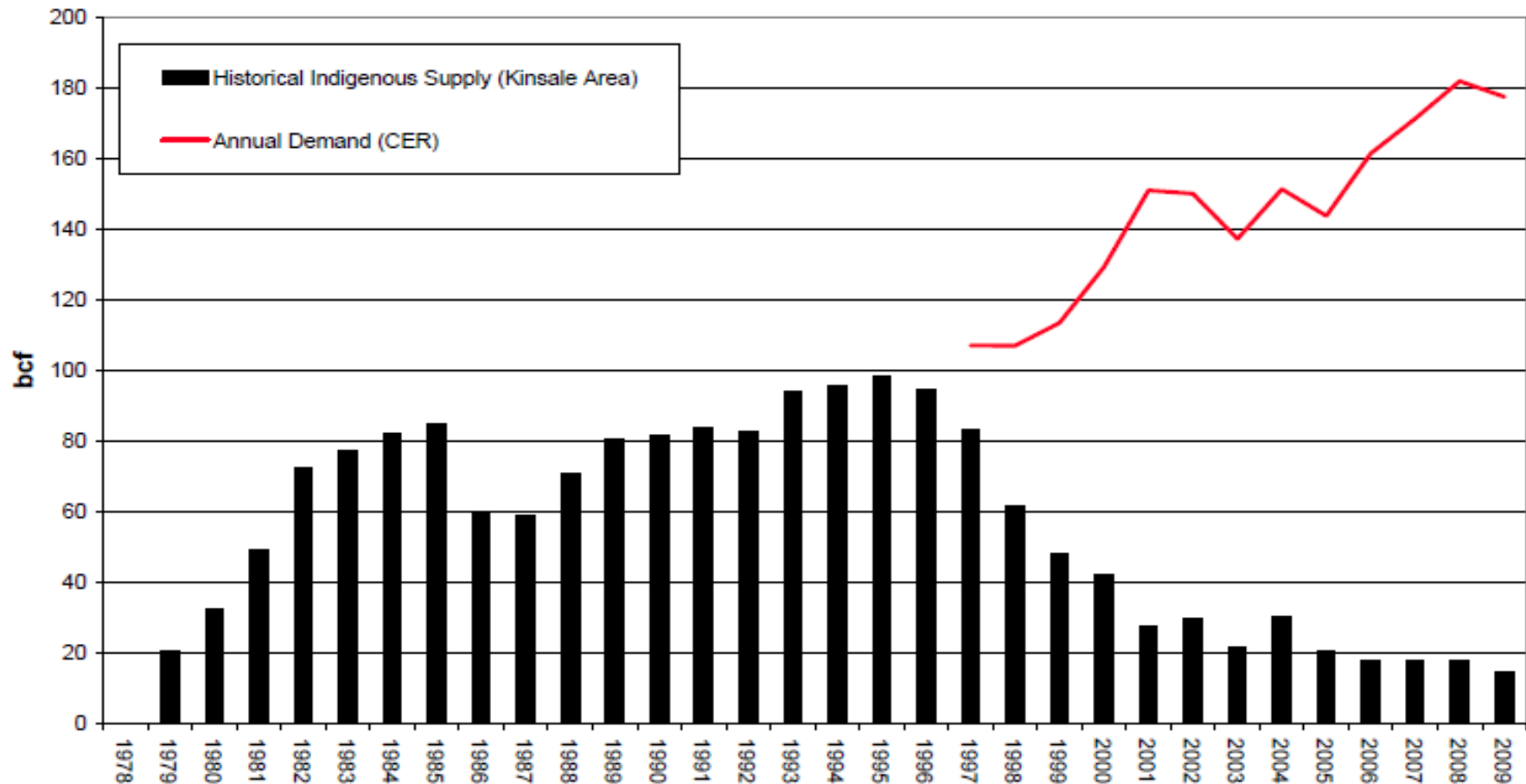


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Gas Market

Ireland's Annual Gas Demand and Indigenous Supply

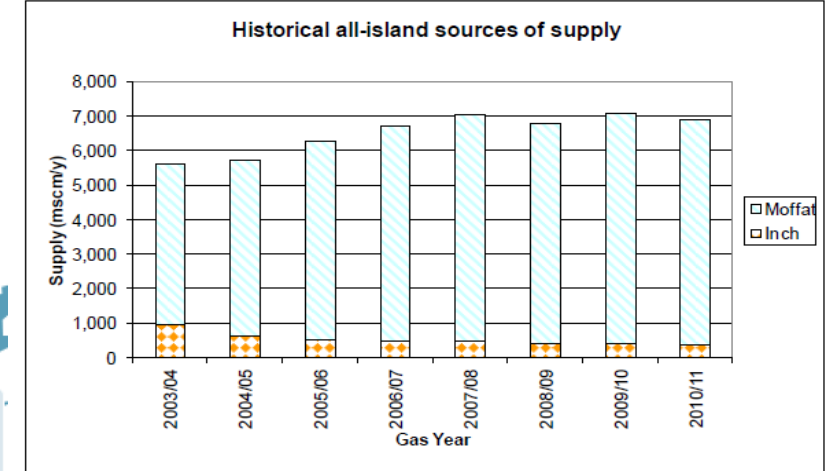


Source: DCENR

Gas Market

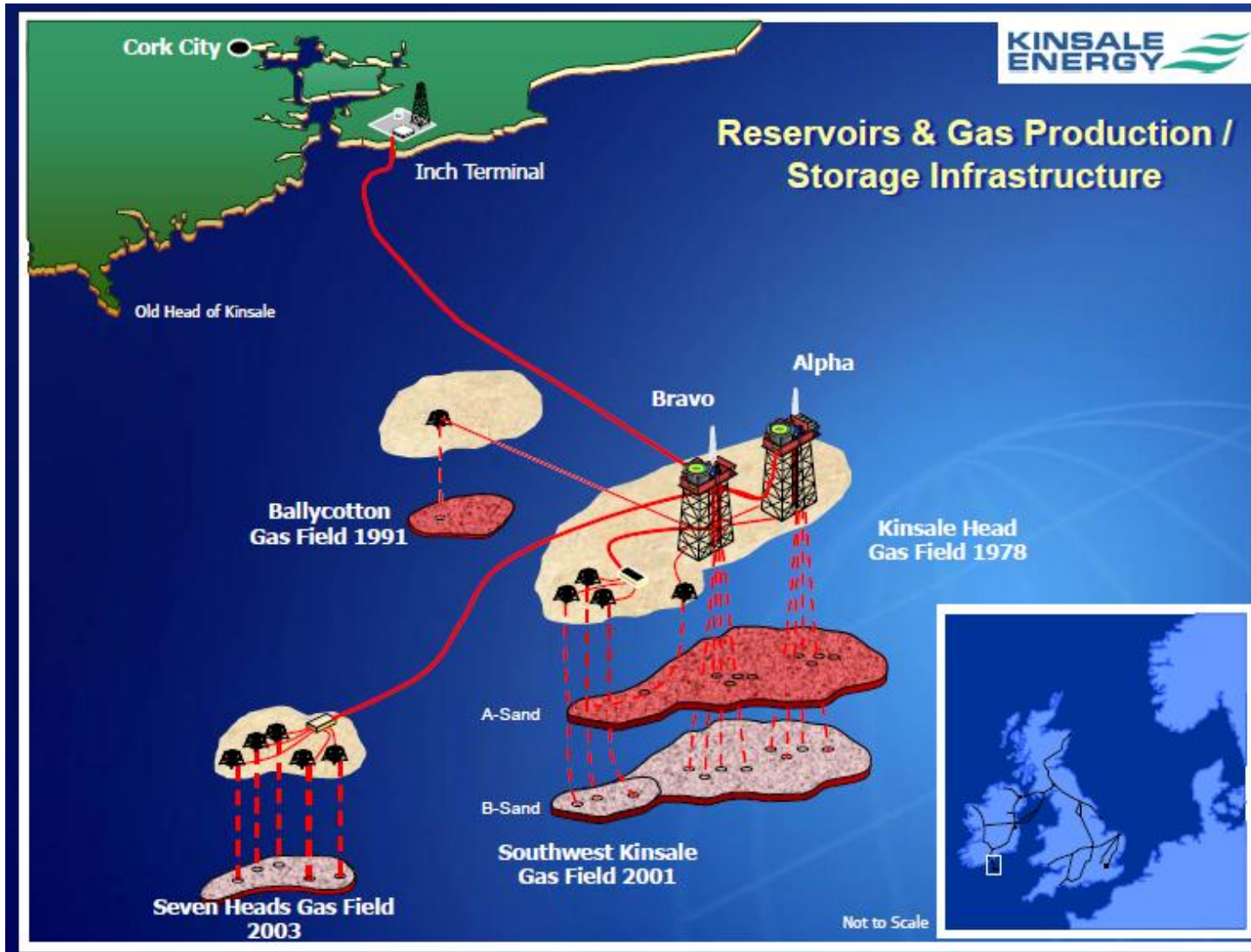


Figure 4-2: Historical All-island Sources of Supply



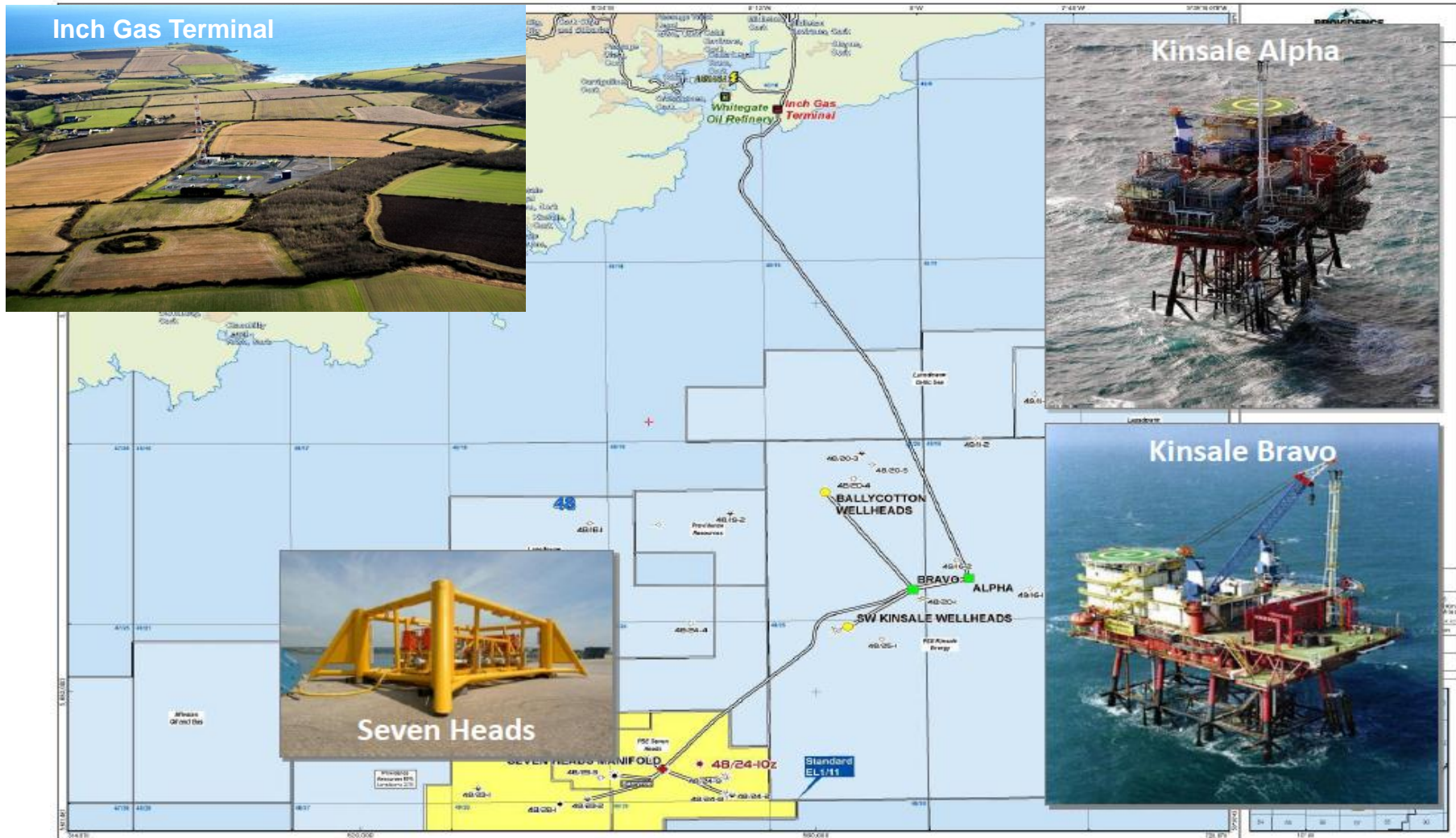
- **Winter Outlook 2013/2014**
 - Gas supplies from Great Britain via Moffat will continue to meet over 93% of demand
 - Corrib Gas not expected to commence until 2015

Development Concepts



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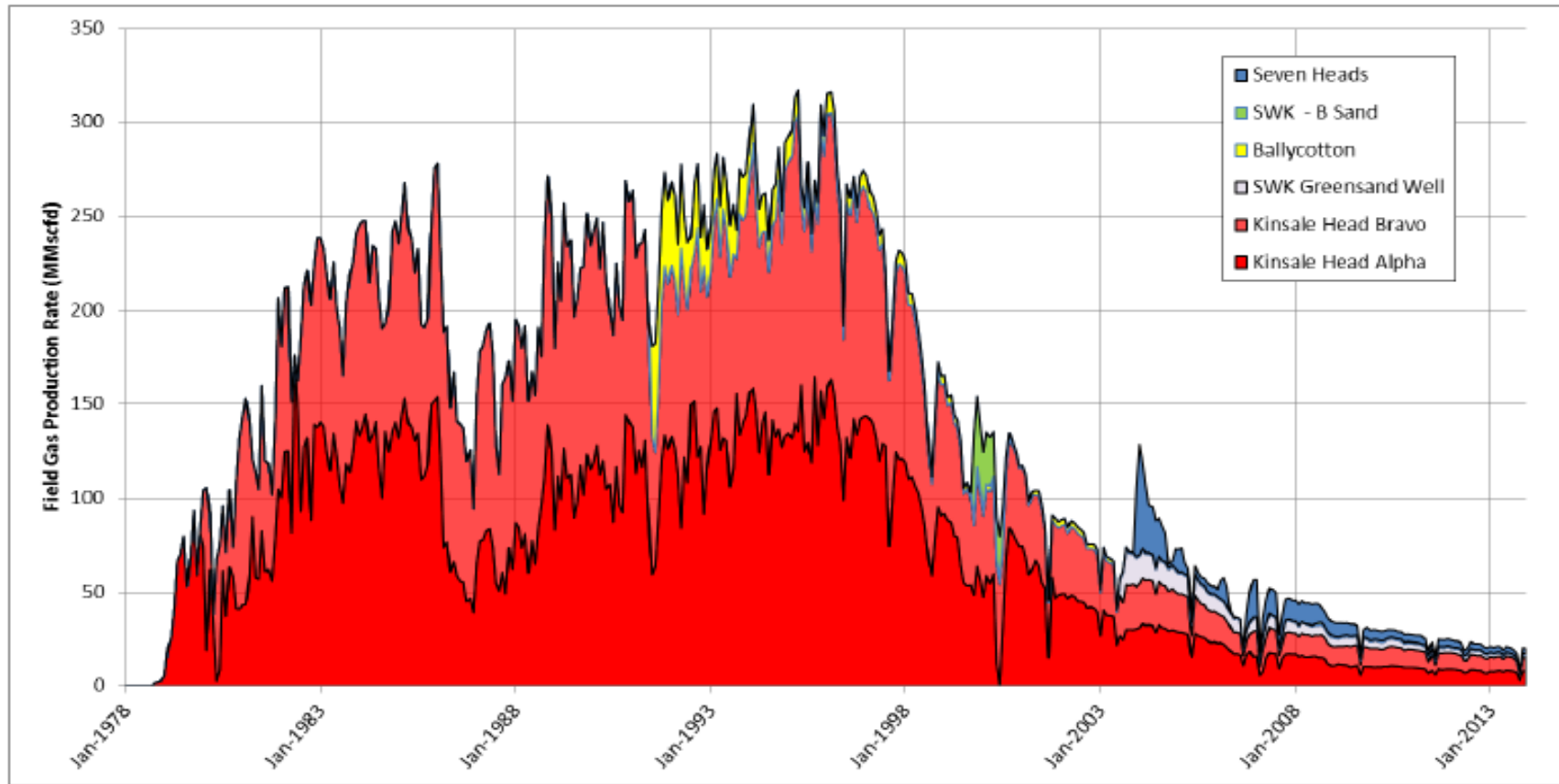
Infrastructure



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Sources: PSE Kinsale Energy/PETRONAS & Providence Resources

Kinsale Area Production History



Source: Kinsale Energy/PETRONAS

Kinsale Area Production Capability

● Infrastructure Capability

- Kinsale Infrastructure limited to gas processing & transportation
- Existing gas processing capacity c. 200 mmscfd
- Existing Utilisation c. 50%
- Additional Processing Capacity can be added
- Export Pipeline Capacity c. 300 mmscfd

● Infrastructure Longevity

- Existing Production/Storage Life 5 to 7 years
- The Infrastructure has been well maintained and the process fluids are benign
- Although original design life was 25 years, jacket, topsides and pipeline inspection as well as integrity analyses indicate that a life in excess of 50 years could be achievable

Conclusions

- **1.879 TCF anticipated recovery from fields in production**
 - But only 66 bcf remaining
- **Additional 202 - 322 BCF GIIP in undeveloped discoveries**
- **At least a further 780 – 1658 BCF GIIP in mapped prospects**
- **Shallow water (275 – 350 ft)**
- **Shallow drilling targets (above 4,000ft)**
- **Extensive infrastructure with spare processing and export capacity**

Celtic Sea Cretaceous Gas

