**Lower Carboniferous clastics**

**A virtually untested play**

- The Lower Carboniferous clastics play is established in the SNS, with fields producing from Namurian reservoirs and the Breagh field development that will produce from Visean clastics.
- From well reviews we conclude that the play is virtually untested in the Dutch northern offshore, see fig. 1.
- EBN’s regional play framework analysis indicates the presence of traps, source and reservoir rocks in large parts of the study area.
- 20 structures have been defined on the Base Permian Unconformity (BPU) depth map. These are all 4-way or fault dip closures. Screening PSO GIIP’s sum up to ~75 BCM (unrisked).

### Reservoir

- Visean and Namurian reservoir rocks are present throughout the study area.
- Abundance and thickness of reservoir quality sands increase from Breagh towards the northeast, see fig. 4, and favourable reservoir properties are not limited to a zone <200 m below the BPU.

### Seal

- Numerous 4-way closures at BPU level, below proven seals: Silverpit shales and Zechstein salt.
- Fault dip closures are dependent on fault seal.
- Presence of intra Lower Carboniferous seal(s) would provide large upside.

### Source & Charge

- Lower Carboniferous Scremerston coals are the most promising source rocks in the northern part of the study area.
- In the southern part charge may occur from Lower Carboniferous basinal shales and laterally from Upper Carboniferous Westphalian coals.
- See adjacent poster: Source rock potential.

### Structures and leads

- 20 structures have been identified with a total PSO GIIP of ~75 BCM (unrisked). A subset of these structures is indicated on the BPU depth map in fig. 6. One example of a lead is shown in fig. 7.
- These structures will be evaluated in more detail, final prospects could be part of multi-target exploration with prospects at various levels.
- The presence of intra Lower Carboniferous seal(s) would provide large upside since many additional structural closures would become prospective; see Top Yoredale map below and the adjacent poster: Structural framework.

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**Fig. 1.** Well review results

**Fig. 2.** Diagram illustrating concepts for the play elements of the Lower Carboniferous plays.

**Fig. 3.** Porosity and permeability measurements from core plugs for the Lower Carboniferous. Web: 4/3/13-2, A14-01, B10-01, A16-01, E02-01, E06-01, E12-02, E12-03, E12-04 (NL), B10-01 (DE). 400 0 2 4 6 8 10 12 14 16 18 20 22

**Fig. 4.** Lithological characteristics of Lower Carboniferous below BPU.

**Fig. 5.** Top Yoredale TWT map (red) – Illustrating structures at Yoredale Fm level in the E-blocks. Mapping on 3D DLF survey - seismic data courtesy Spectrum ASA.

**Fig. 6.** BPU depth map with closures indicated.

**Fig. 7.** N-S (above) and NW-SE (below) seismic sections through lead Kilimanjaro (pro public 3D seismic data).