UK & Norway producing fields and discoveries

Results to date



Presenter: Mike Cooper

Co-authors: Kinga Wroblewska, Maurice Bamford, Jeremy Lockett, Ben Duncan & Matthew Belshaw

Devex 8th May 2018 AECC, Aberdeen



UK & Norwegian fields are all different.

Geology	(Age, Trap, Lithology, Poroperm, Faulting, Timing etc)
Economics	(Commodity Price, Taxation)
Maturity	(Greenfield [URR extrapolated], late-life (prone to low commodity price environment & mechanical failure)

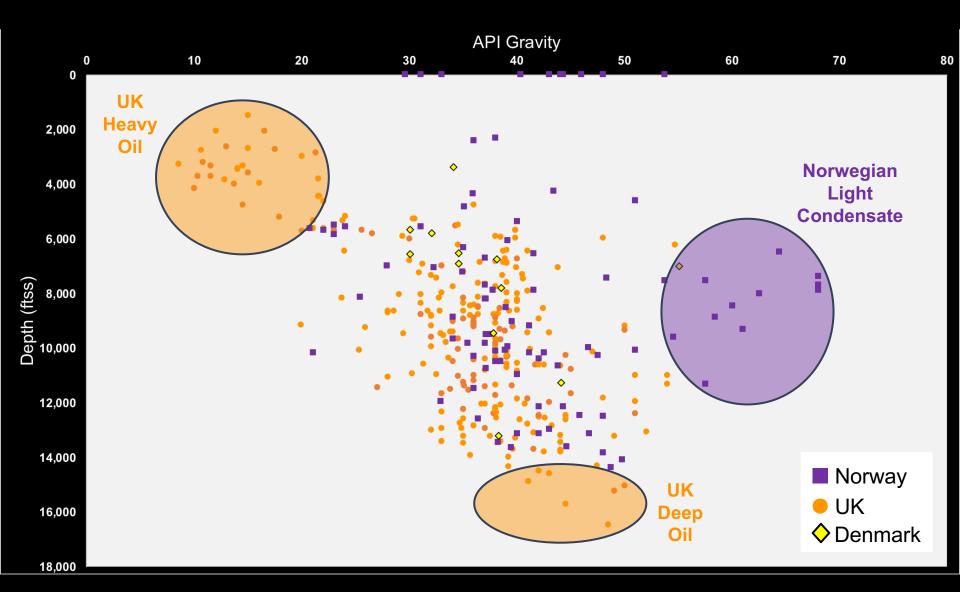
Trove databases utilise Open Source Data (incl. OGA, NPD, company websites etc)

"Largest collation of North Sea technical subsurface data" Common format, auditable, borderless



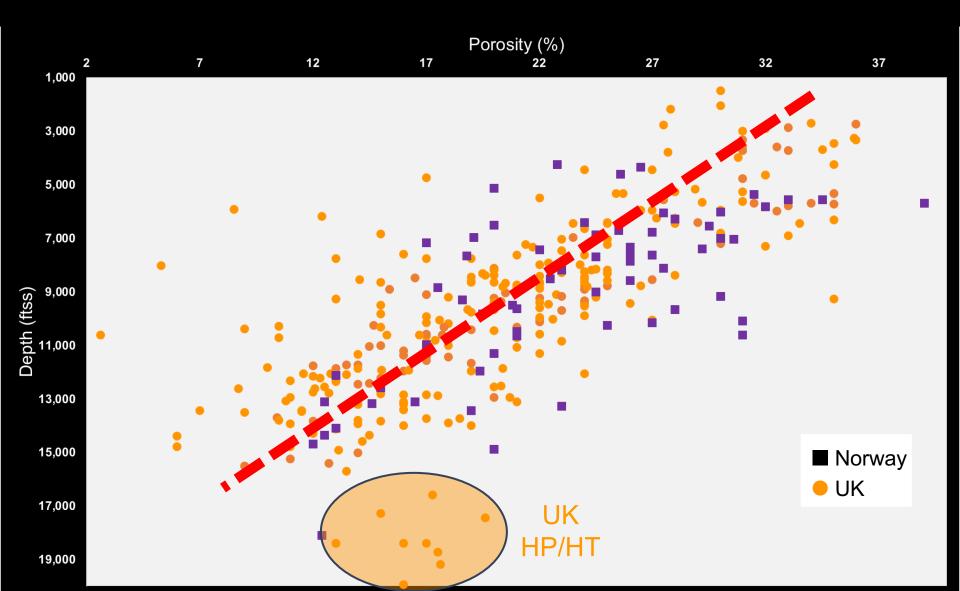


Oil Gravity v Depth





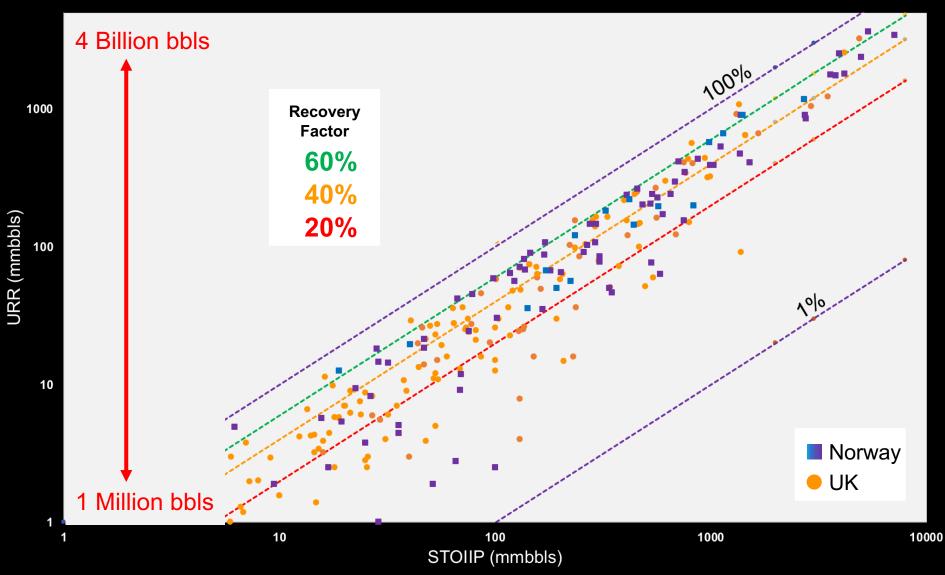
Porosity v Depth





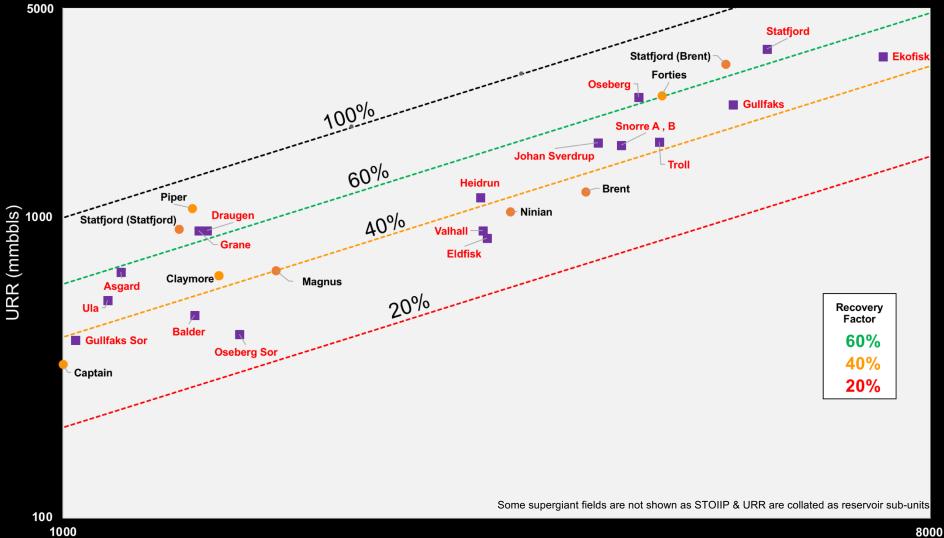
UK & Norway Oil Fields

All Fields & Discoveries





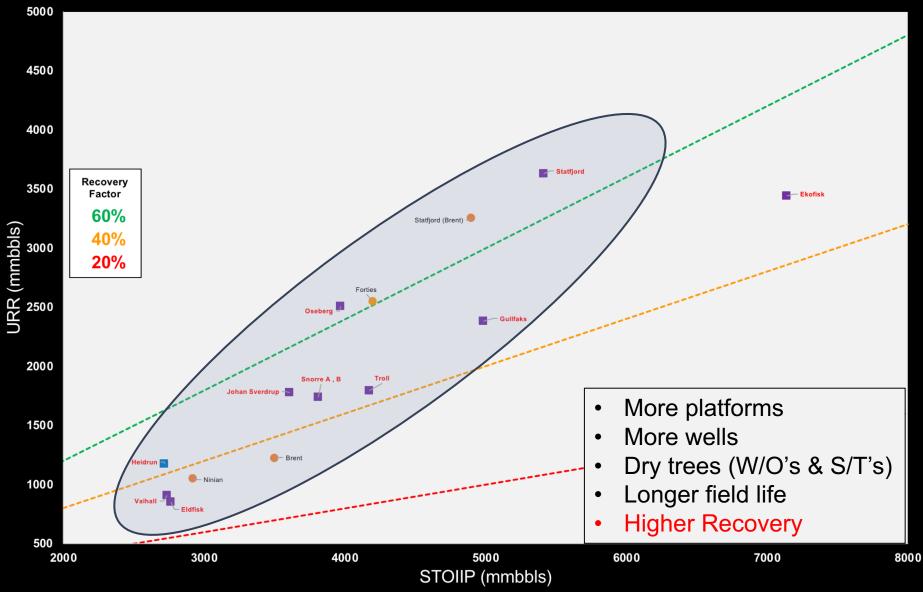
Giants & Supergiant Oilfields





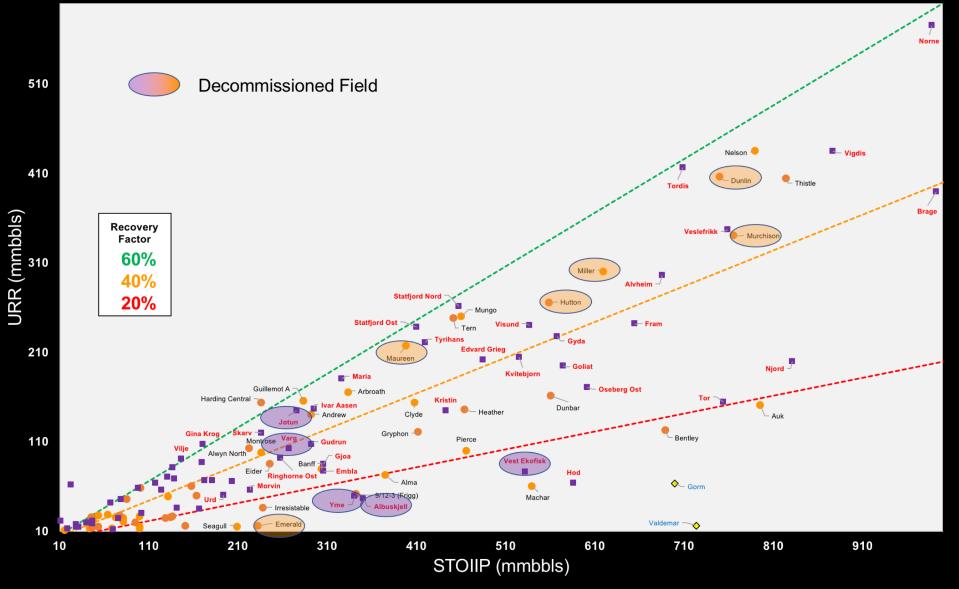
Economies of Scale?







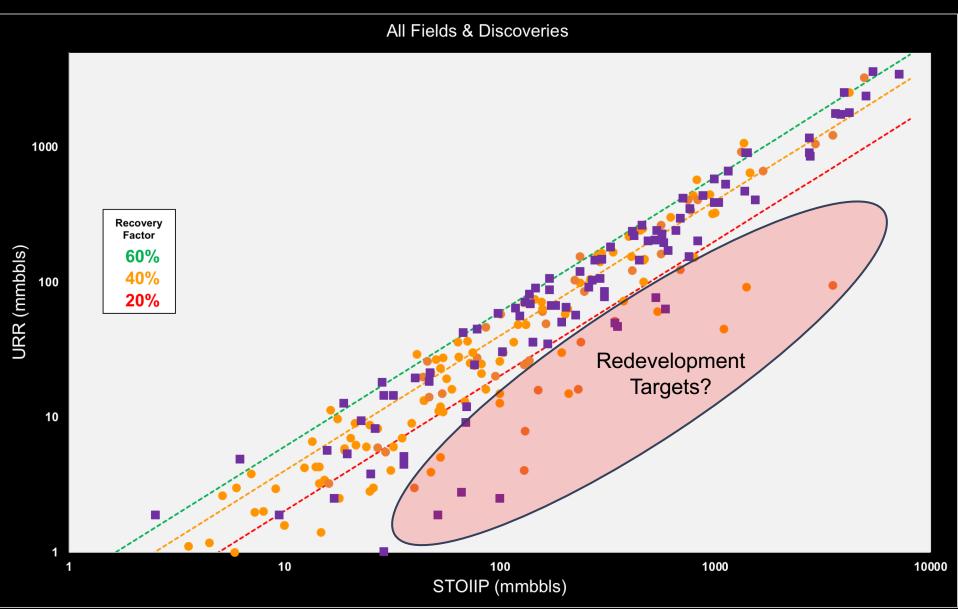
Cessation of Production (10 - 1,000 mmbbls)



Some supergiant fields are not represented as STOIIP & URR are collated in more detailed reservoir sub-units, not field totals.



Target the larger low recovery oil fields





Prospects & Leads

Example: Prospects in the Outer Moray Firth

16/22 Larger 4-wa

16/27 Legd J2

16/27 KL Lear

16/27 Lead J

16/27 Lead L

22/02 Fav

21/08 Rola

21/13 A L

2N13 Ordie 21/13 8 Lead 21/14 Temple

1/14 Sandray

6/27 L

22/02 N

22/02 Mr

22/02 Mordaé

Q12 Q13 Ø15 Q16 Q14 14/15 Cabo 14/15 Mount 21/07 Lead D 14/15 Bering - 21/07 Lead C 14/15 Cabot West 14/15 Balboa 14/15 Chenas 21/07 Lead B 4112 Crow 14/09 Anglesey North 14/09 North Marshall 14/15 Brouilly - 6 15/11 Colonsay Deep 4/09 Marshall - Greate 15/11 Penny - Piper 15/10 Lead 14/20 Evon West - Mey 14/15 Julienas 14/09 West Marshall 15/15 Pip 13/13 Teviot Lead 15/12 J2 15/12 J3 14/15 Hudse 13/11 Scapa Lead 14/14 Anglesey Central 13/14 Lead B 15/11 14/09 South Marshall 15/12 J4 Fynn 13/12 Trias Lead 14/14 Anglesey Sou 15/12 J5 15/15 15/15-Lead 12/14 Nazdarovva 13/14 Lead C 15/12 C7 15/14 15/14 Lead 14/14 North Bru • 15/12 Jf 12/14 Baroos 14/11 Partridos 16/11 0 14/13 Bird 15/12 Corur 13/13 Buzzard Lead 14/15 Ar 16/16 Bagpip Nazdarovya. 15/12 Zeta 15/12 Acto 13/15 Lead D 14/13 Crazy H **66 و** . 16(16 Bombar 12/14 Baroosh 13/12 Scapa Lead 14/15 Dra 13/14 Lead A 16/16 Flute 12/14 Auberge 14/12 Lead D 👝 15(16 Ranger 12/19 Earl 15/13 Rowallan Wes 13/13 Piper Lead 15/19 Carrados 18 6/16 Palas 14/17 Athena We 15/18 Rogers 13/18 Scapa Lead 13/14 Lead 1 14/15 Jolie 15/19 Mag 12/19 Cret Lead 15/18 Maria NW 16/16 Fiddle 16/16 Abernethie 13/16 Pegasus . 16 Birmin 12/20 Z 13/20 Lead 9 14/15 Long Birt ۰. 12/19 Lead A 13/16 Trident 16 Beaur 15/17 Tat 12/19 Lead B 14/15 Fledhe 15/19 Holm 13/16 Poseidon - 13/17 Stanie 14/16 Lead B 16/16 Str 12/20 Linner Volgian Lea 15/18 Buildoo 16/16 Brodie 13/17 Churchwar rot4/15/ 14/16 Ober 16/16 Balvaire 12/18 Sunsel20 G 13/17 Churchard - Stanie 15/17 Egils: 16/16 Braid 14/23 Lead 13/21 Tri 13/17 Collet 13/23 Mimosa 13/2 16/16 Pa 14/21 Lead B (14/21a-1)4/22 b 16/16 Whistle 12/24 Charle Fat. 14/23 Lead . . 16/16 Morris 12/24 Kate 14/25 Scana Lead 1 8/16 Carnar 16/16 Palac 12/24 Camilla - 13/22 Mag 13/25 Lead B 15/21 Perth East Upper 15/21 Sp 12/24 Vanna 🖢 13/22 En: 15/24 Lead B 14/22 Lead E 15/23 B Pr 16/21 Injectite-N Lea 13/23 Albacorra 14/28 Marby Uppe 13/25 Lead A 12/24 Jenna 15/24 Bowmo 3/22 Magnolia Wett/22 Fatt 14/23 Updip Laurel Va 16/22 16/22-3 Updip Lea 14/22 15/24 head A 13/23 Lyga 4/28 Mabry East 2/29 Sigma & Sigma South 15/21 Fint 15/23 A Pres 13/25 Fat Cat East Plot Area 16/27 Lead ID 13/22 Ph/ 122 Dime 12/29 Keira A - Beatrice 12/29 Keira A - Strathro 15/28 Mun 14/27 Whitelock 14/28 J37-Updip 15/21 Finn Shallo 16/27 Lead H 13/25 Blofeld 15/28 Lead B 12/29 Keira A - Deer 13/22 Ashes 14/26 Cyan 13/23 Lysande 15/28 Se 13/22 Hermes Updip [BG] 13/23 5728 Yoichi 12/30 Findbe 14/30 14/30-JU3 -16/27 Edzell 15/27 15/29 Elve S mes Updip (Bana ٥. nzean 13/23 Mino 14/28 R 15/28 Lead C 15/28 Yamazaki 15/29 Fuji d Updip 🍟 ∕∙ 16/27 Land D 14/28 Mabry 12/28 Aries 13/26 Ferrick 12/30 Badger 15/28 P1 15/28 M 15/28 Mulliga 12/28 Burns Lead 🗢 13/26 Ulysses 14/30 14/30-1112 5/26 Morta 13/28 Miyako 13/243 16/27 Enro 13/28 Bobcat 12/28 Beatrice Lead 12/30 Spr . 14/80 Buffalo /• 12/29 Sigma 14DE TH 8 Hibernia 12/28 Beatrice Lead 2 12/29 Keira B 14/30 Du 13/28 Morab m21/01 Bunty 21/01 Hotspu 21/01 Cortina 21/03 JU1 5/29 14/26 Thunderball-HW I 13/26 Cullerlie [Punt] 14/26 Thunderball P 14/28 14/28 J713 15/30 22/02 Tullam 12/28 Beatrice Lead 3 14/28 Galley Fau 22/01 Lan 13/26 Cullerlie [Burns] 12/28 Beatrice Lead 4 14/27 Merma 21401 Chine 14/28 ook NW Outlies 14/26 Oring co 12/28 Punt Lead 13/26 Cullerlie [Alness] 22/02 Dine 4/28 Rotlegend Se 21/02 South Glenn 15/29 1/26 Tobermon Meribel 13/26 Cullerlie [Rot'] femple. 14/28 Scapa Wes 21/01 Topp 21/02 Forties 2 21/05 Britannia Land 22/02 Maclood West 21/01 Minstra 4/28 J71-4 way dip 21/03 Wescot 21/05 Bobcat 14/28 Mortor 106 Seabrigh 4/28 Rotliegend-4 way dip-21/09 Val 4/28 Scapa South 21/07 Ter 22/06 UJR-Lead 2 22/02 Bushmil 14/28 R 21/06 Surfin 20/03 Goshawk 21/09 Lea 22/08/11/IR-Lead 20/03 Blackbird 20/07 Allington 20/10 Evo -21/06 De 1/09 Lead 21/10 Lead 21/06 Pod-2 21/06 Seacliff 21/06 F nii i 007 Bardolph Updip 21/07 Typhoon 1/10 Bennachie 108 Walme 21/15 Ovencrain 1/15 Ogmore 22/11 Emma 20/10 Cromarty B 20/12 Car 20/12 20/15 Manate 20/12 20/12 21/13 Des 22/11 Shinkow Leads 20/15 Rinby Load 22/11 A-Basin 21/13 Perce 20/15 Protecto 22/11 Macdu 21/06 Goleta 21/13 Binnet @ . 20/07 Punt Hotspur^{20/15} Omega 22/11 Keystone 21/13 Durris 21/19 20/12 Lead 2 Buzzard... 20/12 20/15 Marlb 21/15 Lw Ettrick Cretz 21/15 Ebbw 20/14 Cromwell 21/15 Brunts 21/06 Kopervik... 21/06 Cromarty A 21/15 Minerva 21/11 21/11 Fulmar C Con. 21/15 Lead 1 21/11 Cooch 21/1 21/09 Cynon 21/08 Egils 21/13 Bal 21/11 Pampas 2114 Strons 21/11 Astute

"Unlocking MER in the Outer Moray Firth through industry collaboration" Paul Lindop, Wednesday 15:20hrs Gordon Suite

298

21/16 Bluester



Trove Database North Sea Coverage



NNS OMF CNS SNS Irish Sea West of Britain Onshore & Channel



Norway North Sea Norwegian Sea Barents Sea



.....and other basins worldwide

Conclusions

No discernible differences in Recovery Factor between UK & Norwegian oilfields.

Highly variable data sample – some systematic differences in populations (Heavy oil, HP/HT).

Geology accounts for major differences in recovery factor.

Economic impacts (e.g. higher taxation) not apparent from data.



Thank you for your attention.

info@1stsom.com