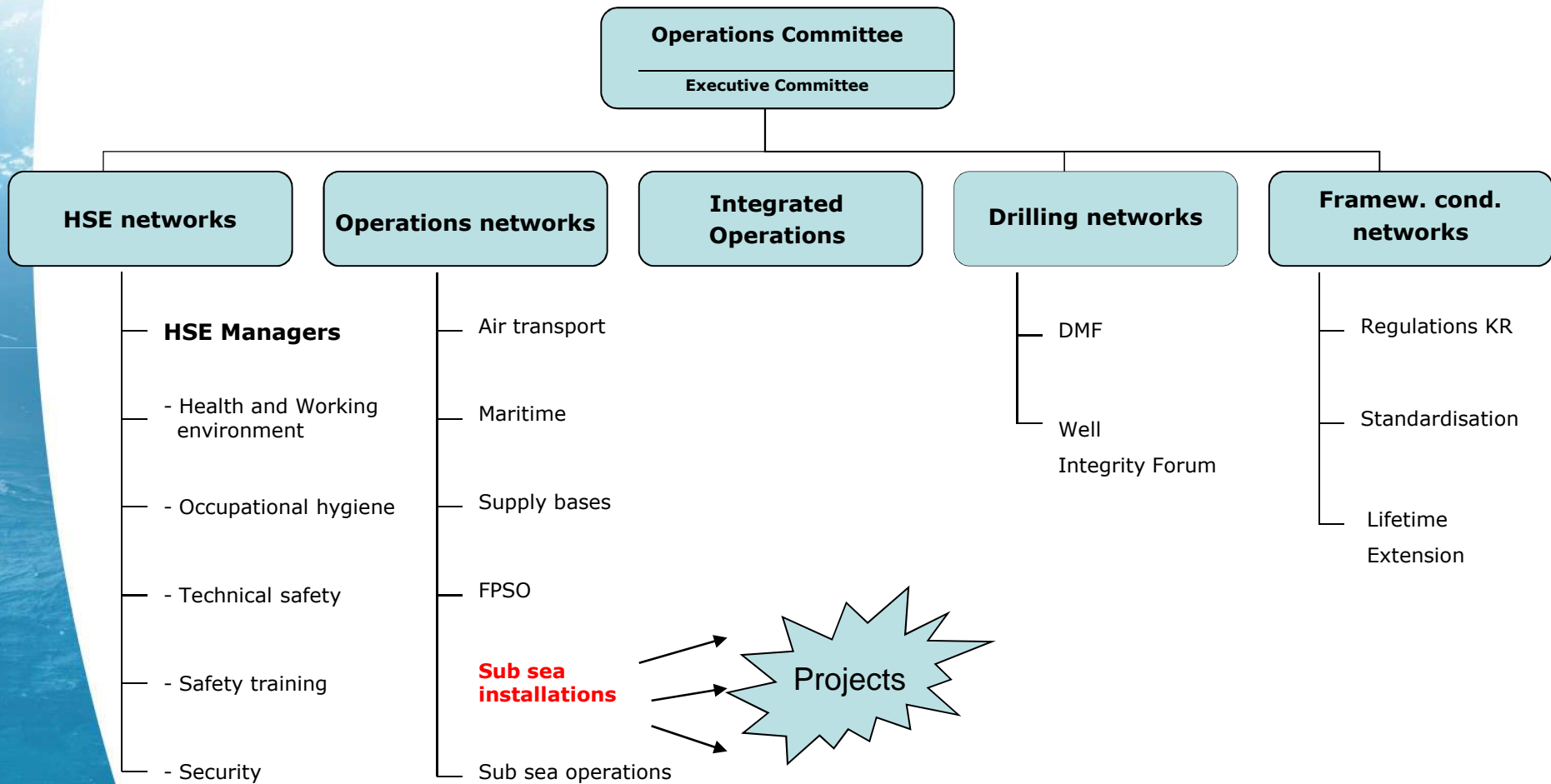


OLF's Subsea Leak Detection Project: Objectives and Goals

- OLF Operations Committee
 - Subsea overview
 - Leak data and project context
 - Challenges
-
- Subsea Leak Detection Systems DNV-RP-F302
(Anders Husby)

by David Llewelyn
Subsea installations Network, OLF

OLF Operations Committee organisation



Why is Subsea production becoming so Important?

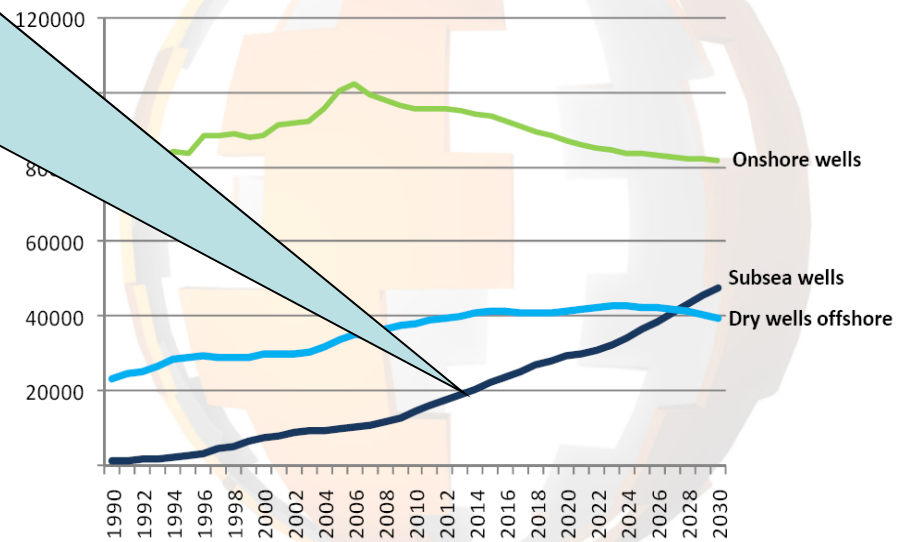
..Subsea wells are the best option for:

- Deep water
- Extended complex fields
- Sea bed artificial lift
- Re-using exploration wells
- Reducing environmental impact
- Field extensions or tie backs

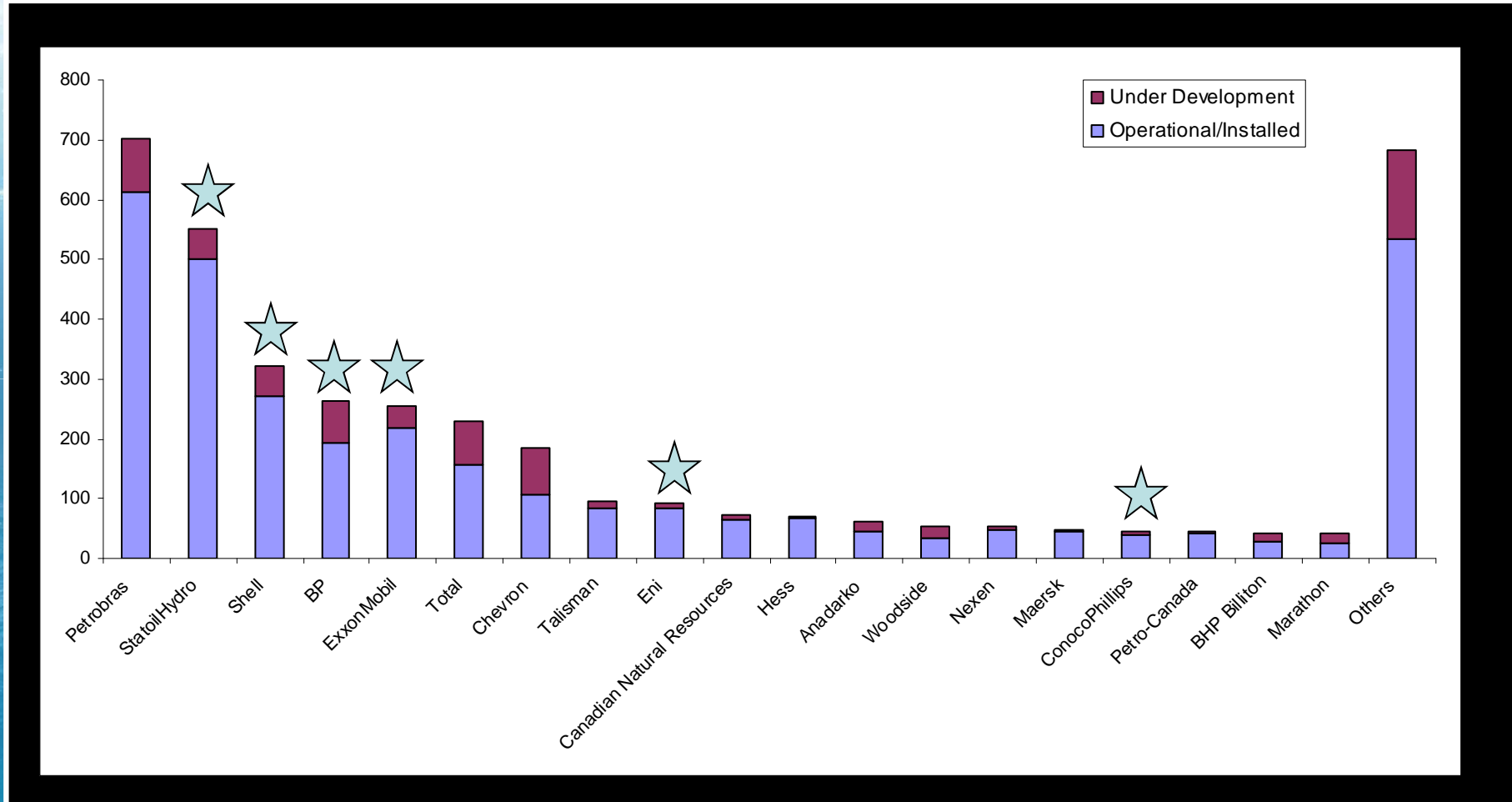
Supply growth from offshore – in particular from subsea wells



Global production of oil, condensate and gas
Thousand boe/d

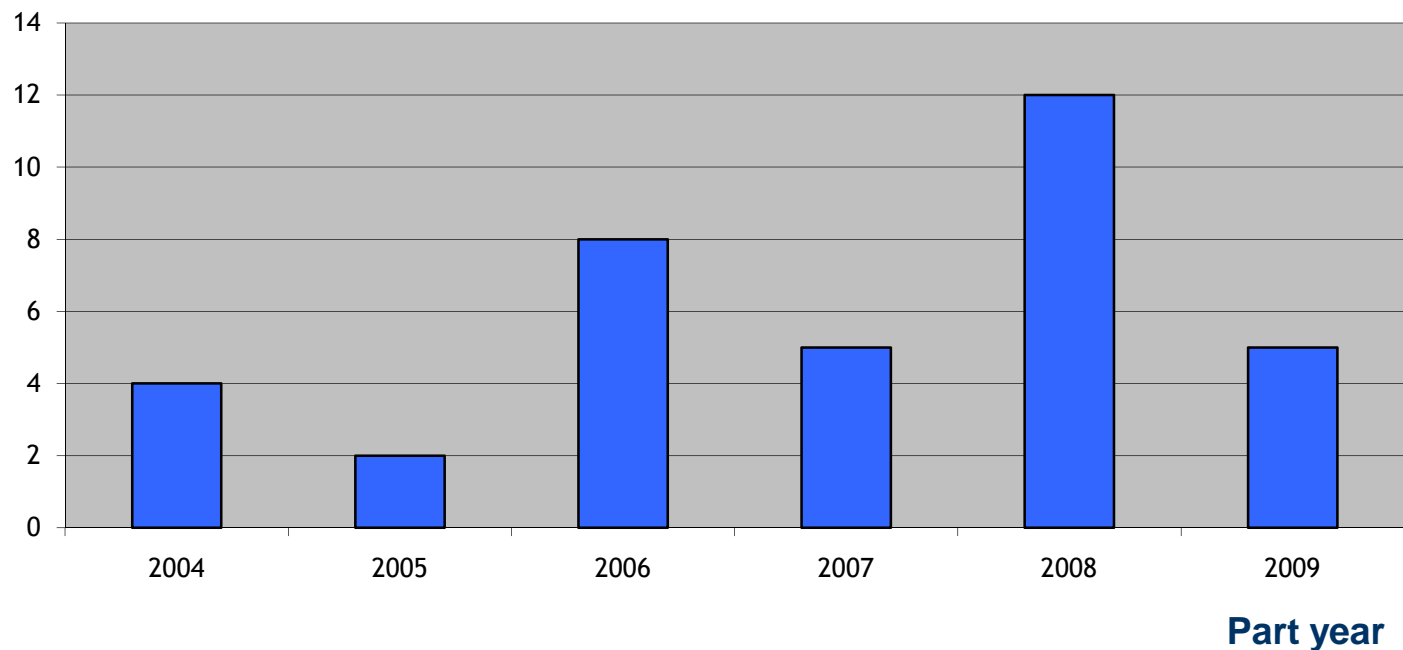


Who are the big players Subsea (2009) ?



★ Participated in OLF SSLD Projects

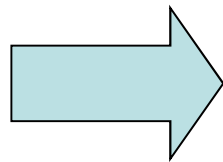
Subsea leakages as recorded by PSA



- Typically 60% of leaks are classified small or very small
- Subsea wells have increased by around 30% in the period
- The above indicates approx 10^{-2} leaks/yr per well

OLF's Subsea Leak Detection Project Context

- All operators want to minimise leaks, and have a responsibility to do so
 - Mass balance (via flow instrumentation) is the basic technology
 - The accuracy of these measurements is improving (now generally better than 5%)
 - But a back up system is needed - ideally for "direct" leak measurement



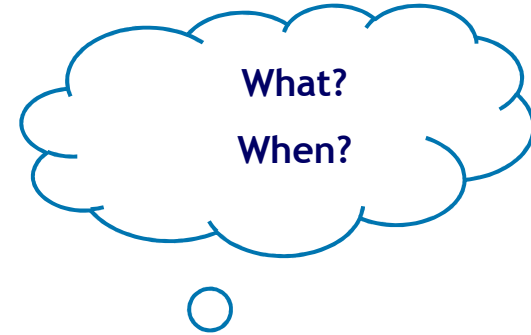
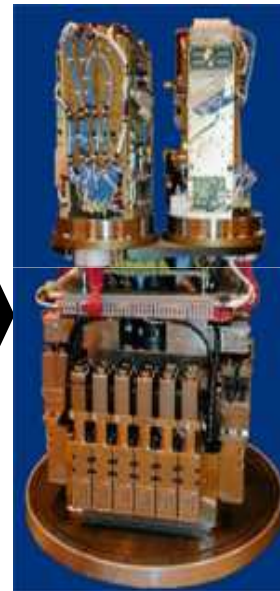
OLF leak detection project - Phases 1,2,3 and 4
(2004-2009)

Direct Leak detection - some of the challenges

Advanced 3rd party Systems



Subsea Control Module



**Broad
Comm
Open
Protocols**

- Limited bandwidth 2400 Bit/s
- Proprietary protocols
- Low incidence of actual leaks
- Limited feedback

- False alarms
- Poor reliability
- High repair cost
- No perceived operational benefits

