Subsea Market Overview

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6th of February 2013
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Subsea Market Drivers
Subsea Market Drivers – Going deeper

17% of the 2008-2017 fields are located in deep and ultra-deep waters

• Since 2000, important deep and ultra-deep discoveries
  - 17% of the 2008-2017 fields expected to lie in such environments

• Key offshore oil fields were discovered in:
  - pre-salt Brazil
  - the US GoM
  - West Africa
  - Malaysia

• E&A deep and ultra-deep water activity led to the discovery of significant gas finds in:
  - East Africa
  - Australia
  - Israel
  - India
  - Associated gas in Brazil

• Excluding Petrobras, deep and ultra-deep fields are primarily operated by:
  - Internationals
  - Large Independents

Fields by WD Group, 1998-2007 (1,963 fields)

Fields by WD Group, 2008-2017 (2,372 fields)
Subsea Market Drivers – Going further

Average tieback distance is increasing. Currently stands at 17 kilometres

Key Projects:

- 1997: Shell’s MC Mensa in US GoM – Ultra-deep subsea tieback to fixed platform – 110km
- 2007: Statoil’s Snøhvit/Albatross (Melkoya Island) in Norway – Shallow subsea tieback to shore – 156km
- 2016+: Chevron et al Gorgon area fields in Australia – Deep subsea tiebacks to shore – up to 188km
Global Market Overview
Subsea contracting sentiment is improving

345 confirmed subsea tree orders in the first 3 quarters of 2012. Expect to surpass 400 trees by FYE

- Contracting activity has improved in 2012
  - FYE >400 unit threshold
- Q1 to Q3 2012
  - FMC largest market both in terms of volume and EPC revenues
- FMC key 2012 awards include:
  - Pre-salt Brazil
  - Statoil FA
  - IOCs in ultra-deep water US GoM
- GE - 55% of the shallow water market
  - UK, Nigeria & Australia
  - Deep water: Eni & ExxonMobil - Angola
- Cameron
  - Post and pre-salt assets in Brazil
- Aker Solutions
  - Statoil FA
  - Murphy - Malaysia

Europe largest market for SW subsea with 52% of overall Capex. Asia Pacific and Africa also significant

North Sea
- **Key Markets:**
  - Norway
  - UK
- **Key Operators:**
  - Statoil
  - Variety of Independents
- **Key Manufacturers:**
  - FMC & Aker Solutions (FA)
  - GE & Cameron

Africa
- **Key Markets:**
  - West Africa
- **Key Operators:**
  - Eni
  - Chevron
  - Sinopec
- **Key Manufacturers:**
  - GE

Asia Pacific
- **Key Markets (80% of APAC):**
  - Australia
  - China
  - Indonesia
- **Key Operators:**
  - Chevron
  - Apache
  - CNOOC
- **Key Manufacturers:**
  - Cameron (Australia)
  - Diversity in SEA

Africa and Latin and North America represent 86% of overall Capex

North America

- Key Operators:
  - Shell
  - BP
  - Anadarko
  - Chevron
  - ExxonMobil
- Key Manufacturers:
  - FMC - 63%
  - Cameron - 28%
  - Dril-Quip - 4%
- Chinese Sinopec & CNOOC ↑presence in:
  - West Africa
  - USA
  - Brazil
- Secure reserves & earn deep water expertise

Africa

- Key Markets:
  - West Africa
  - Egypt
- Key Operators:
  - International Oil Companies
- Key Manufacturers:
  - FMC
  - Cameron

Latin America

- Key operators:
  - Petrobras
- Key Manufacturers:
  - FMC
  - Cameron
  - Aker Solutions
  - GE & Dril-Quip mainly for dry solutions

Asia Pacific

- Key Markets:
  - Malaysia
  - India
- Key Operators:
  - Murphy & Shell - Malaysia
  - Reliance & ONGC - India
- Key Manufacturers:
  - Aker Solutions (45%)
  - FMC, Cameron & GE

↑presence in: West Africa, USA, Brazil

Secure reserves & earn deep water expertise
Supply Chain
Supply Chain

Global supply is capable of dealing with demand. Regional issues exist.

### Drilling Rigs by Build Year

<table>
<thead>
<tr>
<th>Year</th>
<th>JackUps &lt;300</th>
<th>JackUps 300-349</th>
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### Global Subsea Tree Capacity, 2007-2017 Deliveries

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- **2012-2019**: High spec JackUps and Ultra-Deep water rigs expected to experience most significant CAGR: 5.4% and 7.1% respectively
- **Brazil, US GoM, West Africa, Norway and Mexico** – areas where Ultra-Deep water fleet will operate
- **Tree manufacturers have expanded their manufacturing capacity since 2007** in Malaysia and Brazil
- **Despite capacity increases**, tree manufacturers expected to see higher utilisation rates going forward
- **Regional issues exist primarily in Brazil and Europe**
Subsea Technologies
Subsea processing technologies include seabed gas compression, seabed oil boosting and seabed separation.
Subsea Boosting

Subsea boosting is deployed to ensure the flow of fluids after natural reservoir pressure declines.

Seabed Boosting Projects by Water Depth (m)

Seabed Gas Compression by Tieback Distance (km)

Seabed Oil Boosting – Drivers
• Heavy oil
• ↑ tieback distance
• ↑ water depth
• ↓ reservoir pressure & temperature

Seabed Oil Boosting – Key Players
• Framo & Centrilift
• Shell, Statoil & Petrobras

Seabed Gas Compression – Drivers
• Distant offshore gas fields
• ↑ tieback distance
• ↑ water depth
• ↓ reservoir pressure & temperature
• Harsh environmental conditions

Seabed Gas Compression – Key Players
• Aker Solutions & Framo
• Statoil, Total & Chevron
Subsea Separation

Subsea separation units separate oil, gas and water directly at the seabed level vs. the topside facility.

**Subsea Separation by Country**

![Subsea Separation by Country Chart]

**Subsea Separation by Operator**

![Subsea Separation by Operator Chart]

**Seabed Separation @ Mature Fields—Drivers**
- Heavy oil
- ↑ water production
- ↑ tieback distance
- ↑ water depth
- ↑ number of subsea tiebacks

**Seabed Separation @ Green Fields—Drivers**
- ↑ gas volume fraction
- ↑ tieback distance
- ↑ water depth
- ↓ reservoir pressure and temperature

**Seabed Separation – Key Players**
- FMC
Key Contacts

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Key Contacts

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