Future of subsea in Statoil.
Cleaner, Leaner, Smarter

GCE SUBSEA /NORWEGIAN INNOVATION CLUSTER BREAKFAST SEMINAR 05.03.2016

Rune Mode Ramberg Chief Engineer Statoil ASA
Uncertainty will dominate
Climate change, policy, technology, consumers and economy will decide

Sources: The Economist, Google, UN, Statoil, McKinsey & Company, National Geographic, twistedsifter.com
Shaping the future of energy

Competitive at all times | Transforming the oil and gas industry | Providing energy for a low carbon future
Competitive at all times

- Safe and lean operations
- Fit for profitable growth

Transforming the oil and gas industry

- Innovate to simplify and standardise
- Technology for lasting value creation

Providing energy for a low carbon future

- Most carbon efficient oil and gas company
- Build a new energy business
Subsea backdrop:

- Cost efficient and reliable operation
- Life extension of existing production systems
- IOR from subsea wells
- Access into new areas
- Standardisation to increase efficiency
Overview of Statoil subsea fields
Operator of 533 wells + Service provider for 9 wells (per 01.01.2016)

Wells per Area

<table>
<thead>
<tr>
<th>West</th>
<th>North</th>
<th>South</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>241</td>
<td>190</td>
<td>102</td>
<td>533</td>
</tr>
</tbody>
</table>

Service provider

- Sigyn
- Marulk
- Skirne/Bygge
- Atla
- Vale

Operator

- Troll
- Åsgard
- Gullfaks
- Snorre
- Vigdis
- Visund
- Norne
- Oseberg
- Heidrun
- Tordis
- Njord
- Tyrihans
- Fram
- Kristin
- Statfjord Nord
- Urd
- Snøhvit
- Skuld
- Statfjord Øst
- Sleipner
- Tune
- Morvin
- Sygna
- Mikkel
- Statfjord
- Svalin
- Alve
- Hyme
- Fram H Nord
Statoil’s corporate ambition and directions for simplification, standardisation and industrialisation (SSI)

Deliver year 2000 cost-level again - more than 50% reduction!

**Simplify**
- Design-to-cost - always minimum solution as starting point
- Drive for significant efficiency improvements in all cost elements

**Standardise on the simplified solution**
- Standardise on cost effective design and limit variations
- Extensive effort to remove company’s specific requirements

**Industrialise**
- Systematically strive for re-use and repeatability
- Maximise use of industry standards and supplier solutions
A 20% improvement on each of S,S and I has potential for overall 50% cost reduction (0.8x0.8x0.8=0.5).

[NB! Mixture of reversed 3D geometry axis and arithmetic not mathematically correct, but hopefully illustrates SSI potential.]
Supplier competitiveness and capital availability is key to future activity level
Cap-X™ - new challenges, new solutions

Standardisation, simplification and lower cost in practice
Subsea timeline

**Pioneering**
1985 - 1990

**Simplification**
1991 - 2000

**Pushing limits**
2004 - 2012

**Fast track & IOR**
2007 - 2015

**Industrialization**
2015 - 2025

1. generation
- Gullfaks
- Tommeliten

2. & 3. generation
- Sleipner og Statfjord sat.
- Heidrun, Norne
- Yme, Lufeng, Åsgard,
- Gullfaks sat2, Sygna, Sigyn,
- Troll

3. & 4. generation
- Kristin, Morvin,
- Snøhvit, Ormen Lange
- Vega, Gjøa

Subsea catalog and Subsea processing
- Fast track I, II and III
- Aasta Hansteen
- Tordis SSBI, Tyrihans, ASC,
- GSC
- Pazflor, Marlim; Rosa;Clov,
- J&SM, Julia, OL Pilot.

Cost reduction, Collaboration
Copy /reuse
- JC, JS fase 2, Grane N,
- Trestakk, Vigdis Booster,
- Hoop, TGP, BdN, BCT33,
- BROWNFIELD Solutions
  - Njord, Visund +
- SUBSEA-TO-HOST
- Barents sea + 23. round
- DEEP WATER
  - TGP, BdN, Brazil
- Classification: Restricted     2015 - 06 - 17
Subsea timeline

Pioneering 1985 -1990

1. generation
- Gullfaks
- Tommeliten

Simplification 1991-2000

2. & 3. generation
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Pushing limits 2004-2012

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Fast track & IOR 2007- 2015

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- J&SM, Julia, OL Pilot.

Industrialization 2015-2025

Cost reduction, Collaboration
Copy /reuse
- JC, JS fase 2, Snorre 2040,
- Grane N, Trestakk, Vigdis
- Booster, Hoop, TGP, BdN,
- BCM33,
BCT SUBSEA
Cleaner, Leaner, Smarter

- Staircases with implementation roadmaps produced for all «subsea» topics
- Subsea Factory strategy developed in 2011
- Strategy change from taking subsea longer-deeper-colder to cleaner-leaner-smarter.
- The two first subsea gas compression stations in production

Achievements 2012-2015

2012 ÅSC Retrofit Tee hot tap
2015 ÅSC Subsea compression train
2015 GSC Subsea compression station
2015 Aasta Hansteen Subsea on deep water
Collaboration
Communication
Customization
Creativity
There's never been a better time for good ideas

Cleaner-Leaner- Smarter

Thank You!