Standardisation or New Technology?

Simon Davies, Technology and New Energy, Subsea Technology & Operations

FFU Seminar

Statoil IB Centre, 28 January 2010

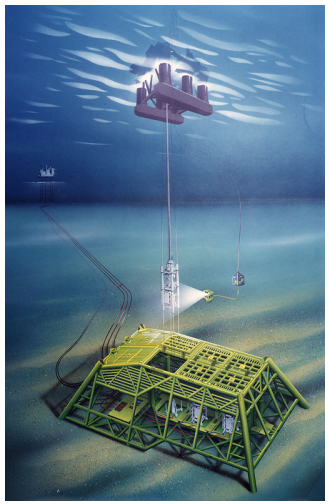
Subsea Production Systems: Statoil

- Worlds largest subsea operator, in terms of production
- Statoil operates 476 subsea wells
- Close to 50 % of total production from subsea wells

Subsea production systems: different generations & drivers

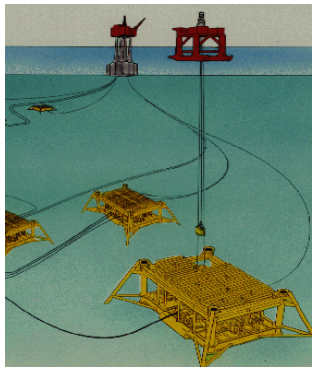
1. generation

Gullfaks, Tommeliten



2. generation

Sleipner sat, Statfjord sat, Heidrun, Norne



1991-1995

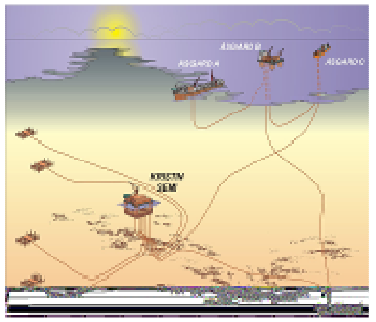
3. generation

Yme, Lufeng, Åsgard, GF sat2, Sygna, Sigyn, Svan

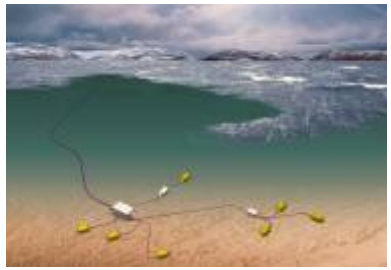
1996-2000

4. generation

Kristin



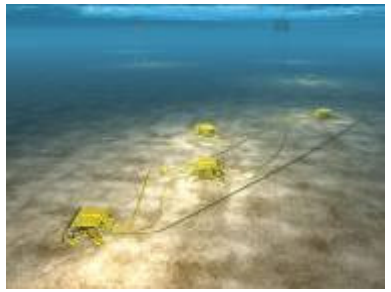
Snøhvit & Ormen Lange



2004-2007

5. generation

Tyrihans



2007-2019

Simplification and cost-reduction

New technical challenges

Robustness & IOR focus

Statoil

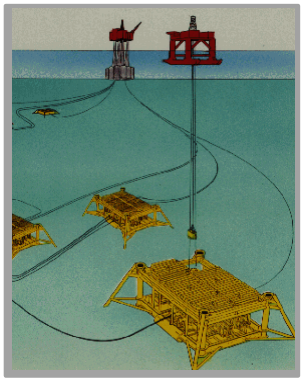
Cost illustration for subsea production system

Based on approximate costs per well for field examples shown

Tommeliten

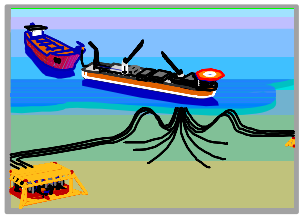
1988

Statfjord satellites



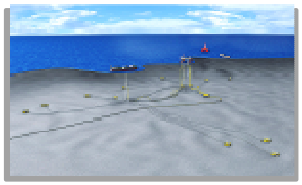
1992

Norne



1994

Åsgard/Gullfaks satellites



1996

Norne Satellites

2004-2005

Tyrihans

2009

Statoil

Current business challenges and opportunities

Challenges

- NCS portfolio has shifted to a large number of small, subsea tie-backs 2010-2015
- Small production volumes (2-6 wells) in connection with infrastructures/asset
- Many generations of subsea equipment (5 generations) in operation
- High activity and corresponding high cost for equipment and vessel
- Porfolio has many different ownership structures (licenses)

Drivers / opportunities

- Need for fast-track projects
  - Streamlined work processes and project execution model
  - Clustering of projects
- Industrialisation of the value chain
  - Configurable standardised products
  - Predictable order level
- Improved operations flexibility
- Reduced life-cycle costs
- Reduced project risk

Statoil

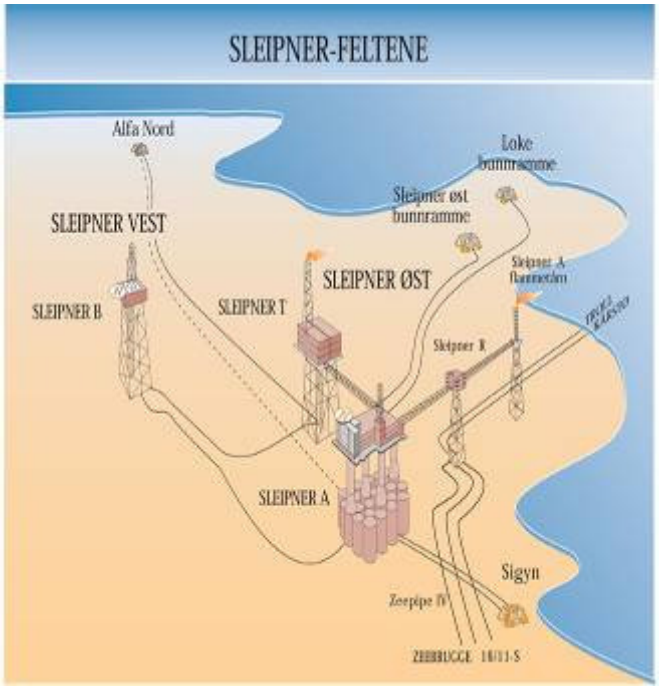
What Is Standardization?

- Facilities standardization is the repeated use or application of a common facility design and/or specification, either within or across E&P asset developments

- In general, standardized components are nearly identical in physical dimensions, throughput capacity, and design

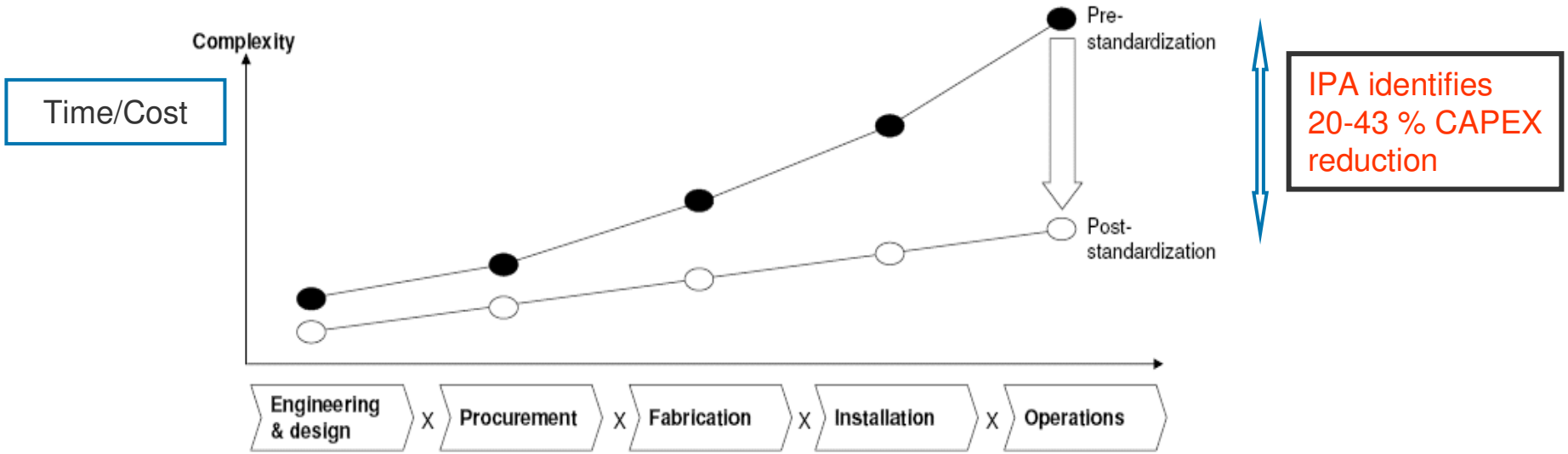
Subsea tie-in: areas of standardisation

- Pipelines/Risers
  - Material spec, Dimentions OD/ID, Spool design,trenching,gravel dumping
  - Use of portfolio in purchase,engineering,construction,mobilization and offshore operations
- Umbilicals
  - Materials,functionality hydraulic/electric, dynamic/static design,construction, moblization and offshore operations
- Marine installations of templates and tie in/connection
  - Optimum installation method wrt number of operations/tie in and connections
- Subsea Equipment
  - Standardized subsea systems with functionality, material spec and running tools for marine contractors and drilling/completion rig
- Rig Equipment
  - Common completion equipment, personell and procedures. Dedicated rig for a portfolio of assets



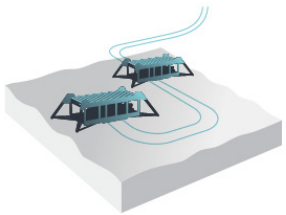
Subsea standardisation benefits

- Merge best practice from previous projects
- Reuse of technical spec and documents (learning curve benefit)
- Optimal contract strategy and cost reductions due to volume effect
- Improved lead time for Long Lead items
- Proven design with high quality and reliability



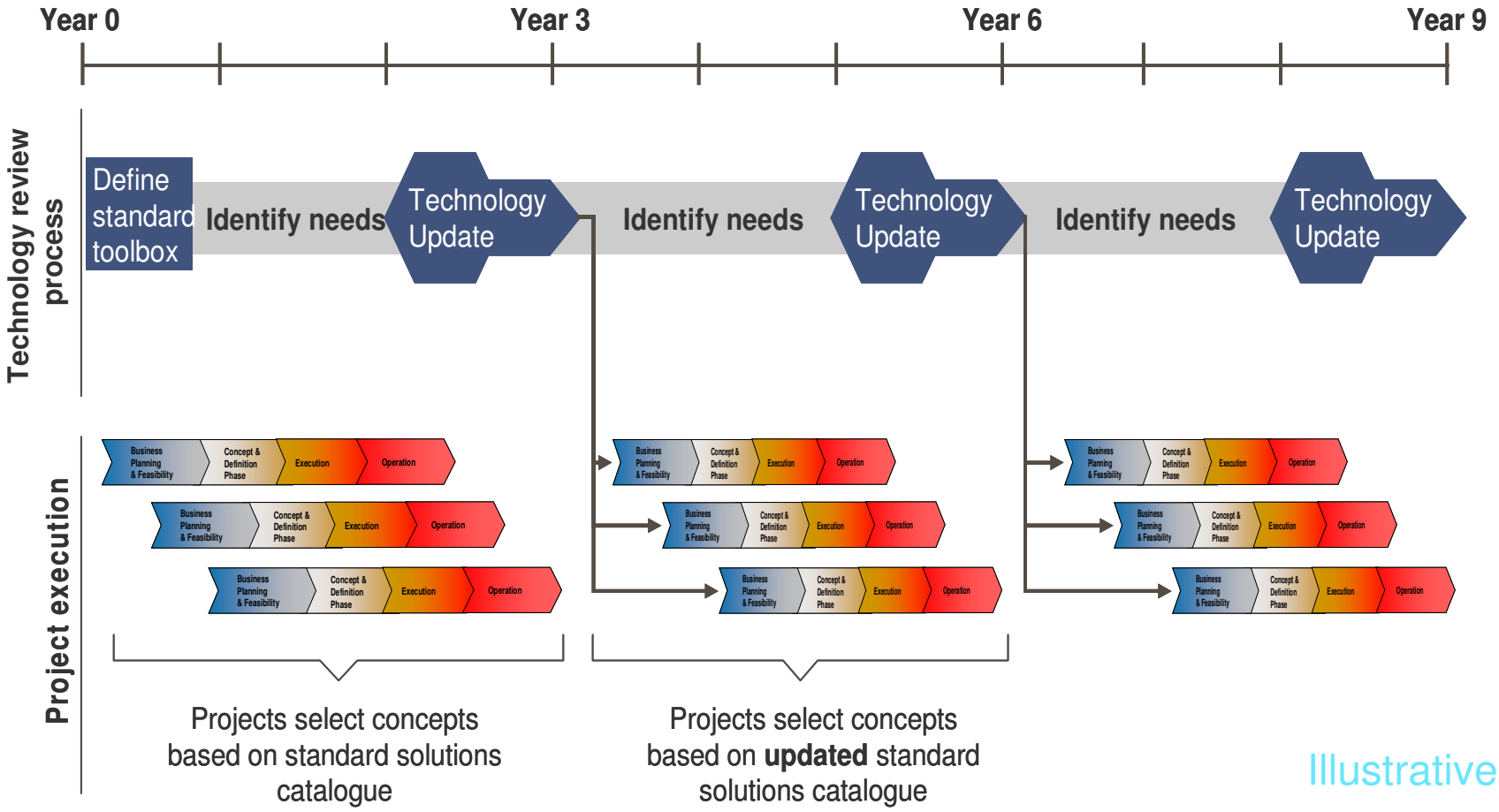
Subsea tie-in EPC solutions: what is required?

- The solutions have to be standardised to enable shorter execution times.
- The solutions have to be configurable, with required functionality to maximise recovery across a range of reservoir uncertainties (e.g. P10 to P90).
- The solutions have to be cost effective to enable development of (marginal) fields.
- The solutions should be compatible with existing WOS (and tooling as far as possible), to minimise additional investments.



Statoil

New technology / improvements can be implemented at given intervals



Standardisation initiative in Statoil: main objectives

The purpose of the work is to establish the required configurable standardised subsea frame agreement EPC solutions* for upcoming subsea tie-in projects.

- Both 4-slot and single slot (satellite) solutions will be included.
- The solutions will satisfy Statoil's requirements to HSE, technology, LCI, schedule, cost and quality.
- The solutions will be configurable to address the project specific requirements, to ensure high HSE standard, high reservoir recovery factor and low life cycle cost).
- The solutions will be applicable to marginal fields, infrastructure tie-ins and many new, larger assets

Standardisation or new technology?

Standardisation

- A key for fast-track realisaation of small, marginal subsea tie-ins on the NCS
- Can contribute to cost-effective subsea solutions for operators and more predictable supply volumes for the suppliers
- Technology upgrading to be disconnected from individual small projects and implemented periodically “as needed”

New technology

- There is still a need – new technology will be driven by larger projects on the NCS and internationally – eg HTHP, ultradeep
- The major new elements in subsea production relate to subsea processing technology
- There is a rapidly increasing number of prospects both on the NCS (including green field and brownfield increased hydrocarbon recovery opportunities) and internationally