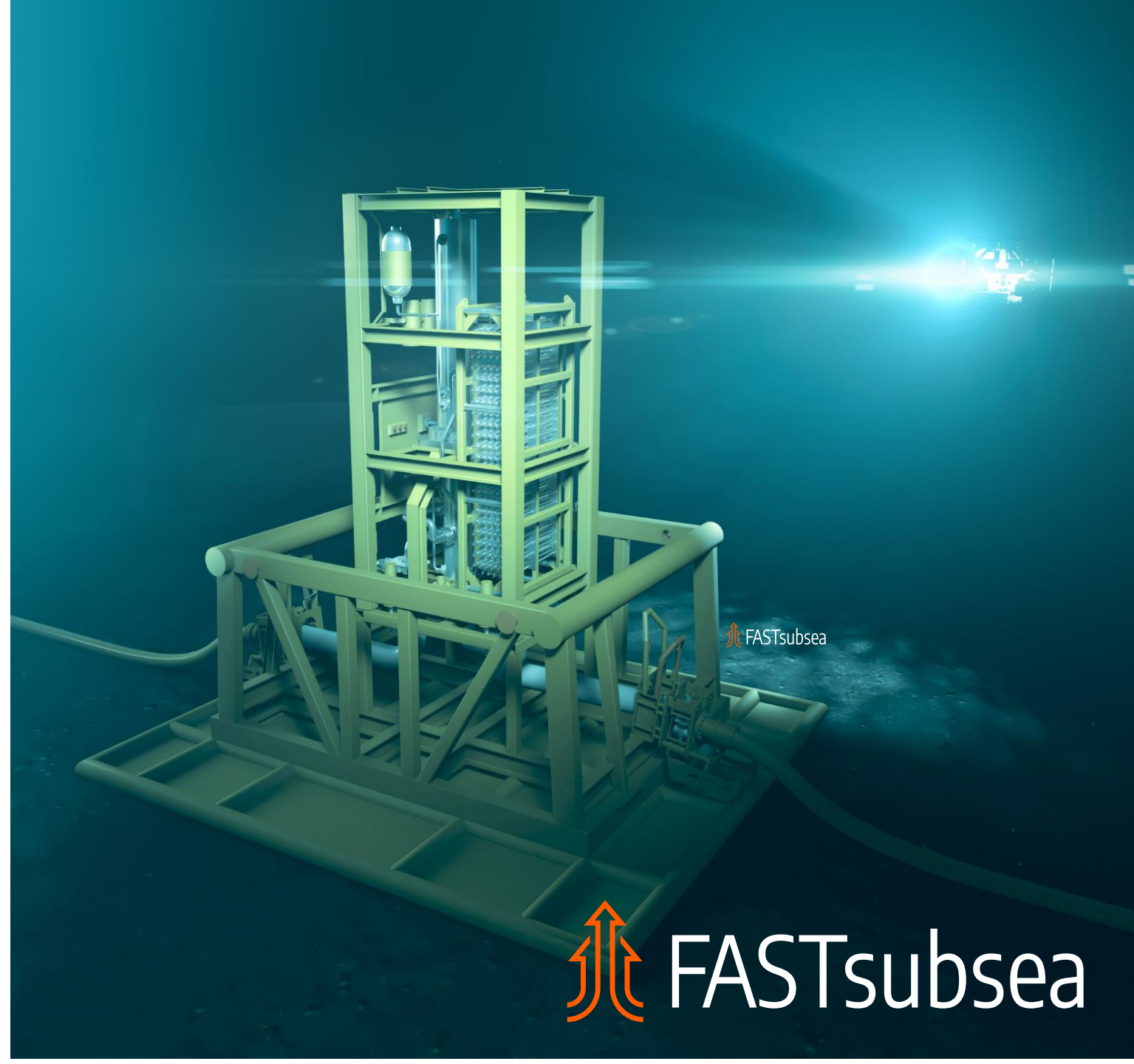


# World's First Topside-Less Subsea Multiphase Pump

Increased Recovery...

**FASTer**  
**CHEAPer**  
**GREENER**



FASTsubsea

 FASTsubsea

# Subsea pumps = Our most powerful «IOR» tool



## BOOSTING ECONOMIC RETURNS

*1% increased recovery increases revenues with more than NOK 100 billion on norwegian shelf alone. Norwegian Petroleum Directorate*

*Global offshore recovery rates are only 30-35%  
OE Digital*

*Vincent subsea boosting gave more than 25% IOR and had 6 month payback period. Woodside*

*Topacio subsea boosting is reported to have a 4 month payback period. Exxon*

# THE CHALLENGE

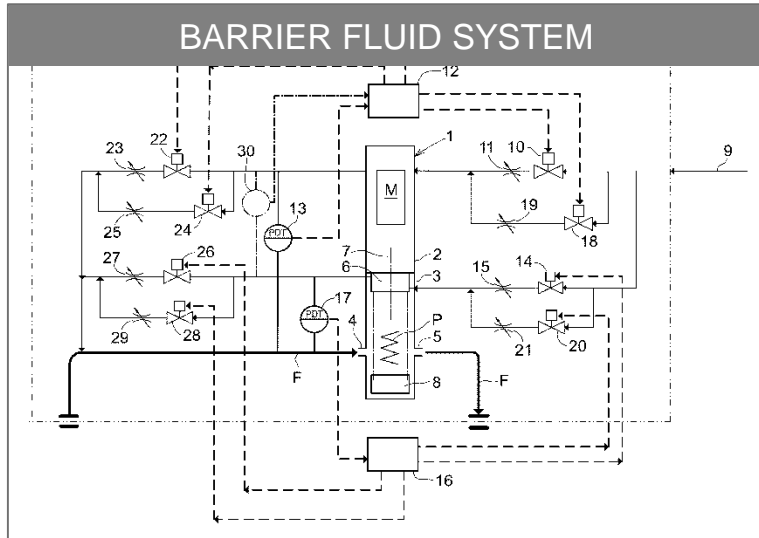
# Conventional subsea boosting systems require

SUBSTANTIAL TOPSIDE INFRASTRUCTURE

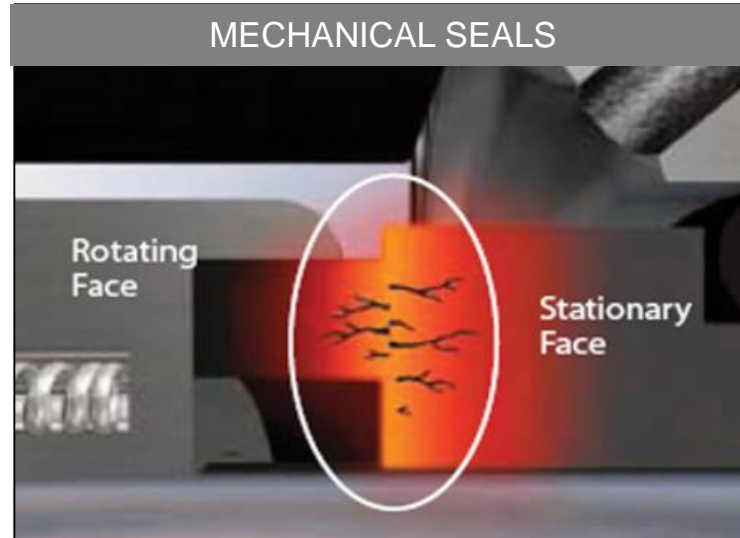


- 100 - 500 tons per project – **very limiting for brownfields**
- Topside Power & Control Module – 1 off per Pump
  - Contains: VSD, HPU & HVAC system (EX)
- VSD's cause downtime (trips)
- VSD's cause noise which increase with step-out
- Subsea VSD's not good alternative: costly, large and heavy
- Installation means lengthy disruption

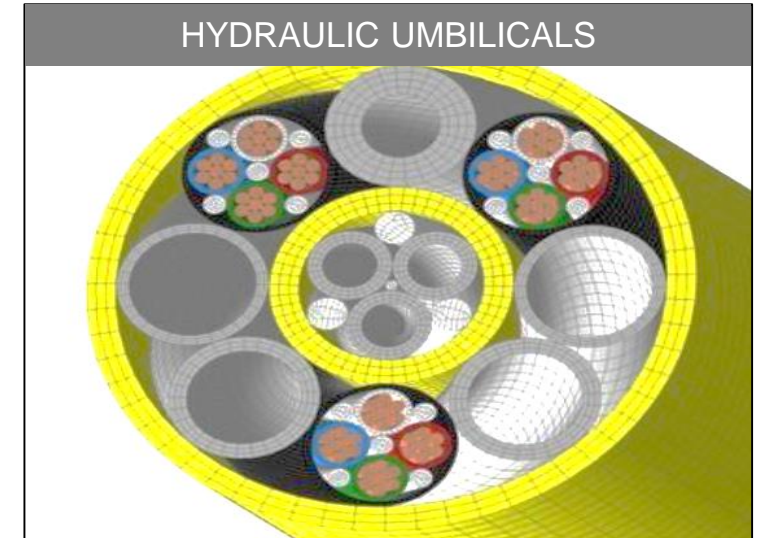
# Conventional subsea boosting systems require



- Complex P&IDs
- Sensitive pressure regulating valves
- Design depends on reservoir pressure
- Risk of leakage to the sea
- Electric vs Mechanical system ?
- Link BF to suction or discharge pressure ?




- Most fragile part in the system
- Handle high pressure in one direction only
- Several failure modes
- Depends on fully functional barrier fluid system



- Liquid umbilical required due to constant mechanical seal leakage into the process
- High design, manufacture & installation cost
- High OPEX cost: flushing, testing, ...



 **AkerSolutions™**

 **OneSubsea**  
A Schlumberger Company

**Baker Hughes™** 

 **TechnipFMC**

# THE SOLUTION

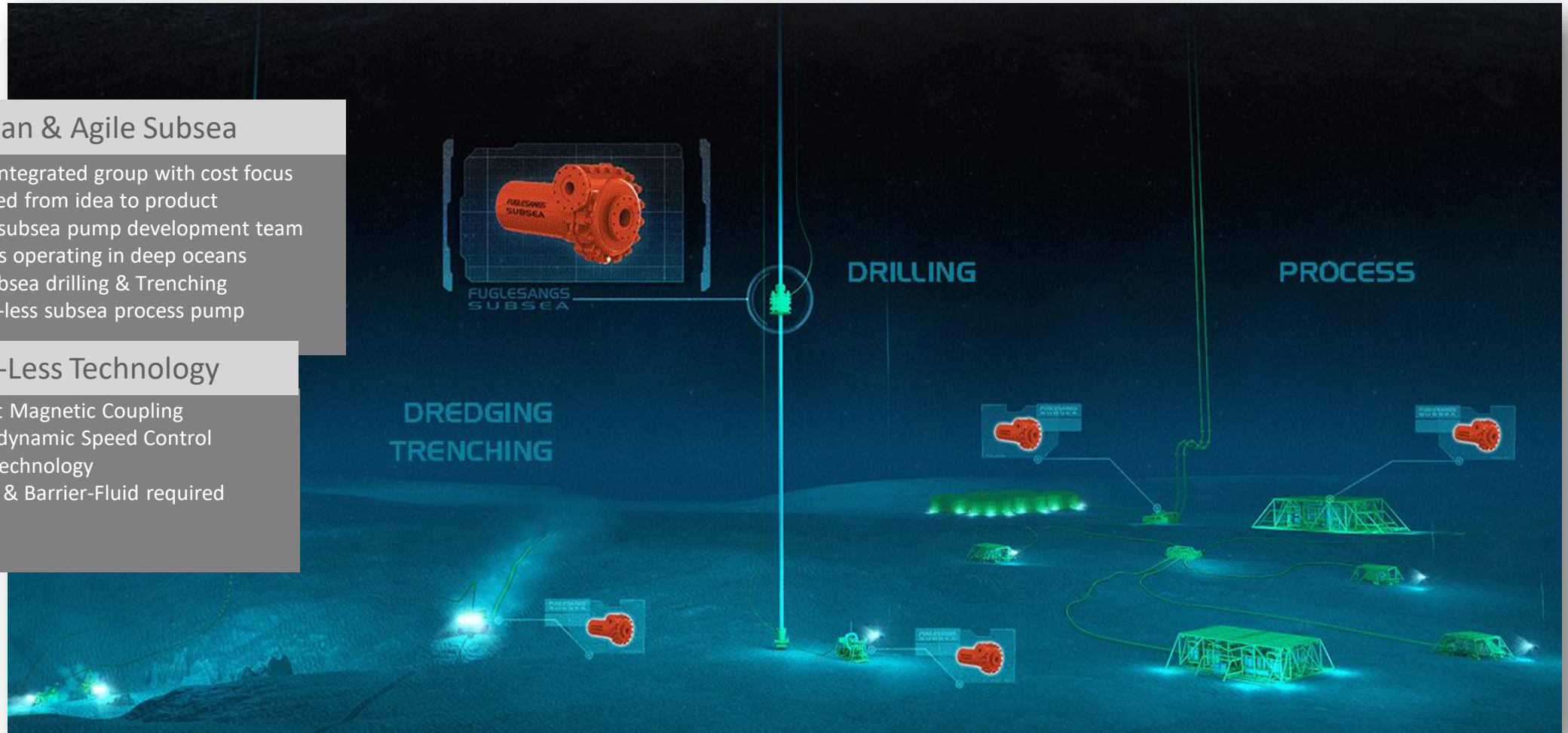
# Take the best of FSubsea

## Lean & Agile Subsea

- Small & integrated group with cost focus
- High speed from idea to product
- Focused subsea pump development team
- 42 pumps operating in deep oceans
  - Subsea drilling & Trenching
  - BF-less subsea process pump

## Topside-Less Technology

- Worlds largest Magnetic Coupling
- Subsea Hydrodynamic Speed Control
- Hydromag™ Technology
  - No VSD & Barrier-Fluid required





# ...and couple it with the best of Aker Solutions

## Subsea Systems

- SPS integrator
- Deepwater & remote areas
- Extensive subsea boosting experience

## High Performance Boosting

- MultiBooster™
  - 6 MW / 6 kV
  - 250 bar dP @60% GVF
  - 0-100% GVF
  - Semi axial impeller
- Full size MPP test facility





# Create FASTsubsea

Taking the best of FSubsea...

...and combining it with the best of Aker Solutions



Topside-less technology

Lean and agile subsea

High performance boosting

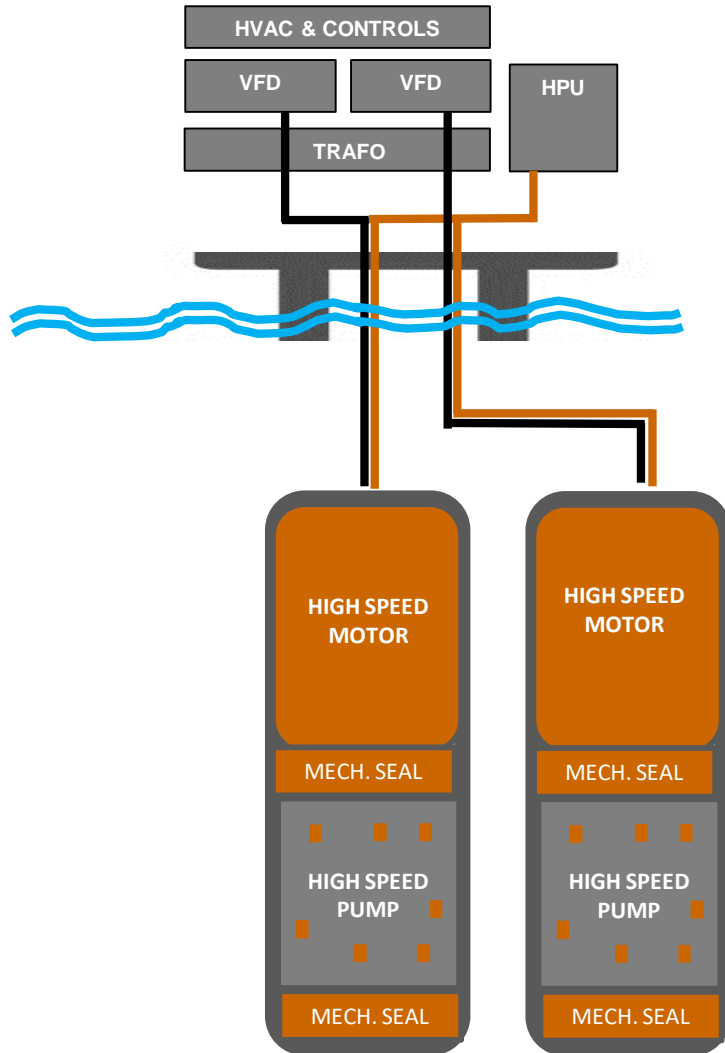
Subsea systems



**Simplified and Low-Cost 2 MW subsea Multiphase Pump System for Brownfield IOR, tie-backs and distributed wells**

# Simplify, Reduce costs & Increase Reliability

## Conventional Subsea Boosting System



## FASTsubsea X - Topside-less & Barrier Fluid-less

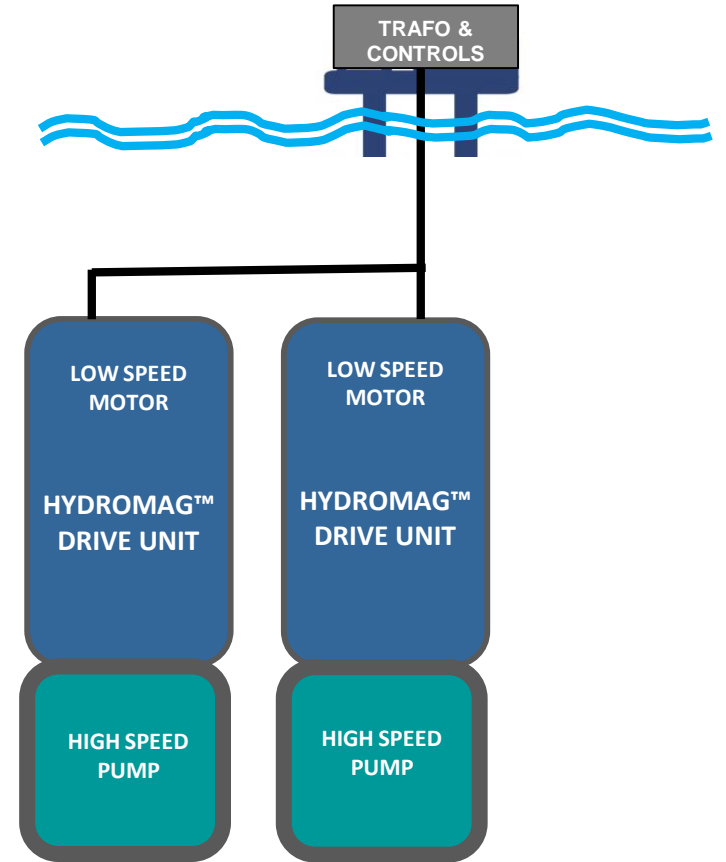
*Total equipment and steel topside weight savings of 100 to 500 tons*

*Eliminate hydraulic Barrier Fluid equipment inc. umbilicals*

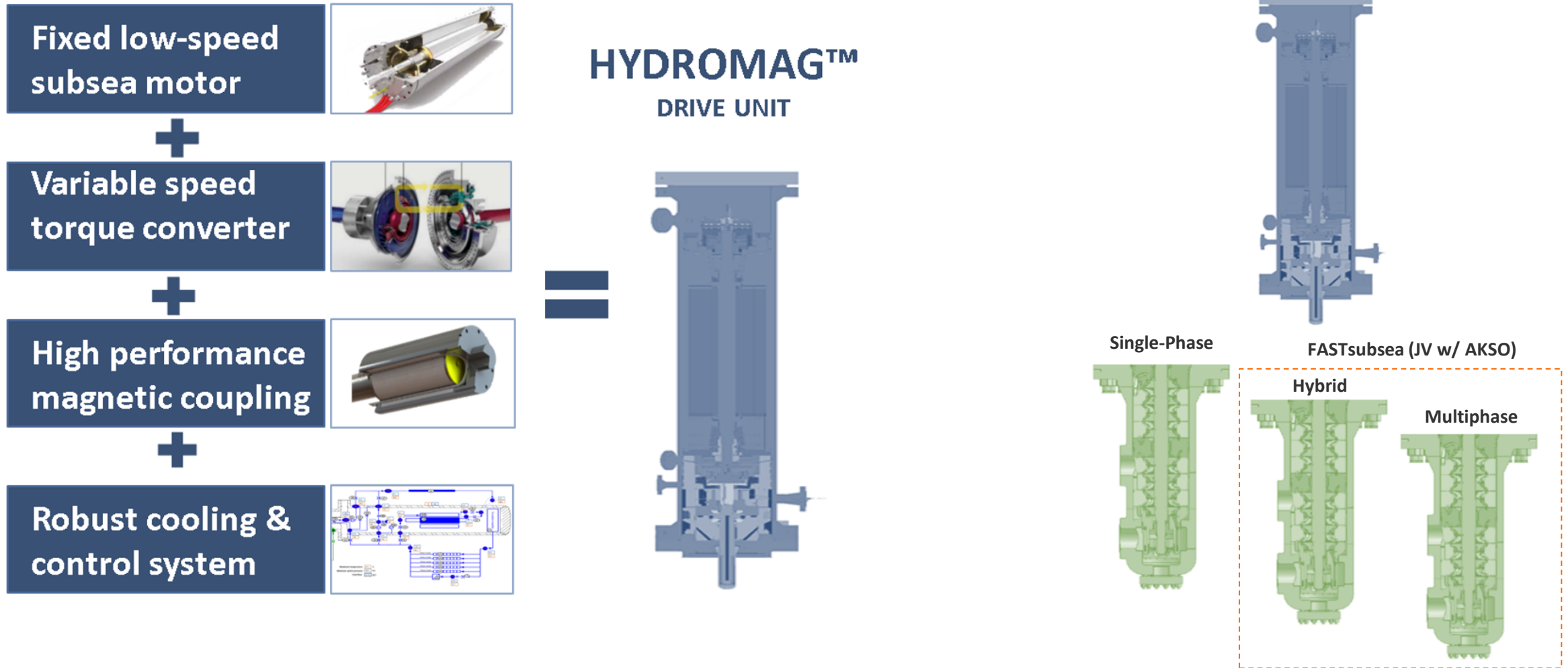
*Multiple Pumps Supplied with Single Power Cable*

*Smooth operation with closed-loop hydrodynamic speed-control*

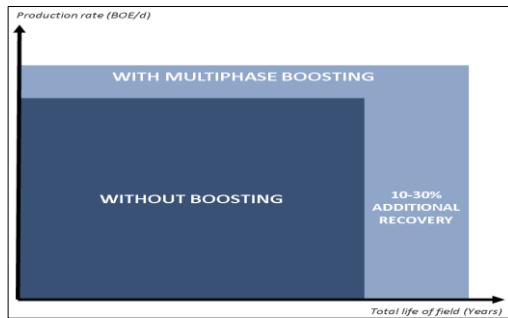
*Hermetically sealed pumping unit*



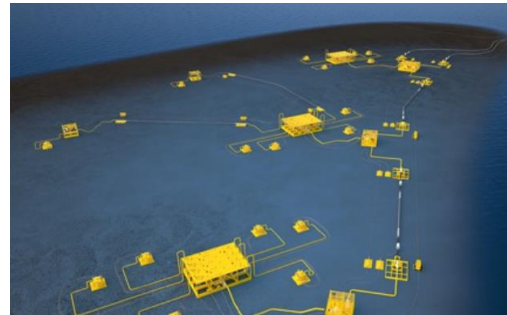
# World's first Modularized & Autonomous Pumping System



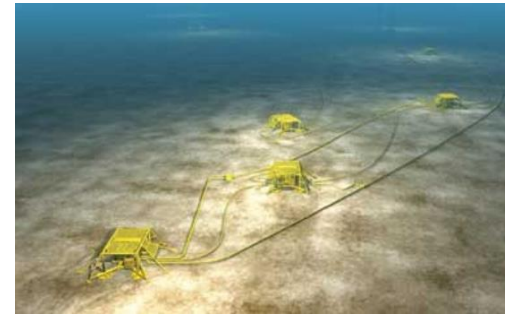
# Main Business Cases



**Increased recovery from existing wells**



**Enabler for boosting on distributed fields**



**Unlock marginal long distance tie-backs**



**Topside – Unmanned Process Platform**

# Environmental effects

## Reduced Topside Hardware

- No Electric VSD, HPU & HVAC
- Less Supporting Steel Structure



*100-500 tons of equipment and steel saved pr project.*



## Eliminate Platforms, by enabling simpler subsea processing



*Subsea processing consumes 50% of the energy of topside/surface processing.*

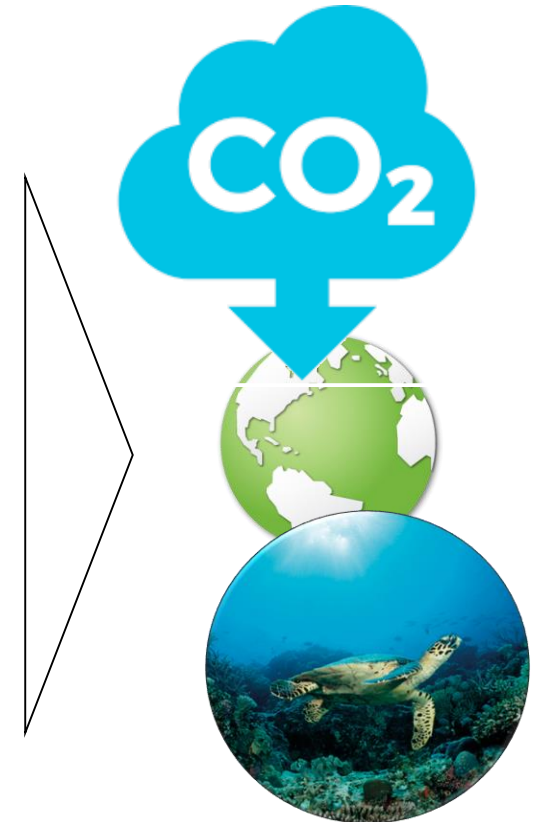
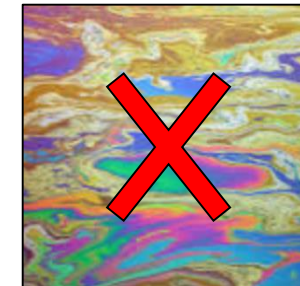


## Reduced Opex To Serve Topside Hardware

Less Personell  
Less Heli / Vessel Transport To/From Platform

## Removed Barrier Fluid System

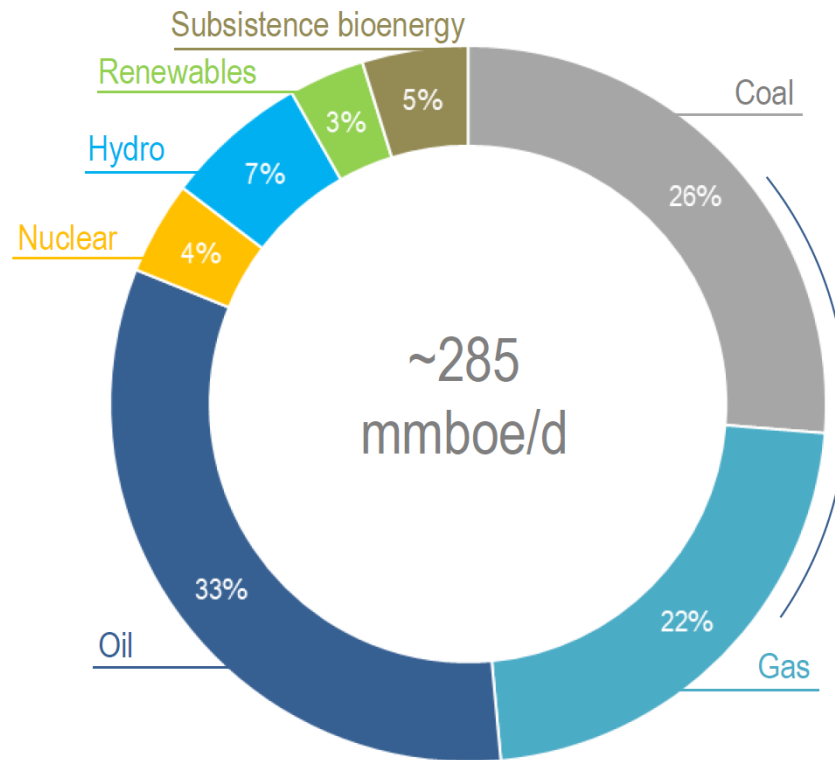
No Barrier Fluid Consumption / Testing  
Hermetic Barrier = No Risk Of Spill



# Oil & gas is 40-50 % of the world's energy mix in 2050

Hydrocarbons provide ~80% of our energy needs

2017 global primary energy demand by fuel



Courtesy: Lambert Energy Advisory Ltd, 2019

But while our energy mix is generally affordable and reliable, it is not sustainable



- X Urban smog
- X Primary bioenergy
- X Conflict & corruption



- X GHG emissions
- X Habitat destruction
- X Deforestation



# Does the environment prefer increased recovery over finding new wells?



**\$7 billion/year**



**\$24 billion/year**

# Helping to achieve the UN Sustainability Goals

1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

7.1 By 2030, ensure universal access to affordable, reliable and modern energy services



How to do this without ensuring a cost effective, reliable and more sustainable oil & gas supply?

FASTsubsea offers the simplest, most cost effective and reliable method of getting more from existing fields

- Subsea Boosting System up to 2MW
- >50% CAPEX reduction
- Minimal topside impact
- Have applied for Demo2000
- JIP scheduled to start 2020



# Get in touch

**Alexander Fuglesang**  
**(Business development)**

[awf@fastsubsea.com](mailto:awf@fastsubsea.com)

[+47 915 42 021](tel:+4791542021)

**Bastiaen van der Rest**  
**(Project & Operations)**

[bvr@fastsubsea.com](mailto:bvr@fastsubsea.com)

[+47 994 93 026](tel:+4799493026)

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