

Oil, Gas and Chemicals

Power from shore Energy efficient solutions with proven technology



What is power from shore? Electrification of offshore assets using power generated onshore



Energy efficiency Big savings potential in oil and gas





Why electrification? Power from shore is more energy efficient



- Power from shore:
 - Efficiency around 90%
- Offshore gas turbines:
 - Efficiency 25-30%, 35-40% with heat recovery



Why electrification? Electrification by power from shore benefits other areas as well





Technologies for power from shore Three alternatives





Technology solutions for power from shore HVAC or HVDC?



Elements to be considered:

- Distance from connection-point to consumer
- Power to be transferred
- Frequency (60/50 HZ)
- Cost, available space, weight

"Rules of thumb" for choice of solution:

- Less than 50 km normally AC
- Longer distances lower transmission frequency
- Between 50-150 km dependent upon several factors
- More than 150 km Normally DC





HVDC Light Technical development



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Power from shore Market growing in importance around the globe





Already a strong heritage in power from shore Troll A - Statoil





Supplying power to Johan Sverdrup Project development

Close collaboration on Johan Sverdrup

- September 2012 March 2014: ABB executes a number of studies
- April 2014: ABB awarded FEED contract for DC power supply from Kårstø to Johan Sverdrup
- March 2015: ABB awarded HVDC equipment and systems supply





Johan Sverdrup Overall design requirements



Design requirements

Criteria:

- 100 MW power delivered at Johan Sverdrup
- High availablility
- Proven technology and solutions

Solution:

- The converter station will be an integral part of the riser platform
- The converter station onshore will be located on Haugsneset
- HVDC VSC system complying to Statoil's requirements



Power from shore Electrification is a profitable and sustainable solution

\$	Economics Reduced operational costs Reduced footprint/weight More gas available
 Image: A start of the start of	Predictability Many references High availability Synergies with subsea electrification offshore and wind
Ť	Better working environment Reduced local pollution Reduced noise and vibration Reduction of personnel offshore
CO ₂	Climate All new O&G projects evaluated for electrification (in Norway) CO ₂ footprint



Power and productivity for a better world[™]

