



Subsea automation

One of the obvious problems posed by working in deep water is that the equipment is inaccessible. This puts a premium on the systems that tell an operator what is going on 3 km below their feet, and allow them to detect and correct problems before they interrupt the production process. ABB supplies ultra-high-speed controllers for demanding subsea applications through to highly flexible human-machine interface (HMI) solutions for seamless integration to topside control systems. Its System 800xA distributed control system integrates subsea and topside equipment and allows engineers to run their entire operation from one screen. It also enables remote communication and monitoring and control operations for subsea factories. Engineers can manage entire operations from a modern onshore control room that may be some 600 km away.

Long step-out system

Åsgard subsea gas compression project , long step-out, 2 x 15 MVA, 43 km, 120 Hz
ABB was commissioned to provide power to the gas compression system. The Åsgard long step-out power system consists of two compressor strings and two pump strings. The subsea power system for the compressor string transmits 15 MVA of electric power at 34 kV/120 Hz over a 43 km subsea cable. This is a world record for distance, voltage, power and frequency between a drive on a floating production facility and a seabed compressor. ABB is also responsible for delivery of the topside high voltage power apparatus and the subsea transformers.

Moho Nord, long step-out, 2 x 5 MVA, 7 km, 68 Hz
The Moho Nord long step-out system delivers electric power to two multiphase pumps. It consists of two separate step-out systems (inner and outer system), where the power transmission from topside to subsea is via two separate three-phase systems within the same subsea high voltage cable. The long step-out system transmits 5 MVA of electric power at 23.4 kV/68 Hz. ABB's scope of work includes validating the power system design for the step-up transformer, VSD, step-down transformer, subsea umbilical high voltage cables and subsea motors. ABB is also responsible for delivery of the topside VSDs and combined transformers and the subsea transformers.

Direct electrical heating

Na Kika pipeline heating system
The Na Kika field extends across the Mississippi Canyon blocks in the Gulf of Mexico. It has recoverable reserves of 300 million barrels of oil equivalent and a production rate of around 110,000 bpd oil and 500 million cubic feet of gas a day.

The pipeline is 2,500 m deep, and to prevent ice forming, ABB supplied a power and control system for electrical heating of the pipeline. A container was placed on board a vessel, the subsea transformer was then lowered to the midline assembly on the pipe segment and the pigtails connected by a remotely operated vehicle. The umbilical and generators were connected to the container and, following a circuit check, power up resulting in up to 10 days heating time.

Gulfaks pipeline heating system

Gulfaks is an oil and gas field in the Norwegian sector of the North Sea, operated by Statoil. Gulfaks south is located on Block 34/10 and 33/12, at a depth of 130 to 220 m. The recoverable reserve is 65 million barrels.

Statoil required a reliable electrical heating system to prevent the formation of hydrate and wax in the flowlines and pipelines. ABB provided a direct electrical heating system comprising power transformer, compensation and symmetration units, control and protection, along with design and in-house engineering. The benefits include longer equipment lifetime, reduced site construction schedule and an environmentally-friendly solution.

Subsea power substation

ABB has entered a joint industry program (JIP) with the Norwegian oil and gas company, Statoil. The program will develop solutions for transmission, distribution and power conversion systems designed to power and control subsea pumps and gas compressors at depths of 3,000 meters and over vast distances. The five year program is pivotal to the development of technologies required to power and control large-scale subsea pumping and gas-compression projects planned for the Norwegian continental shelf, the Gulf of Mexico and other places around the world. The JIP will provide solutions for transmission of electrical power up to 100 MW over a distance of 600 km and to depths of up to 3,000 m. This is important for the development of remote oil and gas fields located far from other infrastructure.

