

## **ATLE STROEMME, SIEMENS, NORWAY**

**T**he future of oil and gas recovery involves accessing increasingly complex reserves, many of which are located in deep and ultra-deep waters. The Subsea Power Grid from Siemens can be used for highly dispersed fields in water depths up to 3000 m.

Subsea power distribution can transform the way operators develop and exploit offshore and deepwater fields by significantly reducing development costs – especially for long tiebacks, and for marginal and dispersed fields. By moving heavy, space-consuming power equipment like variable speed drives (VSD) and pumps and compressors to the seafloor, it allows operators and EPCs to rethink topsides philosophies, opening the door to more flexible designs as well as moving subsea pumps and compressors far from host facilities.

Siemens' new medium-voltage power distribution solution – the Subsea Power Grid – is suitable for water depths up to 3000 m (~10 000 ft). The grid consists of a subsea transformer, subsea switchgear, subsea variable speed drive (VSD), subsea wet mate connectors, and a remote control and monitoring system that includes cloud-based user dashboards and data analytics. To enable optimum heat transfer, all of the Subsea Power Grid's units are pressure-compensated with dielectric oil and use natural convection cooling.

### **Less costly and more environmentally friendly**

The Subsea Power Grid is a clear departure from conventional offshore power approaches. Critical equipment and power modules, like VSDs, are removed from the platform topsides and installed on the seabed close to the final consumer. In addition to reducing costs of deepwater developments, the commercialisation of the Subsea Power Grid also has environmental implications. It improves the economics of tying into onshore power grids or harnessing clean generation from offshore wind farms located long distances from production platforms.

### **Shallow water test yields positive results**

In the fall of 2018, Siemens completed a shallow water test of the Subsea Power Grid, with all units operating within design parameters. This work was performed as part of a joint industry partnership with four major international operators – Chevron, ExxonMobil, Equinor, and Eni Norge. Following the initial shallow water test, Siemens, in agreement with its partners, moved into the next phase with an extended shallow water test to build operational experience and verify long-term reliability.

Following the successful completion of the initial shallow water test in Norway last autumn, the Subsea Power Grid is ready for large-scale processing projects with multiple seabed power consumers in deepwater. ■



**Figure 1.** Siemens successfully concluded the first phase of its Subsea Power Grid shallow water test in Trondheim, Norway.

