

Rapid on-site wind turbine service

Non-stop green energy

Wind power is generally accepted as one of the cleanest and most desirable sources of electricity. The performance and efficiency of wind turbines depend greatly on continuous and reliable operation. In the case of an interruption, Sulzer's service teams are available to provide rapid repair—even in challenging offshore environments, as a recent mission in the North Sea illustrates.

Significant public focus and funding have gone into creating new wind power installations around the world over the last decade. The objective of these efforts is to replace fossil and nuclear power with clean, renewable electricity. Offshore wind power—with high average wind speeds and low environmental impact—plays an important role in many countries. However, offshore wind turbines operate in a challenging marine environment. High

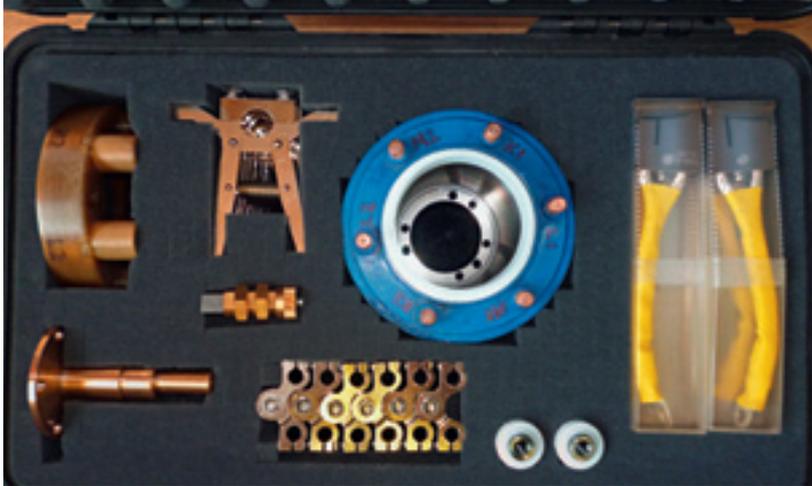
turbine availability is essential both to maintain the financial viability of the wind park and to maximize the positive environmental impact with the clean electricity it produces. For this reason, Sulzer Turbo Services has specialized in on-site wind turbine repair. Sulzer's teams play a key role in maintaining the client's turbine availability by reacting to on-site generator issues with technically competent personnel and professional solutions ¹.

Help on the high seas

In January 2012, Sulzer Dowding & Mills Nottingham learned of troubles at an offshore wind park. A wind turbine generator was out of service and was even being considered for decommissioning. The turbine generator had failed due to a rotor earth fault, which had been confirmed by the client-appointed engineers. Under normal circumstances, this would result in the unit generator being replaced at great cost. The overhaul

High turbine availability is essential for wind parks—especially in challenging offshore environments.





1 For on-site service, Sulzer's engineers use dedicated wind turbine generator repair kits.



2 After the full rebuild of the slip ring and the brush gear, the wind turbine was successfully synchronized to the power grid and produced maximum output.

would involve a crane barge, which can cost as much as £100 000 per day, plus the associated labor and new generator expenditures. These financial issues and the age of the turbine were factors that supported a decommissioning of the unit. In this critical situation, Sulzer's engineers reacted promptly. With great customer dedication, they offered to visit the site, confirm the original test results, and see if an effective on-site repair could be made. Sulzer's team went to the site via boat and was transferred to the base of the turbine structure.

Problem solved in less than a day

The engineers carried out an insulation resistance check on both the rotor and stator circuit. This test confirmed that an earth fault in line with the reported fault existed on the rotor. The team then dismantled the brush gear and slip ring assembly, inspected components, and identified areas of carbon tracking. Once all components had been removed, the rotor lead arrangement and surrounding area were thoroughly cleaned so that they were free of carbon deposits. A further insulation resistance test and phase resistance test with all insulators removed proved successful. After the test, Sulzer assembled the unit, fitting several new parts:

- Slip rings
- Earth contact encoder drive shaft
- High-silver-content carbon brushes
- Earth brush and brush holder
- Insulated lead-entry ring complete with inserts
- Brush gear posts
- Double-leg calipers
- Knuckle joints
- PTFE (polytetrafluoroethylene) ring

Sulzer's quick and competent offshore service resulted in substantial cost savings and a positive environmental outcome.

During the process of fitting complete slip ring and brush gear assemblies, Sulzer successfully reengineered certain components to reduce downtime. After the rebuild 2, the unit underwent final static tests before being reconnected to the power grid. Once it was connected, the unit successfully generated the required power, and full operation was restored. Sulzer completed the on-site work in 20 hours.

How to avoid failures

Sulzer's engineers identified the root cause of the fault as carbon contamination leading to electrical tracking between phase and earth through insulated components. This kind of failure mechanism can be avoided through professional maintenance, which requires in-depth knowledge of the generator. A periodic

examination involving replacement components stocked by Sulzer could have prevented the failure.

The client was full of praise for the professional way in which Sulzer had responded and had rectified the problems. Sulzer's quick and competent offshore service resulted in substantial cost savings but also in a positive environmental outcome by ensuring the production of green energy and by avoiding a replacement of the unit.

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Growing wind energy industry

Wind energy is a power source with high potential. According to the Global Status Report "Renewables 2012," global wind power capacity increased by 20% in 2011 to approximately 238 GW by year-end, seeing the greatest capacity additions of any renewable technology. The offshore wind sector continued to expand, with the use of larger turbines and movement into deeper water, farther from shore. Sulzer provides fast and competent services for on- and offshore wind parks and, this way, helps to support the reliable production of green energy.

Find more information on
www.sulzer.com/windenergy