

## Wind turbine

For wind turbines, the gearbox is one of the most essential and important components. The gearbox transfers the rotations from the wings to the generator inside the turbine, which converts it to electrical energy. A gearbox is heavily loaded and will be exposed to wear and tear. If the transmission is worn or damaged, it will usually require an overhaul, or at worst, a complete new gearbox. In both cases, the gearbox must be taken out of operation and often lifted down from the wind turbine with a mobile crane and sent for overhaul or replacement - which generally is a very expensive solution.

Throughout the period of replacement or repair of a gearbox, the turbine is not producing power and therefore not making profit.

Tear and wear on a gearbox is extensively increased as the oil in the gearbox gets polluted with wear particles. Bad or no maintenance of the oil will degrade the oil and increase wear of the gearbox with the risk of a breakdown.

One of the best ways to optimize the lifetime and keep maintenance cost low, and by that getting the best lifetime profit out of the invested equipment, is to make sure that the oil in the gearbox is well maintained.



*Siemens Bonus 500 wind turbine.*

The GreenOil off-line filter solution is produced with that in mind. Over a period of 4 months a GreenOil filter unit WP1-P1-30 was installed on the gearbox in a Siemens Bonus 500 wind turbine. The results showed that the oil quality was improved and kept at conditions better than new oil, hence aiding in keeping the gearbox in good condition, and by that enhancing the business case and life time of the wind turbine.

### Oil sample test before filter installation

| Particle class | Count    |
|----------------|----------|
| ISO 4406       | 23/21/15 |
| NAS 1638       | 12       |
| Water PPM      | 440      |

### Oil sample test after filter installation

| Particle class | Count    |
|----------------|----------|
| ISO 4406       | 15/13/10 |
| NAS 1638       | 4        |
| Water PPM      | 138      |

### Oil sample test complete new oil

| Particle class | Count    |
|----------------|----------|
| ISO 4406       | 17/15/12 |
| NAS 1638       | 6        |
| Water PPM      | 100      |