

# Wind turbine generator failure repair costs



## Overview

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While generator annual failure rate is typically around 1%-4% (including full generator and up-tower replacements), the associated downtime is quite long, and replacement (disassemble/assemble) costs are high.

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### Failure Rate, Repair Time and Unscheduled O&M Cost

The average cost of major repairs and particularly minor repairs are far less significant in this graph because they are so small in comparison to the average cost of major replacements.

### [Failure rate, repair time and unscheduled O&M cost analysis of](#)

Repair times, average repair costs and average number of technicians required for repair are also detailed in this paper. An onshore to offshore failure rate comparison is carried out for generators



### [Wind Turbine Maintenance Costs: Assessing the Potential of](#)

LCOE is helpful to compare projects/technologies with different cash flow profiles and over time. LCOE does not capture the locational and time value of the generated energy and other services.

### [Analysing the cost impact of failure rates for the next generation of](#)

These findings are crucial for the offshore wind energy industry, particularly for OEMs, developers and maintenance providers, as they provide insights into the required reliability for next





## Offshore Wind Turbine Failure Analysis

This document analyzes failure rates, repair times, and unscheduled operation and maintenance (O&M) costs for offshore wind turbines based on data from approximately 350 offshore wind turbines

### [Operation and Maintenance Costs of Wind Generated Power](#)

And although all cost components tend to increase as the turbine gets older, costs for repair and spare parts are particularly influenced by turbine age; starting low and increasing over time.



### [Predicting Frequency, Time-To-Repair and Costs of Wind Turbine](#)

We applied Bayesian updating to predict wind turbine failure frequency and time-to-repair (TTR), in conjunction to machine learning techniques for assessing costs associated with failures.

### [Wind Turbine Generator Reliability Analysis to Reduce](#)

Generator issues continue to remain a concern in the wind industry, both for stator-fed synchronous machines as well as for rotor-fed, wound rotor machines. Each of these generator failure events lead



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