

Wind Farm O&M Strategy: Predictive vs Condition Based Performance Results

The Wind Energy O&M Report 2017 has found a significant difference in the performance of predictive vs condition based O&M strategies. A condition based monitoring strategy using all sensors, except oil sensors, was found to be the optimal O&M strategy for a 630MW wind farm made up of 105, 3MW turbines. A preventive strategy was found more expensive, particularly under a high gearbox failure scenario. In stark contrast, for smaller 2MW size turbines, preventive O&M strategies are more effective, while all sensor condition based strategies are more expensive.

Table 1: 3MW turbines, 630MW, wind farm

Failure Scenarios	Best scoring strategy and relative scores of other options					
	USD (per turbine)					
	Preventive Strategy	Condition-Based Strategy				
		All sensors	All sensors except from the optical sensor	All sensors except from the oil sensor	Only vibration sensor and temperature sensors	Only temperature sensors
Reference scenario	1.10%	0.40%	1.20%	Optimal	0.90%	0.30%
High gearbox failure scenario	6.70%	Optimal	0.80%	1.30%	2.10%	3.00%
High generator failure scenario	2.60%	0.30%	1.10%	Optimal	0.80%	0.30%
High blade failure scenario	4.40%	0.30%	4.50%	Optimal	4.20%	3.70%
%: Percent difference compared with the optimal case						

Table 2: 2MW turbines, 420MW wind farm

Failure Scenarios	Best scoring strategy and relative scores of other options					
	USD (per turbine)					
	Preventive Strategy	Condition-Based Strategy				
		All sensors	All sensors except from the optical sensor	All sensors except from the oil sensor	Only vibration sensor and temperature sensors	Only temperature sensors
Reference scenario	Optimal	5.00%	3.90%	3.70%	2.60%	1.10%
High gearbox failure scenario	1.40%	1.00%	Optimal	1.20%	0.20%	0.00%
High generator failure scenario	0.40%	3.60%	2.60%	2.40%	1.40%	Optimal
High blade failure scenario	Optimal	1.50%	3.30%	0.40%	2.20%	1.00%
%: Percent difference compared with the optimal case						

These results are for a wind farm with 210 turbines. The Wind Energy O&M Report 2017 contains data for wind farms with 1MW, 2MW and 3MW turbines. The report also covers wind farms of 35MW, 70MW, 105MW, 140MW, 315MW, 420MW and 630MW capacities. For more information visit <http://www.windenergyupdate.com/onshore-wind-operations-maintenance-report/>.