# Wind Turbine Operational Analysis

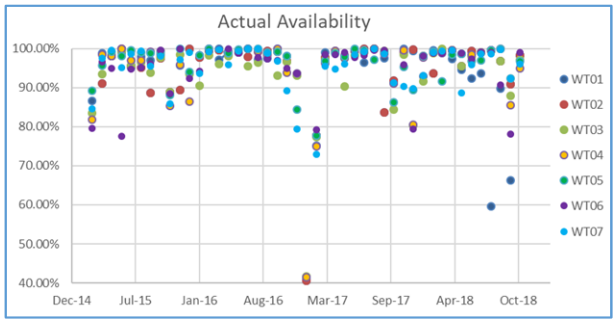
As wind power becomes one of the fastest growing renewable energy sectors in the world today, the demand for reliable and optimal operation also rises.

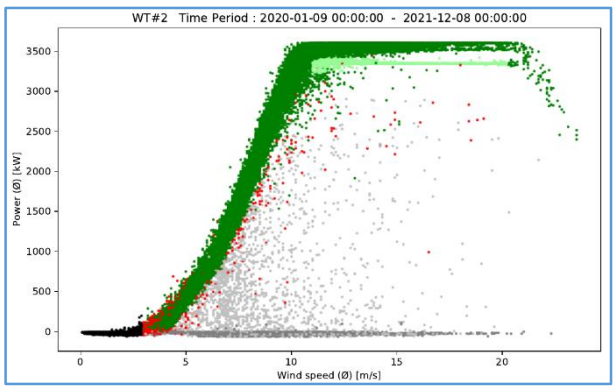
However, wind turbines still exhibit a considerable rate of faults and malfunctions which lead to unscheduled downtime and compromised efficiency. Fault diagnosis and tracing of possible sources of under-performance are necessary to maximize production and revenue.

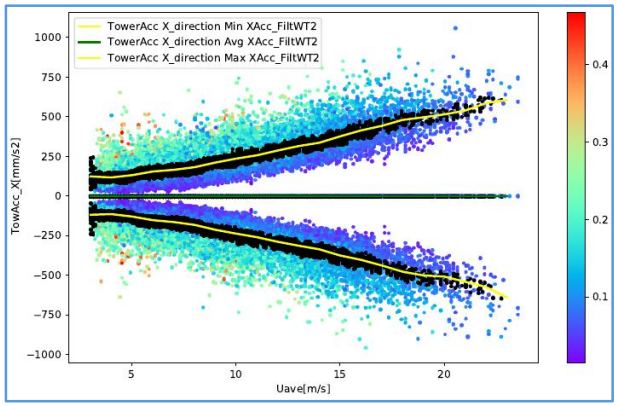
iWind has developed a SCADA-based integrated toolkit that provides the following relevant services:

- Historical operation evaluation (classification of SCADA records to meaningful sub-sets, such as normal operation, derated, idling etc.). Calculation of actual and technical availability and trends, electrical losses etc.
- Wind turbine operational data review (power, torque, rotational speed vs. reference curves, directional/seasonal variability etc.)
- Alarm log analysis (fault diagnosis and categorization, total downtime/curtailment durations etc.)
- Sector management scheme evaluation (in conjunction with in-house CFD micro-siting tools)
- Real-time fatigue life consumption

Based on the analysis results, the **Wind Farm Operator** will be able to identify defective components and conditions under which operation is suboptimal. Addressing such issues can play a key-role in the recovery of lost revenue.




| WT Number | Stoppage Category | Duration (h) |
|---|---|---|
| WTG01 | fault_converter | 1.1 |
| WTG01 | fault_converter, fault_generator, fault_misc | 1.1 |
| WTG01 | fault_electric | 0.1 |
| WTG01 | fault_electric, grid | 51.4 |
| WTG01 | fault_gearbox | 16.1 |
| WTG01 | fault_generator | 0.6 |
| WTG01 | fault_hub | 19.6 |
| WTG01 | fault_hydraulics | 0.0 |
| WTG01 | fault_misc | 89.4 |
| WTG01 | grid | 228.4 |
| WTG01 | fault_tower | 1.3 |
| WTG01 | fault_yaw | 58.4 |
| WTG01 | test | 0.8 |
| WTG01 | user | 41.6 |

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