Availability, Grid Compliance and Asset Life Extension; the Key is SCADA Service and Maintenance

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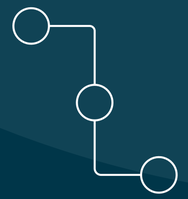
SCADA system is a crucial part of the wind turbine



SCADA systems are normally a single point of failure (SPOF) in a wind power plant

SCADA systems are often seen as a black box, which does not require maintenance

SCADA information is key for owners to...

Ensure grid compliance for ISO & market control

Control & monitor the turbine and its components

Reporting & data analysis

Loss of control and data due to unavailability of the SCADA system

SCADA unavailability has an impact on:

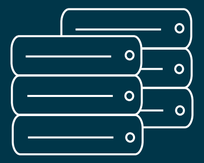
- the ability to curtail output when required
- the performance reporting
- data integration
- the lifetime of the SCADA system

The SCADA system must be treated like the wind turbine, so scheduled service, maintenance and life cycle management have to be planned.

The right design and service is needed to increase your SCADA system lifetime and to ensure reliable operation of the asset

Regular hardware & software upgrades

Prioritization of SCADA maintenance and upgrades as part of the wind power plants overall O&M strategy



Redundant system

Redundancy, backup systems and recovery plans are needed to avoid SPOFs of critical parts of the system

Endurance & prevention

- Expand technology lifetime and avoid problems of outdated technology or system incompatibility
- Enhance cybersecurity
- Continuous operation with a contingency plan
- Budget planning for maintenance — avoid unexpected costs

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