



ENERGY · PRODUCTION & ASSETS

Wind Turbine Predictive Maintenance Prototype

Quantum One built a predictive maintenance prototype for wind turbines, targeting up to a 50% reduction in shutdowns.

IMPACT

Up to 50%

Reduction of shutdowns — fully avoided, or an early alert before an inevitable one

Faults caught before the machine stops

Root cause identification for potential failures

CLIENT PROFILE

INDUSTRY

Energy

SCENARIO

Production & assets

COMPANY TYPE

Wind farm operator

CHALLENGES

- Unplanned downtime on a wind fleet is expensive and hard to anticipate: abnormal equipment behavior is visible in the data long before it stops a machine, but not to a person watching dashboards.
- Maintenance teams need the probable cause as well as the alert, otherwise the warning does not shorten the intervention.

APPROACH

An AI-powered predictive maintenance prototype detects abnormal equipment behavior and alerts operators before a potential shutdown.

It helps maintenance teams reduce unplanned downtime, identify likely root causes, and take preventive action, drawing on real-time equipment data, maintenance guidelines and the history of past breakdowns.

BENEFITS

- Real-time Equipment Health Index for monitoring turbine condition
- Early detection of abnormal equipment behavior
- Root cause identification for potential failures
- Preventive action recommendations for operators
- LLM-based action insights drawing on maintenance guidelines and historical breakdowns

MVP FUNCTIONALITY

- Real-time fleet dashboard providing live energy production data, key operational metrics, and health status of critical wind turbine systems.
- A drill-down view of a wind-farm operations dashboard pairing live performance and health-index analytics with an AI assistant that surfaces alerts, downtime costs and fleet status at a glance.
- A turbine-level diagnostic view showing health index, reliability metrics and live sensor readings alongside an AI co-pilot that diagnoses a generator-bearing thermal issue and recommends a derate action, with an annotated turbine schematic and service history.

TIME TO PRODUCTION

Stage	Quantum One	Typical process	
Problem definition	1 week	2–3 weeks	
Proof of concept	2–3 weeks	4–6 weeks	
MVP	4–6 weeks	8–12 weeks	
Scale-up	1–2 months	3–4 months	
Maintenance	Ongoing	—	

TAKE THE NEXT STEP

Speak with our experts to discuss tailored AI solutions for your industry

quantumone.ae