# End of Warranty Inspection Services

Understanding the health of your turbine is an important part of preparing for your equipment's end of warranty. Detailed inspections not only assist with turbine supplier negotiations on repairs, replacement and extended warranty, but also provide a health baseline with which to develop plans for post warranty operations.

Romax InSight services can support your O&M business at this critical time by drawing on our independent drivetrain design and engineering expertise to deliver a high-value assessment. Simply gathering data is not sufficient. We interpret the information collected and make recommendations on how to manage and mitigate any issues.

Using InSight software we can identify all of your failed drivetrain components before you leave your office. We deliver an inspection service to shortlist the turbines that need attention. Romax provide you with the ability to reduce costs, by only looking at failed turbines and facilitating the work that needs to be done to bring your drivetrains back to health.

**Inspections cover:**

- Gearbox
- Main Bearings
- Blades
- Mounts
- Lightning Protection System
- Lubrication and Cooling Systems
- Tower
- Switchroom

## *Romax delivered the world's largest offshore end of warranty project: Sheringham Shoal in the North Sea.*

Operated by Statkraft and jointly owned with the Norwegian gas and oil company Statoil, Sheringham Shoal is one of the UK's largest wind farms with 88 Siemens 3.6MW turbines.

Romax provided full turbine inspections for the entire wind farm, including main bearings, gearbox, tower, electric cabinets and blade inspection. By enlisting the help of Romax, Statkraft was able to assess the status of their wind turbines and confidently enter end of warranty negotiations with the manufacturer.

Romax Technology uses its wind turbine gearbox design and testing experience in offering operations and maintenance services and has developed a range of performance and health monitoring software tools and services. The diagnostic and prognostic tools enable wind farm owners and operators to coordinate predictive maintenance strategies to reduce the cost and improve the yield from their wind farms. Romax currently monitors over 2 GW of wind turbines globally, including more than 40% of the UK's offshore fleet.

Romax TECHNOLOGY

# *How Romax can help*

For over 25 years Romax has been a global leader in providing solutions to design, develop, deploy and monitor drivetrains across various industries. These solutions deliver a proven combination of innovative technology, engineering excellence and design expertise to optimise business performance while reducing carbon emissions.

As the world's leading independent designer of wind turbine gearboxes and drivetrains, Romax has 33 DNV GL certified designs in production ranging in capacity from 750 kW to 6 MW. We have an unparalleled understanding of the heart of wind turbines. Project scope can vary greatly but generally follows these typical stages and always results in an actionable report:

### Data Collection

Data is gathered, either via Romax portable monitoring systems or by using data from existing CMS, SCADA and maintenance record systems.

### Inspection

Romax engineers inspect the turbine, using endoscope, thermal imaging, physical examination and collection of grease and oil samples.

### Analysis

Romax experts analyse data gathered from all sources - SCADA, CMS, oil/grease samples, manufacturing data, maintenance and inspection records, etc.

### Report

Romax InSight produces a health report in the form of a set of actionable recommendations for each turbine inspected in order to help facilitate an end of warranty claim document and a post warranty O&M plan.

Key to the success of this service is the integration of our inspection information with analysis of CMS data, SCADA, site measurements, analysis and maintenance data.

### About Romax and InSight

A world-class engineering technology and services company, we have a deep understanding of the design and operation of wind turbines. This specialism and hands-on experience underpins our InSight software, services and personnel. Known globally for software simulation tools and consulting expertise, we have proven abilities to predict potential issues, understand failure modes, reveal root causes and recommend remedial action and proactive improvements.

Wind farm operators continue to experience unnecessary gearbox, main bearing and generator failures. This situation demands far better detection and faster reporting of problems at an earlier stage so preventative action can be taken sooner. Maintenance needs to be planned and executed in more timely and cost-effective ways to minimise disruption to generation and avoid potential losses. Vastly improved visibility of faults and longer maintenance lead times mean you can plan more effectively - essential in offshore operations, for example, where expensive large vessels and cranes may be required.

With 250 employees serving over 220 customers worldwide, our headquarters are in Nottingham, UK. We operate 12 offices in Europe, the USA, Korea, Japan, China and India. We also engage in collaborative R&D programmes with the world's leading turbine manufacturers and operators.

**We deliver:**

- Offshore and onshore
- Visual, endoscopic and thermal image
- Rope access

**Romax InSight supports over 50% of the top 20 owners in North America and dozens of owners around the globe including E.ON, EDPR, EDF, Globaleq Mesoamerica Energy, Statkraft and Centrica**

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