



VIII Día Eólico – Nuevas habilidades en O&M

Ávila – 25 de Febrero de 2014

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Agenda

1. Vestas Service Iberia en números
2. Los retos de hoy
3. Nuestro modelo operativo
4. Technical Planning Operations
5. Vestas After Sales

Service Iberia en Números

4,5 MW

Instalados

3,8 MW

Bajo service

25

Centros de logística,
Servicio y
Mantenimiento

360

Empleados

2853 WTGs

Turbinas monitorizadas

98,5 %

De disponibilidad
media

1,7 LPF

De pérdida de
producción

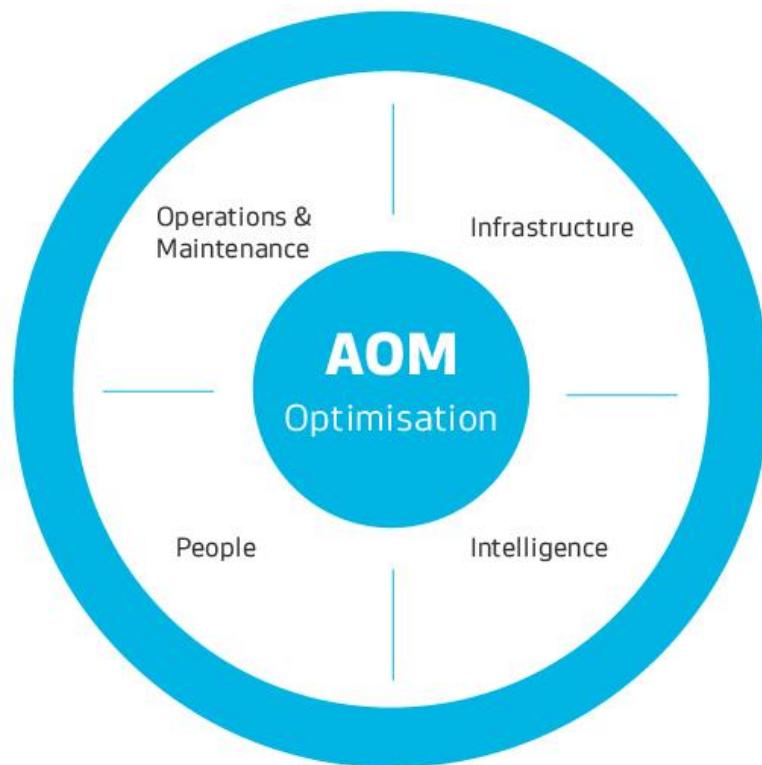
20 años

De experiencia
Operando y
Manteniendo
Parques eólicos



VestasServices™ se construye a base de amplia experiencia

30 años de recogida de datos globales permite a Vestas conseguir el liderazgo en rendimiento



El plan de O&M correcto

Centrado en mantenimiento preventivo y predictivo para asegurar la mayor disponibilidad posible para los clientes



La Infraestructura adecuada

Construida tras 30 años de experiencia en el mantenimiento de turbinas a escala global



La Gente adecuada

Que ha sido formada a través de programas de formación certificados y avalados con experiencia real en campo



La estrategia adecuada

Basado en 30 años de recopilación de datos, que permiten a Vestas ofrecer a la industria un mantenimiento basado en hechos

Durante los últimos 30 años, Vestas ha refinado cada elemento de nuestra oferta de O&M. Dar servicio a más de 45 GW nos ha permitido unir perfectamente estos elementos. El resultado es un nivel de ofertas de O&M flexible que proporciona el mejor rendimiento de las turbinas del mercado.

Los retos de hoy

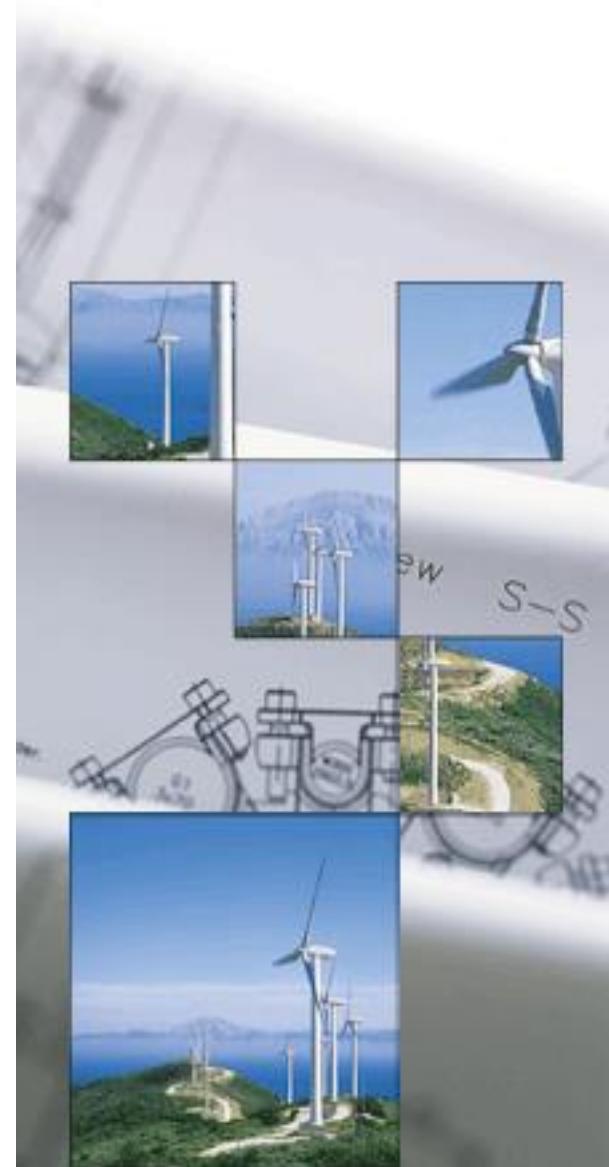


Centrados en las necesidades del cliente

Vestas está centrado en la necesidad de entregar un **servicio sólido** a través de un **entendimiento robusto del negocio** de sus clientes.

Vestas ayuda a sus clientes a optimizar el rendimiento a través de:

- REDUCCIÓN DE COSTES**
- AUMENTO DE LA PRODUCCIÓN**
- MEJORA DE LA DEVOLUCIÓN DE LA INVERSIÓN**



Nuestro Modelo Operativo



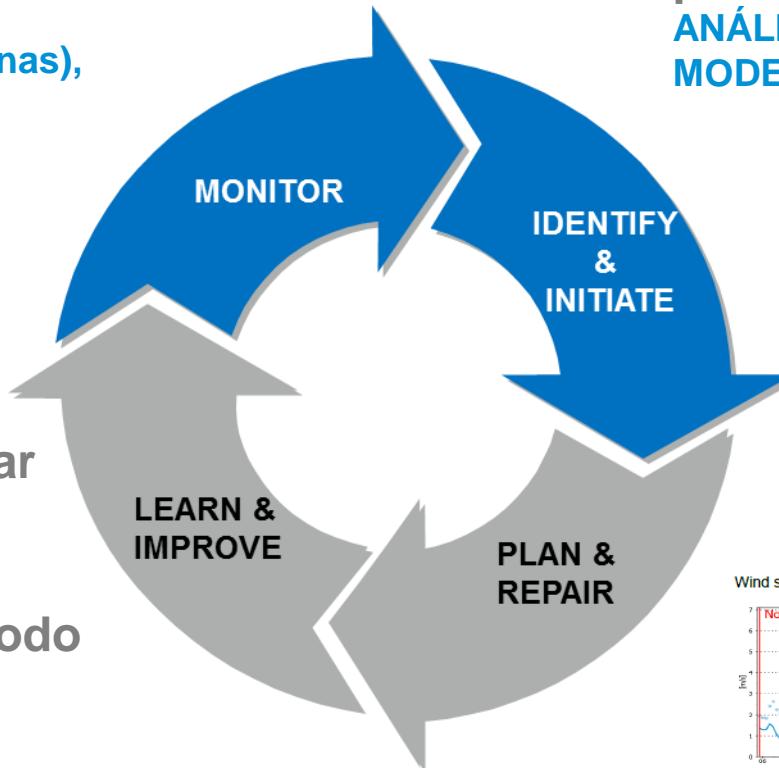
Wind. It means the world to us.™

Estrategia de mantenimiento

Recopilación de datos:

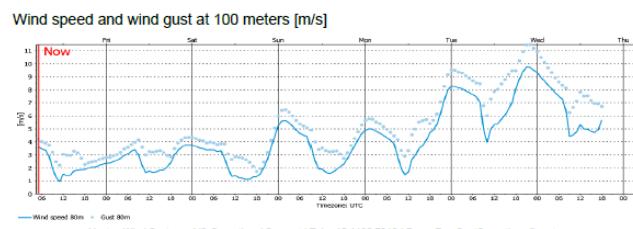
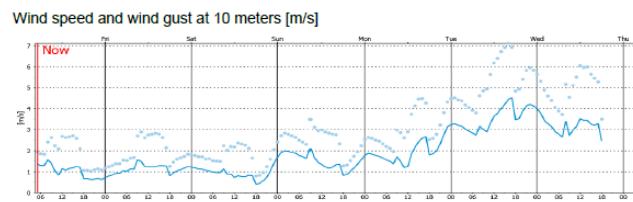
CMS
VTM (monitores de turbinas),
SURVEILLANCE
INS. PREDICTIVAS

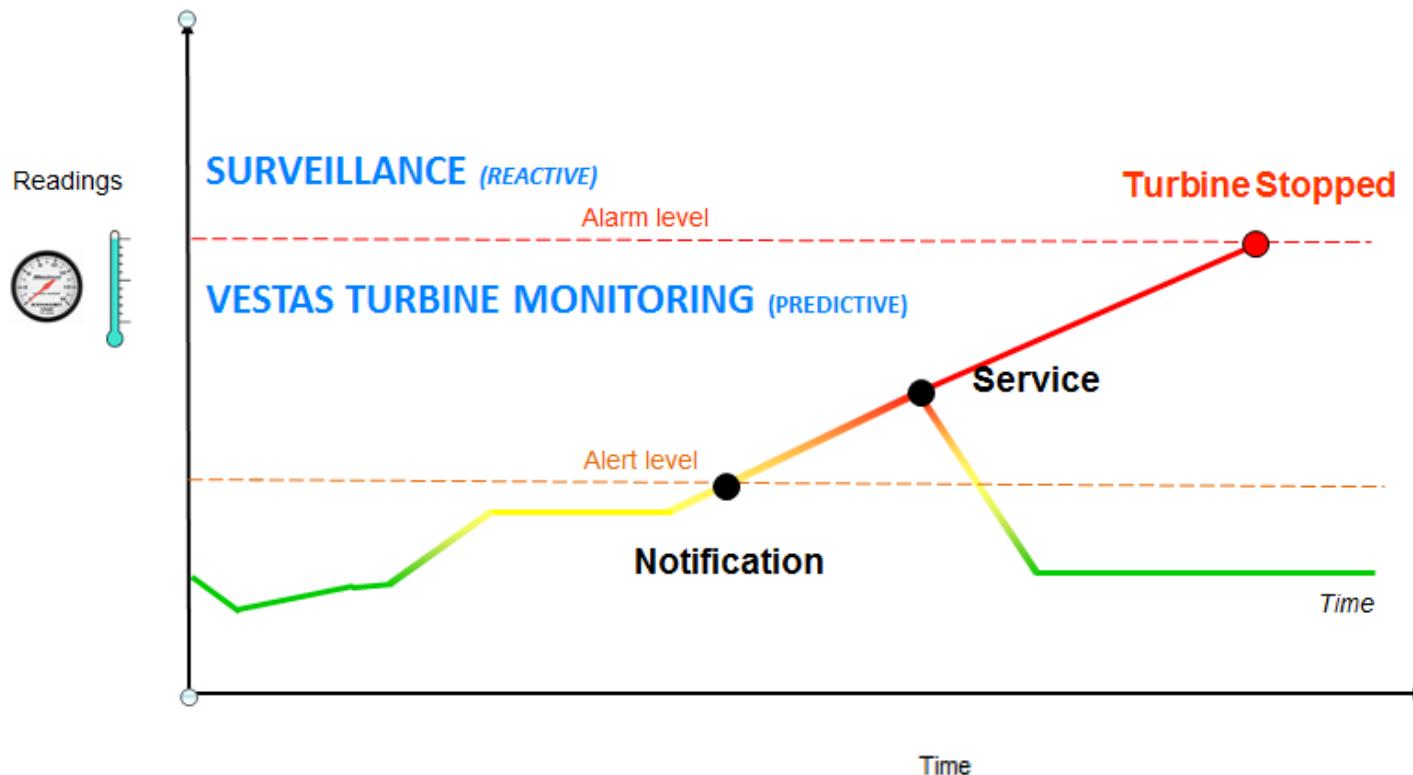
La experiencia se emplea para mejorar la estrategia de mantenimiento y entregar de este modo
MAYOR FIABILIDAD Y RENDIMIENTO DE LA TURBINA



Identificar los fallos prematuros a través de
ANÁLISIS ESTADÍSTICOS
MODELOS PREDICTIVOS

Planificación de los trabajos basados en
VESTAS WEATHER FORECAST
para **OPTIMIZAR COSTES Y PRODUCCIÓN**



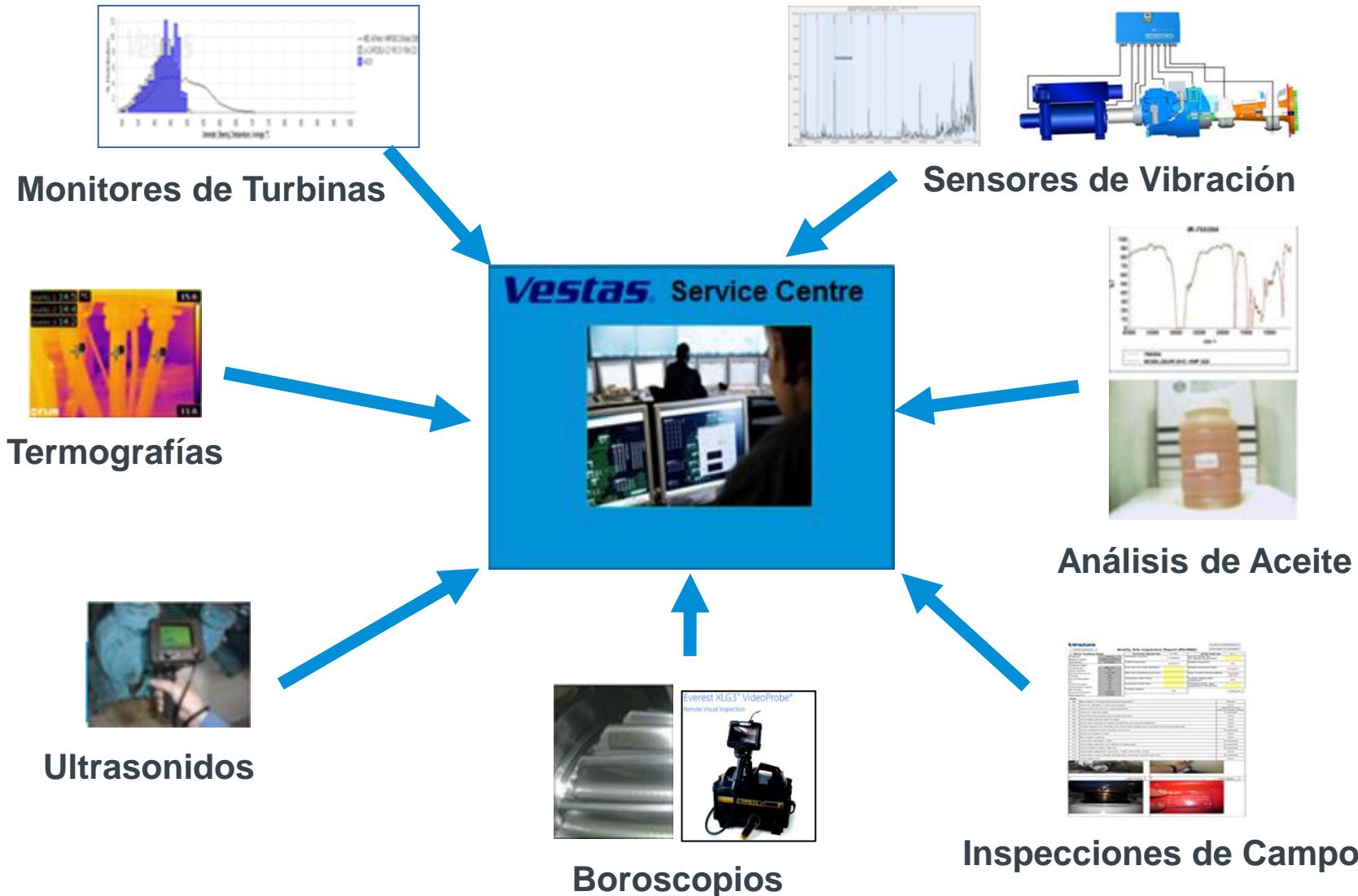


Con la monitorización y análisis de las máquinas se consigue detectar los fallos antes de que ocurran:

TIEMPOS DE PARADA MÁS CORTOS
PLANIFICACIÓN DE LAS PARADAS CON VIENTOS BAJOS

Sistemas de mantenimiento predictivo de Vestas

Vestas®



Condition Monitoring System (CMS)

GENERADOR

Bearing faults

Coupling

Misalignment

Electrical faults

Unbalance

Looseness

Lubrication

GEARBOX

Bearings, WEC

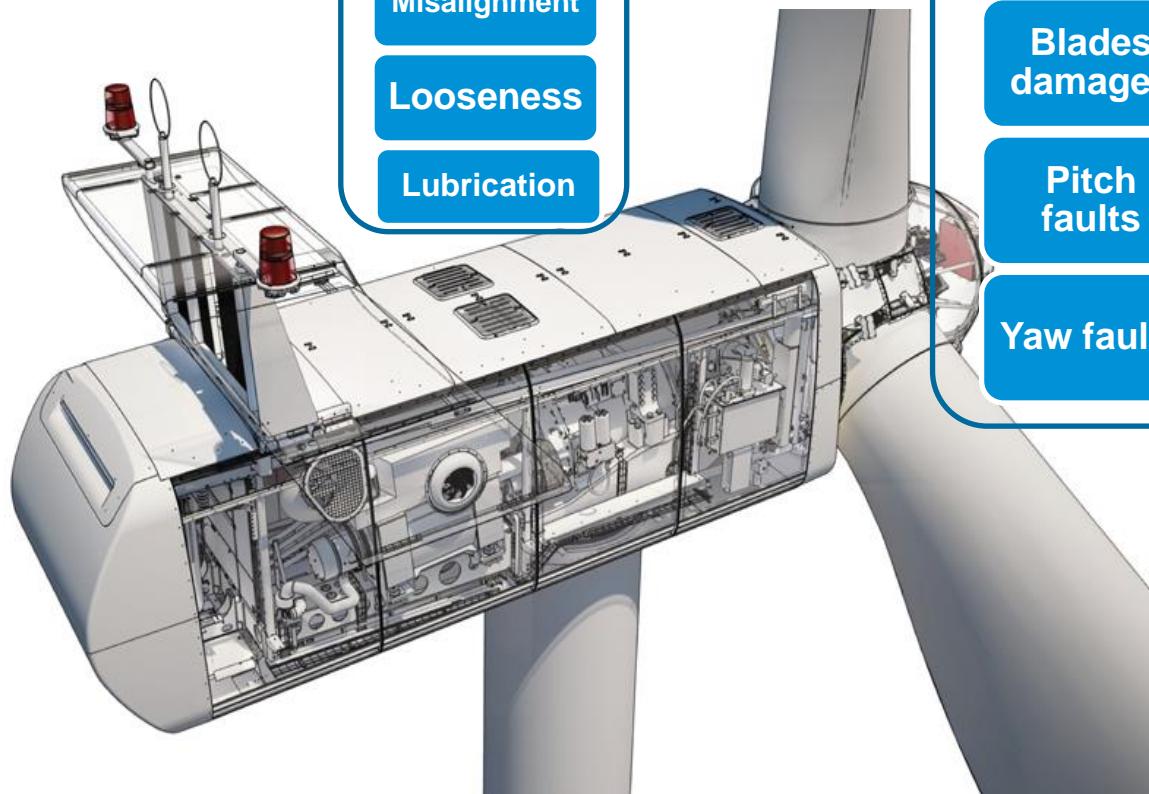
Teeth broken

Micropitting

Misalignment

Looseness

Lubrication



EJE

Rotor unbalance

Blades damages

Pitch faults

Yaw faults

Technical Planning Operations (TPO)



Reparaciones uptower

Nuestro sistema de mantenimiento preventivo nos permite la detección temprana de los fallos:

PERMITIENDO LA REALIZACIÓN DE GRANDES CORRECTIVOS UP TOWER

Ahorros:

**EVITAR GRÚAS
MINIMIZAR PARADAS**

Vestas Service Offerings



Service Offerings – Active Output Management® (AOM)

AOM 1000 “pay as you go”

AOM 2000 “basic services”

- Builds on AOM 1000 – add scheduled maintenance

AOM 3000 “full service flat fee”

- Builds on AOM 2000 – and adds unscheduled maintenance
 - No main components

AOM 4000 “guaranteed availability”(*)

- Full scope contract
- Builds on AOM 3000 but includes main components and time availability warranty

AOM 5000 “aligned incentives” (*)

- Full scope contract
- Builds on AOM 4000 but with a lost production warranty (LPF – Load Production Factor)

(*) Only Vestas turbines

Vestas After Sales



Vestas PowerPlus™ hosts a range of solutions

Depending on turbine type and site conditions owners can realise significant returns

Vestas PowerPlus™

Power Uprate

V82-1.65MW • V90-1.8MW • V100-1.8MW

Solution Overview

Power Uprate makes use of available load margins and increases the nominal power of a wind turbine while maintaining the original design life of the turbine. Increased energy production is realised at both the knee and top-end of the power curve, making it an interesting option also for grid limited sites.

Benefits at a glance

- Increase nominal power
- Increase AEP by up to 4%*
- Recover capital costs sooner
- Optimize use of available turbine load margins

Vestas PowerPlus™

Extended Cut Out

V90-3.0MW • V100-2.0MW • V100-1.8MW

Solution Overview

Extended Cut Out allows turbine owners to capture the full potential of strong winds. By extending the cut out and re-cut in wind speeds of the turbine and maintaining loads within their certified level this solution makes optimal use of the site conditions and delivers increased returns.

Benefits at a glance

- Capture full potential of strong winds
- Increase AEP by up to 2%*
- Recover capital costs sooner
- Reduce abrupt stops of turbine

Vestas PowerPlus™

Aerodynamic Upgrades

V82-1.65MW

Solution Overview

Optimising aerodynamic performance by reducing separation of airflow at the root-end of the blade, vortex generators can increase the annual energy production by up to 0.8%*. Vortex generators are the first set of Aerodynamic Upgrades specifically designed for Vestas turbines.

Benefits at a glance

- Improve aerodynamic performance
- Increase AEP by up to 0.8%*
- Recover capital costs sooner
- Optimized for Vestas blades
- Extensively tested components and adhesive materials

Programa de extensión de vida útil

Extending Lifetime of Vestas Wind Turbines

Benefits

- Improves the business case certainty
- Maximises the output
- DNV approved solution
- Helps fulfilling regulatory requirements

Extensive experience

With more than 30 years of experience, Vestas is a wind industry pioneer continuously working to improve the business case certainty and the output of the large fleet of wind turbines.

A number of Vestas' turbine platforms are reaching the 20 years for which they were designed. Many of these turbines are still in good condition and with a minimal investment they will be able to operate beyond their design life.

DNV approved solution

Vestas has developed a low capex solution, which can extend the lifetime of V39-V47 turbines by up to 10 years.

Vestas' experienced and highly qualified technicians will perform a detailed inspection of the turbines, highlighting potential problems and recommending actions for achieving an approval for lifetime extension.

The extended lifetime requires regular inspections and monitoring of the turbines, which will also be performed by Vestas.

Regulator requirement

In many cases, the authorities require assurance before turbines are allowed to operate beyond their design lifetime. The solution offered by Vestas can help meeting such regulatory requirements.



Gracias por su atención



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