

A low-angle, close-up photograph of several white wind turbine towers and nacelles against a bright blue sky with light clouds. The perspective is looking up at the towers, which are slightly out of focus in the background, creating a sense of height and scale. The nacelles are dark, possibly black or dark blue, and are positioned at the top of the towers.

**Optimising operations
of wind energy plants**

Optimising operations of wind energy plants

Wind energy plants are complex, maintenance-intensive and safety-relevant systems with an operating time of over 20 years. The long life expectancy, increasing range of variants and the rising electrification in plants pose significant challenges in view of providing robust and reliable operation.

ESG customer-specific software-based solutions for operation and maintenance as well as product life-cycle management.

At the same time, we are harnessing decades of expertise from our involvement in the high-tech environment surrounding the automotive and airline industries and will optimise operating and service procedures as a reliable partner. As an innovative technology partner, we are opening up additional optimisation potential through the use of the transfer of knowledge acquired across the sectors.

The following target groups will profit from the services:

- ▶ Operators of wind energy plants

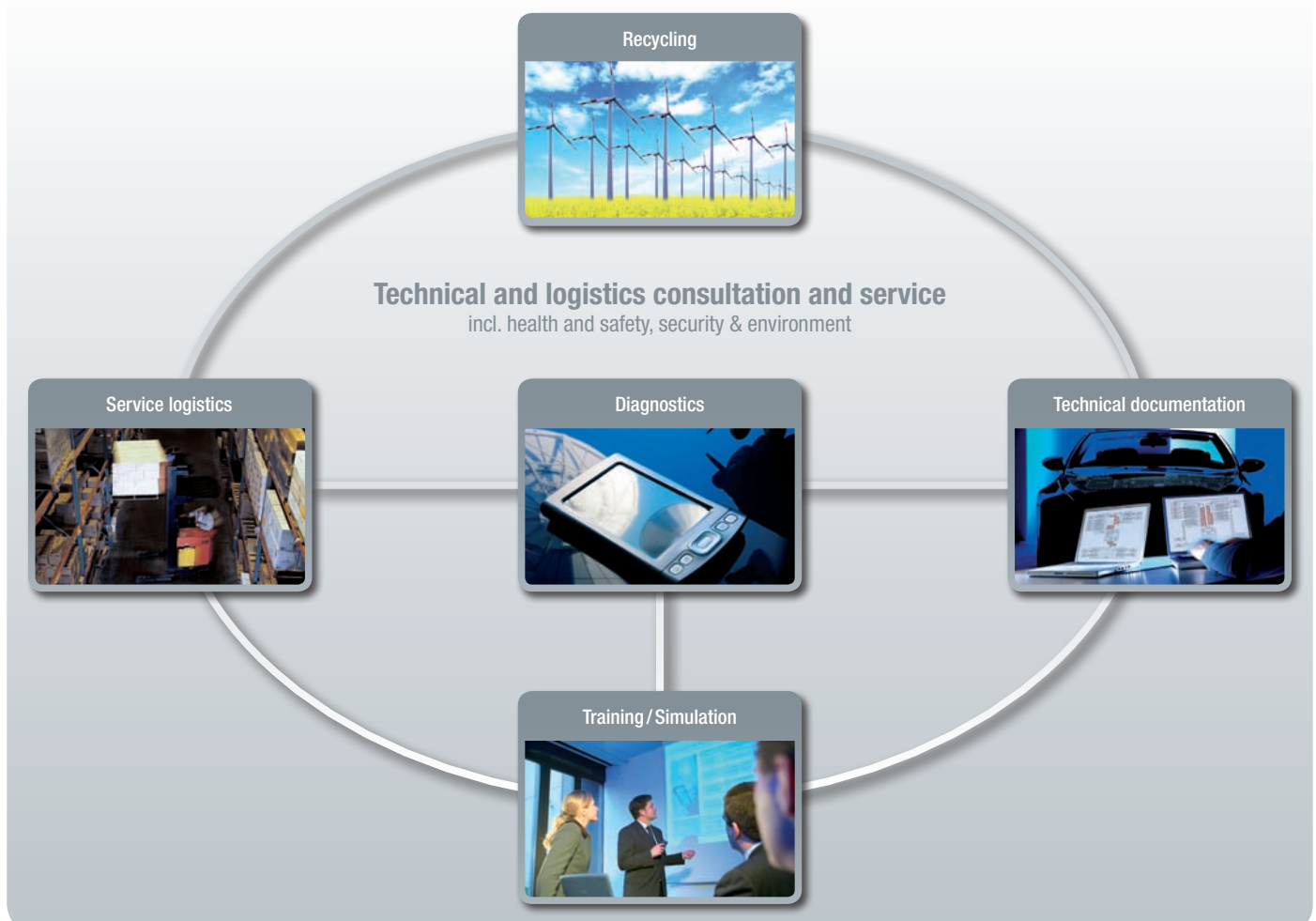
- ▶ Service and maintenance companies
- ▶ Consultants for and suppliers of wind energy plants.

The availability of wind energy plants is one of the most decisive factors for productivity during operation.

Our mission, "rising availability", stands for the simplification of operating and service procedures. We maximise technical availability of wind energy plants by virtue of our solutions in the field of operations and maintenance.

ADVANTAGES

- ▶ Increase in the technical availability
- ▶ Transparency over plants and processes
- ▶ Increase in quality through consistent standards
- ▶ Flexibility, optimisation of overhaul
- ▶ Process efficiency
- ▶ Quick supply of spare parts
- ▶ Quick error analysis
- ▶ Identification and designation of required spare parts
- ▶ Qualification of staff





Systematic lifecycle management

Product lifecycle management

Technical and logistical consultation running alongside the entire product lifecycle can significantly increase the productivity of your plants. Examples of this are operational management concepts as well as **Lifecycle Costing analyses**, which are used to optimise costs in the operating phase and to set the correct course for reducing the overall costs. Furthermore, ESG both creates concepts for optimising logistical processes and the product lifecycle management adapted for your specific requirements. Individual software solutions for product lifecycle management have been part of ESG's portfolio for decades (i.e. aerospace, naval area).

Health safety security environment

With regard to safety at work, we provide comprehensive measures re-

quired in terms both of the industrial safety regulations and the EN 50308 directive. With OSIMA, we provide one of the leading complete modular solutions for legally compliant occupational safety and environmental management. Where necessary, our consulting services include the consideration and implementation of logistics standards and directives.

This means that you profit from the optimisation of your processes, from demand-oriented and sustainable solutions and from the transfer of logistics know-how from other sectors.

Service logistics

The continued expansion of renewable energy sources as well as new markets being opened up and the increasing technological progress place more and more demands on operators of wind energy plants. Wide product variety in a decentralised environ-

ment requires transparent operational processes and sustainable lifecycle management. Added to this are the initial cross-departmental management of logistical processes, security of supply in spare parts logistics and efficient overhauling control – worldwide.

As lead logistics provider, ESG operates logistics centres for its customers, focusing on spare and replacement parts logistics (local and global, central and decentralised) and ties these to the necessary transport structures. Among the services provided are overhauling control, warehouse management, centralised data management with the possibility of decentralised access and coordinating material depots.

ESG has software systems providing the necessary transparency over your logistical and overhauling processes – throughout the logistic partners. This

transparency is the basis for control and optimisation of processes. Customers of ESG were able to save up to 34 percent in maintenance costs.

In the operating phase, we also support you with concepts for the optimisation of your “level of repair”. In the long-term, ongoing changes to legal regulations can be expected as well as obsolescence and discontinued spare parts. Product lifecycle management and operational solutions provide an option for cost-effective operation and an extension of the action time for your plants.

Diagnostics

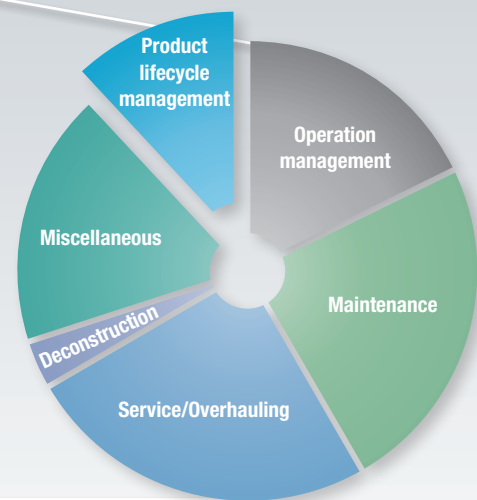
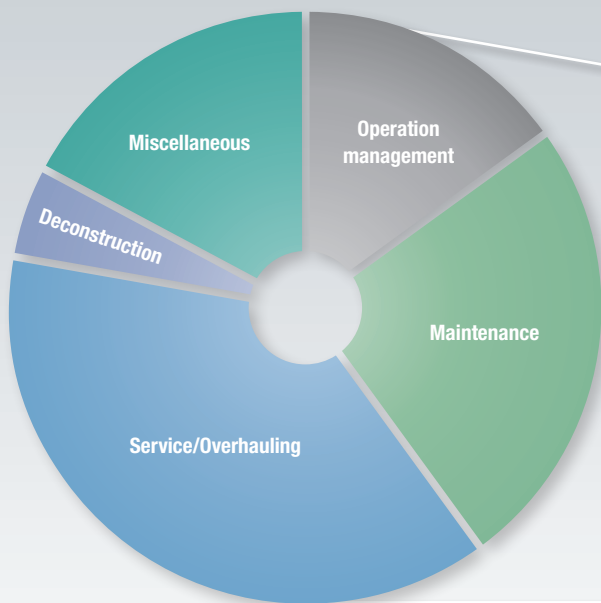
High efficiency is required when recording and processing diagnostics data in the light of long-term operation and the high speed of innovation in wind energy and thus the accompanying wide range of available versions and models. For decades, ESG has been developing diagnostic and test procedures for companies in the automotive and commercial vehicle industries and has been providing specifications and tests for the maintainability of systems.

Diagnostic tools deriving from relevant prognoses and causal analyses for recommendations for action are available for this purpose. Interactive circuit diagrams and parts and tool layout plans support your service and maintenance procedures. In this connection, ESG is covering everything from the quick analysis of errors and clear identification of defective parts right up to the optimal supply of spare parts. This guarantees a systematic product lifecycle management for your plant.

Reduction in the operating costs through integrated product lifecycle management

Today: damage-oriented overhauling

Future: proactive product lifecycle management



Technical documentation

Technical documentation provides transparency over which parts are installed where in your plant – along with the relevant maintenance instructions.

ESG has been an important partner for the technical logistic support in the public sector for almost five decades. ESG compiles extensive technical documentation – from service instructions up to global workshop systems that are used all over the world. We will take care of the identification process for your wind park as set out in the RDS-PP (Reference Designation System for Power Plants).

ESG is one of the leading producers of customised technical manuals,

parts catalogues and for Interactive Electronic Technical Documentation (IETD). Our codification solutions have been used worldwide since more than 10 years.

Recycling

Efficient repowering requires the early introduction of measures for deconstructing the old sites. We will take care of the reduction of material stocks, the economical recovery of high quality parts as well as the creation of a disposal concept for you. With our solutions from the fields of toxic and hazardous substance management, work safety and environmental compatibility, we can guarantee compliance with the relevant safety requirements and legal restrictions.

Training / Simulation

The qualification of the technical personnel is an important factor for the successful operation of wind energy plants.

ESG's scope of services ranges here from training concepts on how training is performed along with the preparation of suitable training resources and up to the operation of training centres.

Customer-specific, computer-based and Web-based training as well as simulation-supported training from ESG can all support a training programme usefully.