



Partnership for outstanding service

German engineered wind turbines

PowerWind

Partnership for outstanding service

Service partnership

Service ideally tailored to the situation and requirements is only possible if customer and manufacturer can rely on one another, ideally complement one another and learn from one another. We call that service partnership.

The project development of a wind farm is limited to a few years, but PowerWind turbines are operated for more than 20 years. Only if your wind turbines rotate most of the time during their entire service life can you ensure the best-possible return. Constant rotation brings revenues; standstill results in lost income.

Our service concept thus only has one overriding goal: to ensure PowerWind turbines keep turning. For at least 20 years. We are convinced that this goal can be best reached in close partnership with you.

Service partnership from PowerWind is based on three pillars:

- **Maximum customer benefit:** Each service is designed for maximum customer benefit. Each service activity aims to keep your wind

turbines rotating as continuously as possible. PowerWind advises you on current technological developments in order to guarantee maximum value conservation of your wind turbine at all times.

- **Customized service solutions:** Each customer has different service and safety requirements. The modular and individual PowerWind range of services ensures that you only pay for services that bring benefit to you specifically and that you really need.

- **Know-how transfer:** Our own highly qualified service personnel ensure smooth operation and expert elimination of faults. For customers who want to carry out selected services with their own service personnel or qualified external service providers, PowerWind offers an individual training and know-how transfer program.



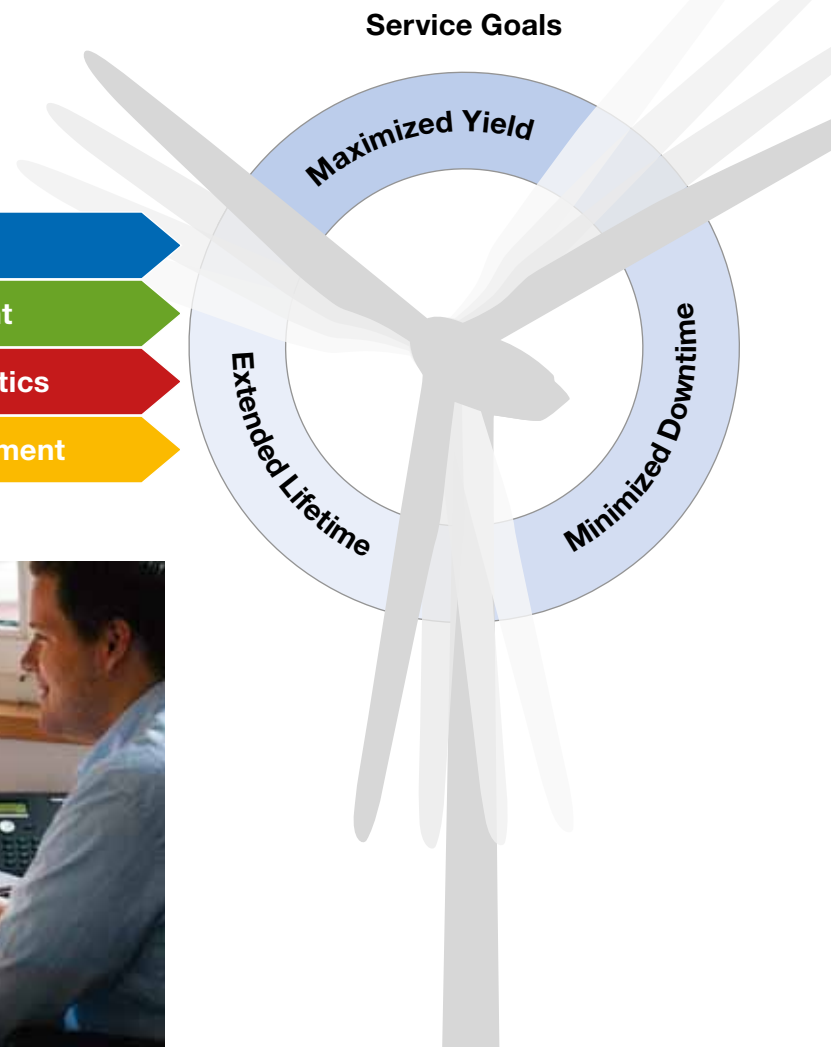
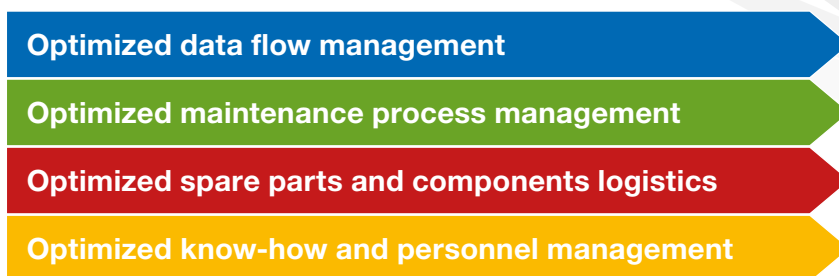
Maximum customer benefit

Service partnership from PowerWind guarantees maximum customer benefit: minimized downtime, extended lifetime and consequently maximized energy yields.

These three aspects of optimized customer benefit are influenced by four higher-level service categories: data flow management, maintenance process management, spare parts and components logistics, as well as know-how and personnel management. In order to maximize the benefit in line with your requirements, PowerWind has provided many modules in each category.

- **Optimized data flow management:** The use of highly modern transmission and analysis technologies ensures the efficient flow of information between the wind turbine, Remote Service Center, service technicians on site and yourself.
- **Optimized maintenance process management:** On the basis of analyzed performance data, maintenance processes are optimized with regard to time and content and combined with one another in the best possible way. Continuous improvement of the turbines is achieved through coordinated modernization activities based on technological progress.
- **Optimized spare parts and components logistics:** With the aid of state-of-the-art evaluation and analysis of performance data, the availability and logistics processes of spare parts are optimized – over the whole service life of the PowerWind turbine. Specific maintenance measures increase the lifetime of core components. A prompt supply of spare parts for all important components is thus ensured.
- **Optimized know-how and personnel management:** With regional service support centers and an individual training program for service cooperation partners, first-class qualified service technicians are available in a timely manner for each wind turbine when required. PowerWind passes service know-how on to customers and authorized service providers.

The Remote Service Center at the headquarters ensures ideal coordination of the individual service categories.




Customized service solutions

Each customer has different service and safety requirements. PowerWind has therefore developed a modular concept. Based on project-specific requirements and your needs, a customized service solution is created for you from individual components.

Service packages with a defined content always include services that do not offer a benefit for individual customers but have to be paid for nevertheless. The advantage with the modular concept: You only pay for services that you really need.

A good example of maximum customer benefit is the 'Maintenance Management Plus' module. Here, PowerWind harmoniously aligns

the different maintenance approaches Condition-Based Maintenance (CBM), Fixed Time Maintenance (FTM) and Operate to Failure (OTF) to your turbines and sites. Preventive maintenance of critical components on the basis of modern sensors (CBM) and empirical values (FTM) facilitates time-optimized maintenance activities and logistics processes. The conscious exploitation of the lifetime of non-critical components (OTF) reduces the costs.

Optimized data flow management	Optimized maintenance process management	Optimized spare parts and components logistics	Optimized know-how and personnel management
		Recommended Repair Kits Repair packages compiled from several individual spare parts	
	Supplier Back-up Services Provision of important information by the component manufacturer	Maintenance Parts Selection of the spare parts and wear parts required pursuant to the maintenance plan	
	Oil Exchange Service Ensuring oil quality through replacement of oil and filter	Overhauled Parts and Components Corrective maintenance for subsequent further use to save costs	
	Retrofit Retrofit and modernization packages for software and selected components	Emergency Parts Selection of B and C components whose failure results in downtime	
Turbine Monitoring Continuous active remote monitoring by the Remote Service Center	Visual Inspection Comprehensive inspection for the avoidance of faults	Capital Components Selection of A components whose failure results in downtime	
Data Mining Systematic analysis of fault and test protocols to optimize maintenance and repair processes	Maintenance Management Plus Combination of different maintenance approaches that is ideally aligned to the specific system	Blade Revision Comprehensive check of the rotor blade quality and measures to extend their lifetime	
Real-Time Data Flow Online preparation of real-time performance data of the systems	Remote Control Parameter settings and system reboot by the Remote Service Center	Converter Overhaul Comprehensive test, cleaning, maintenance and repair	PowerWind Training Center Theoretical and practical training by PowerWind experts
Experts Hotline Direct contact to service technicians and engineers in the Remote Service Center	Remote Diagnostics and Control Fault diagnosis and active control by the Remote Service Center	Gearbox Endoscopy Comprehensive status test by video endoscopy	On-the-Job Training Training at wind turbines
Partner Net Online provision of additional system and customer-specific information	Anti-Corrosion Package Comprehensive protection for sites with extreme weather conditions	Transformer Overhaul Comprehensive status test, cleaning, maintenance and repair	Training of 3rd Party Service Provider Individual training of the service providers suggested by customers
			Regional Service Hub Regional service station with staff and spare parts depot



Know-how transfer

For PowerWind, service partnership means providing you with the know-how that is required for the ideal servicing of your PowerWind products. For us, it's all about preserving the value of your wind turbine.



The know-how transfer concept includes the elements training and forwarding of information:

The experts of the Remote Service Center at the Hamburg headquarters ensure the prompt forwarding of all important information to the service organization and to you, coordinate the individual service activities and are the contact person for your questions.

For customers who use their own service personnel or would like to commission an external service provider of their choice, PowerWind has developed an individual training program. The service personnel of the customer or the suggested service provider are trained according to their requirements. On successful completion of the training they are authorized as PowerWind service partners.

Depending on the customer's experience and the focal areas of content, the individual training program consists of component units at the training center in Bremerhaven and training on the job at installed wind turbines.

The program incorporates the following content:

- Remote services
- Training of trouble shooting and repair
- Maintenance training
- Occupational safety and protection

For customers without their own service personnel, PowerWind will take over the complete service with its own teams or experienced local PowerWind cooperation partners.



Photos: Matthias Ibeler (2, 4, 5), Jens Meier (1, 6)

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