



# NORDEX SERVICE

**THE SERVICE MAKES THE DIFFERENCE**





## GLOBAL DIMENSIONS AND CLOSE RELATIONSHIPS

*The strength of Nordex Service*

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► Passion, sophisticated technology, and an excellent service have made us what we are today: a global manufacturer of wind turbines that always maintains close relationships with its customers and partner companies. With more than 5,100 employees, production facilities in Germany, Spain, Brazil, the US, and India, turbines installed worldwide, and a well-developed service network, the Nordex Group is one of the market's global players. This dimension provides security and stability in the rapidly changing energy markets. However, it does not let us lose sight of the essentials: the relationship with our customers. Providing them with state of the art service is what drives us. We know our turbines better than anyone else. We are continuously

expanding on this lead in knowledge through the early detection of damage patterns by our modern data analysis, among other things. Every timely-planned service saves unnecessary downtime. We have established a dense network of service points so that our service technicians are available on short notice if things need to move quickly again. As necessary, we can consult at any time with our own engineering department for professional advice and tangible solutions.

Manufacturer knowledge paired with an enormous wealth of data and years of experience make the Nordex Group service what it is today: the main reason why you should choose our turbines.



## YOUR STRONG ON-SITE PARTNER

*Close-knit service network  
and qualified technicians*

► Our decentralised regional offices manage our operational services on-site and are the direct contact point for our customers. Due to the continuous flow of information between the Nordex Group headquarters and subsidiaries, customers benefit from the latest research and development results, the knowledge of current market demands, as well as fast solutions to technical issues. In this way, we provide excellent service and enable maximum performance of your assets.

Our experienced and highly-trained service technicians take care of your wind farm and ensure that your systems run smoothly. The Nordex training concept enables them to carry out regular maintenance, repair, and replacement of individual components, as well as modernisation of turbines in order to bring it up-to-date with the latest technology.

Safety and quality always go hand in hand.



## SAFETY, QUALITY AND LOCAL EXPERTISE

### *Nordex Academy's training concepts*

► The training concept developed by Nordex aims to convey all know-how directly to the regions and to train service technicians on-site. To achieve this, the trainers of the Nordex Group shall initially be extensively trained at the Academy in Hamburg. Following this, the technicians' training will take place in the respective countries. Thus we ensure uniform qualification of all service technicians worldwide, and ensure that our customers receive the best possible service for their facilities.

In addition, Nordex also offers its customers special training courses. These take place at the Academy,

both in simulators and on an original nacelle, different hubs with pitch systems, converter cabinets, etc. They are aimed at owners, operations managers and technology coordinators of Nordex turbines.

The training modules for our customers include:

- Fundamentals of wind energy
- Turbine description
- Network and operational management
- Tour of the production facilities
- Service and maintenance
- Turbine walk-through



## ALWAYS KEEPING AN EYE ON YOUR TURBINE

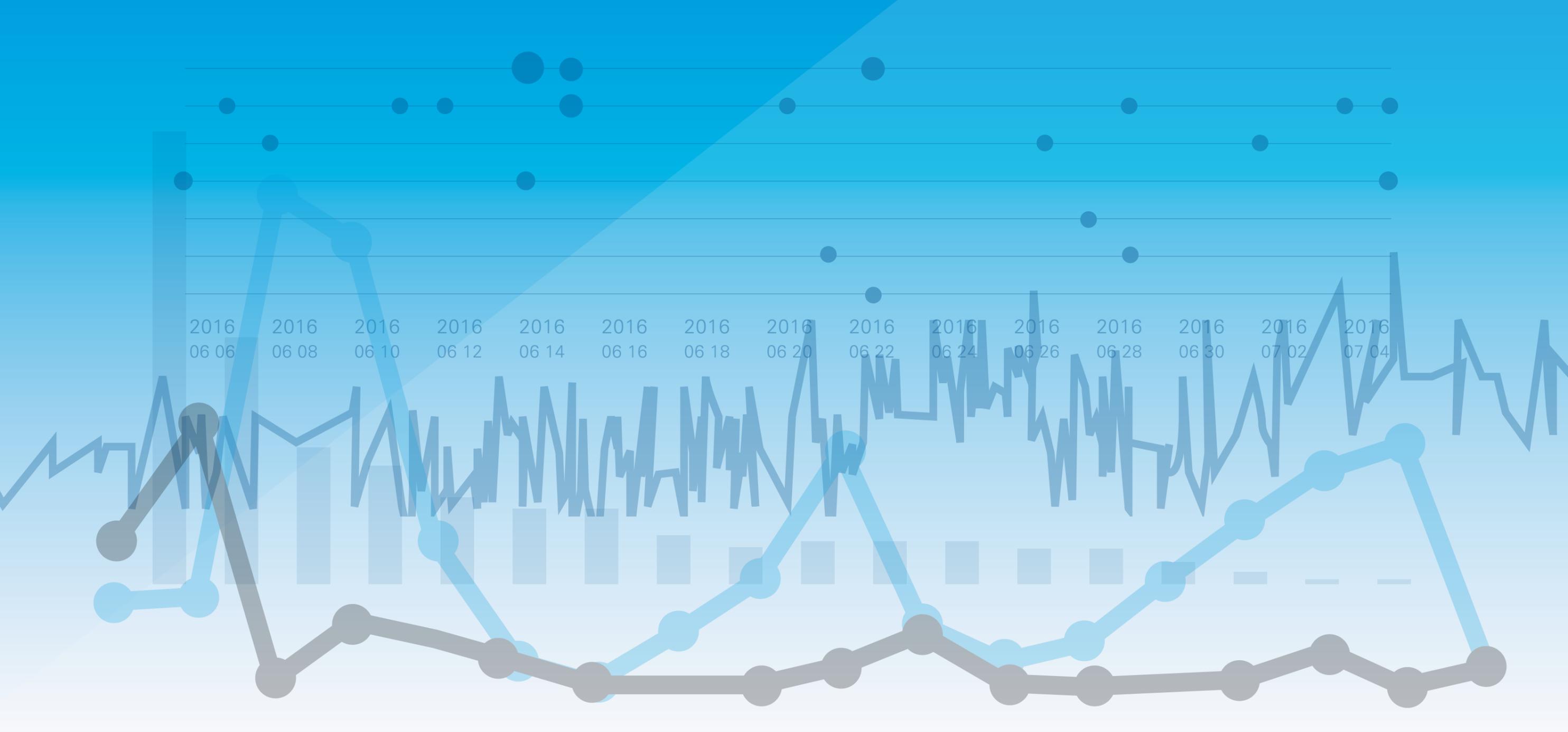
### *Remote Monitoring as a direct link to your turbine*

► Wind farms are monitored, analysed, and evaluated for issues in real time by our teams at headquarters, around the clock and seven days a week. Remote Monitoring also performs actions to restore production operations remotely. As necessary, employees can send action plans and solutions to regional company technicians, and send the activity history in order to enable goal-oriented work on site. For complex situations, the Technical Support team is called upon for assistance.

## RAPID SOLUTIONS FOR COMPLEX ISSUES

### *Technical support reduces unplanned downtime*

► The Technical Support team can provide assistance for any complex technical issue. Our experts receive additional information and evaluations from the data analysis, and are thus able to recognise abnormalities early and resolve them quickly. If special expertise is required, Technical Support calls in engineers in order to seek solutions. In addition, Technical Support coordinates all SCADA queries.



**PRACTICAL APPLICATION OF SCIENTIFIC FORECASTS**  
*Data Analysis supports the optimal performance of your turbine*

► For decades, we have been collecting data from our worldwide wind farms and storing it in our central database. This wealth of data includes information from several generations of turbines, forming an extensive basis for all current evaluations.

Data Analysis develops mathematical methods for automatic monitoring of the fleet. It analyses all measured values for potential problems that

originated in the past or may occur in future. In the event of any abnormalities, experts from Technical Support are consulted. The number of automatic analysis programmes is constantly increasing, so that deviations from the target state can be detected at an early stage. The derived findings help to ensure optimal performance, limit downtime, and keep the necessary spare parts in stock.



## UPGRADES MADE BY NORDEX

### *Standardised modernisation for turbine optimisation*

► Higher annual energy yields, improved safety, and prolonging the life of your existing turbines - these are the aims of our self-developed upgrades. They are the results of both the latest improvement of our series production and our experience as a long-time service partner. For example, service technicians provide valuable information for equipment optimisation from their daily work. Using the information collected about the wind farm and the data evaluation by our experts, we can make targeted improvements to our

turbines. In this way, we work together with our Development department to create intelligent modernisation products that enhance the performance of the existing fleet.

The Service department continually expands and improves its offerings. Our specialists ensure smooth installation of upgrades to your wind turbine. No lengthy project planning is required for standardised products.



## IN THE RIGHT PLACE AT THE RIGHT TIME

*Spare Parts Management provides the appropriate spare parts*

► The Spare Parts Management of the Nordex Group ensures worldwide supply of spare parts for your wind turbine, 365 days a year. By providing exclusively the types of materials required, as well as short response and transport times, the best possible availability of the global fleet is guaranteed.

As a manufacturer, we know our turbines best and know exactly which replacement parts are needed for efficient and long-term turbine operations throughout the entire

period of their use. Based on this knowledge, the Spare Parts Management, in collaboration with local service organisations, defines the required range of spare parts for all maintenance and repair incidents. This tailor-made provision of materials and punctual delivery to the wind farm guarantees optimal on-site service. No matter what components are needed, our efficient team secures the entire spare parts supply chain—from purchasing to warehousing and delivery—worldwide.



MINIMAL DOWNTIME ENSURES  
MAXIMUM YIELD  
*Blade Service creates the  
optimal balance*

► The Blade Service has a deep knowledge of blade behavior in the field. With detailed documentation of this data, we are able to perform particularly effective maintenance. In the annual inspection, trained technicians check the blades from the ground with a camera. Minor repairs are made directly as a part of routine maintenance.

At regular intervals, the specially-trained wind turbine technicians conduct a thorough inspection of the rotor blades. Both the blade surfaces and the interiors are closely examined. The Blade Service operates worldwide with specified materials according to uniformly

defined specifications. This guarantees a consistently high standard of service. Blade Service Field Support ensures well-functioning on-site maintenance. All data regarding the blades, including complete inspection documentation, are collected here. These data form the basis for the planning and coordination of inspection, maintenance, and repair operations. The Technology department works with the theoretical analysis of rotor blades and generates damage classifications. Work and repair instructions are written and special materials for the required service are selected. This division of Blade Service is the primary interface with Blade Engineering.

SERVICES\*

CONTRACT PACKAGES

	PREMIUM LIGHT	PREMIUM	PREMIUM PLUS
Production-based availability warranty with availability report			
Time-based availability warranty with availability report			
Customer support from your personal Nordex contact person			
24/7 remote monitoring incl. nonstop on-call service and remote diagnosis			
Regular maintenance and inspection according to maintenance report			
Condition monitoring incl. analysis and report			
Repairs of all parts and components incl. major component replacement			
Spare parts supply of all parts and components incl. major components			
Modernisation and upgrades to improve yield, availability and security of existing turbines			
Individual training for operators, operations managers and technicians			
Further options on request			

**YOU HAVE THE CHOICE**  
*The Nordex contract packages at a glance*



**PREMIUM LIGHT – THE FLEXIBLE SOLUTION**

The Premium Light package includes 24/7 remote monitoring, scheduled and un-scheduled maintenance and a time-based

availability warranty. Major components are not part of the contractual scope. Naturally, repairs and spare parts supply of all other parts and components are fully covered.

**PREMIUM – THE ALL-ROUND CAREFREE PACKAGE**

The Premium contract package ensures an all-round carefree service to secure our customers’ investment. On top of the Premium Light scope, repairs and spare parts supply of all major components are fully included.

**PREMIUM PLUS – THE PRODUCTION-BASED ALTERNATIVE**

The “Plus” stands for a production-based availability warranty which extends the all-round carefree package of the Premium contract. The planning of works during low wind periods ensures our customers the highest possible yields.

\* The services in the service portfolio are also available individually (rather than as part of a contract package).

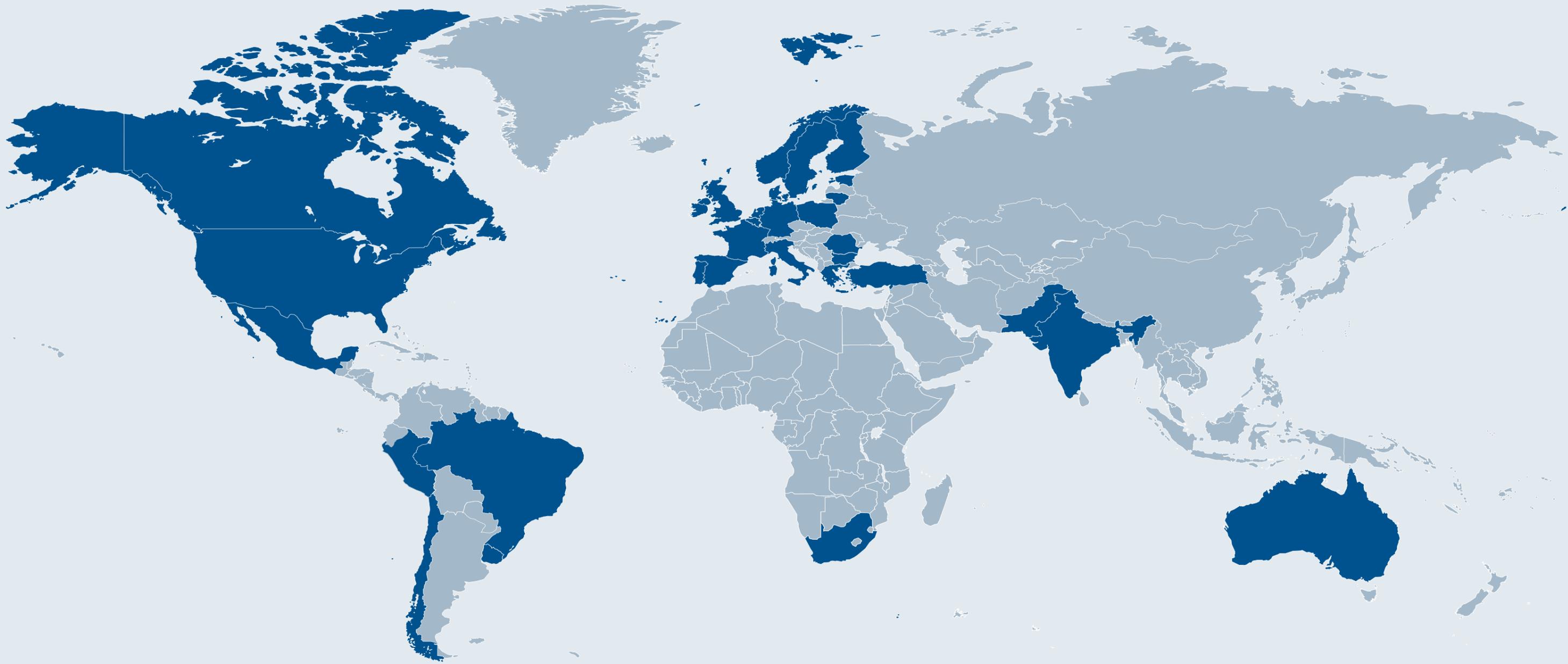


## SAFETY FIRST! *Safety concerns everybody*

► Health, Safety and Environment (HSE) have the highest priority in the Nordex Group. Safety first! We are convinced that accidents, occupational illnesses, as well as safety and environmental incidents can be avoided in most cases. For this purpose, we first identify the risks and dangers that arise in our service operations, in production, or even in the office. Based on this, we develop strategies and procedures to minimise these risks. We are constantly striving to improve in the areas of health, safety and environmental protection, and aim to completely rid our business of such incidents. For this reason, our service technicians, for example, always wear their personal safety equipment, including safety

vest, helmet, safety goggles, safety shoes, and gloves. We also make sure that our partners, contractors, and suppliers adhere to our standards in this area.

In terms of health, safety, and environmental protection, we meet the legal requirements of national, regional, and local regulations, and implement them on-site. Our Health, Safety and Environment Management System is certified according to BS OHSAS 18001, one of the most important standards for a safety management system, and ISO 14001, the international environmental management standard.



THE SERVICE MAKES  
THE DIFFERENCE  
*Nordex Service is  
the strong partner  
at your side*

► If the price and performance of various turbine manufacturers are at a similar level, the differences in the details become even more important. It is then often the service that becomes the decisive factor for the purchase - and the Nordex Group is aware of this. Our goal is to always be flexible and respond individually to our customers' wishes. Depending on these wishes, we can either support with single tasks or deliver an all-round carefree package that minimises the customer's risk.

The goal is clear: minimise downtime and maximise possible yield. We achieve this with our highest-quality maintenance and repair work, among other

things. For this purpose and to ensure global standards, our service technicians are trained in their own country by our Academy trainers. Our Spare Parts Management ensures the swift delivery of required spare parts. Our Modernisation Center offers, with the Upgrades made by Nordex, the opportunity for operators of existing turbines to bring their assets up-to-date with the latest technology.

What counts in the end, however, is a satisfied customer. Only then can we be confident that the customer will continue to choose the proven services of the Nordex Group. And that is what motivates us.

## NORDEX WORLDWIDE

### Nordex SE

Langenhorner Chaussee 600  
22419 Hamburg  
Germany  
Tel.: +49 40 30030 1000

### Nordex Energy GmbH

Langenhorner Chaussee 600  
22419 Hamburg  
Germany  
Tel.: +49 40 30030 1000

### Acciona Windpower

Polígono Industrial Barásoain  
31395 Barásoain, Navarra  
Spain  
Tel.: +34 948 72 05 35

## DIVISION EUROPE

### Service Northern Europe

Uppsala, Sweden  
Tel.: +46 18 185900

### Service Germany

Hamburg, Germany  
Tel.: +49 40 30030 1786

### Service Southern Europe

Area Mediterranean  
Porto, Portugal  
Tel.: + 351 229388972

### Service Southern Europe

Area Turkey & Mid East  
Istanbul, Turkey  
Tel.: +90 212 468 37 37

## DIVISION INTERNATIONAL

### Service Brazil

Vila Olimpia, São Paulo, Brazil  
Tel.: +55 11 3047-2900

### Service India

Bangalore, India  
Tel.: +91 80 4091 6660

### Service Rest of World

Sarriguren, Navarra, Spain  
Tel.: +34 948 720535

## DIVISION NORTH AMERICA

### Service North America

West Branch, IA, United States  
Tel.: +1 319 643 9463



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