



Nordex Group

# Nordex Service - Vindkraftsdagarna

2022

# Agenda

**1** **Service Contract Overview**

**2** **Multibranding**

**3** **Today & Future**

# > Nothing suits Nordex turbines better than Nordex Service



## TAILORED SERVICE CONCEPTS TO BEST MATCH YOUR NEEDS

### MONITOR & SUPPORT

- > Condition Monitoring Services
- > 24-hour remote monitoring
- > Remote diagnosis
- > Support & Reporting
- > Predict to Prevent

### SERVICE & MAINTAIN

- > Scheduled maintenance
- > Troubleshooting & repair
- > Spare parts delivery & installation

### ENHANCE & OPTIMIZE

- > Updates & upgrades
- > Services & technical advice



**Minimize turbine downtimes**



**Increase availability**




**Increase revenue**


# Flexible contractual models for a successful partnership

## NORDEX CONTRACT PACKAGES AT A GLANCE


|  | <b>PREMIUM LIGHT</b><br>The flexible solution | <b>PREMIUM</b><br>The all-round carefree package | <b>PREMIUM PLUS</b><br>The production-based alternative |
|--|---|--|---|
| <b>MONITOR &amp; SUPPORT</b><br><b>Condition Monitoring Services</b> incl. diagnostics, analysis and report<br><b>24-hour remote monitoring</b> incl. 24-hour on-call service and remote diagnosis<br><b>Support and reporting</b> from Field Operations and Account Managers<br><b>Predict to Prevent</b> |   |  |   |
| <b>WARRANTED AVAILABILITY</b> incl. availability report  | TIME BASED AVAILABILITY (TBA)                 | TIME BASED AVAILABILITY (TBA)                    | PRODUCTION BASED AVAILABILITY (PBA)                     |
| <b>SERVICE &amp; MAINTAIN</b><br><b>Scheduled maintenance</b> incl. consumables<br><b>Troubleshooting &amp; repair</b> from fault analysis to major component replacement<br><b>Spare parts delivery &amp; installation</b> from small parts to major components   | MAJOR COMPONENTS EXCLUDED                     |  |   |




**ENHANCE & OPTIMIZE YOUR WINDFARM WITH OUR OPTIONS \***



Customer Trainings



CMS online portal



Updates & Upgrades

## ➤ Nordex supports the ambition of strategic customers to self-maintain their wind farms

### ➤ NORDEX OFFERS A LONG TERM PARTNERSHIP TO SELF MAINTAINING CUSTOMERS

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#### **With our self maintainer solutions we...**

- enable our customers to operate, maintain and troubleshoot their wind farms
- help them to ensure a safe operation of the turbines
- provide best technical support based on our manufacturer competence and experience as long-standing Service partner
- offer easy and seamless access to spare parts supply

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#### **Our tailored solutions cover...**

- documentation, including maintenance manuals and state of the art exchange instructions
  - access to turbine control and software tools
  - technicians trainings
  - spare parts and selected special tools
  - technical support, providing OEM expertise on site and remotely
  - Remote Monitoring and CMS services
  - Upgrades
- 



# ➤ We provide high level OEM support over the turbine lifetime and offer tailored products based on the Self Maintainers' needs

## ➤ A CLEAR & ATTRACTIVE SERVICE PORTFOLIO EMBEDDED IN A TECHNICAL SUPPORT AGREEMENT

### Fixed Subscription Services included in annual fee per WTG

- Advanced access to WTG control
- Access to software tools
- Software Updates
- Spare Parts lists
- List of available Special Tools
- Access to Customer Portal
- Offers for safety relevant retrofits
- Regular information about Upgrades
- Monthly reporting of Services

### Optional Subscription Services can be included in annual fee per WTG

- Technical Remote Support Hours
- Technical Site Support Hours
- Remote Monitoring
- CMS services

### Additional Services can be provided upon request

- Customer Technician Trainings & documents
- Person hours of Service Technicians, Technical Back Office Support and Specialist Engineering
- Upgrades and safety relevant retrofits



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# > An optimized asset performance is ensured by the profound knowledge of the technology

















## Perfect partner to secure the profitability of your assets

- > **Key technologies are the same on Nordex and Senvion turbines:**
  - > Drive train concept is similar to service
  - > Electrical systems are alike
  - > Pitch system is electrical unlike hydraulic pitch used by other manufacturers
  - > Major components provided by the same suppliers
- > Proven track record of **~24 GW under Nordex Service** with similar technology to Senvion



# More than 80% of the main components of Senvion WTGs are part of our daily Service business

| Examples of component similarities |  |   |
|------------------------------------|--|---|
|                                    | Nordex<br>Gamma / Delta  | Senvion<br>MM / 3XM   |
| Gearbox                            |    |    |
| Generator                          |    |    |
| Blade                              |    |    |
| Main Converter                     |   |   |
| Blade bearing                      |   |   |



## Keep your fleet running

- > **Good relationships** with all suppliers
- > **Proven record** of servicing the same spare parts
- > A **widespread network** of **200+ service points** in **24 countries** and **1 central warehouse** in Rostock links local demand with global availability
- > Dedicated regular and express services ensure **spare parts supply 365 days a year**

## ➤ Nordex can utilize its training program and facilities also for Senvion technology

- > Modern training centers in Hamburg and the UK
  - > NX and Senvion platforms share the same main components
- > Contribute to secure working ability and build up specialist knowledge with a high-quality standard
- > Use highly-skilled 3rd parties to gain specific knowledge and support the ramp-up phase



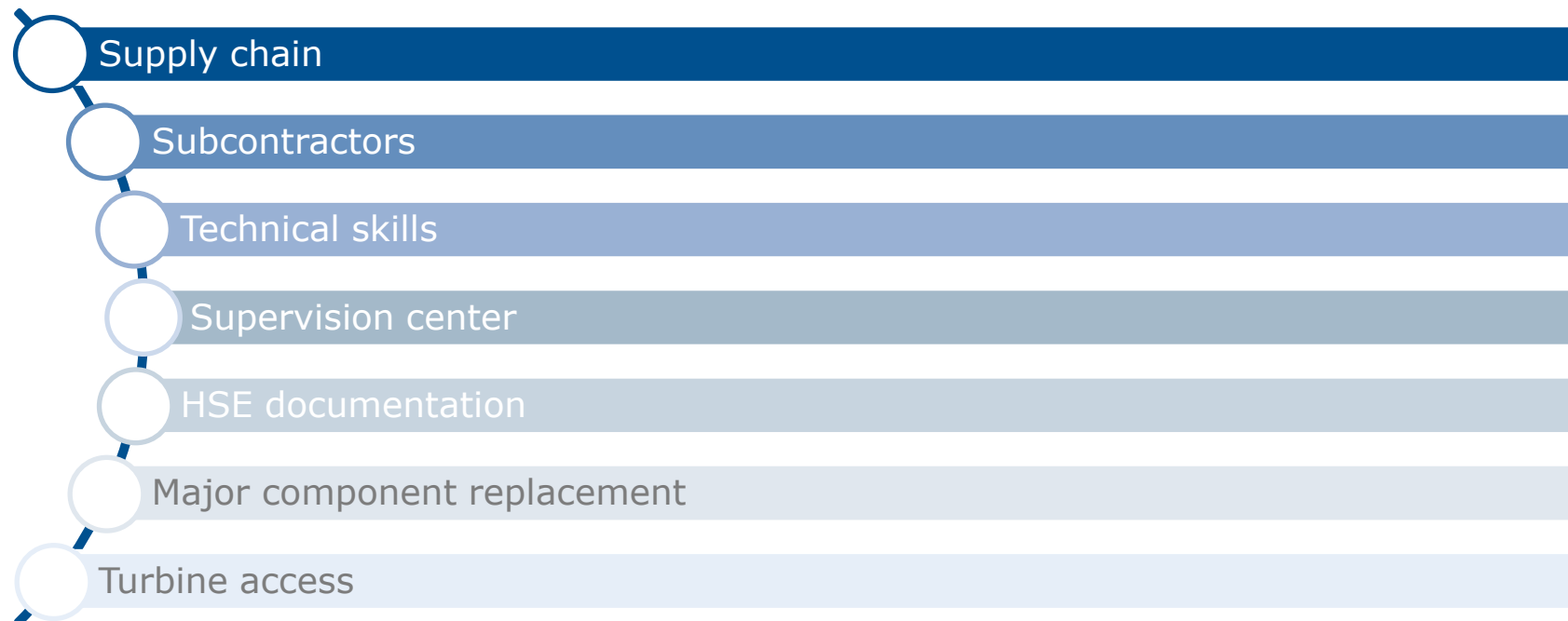
**Haslingden, UK is fully equipped**



**Hamburg with a K08 Gamma & Delta Turbine**

## > We are experienced with Multibrand approach and have a great track record with turbines from different OEMs

- > Successfully supported Multibrand clients with complex technical questions, spare part requests and maintenance activities, remote control solutions
- > Nordex is already successfully servicing Acciona & Führländer Wind turbines with full scope service contracts including:



## Senvion fleet under service

**SITES:** 4 WIND FARMS WITH SENVION MM90/100 TURBINES  
COMMISSIONED IN 2016 AND 2011

**CAPACITY:** 38 TURBINES, 77.45 MW

**PROJECT DETAILS:** UK, PREMIUM CONTRACT

> **Actions before takeover:**

- Site evaluation and consultation about the condition of the turbines
- Bachmann access solution introduction
- Detailed ramp-up plan including for example onboarding schedule of new technicians, trainings, controller updates, spare part recommendations etc.

> **Success factors:**

- Strong in-house knowledge on the Senvion technology
- Similar turbine technology with existing spare parts network and know-how

> **Availability of first three sites in October 2021 (first month after takeover):**

- > 98.86%
- > 99.06%
- > 99.13%

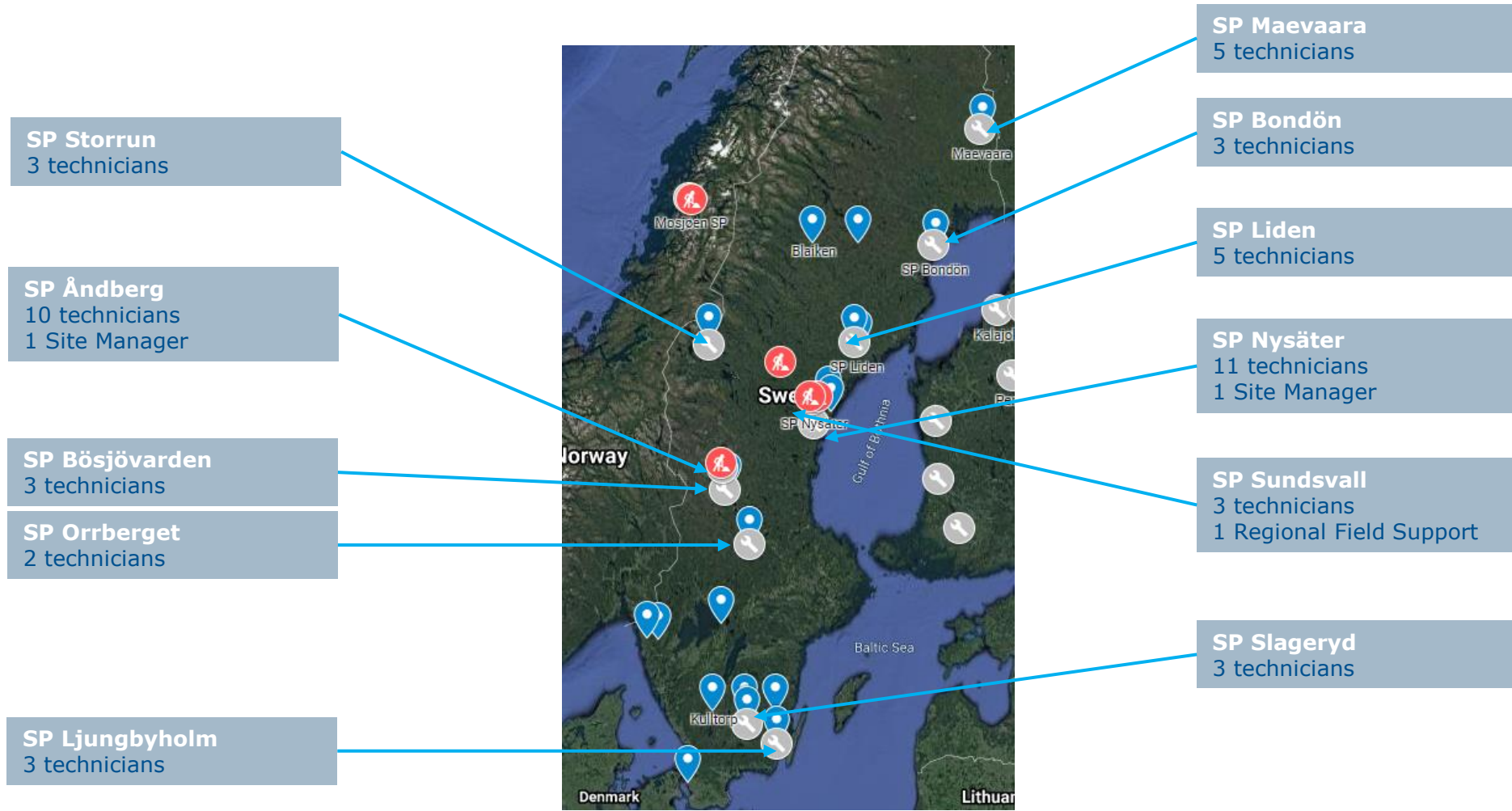
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# Where We Are – Service Sweden



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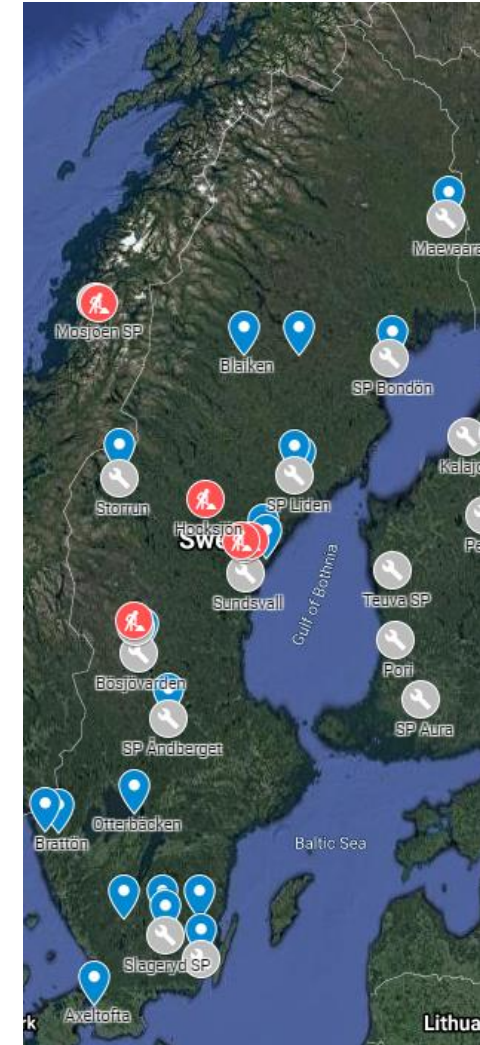
## In Operation ~973 MW

- **Axeltofta**  
2x N90/2500 R80
- **Axelsvik**  
2x N90/2500 R80
- **Bondön**  
14x N90/2500 R80
- **Blaiken I & 2**  
60x N100/2500 R100 AIS
- **Brattön**  
6x N90/2500 R100
- **Bösjövar den**  
8x N100/2500 R100 AIS
- **Huds Moar**  
6x N90/2500 R100
- **Jokkmokksliden**  
18x N100/2500 R100 AIS
- **Kulltorp**  
4x N90/2500 R80
- **Maevaara**  
24x N117/3000 R120 AIS
- **Möckelsjöberget**  
5x N90/2500 R80
- **Orrberget**  
9x N117/3600 TS91

- **Otterbäcken**  
3x N100/2500 R100
- **Ryningsnäs**  
2x N90/2500 R80
- **Slageryd**  
6x N131/3900 TS114
- **Storr un**  
12x N90/2500 R80
- **Vårdkasen**  
2x N100/2500 R100 AIS
- **Åliden**  
12x N131/3900 TS134 AIS
- **Brattmyrliden**  
19 x N131/3900 TS134 AIS
- **Måla jord**  
3 x N149/4.5 TS135
- **Ljungbyholm**  
12 x N149/4.0 TS125
- **Åndberg**  
53 x N149/5.X TS125 AIS

## UNDER CONSTRUCTION ~644 MW

- **Hocksjön**  
23 x N163/5.7 TS118)
- **Nysäter**  
80 x N149/4.0-4.5 TS145  
24x N149/4.0-4.5 TS125  
5 x N131/3900 TS120  
5 x N131/3900 TS134
- **Stölsäterberget**  
8 x N163/5.9 TS118



## > Future challenges

### > **Sustainable service price strategy:**

- Near future challenge – the rising costs of commodities which makes it difficult to predict the future price of materials and components for the longer term service contracts.
- Getting the industry to a sustainable level is a must, there has been a surge in innovation in recent years and this has sometimes meant a race to the bottom in terms of prices, there needs to be a more sustainable approach now to pricing of wind turbines and contracts to ensure longevity for the companies involved which will benefit everyone in the long term.

### > **Larger WTGs:**

- The wind turbines are getting taller and bigger rotors which leads to bigger blades and increasing maintenance costs, which should be offset by the larger capacity but the downtime to do tasks on these machines is longer.

### > **Reporting Requirements:**

- Additional requirements on reporting and planning as the power off-takers need to have a foresight in what power plants will be available to produce, and how much they will produce, for the coming days.

### > **Cyber Security:**

- Cyber security is a big focus for the industry now and now all OEMs have many inhouse experts focusing on that topic



# ➤ What We Do - Service optimized turbine design Delta4000

## Up tower repair options for drivetrain

- Partial exchange of gearbox with on-board tools possible
- Less effort, lower cost of exchange

## Turbine prepared for usage of SHC

- Due to SHC no need for conventional mobile crane
- Crane costs are a crucial cost driver

## Smart repair concepts for several components

- Position of pitch drive can be changed in case of wear of tooth flanks
- Converter repair concepts

## Improved yaw and hydraulic system

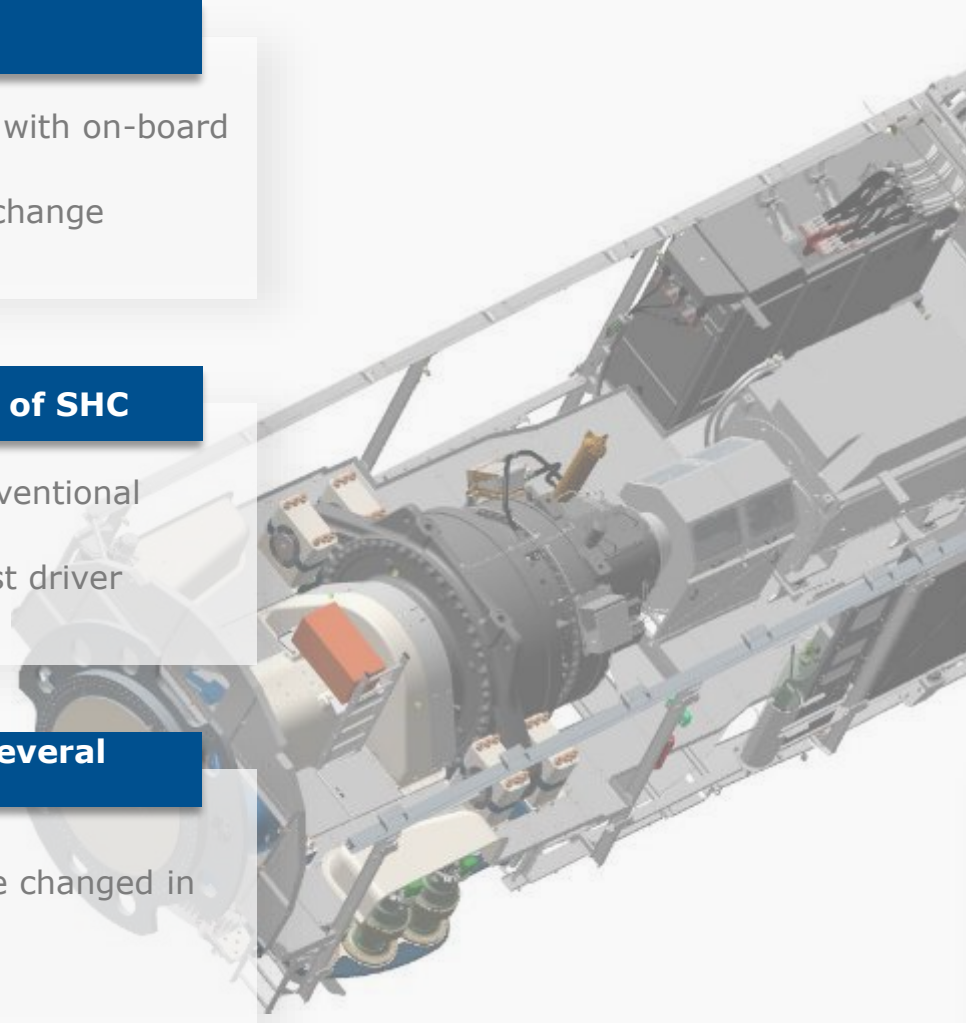
- Minimum hydraulic system & no hydraulic azimuth brakes
- Reduces wear, noise & still-stand

## Predict-to-Prevent Monitors

- Up to 30 Delta monitors will be adapted to the Delta4000
- Predictions of malfunctions enable proactive dealing, reducing costs & minimizing downtime

## Improved maintenance concept, e.g.

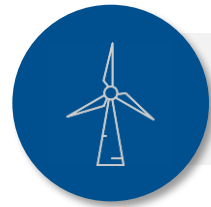
- Several CoE initiatives will be applied
- Revised blade maintenance concept
- Exchanges as necessary fixed intervals



# What We Do - Reducing costs and increasing up time with improved maintenance solutions



## A STATE-OF-THE-ART APPROACH TO CALCULATE FUTURE RISKS AND TO PREVENT FAILURES



**Predictive models** raise alert when abnormal behaviour is detected

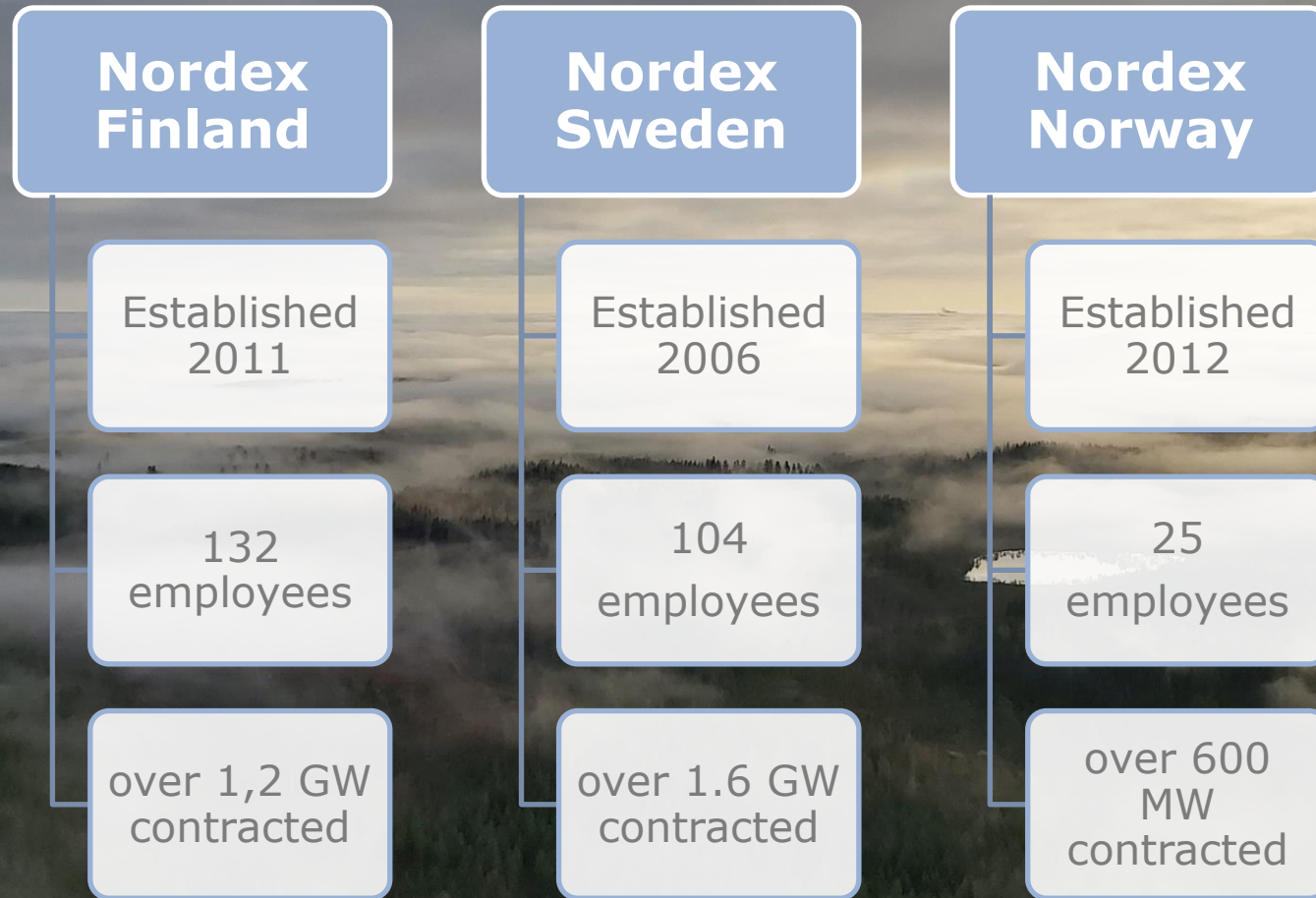
Alert registered into **incident management tool**

Expert data analysts validate **alert**

Work order **planning** and **preparation** begins

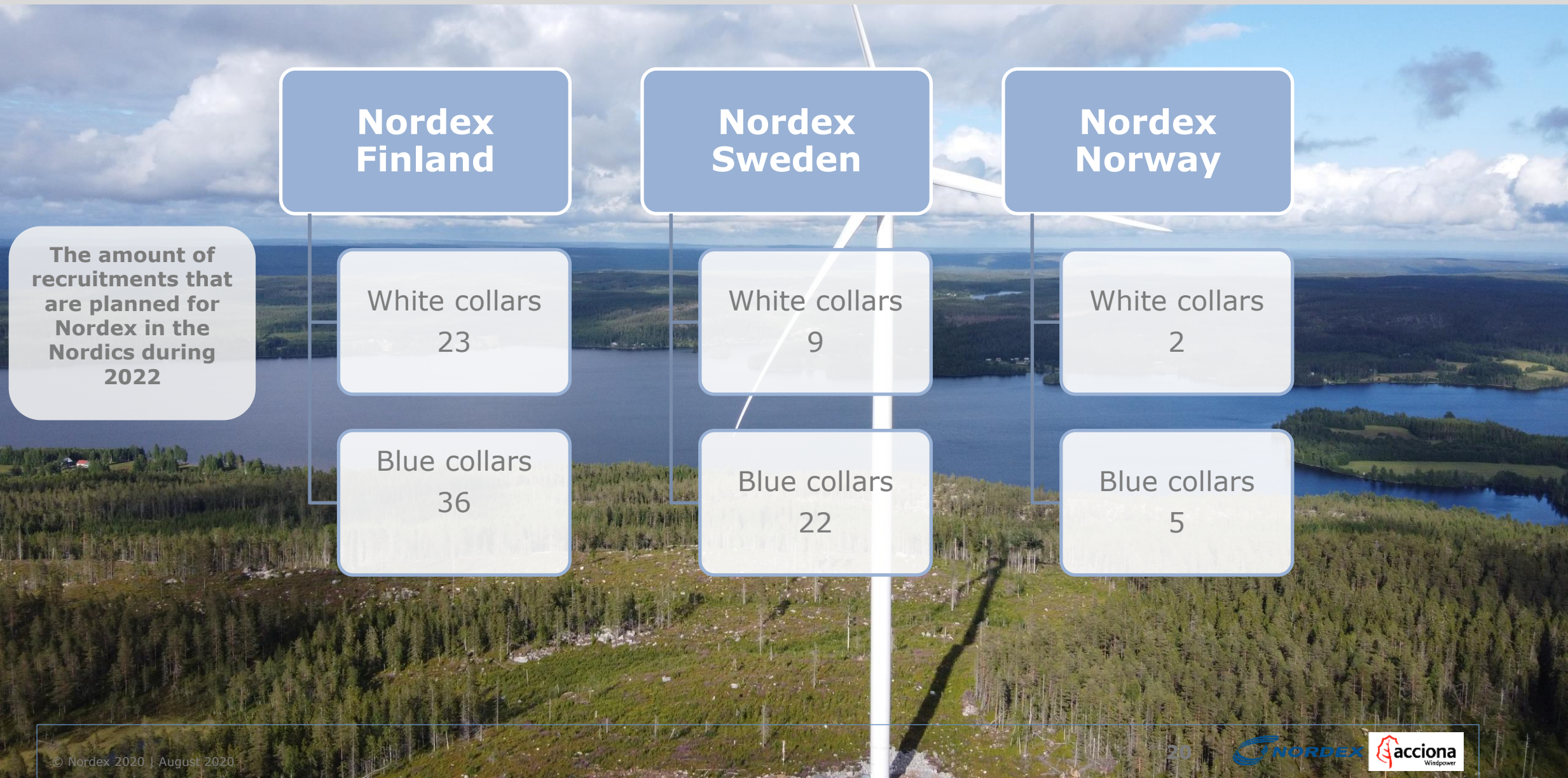
**Technician** carry necessary equipment **to the turbine** and **resolve the issue**

# > Nordex Group in the Nordic region - Portfolio



**...and growing!**

# > Nordex Group in the Nordic region – Growth 2022



# Questions and answers





# Thank you for your attention

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