

Accelerate your  
transition to a circular  
and sustainable  
economy



Repair and Reconditioning services

# Quality repairs of your turbine components

Swift, high-quality repairs and replacements of turbine components are essential to prevent the loss of valuable energy production. That is why you need a world class service partner with a circular economy mindset.

When a major or minor component on your wind turbine needs to be repaired or replaced, time is of the essence. That is why you need a reliable and experienced service partner with a global presence.

The right partner is your best assurance for keeping operations and maintenance (O&M) costs under control and optimizing turnaround time.

## **A solution for Siemens Gamesa and Multibrand wind turbines**

At Siemens Gamesa we are dedicated to extending the lifetime of your wind turbines across the globe.

We keep the uptime of your asset as high as possible – repairing, reconditioning, or reusing components when needed. This solution goes beyond Siemens Gamesa to cover most of the Multibrand fleet.

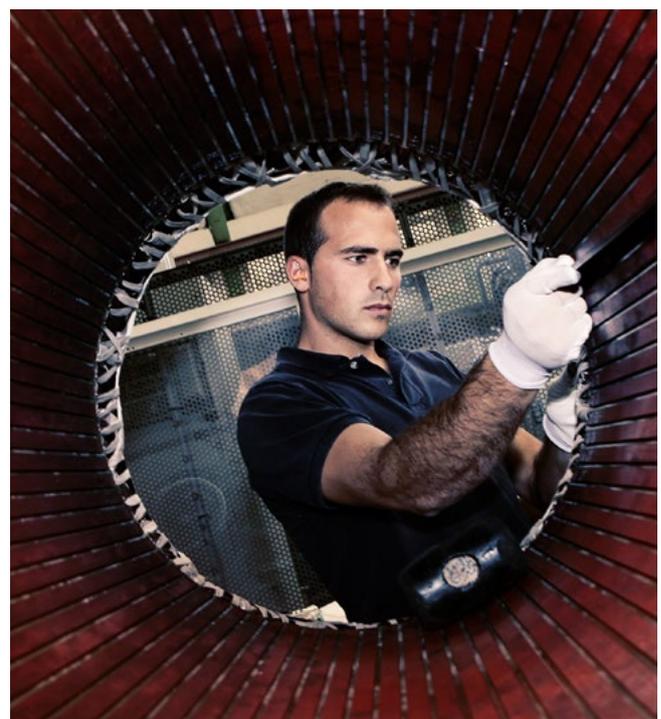
## **Your lifetime service partner**

Few repair service partners can boast more than 40 years of service experience, but at Siemens Gamesa we can. That means we are the only service partner you really need – whether you are looking for comprehensive turnkey services or specific repair services.

Furthermore, we offer our unique Siemens Gamesa Life Extension program, which extends the lifetime of your windfarm with up to ten years. We tailor the maintenance strategy to the specific wind farm site, allowing you to gain additional revenue while contributing to a more sustainable economy.

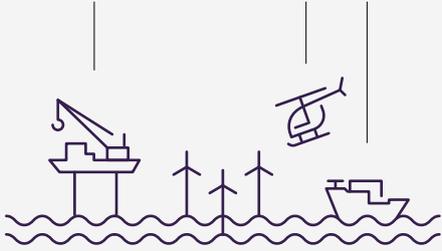
## We provide:

- Repair and Reconditioning services for most major and minor components used in turbines
- Comprehensive and best-in-class repair service options
- Diagnostic services
- Multibrand repair capabilities portfolio
- Component exchange programs
- Extended component warranty
- Repair centers across the globe

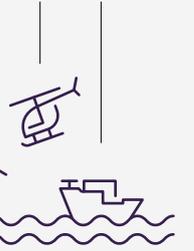


## Comprehensive services - when and where you need it

Repairs or heavy component exchange via Jack-Up Vessel



Flexible transport for diverse service tasks - offshore and onshore



Repair and Reconditioning services - for major and minor components



Highly skilled and trained technicians to inspect, repair, or replace components on-site, incl. special tools



Uptower repair services for Gearbox/Generator



The Siemens Gamesa comprehensive and modular repair services fit your exact needs. With repair centers across the globe, our skilled technicians are able to help you with efficient and quick repairs of your wind turbine fleet - across brands.



# Experience what truly global service can do for your business

With Siemens Gamesa you get a trusted partner who is capable of providing market-leading Repair and Reconditioning services for your fleet. No matter where your site is located and what brand your major and minor components are, you can count on us to reduce your costs, save time, and increase sustainability.



650+  
major component  
references

500+  
minor component  
references

11  
repair centers  
worldwide

40 yrs  
of engineering  
experience

**Global service from a trusted partner**

With Siemens Gamesa as your partner, you get the benefits of working with one of the world's leading suppliers of global wind power solutions. As a pioneer of wind energy, we have over 40 years of experience and the global presence to deal with any issue in a timely and cost-efficient manner.

**Reliability, availability, safety**

In the renewable energy business, trust is not easily earned. That is why we take pride in our ability to deliver on component reliability and availability. Safety is in our DNA, and we take every step to manage risks in all our activities.

**Multibrand support**

Regardless of the brand and model of your turbine, you can count on us to keep it running. With our Multibrand approach to Repair and Reconditioning services, we cover the majority of major and minor components used in turbines in operation today.

**Accelerate your sustainability transition**

By repairing and reconditioning components, you will reduce the use of raw materials, lower greenhouse gas emissions and accelerate our shared transition to a sustainable and circular economy. Take the next step towards truly renewable energy with Siemens Gamesa as your global partner.

All the benefits of our Repair and Reconditioning services



# Four important steps: A rigorous repair process

For both major and minor component repairs, we follow a rigorous and high-quality four-phase process. This is your guarantee that nothing goes undiscovered and the end results live up to the highest quality standards.



## 1. Reception

- Packing conditions are analyzed to improve packing and logistics processes



## 2. Diagnostics

- Disassembly and analysis of components to consider every sub-component
- Identification of specific failure, along with any ancillary issues or potential issues



## 3. Repair, testing, upgrades

- Strictest quality standards during the repair process
- Material and design upgrades may be recommended to boost performance and prevent future failure
- Rigorous testing methods incl. benches designed for simulating turbine operating conditions



## 4. Quality assurance & final testing

- After refurbishment, components are fully tested to ensure quality
- Component match certificate for major components, ensuring it fits with the turbine
- Results for all critical operations are measured, recorded, and compiled into part- and customer-specific reports (on customer's request)

# Is swapping or repairing components the best strategy?

If a component fails, do you immediately swap it with an available replacement or send it in to be repaired? At Siemens Gamesa we offer both options and guide you to make the right choice for your asset.

To ensure the optimal performance of your wind turbine, you are often faced with challenging decisions regarding components in need of servicing and repairs.

Swapping a damaged component with a suitable reconditioned part that is available in stock may reduce your turnaround time and ensure a higher availability of your wind turbine.

On the other hand, repairing the component that will be reused in the turbine may be more cost-efficient, but it is also likely to increase turnaround time.

At Siemens Gamesa we guide you in making the right choice for each individual component.



## Benefits of swapping components

Swapping a damaged or malfunctioning component gives you:

- An immediate replacement of the part, ensuring reduced downtime of your asset
- An efficient choice, ensuring higher availability of your wind turbine

With this choice, the failed component is shipped to one of the Siemens Gamesa repair centers for diagnostics and repair. After repairs, the component will be integrated into the stock and available for future needs.



## Benefits of repairing components

Repairing damaged or malfunctioning components gives you:

- A cost-efficient solution to get your wind turbine back in operation
- A solution, where the failed component is sent to one of the Siemens Gamesa repair centers for diagnostics, and a repair estimate and the lead time is provided
- A choice where you can – upon diagnostics – determine how to proceed

# Major or minor? We repair the component you need

At Siemens Gamesa we offer Repair and Reconditioning services for a diverse portfolio of repaired components for both Siemens Gamesa and Multibrand wind turbines.

You should always be able to rely on a Repair and Reconditioning service partner that supports all typical major and minor wind turbine components.

With Siemens Gamesa as your repair service partner, you have access to an impressive catalogue of repair capabilities to keep your Siemens Gamesa or Multibrand wind turbine fleet running at peak efficiency. From circuit breakers, torque limiters and drive converters to gearboxes, generators and blades, we have got you covered.



## Your repair service partner for every major component

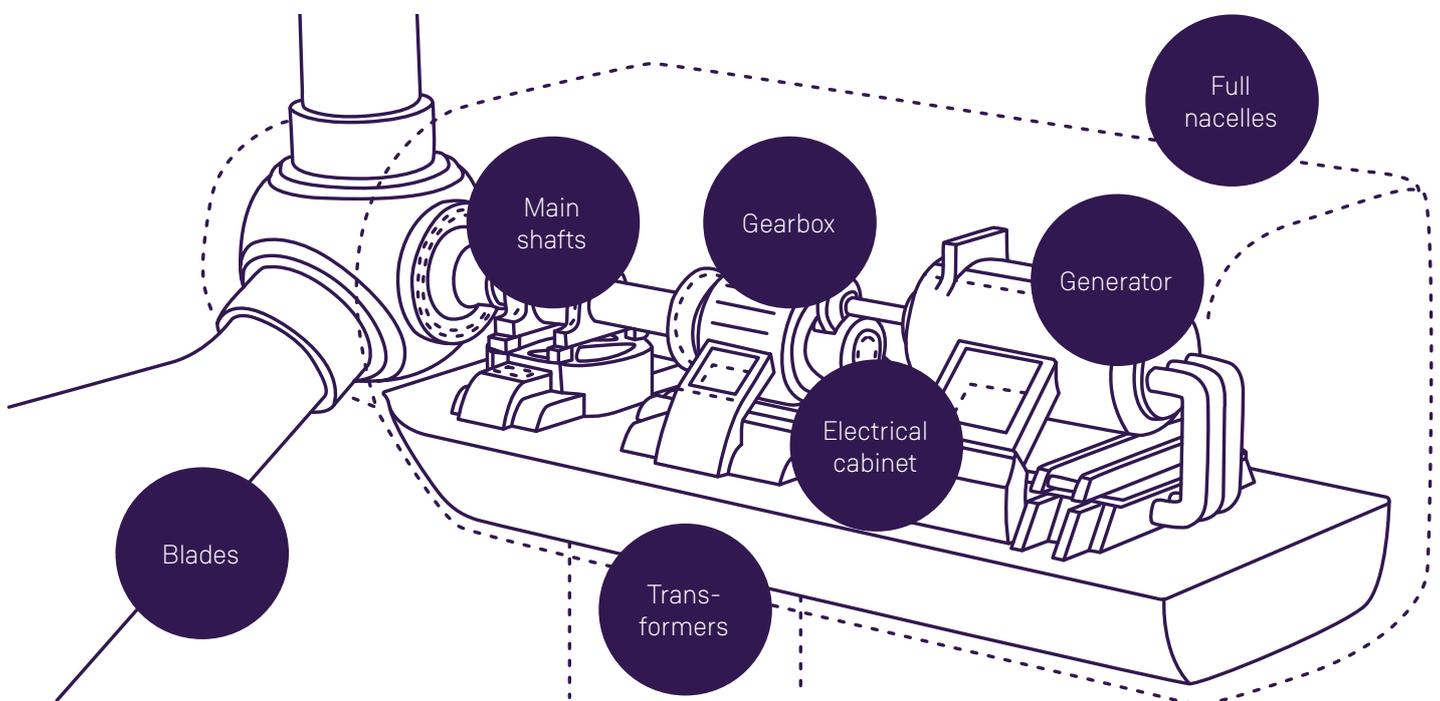
Siemens Gamesa offers Repair and Reconditioning services for the majority of major components in the wind turbine including:

- Gearboxes
- Generators/direct drive generators
- Main shafts
- Transformers
- Blades
- Full nacelles

## Minor components service across brands

When it comes to minor components, Siemens Gamesa supports more than 500 different components within these four component categories – regardless of the brand of wind turbines:

- Electronic: Drivers, inverter modules, CCU, PLC, etc.
- Electrical: Motors, air circuit breakers, power supplies, electric rotary joints, etc.
- Mechanical: Yaw gears, reducers, couplings, etc.
- Hydraulic: Cylinder, proportional valve, etc.



Siemens Gamesa offers repair services for the majority of major components in the wind turbines. From gearbox, generator, main shaft and transformers to blades and full nacelles.

# Don't just repair – upgrade, improve and enhance

Renewable energy technology is ever advancing. Therefore, a failed component not only calls for a repair. At Siemens Gamesa it is often also a golden opportunity to improve the component's quality, thereby enhancing its effectiveness and reliability.

## **Major components: Redesign to enhance effectiveness**

At Siemens Gamesa we offer quality improvement services for major components. Our global team of experienced engineers are ready to redesign all major components, thereby enhancing their effectiveness.

This service is possible as our engineers take advantage of modern manufacturing processes, applying them to older parts. Our team also tackles design issues to make the components more reliable.

The outcome of our quality improvement service is not only a repaired component – but a component with significantly reduced failure rate which allows you to increase energy production – regardless of the age of your wind turbine or its brand.

## **Minor components: From failure modes to component improvements**

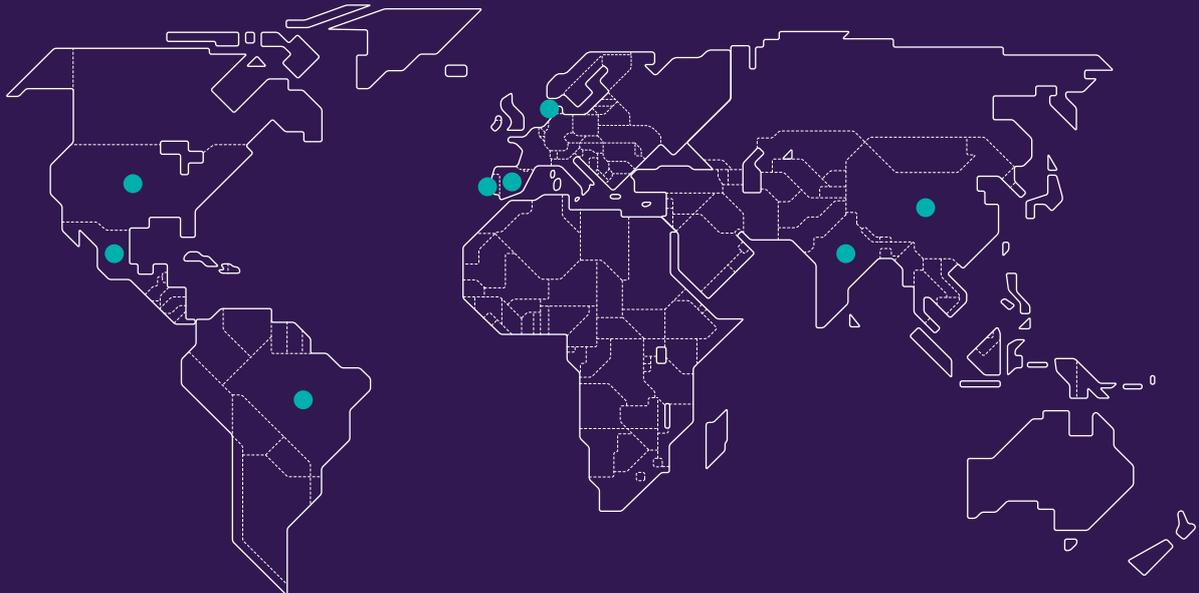
Quality improvements are also our focus when we repair minor components. We classify them based on different failure modes with accompanying suggested actions for improvements. That means that our engineers are not only looking to make repairs, but to make improvements to increase component reliability. So, if a failure mode is recurring, we will investigate with the supplier of the component to identify possible solutions.



# A global partner with experts close to you

No matter where your site is located, you can count on Siemens Gamesa to reduce your costs, save time, and increase sustainability.

With Siemens Gamesa as your partner, you get the benefits of working with one of the world's leading suppliers of global wind power solutions with experts distributed across the globe.



	Spain	Denmark	United States	India	Portugal	Mexico	Brazil	China
<b>Major component repair center</b>	●	●	●	●	●	●	●	
<b>Minor components repair center</b>	●	●	●	●		●	●	●

Services provided by Siemens Gamesa and its partners

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