

An aerial photograph of a white wind turbine nacelle. Two technicians wearing yellow hard hats and high-visibility vests are working inside the nacelle. One technician is on a platform, and the other is near a red crane. The nacelle is open, revealing internal components and a blue tarp. The background is a field of brown, textured ground.

**SIEMENS**

# Caring for wind turbines

In the service environment, experience rules

[www.siemens.com/wind](http://www.siemens.com/wind)

Answers for energy.



Farr wind farm, Scotland

## Keeping the turbines turning

**Wind turbines are an investment in the future. Protecting that investment is the responsibility of highly trained service specialists.**

With an increasing number of turbines being installed at inland, coastal, and offshore sites, reliability under challenging conditions is essential for optimizing return on investment throughout a project's life cycle.

### **In the service environment, experience rules**

From the highly qualified local technician to the senior engineer monitoring a turbine's condition at service headquarters, it is the track record of the Siemens service team that makes the difference.

Over the past 30 years, Siemens has accumulated thousands of hours of service experience. Based upon this significant knowledge, the company has established a flexible range of service solutions that are designed to optimize the output of wind turbines.



*“My favorite moment is arriving at the site every morning and seeing all of the turbines running. It gives me a great deal of satisfaction to see the results of my team’s work.”*

Iain Whyte,  
Siemens Service Site Supervisor

#### **Quality and safety go hand in hand**

The Siemens service team aims to provide the highest-quality services all throughout the life cycle of wind turbines and wind farms. The company is recognized as a world-class service provider through its high quality and dedication to safety in all aspects of its work.

Processes are continuously improved to optimize value for customers through service excellence, responsiveness, and intimate knowledge of an individual customer’s needs.

A dedicated focus on health and safety is essential to reduce the risks associated with servicing wind turbines. Stringent safety requirements are followed meticulously by highly trained and educated service specialists.

#### **Service locations**

Siemens’ service headquarters is located in Brande, Denmark, for both onshore and offshore services. In order to optimize knowledge transfer and customer value globally, regional service centers have been established. These regional centers are located in the United States, Singapore, and Germany. In an effort to stay close to the customer in the complex European region, smaller offices have also been established in the United Kingdom, Spain, Germany, and Denmark.

#### **Behind the scenes**

Service technicians prioritize preventive maintenance of turbines in order to provide optimal output. Technicians often have diverse technical backgrounds, but one thing that they all have in common is a passion for making sure that each individual turbine is running efficiently.



Burbo Bank offshore wind farm, UK

## Striving for superior availability

Having turbines running at optimum capacity is essential for a profitable project. It is also crucial to have qualified service technicians and parts available when needed. Service can help maximize the return from a turbine throughout its entire lifespan.

Lillgrund offshore wind farm, Sweden



### Service technology

The technical service team is comprised of a dedicated team of engineers whose responsibilities include fault analysis, modifications and upgrades, retrofitting of turbines, optimization of maintenance procedures, 24/7 turbine alarm handling, and warranty management. The technical service team works in close collaboration with the research and development group. Combining the service and engineering skill sets helps to reduce the traditional lag between “problem and solution” and that maintenance procedures are in accordance with best practices. Siemens turbines are serviced, fitted, and maintained with the latest technology to help optimize availability.

*“A trustworthy and long-lasting service relationship with our customers is at the core of our service efforts. We are here to provide the best value for safe, reliable operations and high availability throughout the turbine’s lifetime.”*

**Torben Bang,**  
Director Global Service



#### **Preventive maintenance**

Finding and fixing small problems before they develop into major issues is an art. Siemens has years of experience in analyzing data from its turbines via its turbine condition monitoring (TCM®) system. Highly trained service specialists are adept at quickly locating areas of improvement and prescribing the necessary course of action. Supervisory control and data acquisition (SCADA) is also a preventive maintenance system, which provides customers with a detailed analysis of the output of their turbines, such as electrical, meteorological, and statistical data.

#### **Onshore/offshore portfolio**

With installations at a wide variety of locations, both onshore and offshore, a broad range of adaptable services have been developed. The extensive experience and broad portfolio of services help to make low life cycle costs and high availability possible.

#### **Qualified and local staff**

Think global, act local. Availability does not only relate to a turbine’s ability to produce energy. It also means having the right personnel deployed locally in order to optimize response time. Siemens has a global service organization comprised of a chain of experienced, local service technicians. This set-up enables field technicians to draw on the resources, skills, and experience of an entire service division.

#### **Available parts**

Flexible solutions allows for a shorter lead time for the delivery of spare parts. By having all materials available when needed, the service team can truly focus on helping turbines to keep producing clean, green energy.

# Flexible service solutions for diverse markets

Harnessing the power of the wind is made simple through state-of-the-art wind turbines. Like all cutting-edge technology, there is a level of complexity associated with maintaining optimum performance of these highly tuned machines.

## Siemens service concept

All service concepts are offered with scheduled maintenance. In accordance with the service manual this includes:

- Service and maintenance work.
- Skilled, trained, and accredited technicians.
- Basic consumables necessary.
- Service and maintenance of all safety equipment included in the wind turbines and associated equipment.
- Service and maintenance of lifting equipment and service lift.
- Analysis of the gear oil and hydraulic oil.



Wildorado Wind Ranch,  
Texas, United States

## Basic service program – SWPS-100B

### Concept:

The SWPS-100B service program covers a wind turbine's basic service needs for up to 20 years. Selected services are available as add-ons, which allow owners to tailor the most appropriate service solution.

### Value:

Flexibility to select only the services which complement a turbine owner's internal skill set. Flexible terms for service agreements.

### Relevance:

Customers with internal servicing capabilities seeking highly flexible service options.

### Contract duration:

Available as an extension, from year 6 to 20.

## Availability service program – SWPS-200A

### Concept:

The SWPS-200A service program focuses on maximizing a turbine's availability. Siemens provides site presence, turbine monitoring, reporting, and fault analysis via its TCM® and SCADA systems. Selected services are available as add-ons to ensure that the availability program meets the specific needs of the individual owners.

### Value:

Designed to provide optimum availability of the turbines which in turn can help maximize output up to 20 years in duration.

### Relevance:

Turbine owners with a strong focus on maximizing availability.

### Contract duration:

Up to 20 years.



Farr wind farm, Scotland



Burbo Bank offshore wind farm, UK

### The programs

The service concept recognizes that turbine owners have differing needs for their service solutions. The flexible product portfolio allows turbine owners to choose the level of complexity to match their skill set and degree of desired protection. The focus is on providing customers

with a cost-effective, long-term solution for their service needs.

Turbine owners can choose from flexible service programs that cover basic scheduled service to increased complexity with extended defect warranties.

### Warranty service program – SWPS-300W

#### Concept:

The SWPS-300W is one of the industry’s most comprehensive service solutions. The program is designed with extended warranties on turbine components to offer comprehensive coverage for up to 12 years. The parts defects warranty covers all turbine generator components. Selected services are available as add-ons to ensure that the warranty program meets specific needs.

#### Value:

The program is designed to provide turbine owners with greater peace of mind in relation to the maintenance of their investment. From the supply of specially refined oil to large components, predictable operational costs are gained.

#### Relevance:

Turbine owners seeking optimum service coverage and more comprehensive warranty coverage for their investment.

#### Contract duration:

Up to 12 years.

### Offshore service program – SWPS-400O

#### Concept:

Siemens has gained significant knowledge and experience from leading the world in offshore wind projects. This expertise is the foundation of the Siemens SWPS-400O service program, which is specifically designed for turbines in the offshore environment. Vessels, helicopters, and base facilities are just a few of the selected services available that allow turbine owners to tailor their service solution for a specific project.

#### Value:

Turbine owners can be provided with highly flexible, yet comprehensive service coverage tailored to the offshore environment. With a focus on helping to maximize output, both availability and component warranties can be included.

#### Relevance:

All offshore turbine owners.

#### Contract duration:

Up to 20 years, based on the specific offshore service scope chosen.



Service technician inside nacelle



Lillgrund offshore wind farm, Sweden

## Oceans of opportunities

With a history spanning nearly two decades in maintaining fleets in the unique offshore environment, the Siemens dedication to optimizing the lifetime and long-term output of turbines is clear.

Offshore services are tailored to fit the specific context and requirements of each individual project and are based upon four areas of excellence. These areas are the foundation that allows Siemens to increase wind farm size and complexity without compromising availability and output.

### Safety

Safe operations and turbine access are some of the main challenges in the offshore environment. Stringent safety standards are important due to the increased complexity of servicing offshore turbines. Siemens' emphasis on efficient environment, health, and safety processes and turbine access training is unmatched, and is the first and foremost consideration. Quality training sessions and daily assessments help to keep Siemens personnel at the forefront of safety in the wind industry.

### Generation

Located in remote areas and operating under the harshest weather conditions, offshore projects require the most reliable turbines. Siemens delivers exceptional turbine performance and strives for a close collaboration with

## Offshore behind the scenes

1

Diagnostics team analyses overnight data and propose tasks to optimize response times.

2

Siemens field service specialists are updated on applicable health, safety, and environmental requirements and briefed on tasks. Special teams are created and assigned specific tasks.

3

Service team selects the required tools and spares necessary to complete the planned services. Review of responsibilities and preparation of tasks are done en route to the selected turbine.



Service technician using control mechanism to secure data



Service technicians accessing the turbine

customers to help gain maximum output throughout the lifetime of the turbine. Intelligent planning and forecasting can allow Siemens to schedule and execute activities, with due consideration of high energy price windows, which can significantly influence asset economics. A strong focus is placed on building partnerships for the simple reason that shared priorities can lead to efficient power generation.

**Availability**

Siemens is known as a highly reliable offshore service provider within the industry, with an unmatched track record for helping its customers to maintain optimum availability. The diagnostics center and control mechanisms allow for advanced turbine data to be proficiently analyzed, and recommended measures are taken to

help maximize unit availability. Siemens competent field service teams, combined with strategic demand planning capabilities, result in fast response times, and planned service operations help customers to secure optimum availability.

**Access**

Siemens employs sophisticated weather forecasting tools to determine if safe access is possible prior to the dispatch of field service teams.

Research and development into safe transport, all weather access systems, and stationary offshore accommodation platforms helps Siemens to increase response time while providing a safe working environment for its service specialists.

4

Service team performs the first scheduled task as allocated. A call to the site office is made to hand over the serviced turbine and to reconfirm the planned sequence for the day.

5

Service team is picked up after the last task is performed and taken back to the site office. Restocking of vessel and handover of documentation completes their service activities for the day.

6

Field service specialists are debriefed by the site manager and preparations are made for the next day.



## Seven areas of service excellence

Based upon decades of experience in designing, manufacturing, and servicing the world's most reliable wind turbines, Siemens has established seven core areas of service excellence.

### Life cycle management

Enhancing the performance of turbines means optimizing the energy output. The Siemens research and development team is dedicated to advancing products and services to ensure assets remain state-of-the-art. Life cycle management can include:

- Maintenance planning
- Site communication
- Modification and upgrades
- Balance of plant

### Scheduled maintenance

The Siemens service organization is a global network of experienced, highly technical, and safety-oriented, local service engineers. The primary focus of scheduled service is optimized capacity performance, capitalizing on output. Siemens scheduled maintenance includes:

- Maintenance work
- Logistical support
- Service tools

### Remote operational services

Finding and addressing small issues before they develop into major ones is an art. Our remote operational services and highly skilled service specialists monitor turbines 24/7. Optimum response times and a healthy state of turbines can help to provide higher availability and production output. Our industry-leading remote monitoring services include:

- Remote monitoring
- Turbine condition monitoring (TCM®)
- SCADA/wind turbine controller (WTC3)
- Technical support



Service excellence applies to both onshore and offshore wind farms

*“We have always known Siemens Wind Power Service to be professional and, most importantly, concerned with optimizing the output of the turbines.”*

DONG Energy

**Operation management**

Siemens offers various solutions to improve the overall performance of your asset based on a high operation management standard.

This can include:

- Yield management
- Fleet management
- Load balancing and forecasting

**Warranty obligation**

The Siemens comprehensive service portfolio allows turbine owners to choose availability warranty for up to 20 years and extended component defect warranties for up to 12 years.

Available are:

- Availability warranty
- Extended component defect warranty

**Training\***

The Siemens training centers offer thorough training programs to ensure that all service specialists are trained to stringent safety and quality standards. Siemens safety, quality, and technical skill set is second to none. Training centers are located in Brande (Denmark), Bremen (Germany), Newcastle (UK), and Houston (USA). Available training can include:

- Health and safety
- Technical training
- Turbine specific training

**Warranty management**

The Siemens warranty management concept covers all Siemens activities, including analysis, planning, and execution of warranty work, to fulfill warranty obligations. Warranty management can include:

- Fault analysis
- Spare parts
- Warranty planning

\* Training concept varies by region

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