



Power from Berlin to the World

Welcome to the Berlin gas turbine plant

Answers for energy.

SIEMENS

Introductory remarks

by the Governing Mayor of Berlin,
Klaus Wowereit



Berlin and Siemens have always had a special relationship. After all, it was in this city that Werner von Siemens got started in business in 1847. Emil Rathenau, the founder of Allgemeine Elektrizitäts-Gesellschaft (AEG), is another businessman whose name is inseparable from Berlin's development into a modern industrial metropolis.

The work of these two prominent businessmen lives on today in the Berlin Gas Turbine Factory. Founded as a steam turbine factory by the company Allgemeine Elektrizitäts-Gesellschaft in 1904, the plant has been wholly owned by Siemens AG since 1977. For more than 100 years, the gas turbine factory in Berlin has delivered absolutely cutting-edge technology to customers around the world.

Then as now, the factory is an important economic and social engine for our city, as about 3,000 of the nearly 13,000 Siemens employees in Berlin work there. But Siemens in Berlin means more than just cutting-edge technology for the world; it also means a social commitment to the people of Berlin. For that, I express my special gratitude, and also in the name of our city.

A handwritten signature in black ink, which appears to read 'Klaus Wowereit'. The signature is written in a cursive style.

Klaus Wowereit
Governing Mayor of Berlin

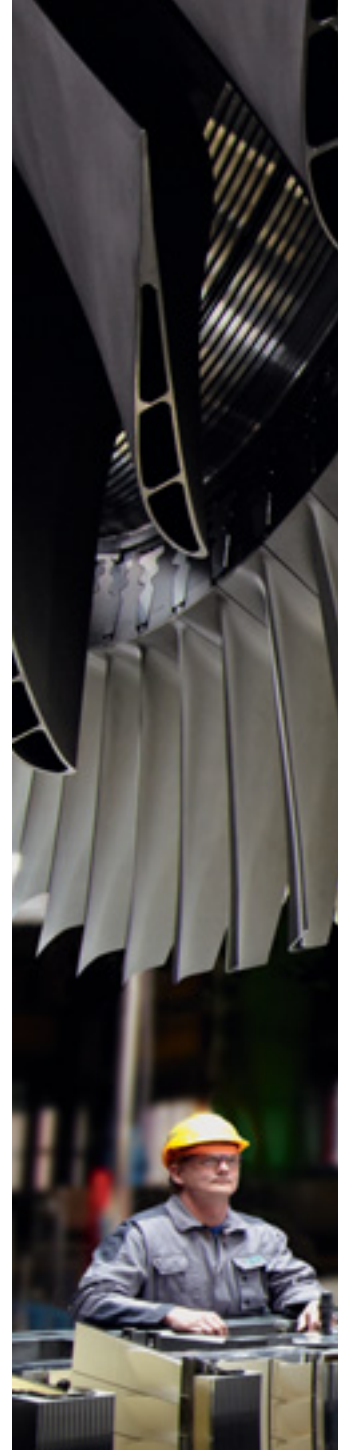
Innovations for high-efficiency power generation

Innovative ideas create customer benefits

Drawing on the latest scientific and technical advances worldwide, the Siemens gas turbine plant in Berlin builds gas turbines for power plants that are highly efficient and thus especially economical and environmentally friendly. The plant always manages to stay one step ahead of its domestic and international rivals. It is almost a tradition that new developments from Berlin regularly rank first in efficiency and performance capability.

The latest product innovation is a gas turbine called the SGT5-8000H. This power pack has a power output of 375 megawatts (MW), which is definitely a world record. If the gas turbine is combined with a steam turbine, the process efficiency can be increased to over sixty percent. This figure, too, is unmatched anywhere in the world. Compared to the turbines commonly used today, this represents about 40,000 metric tons less CO₂ emission annually. That's why this gas turbine is also setting new global standards when it comes to environmental protection.

Innovative production technologies are another focal point of the development work at the Berlin gas turbine plant. One example is the production of ceramic heat shields for the combustion chambers of gas turbines. The Siemens gas turbine plant successfully uses highly efficient tiles for insulating the hot combustion-chamber walls. Compared to open-cooled metallic linings, the ceramic heat shields reduce the cooling air consumption of the turbine. This reduces the output of nitrous oxides, thereby making an important contribution to protecting the environment. This innovative production technology was awarded the Berlin-Brandenburg Innovation Prize.



Cutting of cooling air holes using a highly innovative laser process ensures that the blades do not overheat in operation.

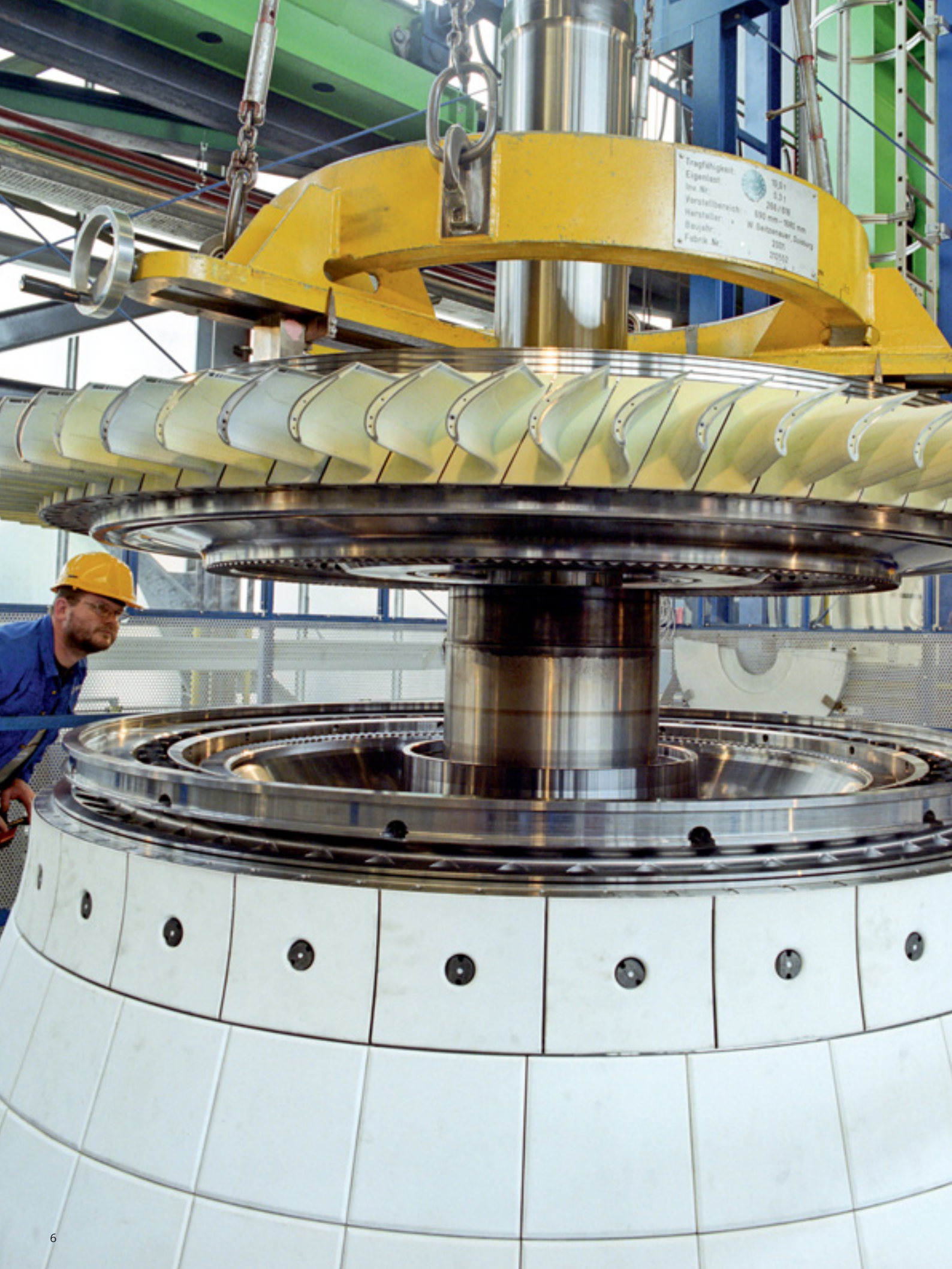


A section of the casing shortly before assembly. Weighing 25 metric tons, it forms part of the largest and most powerful gas turbine in the world.



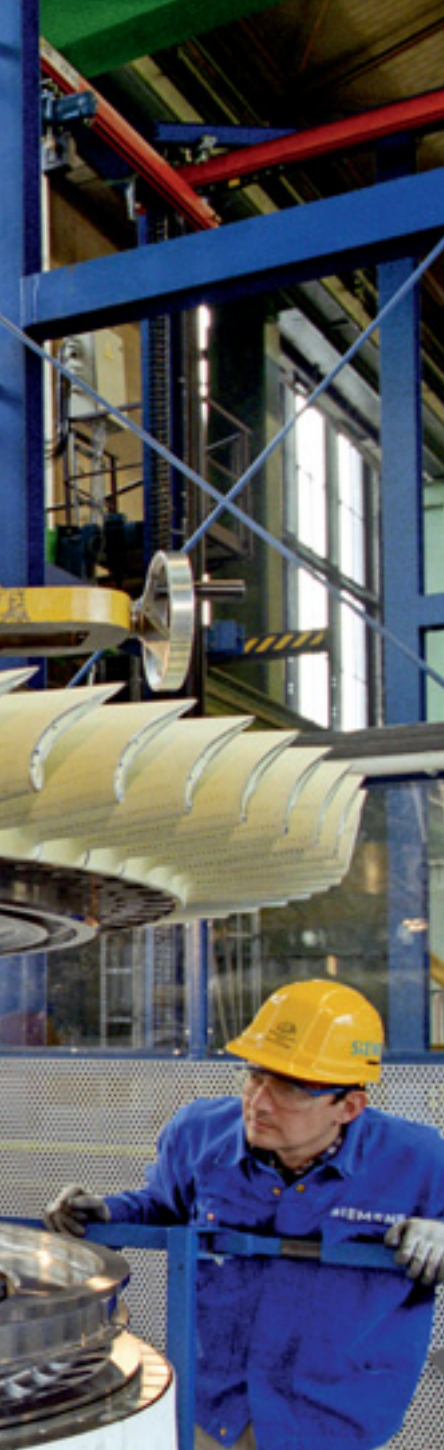
Siemens holds 15 patents on its ceramic heat shields, which are unique worldwide in terms of functionality and stressing capability.





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20252



Giant turbines made with ultimate precision

Impressive technical achievements

Gas turbines represent a unique blend of classic heavy machine construction and ultramodern production technologies. Individual components, some tiny and others weighing several tons, have to be assembled with painstaking precision using highly advanced techniques. The rotor, for example, which is the rotating heart of the turbine, is a multi-component element that can easily weigh a total of 100 metric tons. In operation, this colossus rotates at 50 or 60 revolutions per second. The gap between the blade tips and the casing is only a few millimeters wide. These figures highlight the extremely high precision required, despite the enormous weight. When assembling these components, which can weigh many tons, fractions of millimeters decide whether the turbine runs optimally in the power plant.

Not only the turbine as a whole, but also every single turbine blade is a technical masterpiece combining the highest precision and performance. There are about 2,400 blades in a gas turbine, each of which is subjected to extreme stressing during operation. The temperatures reached inside the turbine are in some cases higher than on the outer skin of the space shuttle when it re-enters the earth's atmosphere. Gas at a temperature of 1,400 °C impinges on the blades at a speed of 100 m/s. Yet even these extreme conditions leave the blades "completely cold." This is achieved through an innovative production technique that makes perfect air-cooling possible.

In order to guarantee the reliability and quality of all components, the entire production process is backed by comprehensive quality management.



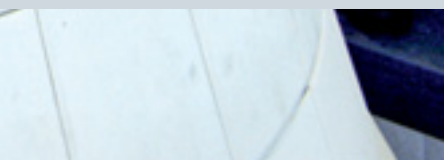
Logistics challenge: Interchangeable swap bodies are used for internal blade transport to save valuable time.



Innovative core expertise: The burner plays an important role in increasing efficiency and reducing exhaust gas values.



Real teamwork: Everyone pulls together to help install a turbine rotor.



A factory full of energy

Overview of products

The products from the Berlin gas turbine plant are at work generating energy at power plants throughout the world. Gas turbines for power plants delivering 113 to 375 MW for the 50- and 60-Hz market are produced at the 130,000 m² factory site. Since the first gas turbine for a power plant was delivered in 1972, more than 600 turbines have been built here for customers in over 60 countries.

In addition to series production, the Berlin plant is also the Siemens center of competence for constructing prototypes for new generations of gas turbines. An in-house test department – one of the most modern and efficient in the world – enables test-running of turbines and turbine components up to 250 MW.

The location also provides service for installed machines. Manufacturing spare parts and performing repairs are important mainstays of the global gas turbine business, with around-the-clock service available 365 days a year.

The plant makes an important contribution to Siemens AG's environmental portfolio in two ways: environmental pollution is significantly reduced both through our environmentally friendly products and our energy-efficient production.

Our product highlights

SGT5-2000E

- Very good maintenance and repair capabilities
- Two worker-accessible combustion chambers with low-emission combustion system and ceramic heat shields
- 16-stage axial compressor
- Horizontally divided casing enabling all rotor blades to be removed with the rotor installed

SGT5-4000F

- Low electric power-generation costs thanks to reduced fuel consumption
- Low-emission combustion in worker-accessible annular combustion chamber with ceramic heat shields and 24 hybrid burners
- 15-stage axial compressor with optimized flow distribution
- Monocrystalline turbine blades with heat-protection coating and film cooling

SGT5-8000H

- Air-cooled gas turbine with an efficiency of over 60% in combined-cycle operation due to modern materials that allow higher firing and exhaust temperature
- Short startup time and improved load-shedding characteristics
- Highly efficient sealing system for minimal cooling air consumption



Flexible in use: The SGT5-2000E runs optimally under a wide range of different operating conditions.



Reliable: The SGT5-4000F has an outstanding reputation worldwide as a result of the use of proven technologies.



Innovation at world-class levels: The SGT5-8000H sets new standards of efficiency and climate protection.



Tested: The test results support the entire fleet of gas turbines.

Making sure that everything runs smoothly

Services that generate added value for customers

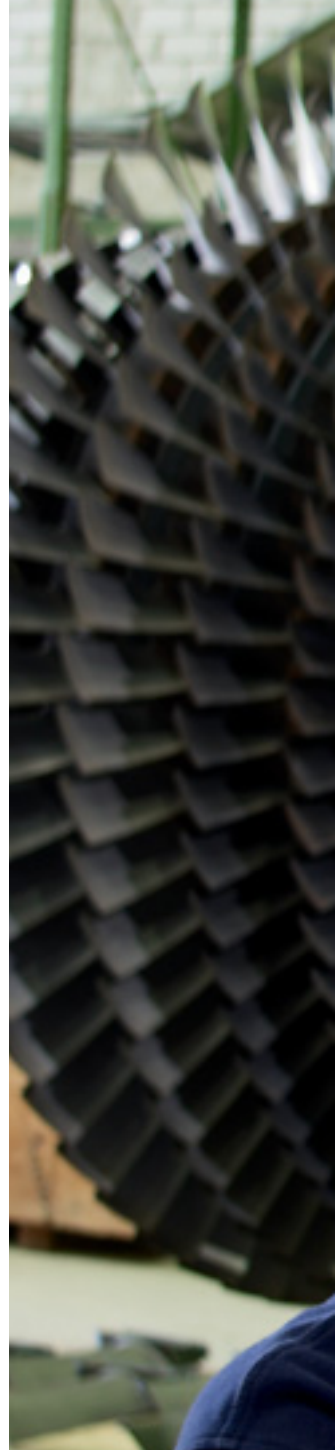
A worldwide, effective and flexible service network is hard at work 24 hours a day, 365 days a year, on behalf of power-plant owners and operators to ensure their gas turbines are available at all times throughout their entire life cycle.

Backed by continuous research and development, the Siemens gas turbine factory offers maintenance, replacement parts, and repairs that are tailored precisely to the particular needs of all its customers. By offering the latest technologies, Siemens helps to further improve the flexibility and competitiveness of power plants.

By modernizing existing power plants, Siemens engineers can substantially boost the efficiency and turbine output of these plants. Increasing the efficiency of gas turbines significantly and cost-effectively reduces carbon dioxide emissions and optimizes fuel consumption.

In Berlin, about 900 Energy Service experts, planners, engineers, technicians and visionaries are working hard to ensure reliable energy supplies and innovative service, both in the near future and beyond.

Customers can take advantage of an unrivaled knowledge pool at the Berlin factory, where authoritative manufacturing expertise is combined with the operations experience of the service department. This advantage is put to good use, for example, at the Berlin factory for repair services.



The quality standards demanded for power-plant service are implemented through a comprehensive maintenance concept.



Siemens' customized services can also include the complete operation of the power plant.



Siemens offers a wide range of training and consulting options to support its customers throughout the life cycle of their power plants.







People excellence

Work, health, work-life balance

Approximately 3,000 highly qualified people work at the Siemens gas turbine factory. Representing 34 nationalities, the employees of the Berlin factory mirror the essence of Siemens as a global enterprise.

The commitment and creativity of all employees are key factors driving the innovative vitality of the gas turbine factory. That's why recruiting highly qualified and motivated young talent is critical to the future success of this location, and cooperative arrangements with universities and research institutions play an important role. Through their involvement in joint projects, students in a wide range of disciplines are given the opportunity to learn about the fascinating technologies used in gas turbine manufacturing.

Every year, about 130 young people complete their vocational training at the Berlin plant. They can choose from a wide range of vocations:

- Plant fitter
- Bachelor of Business Administration (with degree from the Chamber of Commerce and Industry, CCI)
- Bachelor of Engineering (with CCI degree)
- Industrial Sales Representative (CCI)
- Industrial mechanic
- Electronics specialist for management engineering
- Materials tester
- Machinist

Siemens has taken care of its employees since its earliest days.

At the Berlin gas turbine factory, nothing is more important than work-life balance and the health of all employees.

In addition to the company-wide benefits, the factory offers the following additional services:

- Health management
- In-house medical staff
- Social counseling
- Company sports
- Athletic and fitness center
- Day camps for employees' children when school is out



The gas turbine factory supports fitness activities for its employees.



Worker safety is extremely important at the gas turbine factory, as in this example of welding work on the turbine casing.



Quality assurance is an everyday job that employs state-of-the-art technology.





Cutting-edge technology from Berlin means energy for millions

Working together as a global network

For its gas turbine product portfolio, Siemens draws on worldwide manufacturing resources. Depending on the project or product in question, the international locations always cooperate in such a way that delivers the greatest possible benefits to the customer, with highly innovative technology and optimal quality at competitive market prices.

Global Order Management is a service provider between manufacturing, sales, and the customer. As a central interface function, this department operates in a flexible and timely manner, whether on product documentation for new plants or on the delivery of replacement parts for the service business.

The Strategic and Operational Procurement function arranges the necessary capacities in the purchasing market for all components used in gas turbines.

Geared to accommodating customers' wishes, this department manages all external procurement processes, including delivery time, price and quality, and responds to the customers' needs in consultation with Order Management.

The international orientation of the Order Management and Procurement departments represents a significant advantage for customers. Using the latest tools and systems, these departments ensure seamless cooperation across continents and time zones.

Wherever they are in the world, customers who use gas turbines can be assured of a product that always meets the highest standards: Made by Siemens.

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