

Fact sheet: Turbine assembly hall in Berlin celebrates more than 100 years of operation

1. From the beginnings of turbine construction to rebuilding production

- The gas turbine plant in Berlin-Moabit stands for a century-old tradition of making top-notch technology in Berlin for delivery all over the world. More than 100 years after it was built, this industrial building is still serving its original purpose: to build large turbines that consistently embody world-leader performance.
- The new steam turbine assembly hall, designed in 1909 by Prof. Peter Behrens for the AEG turbine factory, was celebrated in its day as a milestone in modern industry, thanks to its advanced concept. Today, the hall is used for machining cast and forged parts, and for assembling the rotors for Siemens AG gas turbines to be used in power plants. Peter Behrens is considered the first modern industrial designer to create a modern aesthetic for AEG's appearance and repertoire of shapes back then – its products, its factories, and even its printed materials. He developed the principle of "Industrial Objectivity," as a synthesis of technology and art.
- The AEG turbine factory, founded in 1904, built the largest steam turbines of its day, with capacities that soon rose from 1 to 5 megawatts. The exemplary fixtures and fittings of the first production hall and the organization of work procedures also impressed contemporaries. But as capacities increased by leaps and bounds, individual turbine components become larger and heavier – and space difficulties forced the manufacturer to build an even larger, even better-designed assembly hall.
- The new AEG turbine hall of 1909 was Berlin's largest iron structure of the era, with a total initial length of 127 meters. Iron, glass and infill concrete dominated the new style of industrial construction. The hall's iron primary load-bearing structure consists of 28 arched girders. The effective span and apex height of the main hall are about 25 meters. Equipped with traveling cranes with lifting capacities of 50 metric tons each, railroad tracks were laid in the hall and the building was dimensioned to let freight car wagons come in.
- Since 1909, the hall's primary operation has been final assembly for steam turbines, including generators, for power plants. Since the early 1920s at the latest, the hall has also served for machining large components and for the final assembly of giant diesel ship engines.
- Heavy air raids that began in 1943 destroyed parts of the turbine factory and its outbuildings. Nevertheless, production continued in the large turbine hall and its annex until the war ended. But a more severe problem than the war damage was the damage caused by dismantling the factory equipment. When an application was filed with the British military

- The building has been a protected historical monument since 1956, but still continues its regular deliveries of superlative machines. Many of these turbines, once the world's biggest and highest-capacity of their kind, still maintain that reputation today.

2. Gas turbine production in Berlin as a worldwide competence center

- When AEG and Siemens decided in 1968 to pool their power plant activities in the company named Kraftwerkunion (KWU), the site received an order to produce gas turbines in the turbine hall as well.
- The new production of gas turbines made it necessary to add a balancing and overspeed test chamber, in which the gas turbine rotors could be balanced under vacuum and tested at overspeed. For that installation, the hall was extended to 242 meters in 1970 with a sleek concrete addition, so it can be used to balance gas turbine rotors with weights of up to 65 metric tons and lengths of up to 12.5 meters.
- On the occasion of the site's 100th anniversary in 2004, the original color scheme of the main assembly hall was partially restored.
- In addition to series production, the plant is also Siemens' world center of competence for building prototypes of new generations of gas turbines. A separate testing area, one of the highest-performance in the world, has the ability to conduct test runs of especially massive gas turbines and turbine components.
- The various products of the gas turbine plant are used to generate power at power plants all over the world. Today, the plant site, which measures some 130,000 square meters, builds gas turbines for power plants with capacities of 113 to 375 megawatts. Since the first gas turbine for a power plant was delivered in 1972, more than 800 turbines have been built in Berlin for customers in over 60 countries.
- The latest product generation holds a world record as the most powerful gas turbine. When this gas turbine is coupled with a steam turbine in a combined cycle plant, process efficiency can be increased to more than 60%. This too is a world record. Compared to the turbines in common use today, it represents some 40,000 metric tons less of CO² emissions per year. So this gas turbine is setting new standards in environmental protection too.
- The Siemens gas turbine plant employs a total workforce of some 3,500. The staff reflects Siemens' identity as an international corporation: 42 nationalities work at the Berlin plant. Some 250 young people complete their vocational training at the Berlin gas turbine plant each year.
- The site also provides servicing for machines installed all over the world. Making spare parts and performing repairs is one of the mainstays of the global gas turbine business.

Berlin has about 1000 energy service experts working on the reliable energy supply of tomorrow and the day after.

- By modernizing existing power plants, Siemens engineers can significantly increase the plants' efficiency and turbine capacities, among other performance figures. More efficient gas turbines significantly reduce carbon dioxide emissions, and provide a cost-efficient optimization of fuel consumption.

3. The steam turbines of yesterday compared to the gas turbines of today

- Annual production of all steam turbines in 1910 totaled just under 270 megawatts (MW) in combined capacity – less than the capacity of a single gas turbine today.
- The capacity of the steam turbines for power plants and industrial applications came to 10 to 22 MW back then, and the capacity of a steam turbine used to propel a ship went as high as 5 MW (equivalent to 8,000 hp). Modern gas turbines for power plants put out around 200 to 375 MW.

The site's worldwide importance in terms of innovation milestones:

- 1916: Steam turbine for power plant in Goldenbergwerk, North Rhine-Westphalia, capacity 50 MW
- 1930: Steam turbine for power plant in Golpa-Zschornowitz, Saxony-Anhalt, at 85 MW
- 1972: Delivery of first gas turbine for a power plant (capacity 62.5 MW)
- 1978: Gas turbine for combined heat and power plant, Munich, Bavaria, at 116 MW
- 2007: Gas turbine for power plant in Irsching, Bavaria, at 375 MW (world record)

Change of materials, example of turbine blades:

- Steam turbine: first phase nickel steel, subsequent stages of brass, bronze.
- Gas turbine: monocrystalline, high-strength investment-cast materials, nickel-based alloys.

Production data, then and today:

- In 1910 the plant had 4,224 employees (3,658 blue-collar, 566 white-collar). Blue-collar occupations: fitters, lathe operators, drill operators, milling machinists, planers, casters, slingers, installers. Male white-collar occupations: engineer, technical draftsman, commercial employee.
- Female white-collar occupations in those days: primarily stenographer-typists.
- Currently some 3,500 employees. Occupations: plant mechanic; operating electronics specialist; industrial salesman; industrial mechanic; salesman for office communications; materials tester. Engineers, MBAs.
- Occupations for female employees today: engineer, materials tester, controller, team assistant.