SIEMENS
Ingenuity for life

Triumph of high-voltage engineering and major international projects

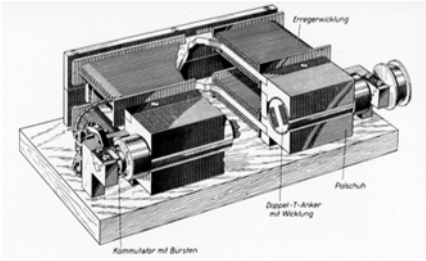
1865–1896

The invention of the dynamo machine and the completion of large-scale, technologically demanding projects earned Siemens & Halske international acclaim.

In 1866, Werner von Siemens discovered the dynamo-electric principle. This advance made it possible to generate and distribute large amounts of electrical energy at low cost. Unlike other researchers in the field who were working on the same problem, Werner von Siemens quickly recognized the economic significance of his invention and, in 1867, took out patents in Germany and England to ensure his right to commercialize it.

The dynamo machine – The triumphal march of power engineering begins

In 1875, after roughly ten years of development and testing, the dynamo was ready for series production, and high-voltage engineering – the term initially used for what is today called power engineering – began its triumphal march. In 1879, the world's first electric railway carried visitors around the grounds of the Berlin Trade Exhibition. For the exhibition, Siemens also installed newly developed differential arc lamps in the *Kaisergalerie*, an early shopping arcade located in Berlin's city center and modeled



Werner von Siemens' dynamo laid the foundations of modern electrical engineering.

on similar facilities in Paris and Brussels. Berlin's first permanent electric street lighting followed three years later.

In 1880, the electrical engineering company installed the world's first passenger elevator in a building in Mannheim, Germany. In 1881, the world's first electric streetcar line began service in the Berlin suburb of Gross-Lichterfelde (now Berlin-Lichterfelde).

International recognition –
Siemens telegraph lines connect the world

Beginning in 1865, Siemens & Halske earned international renown in the field of telegraphy by successfully planning and executing large-scale projects that were both capital-intensive and technologically demanding. For the construction of a telegraph line from London to Calcutta, Werner von Siemens hit on the groundbreaking idea of using induced current to send dispatches fully automatically and without interruption. This innovation made it possible to greatly simplify and accelerate the transmission of messages.

Halfway around the world in 28 minutes: The telegraph line from London to Calcutta brought the Siemens brothers international fame.

Siemens was soon awarded a contract for constructing long stretches of the telegraph line, which had a total length of 11,000 kilometers. On April 12, 1870, William Siemens created a sensation in the English capital by sending a message from London to Calcutta in 28 minutes – something that had previously taken 30 days.

But that wasn't enough for the Siemens brothers. In 1874 they began laying a submarine cable across the North Atlantic. Siemens & Halske recognized that laying an intercontinental telegraph line provided an opportunity to gain a foothold in the flourishing marine cable market. The venture entailed major risks. Several times, it was on the brink of failure. Nevertheless, the transatlantic link was in full operation by the end of 1875. Its outstanding quality brought Siemens & Halske a large number of follow-up contracts. By the end of the 19th century, the company had laid a total of nine transatlantic cables.

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**Responsible corporate management –
An early commitment to social benefits**

To secure the loyalty of skilled workers over the long term and build up a permanent workforce, Siemens introduced numerous social benefits at an early stage. One of its best-known measures was the *Inventurprämie*, a profit-sharing plan for company employees. In 1872, the company launched a pension, widows and orphans fund. Members of the workforce were now entitled to a pension based on their length of employment.

In 1873, the workday was reduced to nine hours. In 1891, it was further reduced to 8.5 hours. That same year, an apprenticeship program was launched, and continuing education programs in selected subjects were established for employees in 1893.

Responsibility in action – Siemens introduced voluntary social benefits before many other companies.

**The end of an era –
Werner von Siemens retires from the company**

In 1890, at 74 years of age, Werner von Siemens retired from active management of Siemens & Halske. When the company was transformed from a general partnership into a limited partnership in January of 1890, management responsibility passed to his younger brother Carl and his sons Arnold and Wilhelm. Werner von Siemens died on December 6, 1892, a few days before his 76th birthday. At that time, the company he founded was generating nearly 20 million marks in revenue and had 6,500 employees, 4,775 of whom were in Germany. Siemens and electrical engineering were now synonymous.

Find out more

siemens.com/history/1866–1896