

# SIEMENS

## Company history

### **Beginnings and initial expansion (1847–1865)**

Werner Siemens – known as Werner von Siemens from 1888 when he was raised to the nobility – was born in 1816 in Lenthe, near Hanover, Germany. As his family lacked the resources to pay for a university education, he joined the Prussian army in 1835, where he spent three years studying mathematics, physics, chemistry and ballistics at the Artillery and Engineering Academy in Berlin.

Werner von Siemens was awarded his first Prussian patent in 1842 – for an electrolytic method of gold and silver plating. His younger brother Wilhelm later marketed this invention successfully in Britain.

In 1846, Werner von Siemens hit upon an idea for improving the Wheatstone telegraph. Using just simple means – cigar boxes, tins, pieces of iron, and some insulated copper wire – he designed his own pointer telegraph. He entrusted the apparatus' construction to a mechanical engineer, Johann Georg Halske, who was won over by its simplicity and reliability. In Berlin in October 1847, the two men formed their own company, Telegraphen-Bauanstalt von Siemens & Halske, and set up a small workshop in a back building at 19 Schöneberger Strasse. A week after the company was founded, the design of the pointer telegraph was awarded a patent in Prussia.

In 1847, Werner von Siemens developed a gutta serena press that made it possible to create seamless insulation for copper wire. This and the pointer telegraph marked two key advances on the road toward modern telecommunications. A year later, the company received a government contract to install a telegraph line between Berlin and Frankfurt/Main – the company's first major success – and Siemens managed to complete the line in time for the Prussian monarch's election as Germany's hereditary emperor.

The lack of follow-up contracts from the Prussian state plunged the company into a crisis during the early 1850s, but its fortunes turned when it received new orders from Russia and Britain. In 1853, Siemens & Halske began building a telegraph network in Russia, which stretched from Finland to the Crimea, covering a distance of around 10,000 kilometers. The company was also contracted by the Russian government to provide maintenance services. In 1855, Werner von Siemens set up a subsidiary in St. Petersburg, headed by his brother Carl.

At this time, activities in Britain were gradually expanding. The English business was managed by Werner's brother Wilhelm, who later made England his home and changed his name to Charles William Siemens. In 1858, the subsidiary Siemens, Halske & Co. (renamed Siemens Brothers in 1865) was set up in Britain. The subsidiary's operations centered on the production and laying of submarine cables, which it began manufacturing at its own cable plant at Woolwich on the River Thames in 1863.

### **Triumph of heavy current engineering and internationalization (1865–1890)**

Werner von Siemens discovered the dynamo-electric principle in 1866. With the advent of the dynamo, it became possible to generate and distribute electrical energy cost-effectively and in large quantities. Unlike others working in the same field at this time, Werner von Siemens was quick to appreciate the economic significance of his

discovery. In 1867, Siemens secured the necessary patents in Germany and Britain to enable the company to capitalize on its invention and then announced it to the world.

In the late 1870s, power engineering began to develop at breathtaking pace. In 1879, the first electric railway was presented at the Berlin Trade Fair and the first electric street lighting was installed in Berlin; in 1880 the first electric elevator was built in Mannheim; and in 1881 the world's first electric tramway went into service in Berlin-Lichterfelde.

Siemens & Halske's activities in telegraphy entered a new phase of expansion in 1866. Werner von Siemens had had a revolutionary idea to construct a telegraph line reaching all the way from London to Calcutta. Dispatches would be transmitted by means of induced current, fully automatically, and continuously. The company was contracted to build large sections of the 11,000-kilometer line. On April 12, 1870, the sensation was complete: In London, William Siemens demonstrated that it was possible to exchange telegrams with Calcutta within the space of an hour. The laying of ocean cables across the Atlantic, joining Europe and North America, by the *Faraday*, a purpose-built cabling ship, marked a supreme technical accomplishment. The continents were now joined by cables.

To bind qualified and experienced workers to the company and to secure an employee base, Siemens instituted a variety of welfare measures at an early stage. One of the most prominent was the so-called stock-taking bonus, introduced to enable wage employees to share in the company's profits. In 1872, Werner von Siemens set up a pension fund that included benefits for widows and orphans. In 1873, the company introduced the nine-hour working day; this was subsequently shortened to an eight-and-a-half-hour day in 1891. And in the same year, the company introduced apprentice training programs for specific trades. These were followed in 1893 by programs focused on workers' onward training.

With time, Austria emerged as an important source of business alongside Russia and Britain. In 1879, Siemens & Halske set up a subsidiary in the city of Vienna to develop trade with countries in the southeast of Europe. Parallel efforts to gain a foothold in the U.S. market, however, proved unsuccessful, and a U.S. subsidiary formed in 1892 had to be closed down only a few years later. Even so, Siemens & Halske's foreign business had reached such a volume that the management began setting up foreign agencies in all its key markets during the 1870s.

### **Growth through consolidation and partnerships (1890–1918)**

Werner von Siemens retired from active management of the company in 1890. He was succeeded by his sons Wilhelm and Arnold, who took over the leadership together with their uncle Carl. Siemens & Halske was re-formed as a stock corporation in 1897. This was an essential step in order to cover the company's expanding capital requirements.

In 1903, Siemens & Halske acquired the company Elektrizitäts-Aktiengesellschaft vorm. Schuckert & Co., merging it with its own power engineering unit to form Siemens-Schuckertwerke GmbH. As electrical engineering advanced, numerous new sectors were added over the years to the two parent companies' traditional power engineering and communications engineering businesses, and the purpose of the new company was to cover all areas of electrical engineering.

Also in 1903, Siemens and AEG co-founded the Gesellschaft für drahtlose Telegraphie System Telefunken, which specialized in developing the new field of radio.

Siemens' expansion eventually necessitated concentrating manufacturing and administration at a single, large-scale location. The company therefore purchased the Nonnenwiesen, a green-field site in the northwest of Berlin, in 1897. Only two years later the Westend cable factory went into operation at the new location, and by 1913 all company activities had been relocated to the new campus known as Siemensstadt.

One interesting innovation to emerge in connection with the creation of the new industrial park was the parallel development of an area of workers' housing, complete with the requisite infrastructure. By 1914, Siemensstadt's population had reached 7,000. This and the fact that more than 20,000 people worked there made the provision of public transport essential.

The company also recorded several notable technological achievements in the field of rail transport. In Budapest, it built continental Europe's first underground rail line, which took just two years to complete and opened in May 1896. In 1903, a high-speed locomotive developed by Siemens set a new world speed record of 210 km/h. The most prominent innovation in the area of telecommunications engineering during this era was introduced with the commissioning of the first metropolitan automatic telephone exchange, which was built in Munich's Schwabing district in 1909 and had a capacity of 2,500 line units.

By fiscal 1914, Siemens had a worldwide workforce of 82,000 employees, of whom a quarter worked outside Germany, and the company had become one of the world's foremost players in its industry. The outbreak of World War I caught Germany's electrical industry entirely unprepared and had a substantial and lasting impact on its global standing. Siemens' markets collapsed, and the majority of its foreign subsidiaries were expropriated.

### **Return to the world market and unity within the "House of Siemens" (1918–1933)**

Carl Friedrich von Siemens, Werner von Siemens' youngest son, took over as "Head of the House" following the deaths of his brothers Arnold and Wilhelm in 1918 and 1919, respectively. He continued to head the company until his death in 1941.

Through World War I, Siemens had lost 40 percent of its capital. Most of its foreign assets and almost all of its patent rights had been expropriated. The most urgent tasks during the immediate postwar years were the reorganization of the company's expanding manufacturing operations and the revitalization of its foreign business.

One of Carl Friedrich von Siemens' policies was to service the whole of the field of electrical engineering but to assign individual areas of business to specialized subsidiaries and related companies. Siemens, AEG and Auer-Gesellschaft accordingly merged their incandescent lamp businesses in a joint venture, Osram GmbH; Siemens-Elektrowärme GmbH took over the manufacture of household appliances and heaters and Siemens & Halske AG's Electrical Railways Division became Siemens Bauunion. Medical engineering was now the responsibility of Siemens-Reiniger-Werke AG. The formation of Siemens Planiawerke AG led to the creation of Europe's largest factory for the manufacture of carbon electrodes.

Each of the spun-off and newly formed companies maintained recognizable ties with their corporate parent. One important factor here was a consistent corporate identity that helped underscore their common origins. In the 1930s, Hans Domizlaff established a unified approach to advertising and consistent company-wide branding.

Partly under the influence of Carl Köttgen, manufacturing was reorganized around assembly lines. This tapped considerable potential for rationalization and ensured that production remained cost-efficient.

In the 1920s, Siemens-Schuckertwerke GmbH received the largest foreign contract awarded to any German company since the turn of the century when it was hired to build a power plant on the Shannon River. The power generated by the facility was used to electrify the whole of Irish Free State. In 1923, Siemens-Schuckertwerke GmbH and Japan's Furukawa group launched a joint venture, Fusi Denki Seizo KK, to manufacture electrical products in Japan.

The official recognition of trade unions by the state and employers paved the way for a new company welfare policy. The primary focus of policy was on the provision of retirement benefits, an issue that Werner von Siemens had originally addressed in 1872 with the formation of a pension fund. Besides reintroducing a year-end annual bonus in 1927, the company also implemented a corporate housing initiative, began offering rest and recovery programs in company-owned facilities, and provided support for employees' leisure activities.

### **The National Socialist economy and the war years (1933–1945)**

From 1933, National Socialist economic policy pursued two primary goals: combating unemployment and "militarization of the German economy." A four-year plan was instituted in 1936 to ready the economy and the armed forces for war within the space of a few years. Like other sectors, the electrical industry received an increasing number of orders from public offices and was drawn into the program of war preparations. This development marked the onset of a phase of rapid growth that continued through to the end of World War II.

Following its invasion of Poland in 1939, Germany embarked on a gradual transition to a war economy. The state restricted and even prohibited the production of certain civilian goods and requisites, and military conscription led to a widening shortage of labor. As a result, an increasing number of foreign civilians – men and women – were employed in manufacturing. Initially, they chose to work of their own free will. Later, though, many were forced into labor. They worked throughout German industry – in the manufacturing sector, in public services, and in agriculture. By the winter of 1941-42, the German economy had become entirely dependent on forced labor.

In late 1944, at the height of World War II, Siemens' total workforce of 244,000 included some 50,000 people who had been put to work against their will. The overall number of men and women who served as forced labor at Siemens during the war years was, however, higher.

During the final years of the war, numerous plants and factories in Berlin and other major cities were destroyed by Allied air raids. To prevent further losses, manufacturing was therefore moved to alternative places and regions not affected by the air war. The goal was to secure continued production of important war-related and everyday goods.

According to records, Siemens was operating almost 400 alternative or relocated manufacturing plants at the end of 1944 and in early 1945.

Germany's political, military and economic collapse led to the closure of Siemens' plants in Berlin on April 20, 1945. By the time the war came to an end, the greater part of Siemens' buildings and industrial installations had been completely destroyed. The company's overall losses resulting from World War II amounted to 2.58 billion reichsmarks – four-fifths of its total assets.

### **Reconstruction and emergence as a global player (1945–1966)**

After the wartime destruction and the subsequent dismantling of industrial installations, Siemens' postwar reconstruction began in earnest in 1946 with initial manufacturing programs for public services and utilities, such as the rail network, the postal service, and power generation. Siemens' workforce had already grown to around 40,000 by the end of 1945. Besides cleanup and reconstruction tasks, Siemens' employees were assigned to the makeshift manufacture of everyday objects, such as coal shovels, cooking pots, and stoves.

During the final months of the war, Siemens had set up so-called Group Directorates in the south and the west of Germany. Acting more or less independently of company headquarters in Berlin, they pressed ahead with the rebuilding of the company. Siemens & Halske in Munich and Siemens-Schuckertwerke, initially based in Hof and later headquartered in Erlangen and Mülheim/Ruhr, took care of the company's interests.

Given the uncertainty of the political situation in Berlin, it was decided in April 1949 to relocate the Siemens companies' headquarters. Siemens & Halske moved to Munich, and Siemens-Schuckertwerke moved to Erlangen. In both cases, secondary company headquarters were retained in Berlin.

Although domestic business gradually began to recover, sales outside Germany remained negligible. This situation only began to change in the mid-fifties, once the company had succeeded in reacquiring its expropriated foreign companies and the rights of ownership to its patents and trademarks. Siemens was then able to set up a new sales and marketing system and begin forming new companies.

Prominent examples of Siemens' expanding export business include the 300MW San Nicolás power plant in Argentina, completed in 1956, and the installation of a nationwide telecommunication network in Saudi Arabia. The company also re-established its ties with Fusi Denki Seizo KK in Japan and with Westinghouse in the United States. By the mid-1960s, Siemens had succeeded in regaining its former standing in world markets.

In 1953, Siemens researchers at the Pretzfeld semiconductor laboratory developed the zone refining method for producing high-purity silicon, which revolutionized the whole of electrical engineering and electronics. In 1965 the company presented Europe's first mass-produced integrated circuit – a key technology in many areas of modern engineering and a major driver of innovation.

Housing construction became an important focus of company welfare policy. The whole town of Traunreut was built in 1951. Just a few years later, Siemens built the first three high-rise residential buildings in Bavaria on the company housing estate in Munich. Also

during the 1950s, the company began setting up its own apprentice workshops and vocational schools offering a core instruction program, plus master courses. Later on, from 1971 onwards, company training centers were established.

### **New markets and areas of business (1966–1989)**

One of the main milestones in the company's development came in October 1966, when, in order to pool the various activities and competences of the company, Ernst von Siemens merged Siemens & Halske AG, Siemens-Schuckertwerke AG and Siemens-Reiniger-Werke AG to form Siemens AG. Prompted by the growing convergence of the power engineering and communications engineering sectors, the move helped to build a stronger position for Siemens in the global marketplace.

At the same time, the company's operating structures and organizational forms were adapted in accordance with the increased range of business. In 1969 the first basic Corporate Principles of Siemens AG came into force. They followed the contemporary trend of division into sectors and decentralization: in order to react faster and more flexibly to the wishes and requirements of customers or the market, Siemens' main business units were consolidated into six largely independent operating Groups: Components, Data Systems, Power Engineering, Electrical Installations, Medical Engineering, and Telecommunications, with five central departments to ensure consistency of company and business policy.

At the time the company had over 270,000 employees worldwide and annual sales of more than DM 10 billion.

A number of company units were managed as independent legal units, including Bosch-Siemens Hausgeräte GmbH, formed in 1967, and Kraftwerk Union AG (KWU), set up as a subsidiary of Siemens and AEG in 1969 to pool the two companies' power plant construction activities. In 1977 Siemens took over KWU completely. Siemens also engaged in numerous business partnerships with well-known foreign companies, including the Allis-Chalmers Corporation in 1978.

In 1969, Siemens for the first time made shares available to company employees at a preferential price. These were common shares, subject to a legally prescribed lockup period of five years.

Siemens has been sponsoring cultural activities since the end of the 1950s through a number of foundations and through the Siemens Arts Program, launched in 1987. The latter focuses mainly on promoting projects that advance contemporary art forms and bringing them to a wider audience within the company.

### **The age of globalization (1989– today)**

At the beginning of fiscal 1990, the operating structure and organizational form of Siemens underwent further change. The seven large business units were divided into 15 smaller entities that would be better equipped to operate flexibly and in closer proximity to the market. Within the decentralized structure the operative units were given considerably more responsibility. This created a basis for operating successfully in the marketplace in the age of globalization.

After German reunification, the eastern part of the country had to be built up as quickly as possible: within a few years Siemens took over eleven plants in the new German

states and established a number of sales locations. The opening of Central and Eastern Europe created the right conditions for a further push to expand Siemens' business activities, especially in the infrastructure segments of telecommunications, environmental protection, medical equipment and transportation systems.

From the 1990s on, Siemens changed from a company dealing mainly with public customers in regulated markets to a global competitor increasingly under pressure from the shareholders. To meet these new challenges effectively and efficiently, the company introduced programs that represented a radical change of approach, based on the strategic pillars of productivity, innovation and growth.

Asia-Pacific was recognized at an early stage as a key market: by 1997 the company was represented throughout the region with 45,000 employees, around 70 joint ventures and over 60 plants.

Siemens also continually adjusted its portfolio: 1990 saw the creation of the largest European company in the computer industry, Siemens-Nixdorf Informationssysteme AG (SNI), which in 1999 became part of Fujitsu Siemens Computers AG. Siemens was able to further enhance its standing as a leader on the world market for electrical and electronic products through the acquisition of Plessey in Britain in 1991 and Rolm in the United States in 1992.

In the U.S., Siemens also acquired Westinghouse's fossil power plant activities in 1998 with the goal of boosting earnings in the power generation sector. With the objective of building a stronger position in the U.S., the world's largest market for electrical and electronic products, Siemens successfully obtained a listing on the New York stock exchange in 2001.

Since the end of the 1990s, Siemens has been focusing even more on optimization of its business portfolio through divestments, acquisitions, the formation of new companies, and the founding of joint ventures. In addition to the spin-off of the semiconductor sector and the listing of Epcos and Infineon on the stock exchange in 1999, these steps have included the acquisition of a majority stake in Atecs Mannesmann AG, and the merging of Siemens' nuclear activities with the French company of Framatome, both in 2001, as well as the acquisition of VA Technologie AG in 2005.

To raise the qualification and motivation levels of the workforce through greater involvement in the entire business process, in 1993 Siemens launched a fitness program with the name of *top* (time optimized process). In 1998, *top* was upgraded to *top<sup>+</sup>* through the addition of specific management instruments. Siemens acknowledged its social responsibility in 2000 with its first Corporate Citizenship Report.

Siemens' 160-year history reveals how visions can become reality. Since its founder years under Werner von Siemens, a visionary inventor and entrepreneur who made an enormous contribution to technological progress in the 19<sup>th</sup> century, the company has grown into a GLOBAL NETWORK OF INNOVATION uniting over 450,000 people in more than 190 of the world's countries.