

EARLY ORIGINS OF ELECTRICITY TRANSMISSION

Although primitive uses of electricity and magnetism had been known for centuries its real possibilities were discovered in the hundred years leading up to the last quarter of the 19th century. Names like Benjamin Franklin, Michael Faraday, James Watt, Luigi Galvani, Nicola Tesla, and Alessandro Volta resonate from the schoolroom, as the men who uncovered the secrets of electricity and interpreted it for use today.

Two men took these discoveries a stage further and invented the technology of the electrical supply industry as we know it today, Thomas Edison and George Westinghouse. Both men were engineer entrepreneurs. What they did seems primitive today, but it was the work of genius and lead to some of the greatest engineering creations of history. Yet these two men disagreed on a fundamental issue, the use of direct current (DC) or alternating current (AC).

In 1878 a British scientist, Joseph Swan invented the first incandescent filament lamp and a year later Thomas Edison made a similar discovery in the United States. Edison had also invented a DC electricity generator, the phonograph, an improved printing telegraph and numerous other devices and technologies. Swan and Edison set up a company to produce the first marketed filament lamps and on

September 4, 1892 the first New York Street was lit with electric lamps, powered by Edison's Pearl Street Power Station. 85 customers in lower Manhattan received enough power to light about 5,000 lamps. Edison had pioneered the concept of supplying power from a central generator via a distribution system to multiple end users.

The turning point of the electrical age came a few years later when in 1895 George Westinghouse opened the first major power plant at Niagara Falls using alternating current. With AC current power plants could transport electricity further than before. While Edison's DC plant at Pearl Street could only transport electricity within one square mile of Manhattan, Westinghouse's AC plant at Niagara could transport it 200 miles.

What Edison had done with his central-station system was to incorporate the natural geography, with its coal and water supply and the human geography with its load or demand, also taking advantage of the financial resources available in New York City. Within a short space of time similar central-station systems made their appearance in other American cities, but New York remained the largest. This helps companies and countries evaluate how the electricity transmission and distribution networks will evolve to cope with ever rising demand.

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