



## Nikola Tesla and the AC revolution

In 1876, Nikola Tesla of Croatia, during his senior year in college, observed a Gramme machine (a DC generator that could also work as a DC motor). He observed the sparks generated by the commutator and brushes. It disturbed him. And he correctly concluded that this was a very inefficient way to generate or use electricity. So, he talked to his professor about a possible way to power a motor with alternating current. And what did his professor do? He spent the next lecture ridiculing young Tesla's new innovative idea. He reasoned that it would be a perpetual motion machine and therefore impossible to make!

But this did not dampen young Tesla's spirit. He was undaunted and he waited patiently since he strongly believed in his idea. In 1881, he took up the problem again and cleverly figured out a way to eliminate the commutator and brushes. How?

By running two or more out-of-phase alternating currents through stationary coils on the periphery of the rotor, he could create a rotating magnetic field that would cause the motor to rotate.

Having done his prototype experiments he took up work at the Continental Edison Company in Paris with the hope that such a big company would help him give birth to his idea. So, he tried hard to create an interest in his bosses. But bosses are bosses after all! And needless to say he failed, as expected.

In the meantime, Edison was already quite busy installing DC electrical systems around the world and had a great dislike for AC. It is understandable and he should not be blamed for this. This problem happens to most visionaries and geniuses. They so strongly believe in their own ideas that they start disliking other ideas that directly compete with theirs. For example, Einstein disliked the 'probability' part of Quantum Mechanics and equally disliked the concept of 'reversibility' of time.

But Tesla, like all good engineering innovators, wasn't disturbed by this. Notwithstanding, Tesla came to the US (like most bright people across the world do now) in 1884 and directly worked for Edison again hoping that the great Edison would understand and accept his idea. But what would happen when two great stars start working together? You got it right! They naturally fell out.

So, Tesla had to begin his own company called The Tesla Electric Company. Ironically, his company was located a few blocks away from Edison's famous company. There he devoted his time perfecting the devices that convert high voltage AC to low voltage AC like motors, transformers and dynamos.

Having perfected his devices, in 1888, Tesla tied up with George Westinghouse, the inventor of the air brakes for trains. Now he found an innovative person with money to support his ideas. Westinghouse was convinced with Tesla's idea of transporting electricity over long distances with little losses – combining dynamos and transformers.

But when Edison came to know of it he realized the competitive threat to his own flourishing business with DC. He then waged a virtually war campaigning against the dangers of high voltage AC and wanted to instill fear in the minds of the users. To underscore the dangers of using AC he developed an AC electrocution system that was tested on animals. Strangely, the demonstrations appealed to legislative bodies and soon New York adopted electrocution as an excellent method to carry out death sentences. Unwittingly, Edison committed a crime that took us years to eradicate from our society.

But nothing can stop an idea whose time has come! Despite the high voltage marketing warfare, Tesla's idea prevailed. And thanks to Tesla's perseverance and determination we today enjoy the benefits of AC power. He ultimately succeeded in changing our world in a positive manner.