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NIKOLA TESLA: THE NIAGARA FALLS PROJECT THAT POWERED MODERN CIVILIZATION

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Abstract: The brilliant mind of Nikola Tesla still leaves people breathless who take a deeper interest in his character and work. He managed to realize his visions from his childhood, about a big wheel driven by water, just at Niagara Falls. In this way, the largest hydroelectric power plant in the world was created in the 19th century. Tesla's polyphase system won a convincing victory over the proposed direct current systems, thus achieving a big step towards the development of modern civilization and the use of renewable energy sources.

Keywords: alternating current; war current; Serbian scientific heritage

Niagara Falls is located on the border of the United States of America and Canada. Because of their attractive appearance, they attract a huge number of tourists every day who enjoy the view of one of the most beautiful natural phenomena. Niagara Falls includes three separate waterfalls that together form the waterfall with the highest water flow rate in the world. The statue of the Serbian scientist Nikola Tesla (Figure 1) attracts the attention of many visitors, whose alternating current system enabled this place to become the most famous and largest producer of electricity in the 19th century.

In 1882, the world's first small-scale hydroelectric power plant was constructed in Appleton (USA), which relied on direct current systems. Great scientists of the time, such as Thomas Alva Edison and Joseph John Thomson, were supporters of direct current. Although Nikola Tesla tried to highlight his discoveries and explain how superior the use of alternating current is compared to direct current, his findings were not so easily accepted. Many tried to discredit him and therefore Tesla bravely started the "war of currents" [1].

Nikola Tesla first heard about Niagara Falls in his elementary school in the village of Smiljan (today's Republic of Croatia). Even back then, he presented his idea of a big wheel driven by waterfalls to his uncle with the promise that one day he would go to that distant America and put it into action [2]. This knowledge is only one of the indicators of the greatness of this Serbian scientist.

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Figure 1. Monument to Nikola Tesla near Niagara Falls [1]

At the end of the 19th century, an international commission was established, consisting of the most famous scientists and experts of the time. The commission's task was to study and find the best solution for using Niagara Falls, both technically and economically. The alternating current technology that emerged from Tesla's polyphase system won the most beautiful and convincing victory over the direct current technology.

A member of the commission, Professor Georges Forbe, said the following on this occasion: "Most of you will be very surprised, as I was when, after a prolonged and impartial study of the problem, I came to the conclusion that the only practical solution and the best for the new industrial town to be built near Niagara, consists in the adoption of alternating current generators and motors. The only asynchronous motor that meets practical needs is the Tesla motor, which was constructed in the Westinghouse factories

[1]Figure is available at: https://emerging-europe.com/culture-travel-sport/who-owns-nikola-tesla/attachment/niagara-falls-canada-oct-28-2019-monument-of-nikola-tesla-at-niagara-falls-ontario-canada/

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and which I personally subjected to various tests in the workshops located in Pittsburgh. This is a motor without commutators, without brushes and without collectors." [3].

The delivery of electrical installations for the Niagara plant was entrusted to Westinghouse in 1891, and the entire plant was officially put into operation in 1896.

Thomas Edison's General Electric Company was responsible for building long-distance transmission lines. Edison considered this a humiliating defeat, given that his preferred system of direct current could not be transmitted over long distances. In this "war of electricity", Tesla won, and we all benefit greatly from that victory to this day.

Tesla did not visit the power plant for the first time until July 19, 1896, because he was busy with other inventions, such as the transformer, which solved one of the most difficult problems in electrical engineering.

Nikola Tesla is also remembered as a symbol of perseverance, courage, and faith. With his discoveries, he contributed a lot to modern civilization and showed how it is possible to use natural resources without destroying them.

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