

How far can you take and apply wireless power transfer?

Ari. F Amromin

The Colligate School at Florida State University Panama City

Abstract

Wireless power transfer is becoming a more common technology by the year. This begs the question; just how far can we take Wireless power transfer? Will we one day be able to use it to power entire rooms, buildings, cities? Probably not but just how far can we realistically take and apply wireless power transfer?

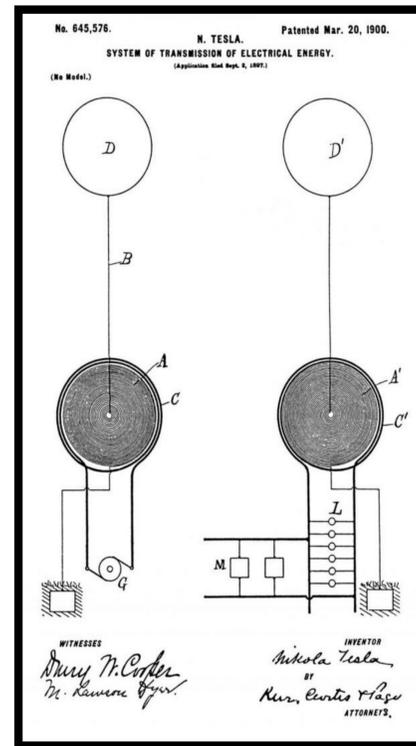
Background

The main principle of wireless power transfer, electromagnetism, was discovered in the year 1826 by Andre-Marie Ampere (Rahman et al., 2024). Andre-Marie Ampere experimented and found that two wires that are parallel to each other could either attract or repel each other depending on their direction and location. This idea was then greatly expanded by Nikola Tesla in the 1880's when he did many experiments that had to do with electromagnetism (Liu et al., 2024, p. 0). For example, in one experiment he used a resonant circuit to send power to a small light that was in a tree using electromagnetic waves (Rahman et al., 2024). From this point on, wireless power transfer has been constantly evolving to the point that it is now where it is able to power phones and cars.

But how farther can we take this seemingly magical technology?



(Barman et al., 2015)



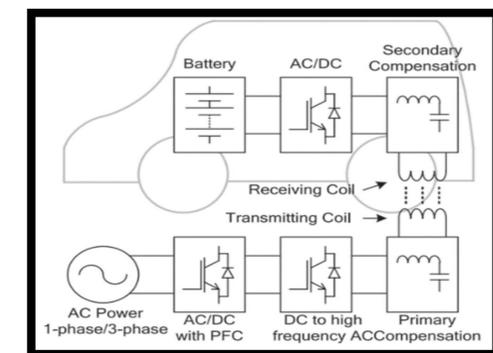
(Waveguide.blog 2026)

Results

It appears that wireless power transfer will be used in almost every type of technology in some way shape or form. Research is being done to apply wireless power transfer to the medicinal fields to more easily power medical implants. They are also researching how to power all types of vehicles with WPT like boats and cars, however there are varying levels of success to these test due to how the transmitting and receiving systems need to line up in order for optimal power transfer. In terms of calculating the cost to use WPT for a whole office building, there are a lot of variables that could change the price but a rough estimate is around 25 million to 50 million dollars so WPT will likely not be used for this.

Discussion

It appears that wireless power transfer will most likely become a common occurrence in small applications such as wireless chargers or wireless application powering. We are already seeing this type of technology start to show up more and more with things like wireless phone chargers and experimental wireless vehicle chargers. However, it is likely that the use of wireless power transfer will not scale past something like wireless vehicle charging. There are too many safety risks associated with making such a big magnetic field and it could interact negatively with people who have special medical devices such as pacemakers or if the wireless power transfer system was big enough it could theoretically mess with a planes navigation services which is a huge problem.



(Md Mahidur Rahman et al., 2024)

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