The Societal Impact of Wireless Power Transfer

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**Abstract:**

This paper is about the societal impact of wireless power transfer. The first part of this paper is about low frequency waves in Inductive coupling. The second part is about high-frequency waves, like microwaves, in Radiative technology.

**Low-frequency impacts:**

Have you ever tried to find plugs for your phones and your computers while all the plugs have been used by other people? It is really a disappointed and annoying thing, especially for college students. There will never be enough plugs for all the students in one class because it needs too many plugs and it is silly to put all the plugs in a classroom. However, what if I tell you, your phones and your computers and any other electronic products of yours can be charged without wires. All the students will never need to worry about losing power of their computers while taking classes because their products will under charging at the same time while they are using. Tens or hundreds products, as long as you are in the charging area where can be a classroom, can be charged at the same time without wires.

People are always busy today. Sometimes you just back home from your company. You are really tired and you fall asleep in a second, forgetting to charge your phone. As a result, your phone is dead in the morning. At that moment, you may think it will be great if phones can charge themselves, which WPT can help with.

AC generators and transformers build our today’s power transfer system, making fewer wires and long-distance transmission possible. If we use DCs, there will be further more wires. The whole city will be covered by wires and loud sound of generators. This is because the DC can not be used for voltage transforming. As a result, the distance transmission will be limited and to solve this problem, we will have to build a power generator in each block. More generators mean more wires and more wires mean more dangerous, for example, wires aging and power leaking.

Despite the fact that we have AC system and fewer wires, there are still wires which means potential dangerous is still there. The possibility is smaller but never 0. Moreover, since we have to use wires, we are limited by wires. Where wires can not go is where power can not go, like mountain areas and space areas. WPT will solve these problems. No wires, no limited.

**High-frequency impacts:**

There are two technologies used in WPT. One is called Inductive coupling and the other is called Radiative technology. Inductive coupling is most widely used technology in WPT. However, the problem of Inductive coupling is its transmission distance is so limited for fast decay of energy.

One way to solve the distance problem is taking advantage of higher directivity of high frequency waves. We can collect energy together and send them into target direction instead of 360’ round so that only target can receive energy and others can’t, which can instantly increase transmission distance. However, high frequency waves have their own problems.

Unlike low frequency waves which we use by inductive coupling, high waves have better directivity than low frequency waves [1][2][3][4], which means it will be like a laser pointer. If it is blocked or it is not aiming at the target, the target will not get any energy at all. The navigation must be quite accurate and can follow the target’s moving actions. To meet this requirement, we have to improve our GPS system. As a result, public traffic navigation will get a big jump. Electrical cars can be located in real-time and be charged by radiative technology. Without worrying about losing power, fuel cars can be replaced by electrical cars. By using green resource to generate power, we will reduce pollution caused by vehicles, making environment better [5].

High-frequency waves have more energy than low-frequency waves. Like a laser, they can burn things and have radiation. Also, they can cause health damage to human bodies.

1. The electromagnetic radiations can be absorbed by water-based bodies such as humans, and animals, so electric currents can be produced inside the cells that formed like these bodies [6][7].

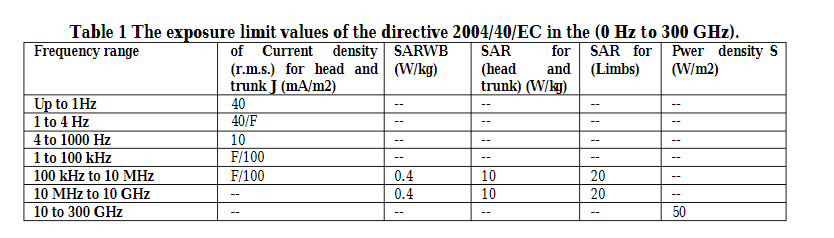


Table from [6]

1. The radiation of high frequencies signals i.e. the fast moving particles obtrudes a cell with sufficient energy to hit electrons from molecules that frame the cell [6]. This may cause broken DNAs and cancer [7][8][9][10].
2. Different levels of stress have different impact on avian diversity. Habitat type, proportion of vegetation cover, exposure to electromagnetic radiation are the possible potential root of stress in this particular instance [11].

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