

الآثار الخطيرة للنيار الكهرومغناطيسي وتلوث الغازات الدفيئة

DANGEROUS EFFECTS OF ELECTROMAGNETIC & GREENHOUSE
GASSES POLLUTION ON THE LIVING ORGANISMS AND
THE ECOSYSTEM AND HOW TO REDUCE IT BY USING
ALTERNATIVE SOURCES OF ENERGY

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ملخص باللغة العربية

الآثار الخطيرة للتيار الكهرومغناطيسي وتلوث الغازات الدفيئة على الكائنات الحية والنظام البيئي وكيفية الحد منه عن طريق استخدام مصادر بديلة للطاقة - الهدف: تقليل التلوث الكهرومغناطيسي والغازات المسببة للاحتباس الحراري باستخدام تجربة هيرتز والمصادر البديلة للطاقة. -المواد المستخدمة: (أسلاك نحاس- السلك الهوائي - مكثف (كهرباء) - لوحة الدارة المطبوعة).

-الأساس العلمي: تجميع الأشعة الكهرومغناطيسية (بروتونات وإلكترونات) باستخدام السلك الهوائي وتخزينها في المكثف، والمكثف يقوم بتقسيمها إلى جزء موجب وجزء سالب؛ ومن ثم يخرج البروتونات والإلكترونات في صورة كهرباء كما في تجربة هيرتز.

-النتيجة: من خلال هذا الأساس العلمي توصل البحث إلى أنه يمكن امتصاص الموجات الكهرومغناطيسية؛ من أجل توصيل الكهرباء بدلا من حرق الوقود أو ترك الإشعاع الكهرومغناطيسي الضار للحد من انبعاث الغازات الدفيئة التي تسبب الاحتباس الحراري.

Goals:

The goal for this research is to reduce the electromagnetic and greenhouse gasses pollution by using Hertz's experiment and alternative sources of energy.

Keywords:

(Electromagnetic pollution - Greenhouse gasses - Hertz experiment - Capacitors - Air pollution - Alternative sources of energy)

Problem to be solved:

Technical devices have become a source of omnipresent electromagnetic emissions and subsequent electromagnetic radiation from induced electromagnetic fields, Electro-magnetic pollution is a serious type of pollution that is produced daily and neglected by most of the countries and it can make a great impact on all living organisms, this kind of pollution can have severe results due to the continuous emission of electromagnetic waves and the continuous exposure to these kinds of . It has been known that high energy microwave radiation which is between 300 GHz to 300 MHz can be carcinogenic and could have a thermal effect on the exposed living organisms. Greenhouse gasses is also another type of pollution that causes severe damage to the pollution and the human beings, as we all know, carbon dioxide is being produced and increased exponentially on a daily level. Even though it is produced for a noble purpose which is gathering energy, it makes a huge impact on the community and the environment as well, and the only way to prevent this from happening is by using our alternative sources of energy to reduce the damage done by the other sources of gathering energy. Both types can be solved by a common solution which is using Hertz's experiment. There was a lot of help we used from the second semester's L. Os that was related to our research. In Chemistry we used L.O 11 & 15 which discussed different types of classifying chemical reactions, in Physics there were L.O 10 & 11 which discussed the thermal energy and temperature in addition to understanding energy graphs and in Biology we used L.O 12 which helped in identifying the major consequences of these problems that can affect the ecosystem and all living organisms.

After these L.Os and prior researches been reviewed and knowing their strengths and weaknesses and after doing some researches we found out that if we modified Hertz's experiment which is described in figure (1)

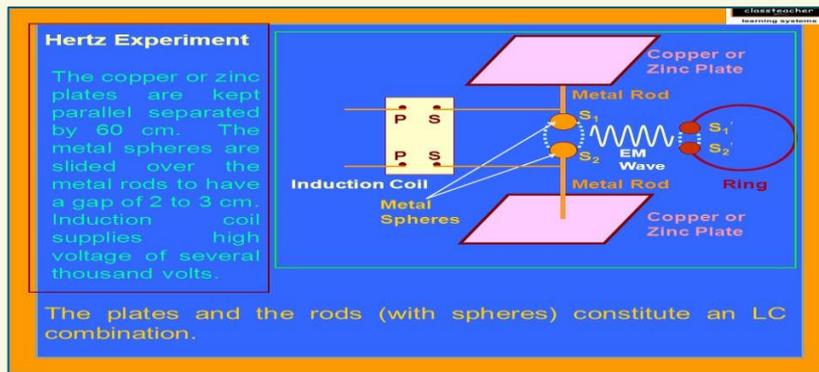


Figure (1): shows a small description to hertz's experiment.

we could extract energy while reducing the electromagnetic waves by using the electromagnetic waves and collecting using an antenna and saving it in a capacitor to be produced later on in the form of electricity as shown in the diagram at the figure (2).

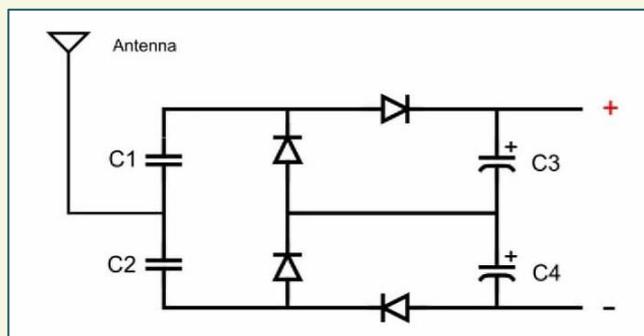


Figure (2): shows a simulating circuit to become a solution to overcome the problem.

This might be the best solution as it reduces the number of electromagnetic waves that can be harmful to all living organisms and replace it with energy which can also reduce the amount of burning fossils and greenhouse gasses and can benefit all living organisms by providing less pollution.

▣ Procedures:

In order to identify the problem and understand it from different aspect we had to review some prior researches and we conclude them by describing each one's strengths and weaknesses.

▣ The Influence of Electromagnetic Pollution on Living Organisms:

this research helped in identifying the problem which was able to provide some information to know the harmful effect of the electromagnetic waves (radiation). The hypotheses that were stated at the research provided us to get to know the strength and the weakness which are, strength: (it provides with the ambiguous information about the safety of electromagnetic fields and/or electromagnetic radiation, it provided us also with the conclusion that has been found such as that children exposed to higher intensity

magnetic fields had a slightly higher risk of contracting leukemia than children who were not exposed to it and Other examination results reported and published in the literature were carried out among Swiss railway workers and suggested endocrine system disorders in many cases), but it also had some weaknesses which are (not providing all the information about the harmful effects on the environment and the living organisms, not providing the uses of electromagnetic wave).

Electromagnetic Waves and Human Health:

this research was helpful in many ways as it made us identify the form and the properties as shown in figure (3) and its major impact of the electromagnetic waves on living organisms.

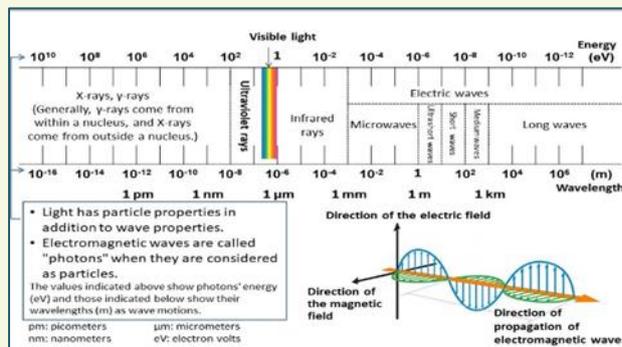


Fig (3): shows a simple explanation of the structure and the properties of the electromagnetic waves.

some information that made a great impact on this research, it showed some major points about the health of humans and other organisms. most importantly is to identify the strength of the research to follow and the weakness to avoid which are strength: (it showed how would the electromagnetic waves on a high cellular level affect the human health especially the RNA and the DNA, and the importance of not getting to close to the cellular phone due to the fact that it emits a low amount of electromagnetic waves which might have a slight effect on the human health) weakness: (not showing enough scientific proofs for the information).

The influence of carbon dioxide on brain activity and metabolism in conscious humans:

The third research was debating the second problem which is the increase of the ratio of the greenhouse gasses as carbon dioxide in air due to the continues harmful ways of collecting energy and its consequences on the human health and it explains how it would affect the brain activity and metabolism

The strength of this research is that it contained specified information and the prove to assure these information was given as well which helped us a lot, but the weakness was that some of its medical terms explained so we had to make more searches to identify what does it mean.

☐ The Effect of Greenhouse Gases on Earth's Temperature:

this was the title of our fourth research to use in order to identify and understand our second problem better which is the effect of the greenhouse gases on global warming. This research concluded that global warming is a serious problem that affects each part of the Earth. One of its main visual problems is that it melts the glaciers at the poles of the Earth which affect the animals, plants and it majorly affects the ecosystem which can affect other related stuff like the community, biome, and even the biosphere. It also stated that global warming needs to be solved and stopped as soon as possible. When it comes to the strength of this research there are many but the most important of them are: (it showed us the consequences of the global warming and the spread of the greenhouse gases, and it also showed us the concentration of the greenhouse gasses by the time it was published, but after doing some search we were able to get its concentration by 2020 as shown in figure (4)

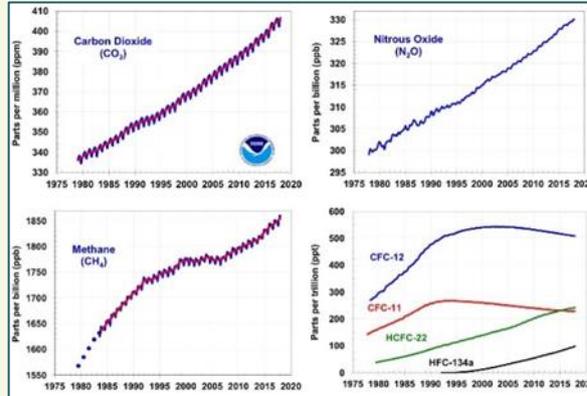


Fig (4): shows the concentration of the greenhouse gasses over the past few years.

The weakness of this research was: (this research didn't show any way for solving this problem or helping in its solution).

☐ Greenhouse Effect: Greenhouse Gases and Their Impact on Global Warming:

This was the fifth and last research that has been used in this research. This research started a very important information as it said "Without the greenhouse effect the Earth's average global temperature would be much colder and life on Earth as we know it would be impossible" which means

that without the greenhouse gasses it would have been impossible to live on earth as it blocks the infrared radiation to escape from the Earth's atmosphere, so it means that there are advantages from the greenhouse gasses, but it also concluded that the much greenhouse gasses exist in the Earth's atmosphere the worst it is for us as it melts the glaciers and affects all living organisms and the ecosystem. This research mentioned many important information which concluded radiation absorption and emission by greenhouse gasses as shown in figure (5):

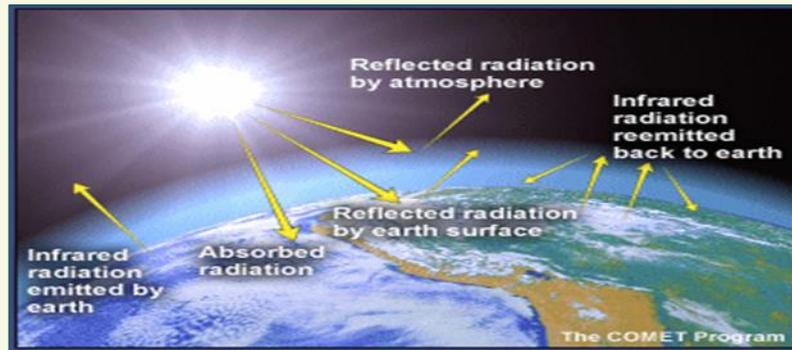


Figure (5): shows the radiation absorption and emission by greenhouse gasses.

After all this research had strength and weakness points which can be concluded in strength (it showed various ways and sources of emitting the greenhouse gasses, it showed some advantages

of greenhouse gasses and it showed some recommendations on solving the problem), weakness (it didn't show all specific information about the nature of these gasses and its radiation).

Materials & methods:

In order to achieve Hertz's experiment, we've chosen these materials to be used for the best outcomes with the lowest price and the safest for the environment.

The method of working is by connecting the copper wires, the antenna, and the capacitors to the circuit board so that the antenna could gather the electromagnetic waves to and

transmitted to the capacitors via the wires and the circuit board. After the

Capacitors: to store the gathered energy.	
Copper wires: for connecting the circuit	
Circuit board: to work as a medium for the passage of the electrons and connecting the circuit	
Antenna: to receive the electromagnetic waves.	

capacitors gather the electromagnetic waves it emits it into an electric charge as showed in figure (1) & (2).

■Solution of the problem:

This research shows a connection between chemistry, physics, biology and English to find a possible solution for the problem with the lowest cost possible. After reviewing these subjects and doing some researches we've found hertz's experiment which proves the existence of electromagnetic waves and after modifying by using the previous (Materials) the idea of the experiment it was found that it was possible to use and absorb electromagnetic waves in order to conduct electricity rather than burning fuels or leaving the harmful electromagnetic radiation. By this way it would be possible to reduce the normal Earth's temperature, but not with a high rate so that it would be possible to live in the new environment and also not leaving it so high that it would melt the glaciers and it is also possible to change the form of the harmful electromagnetic radiation into useful form of energy as electricity and it is considered to be free source of alternative energy and after more research it would be a perfect opportunity to apply this idea on the real life and saving the eco system from these dangerous pollution.

■Literature cited:

- 1) Ozdemir, F., & Kargi, A. (2011). *Electromagnetic Waves and Human Health. Electromagnetic Waves*. doi:10.5772/16343
- 2) Darkwah, Odum, Addae, Koomson, Kwakye, Ewurabena,, Asenso, Buanya (2018/Feb/15). *Greenhouse Effect: Greenhouse Gases and Their Impact on Global Warming. Journal of Scientific Research & Reports*. DOI: 10.9734/JSRR/2017/39630.
- 3) Xu, F., Uh, J., Brier, M. R., Hart, J., Yezhuvath, U. S., Gu, H., . . . Lu, H. (2010). *The Influence of Carbon Dioxide on Brain Activity and Metabolism in Conscious Humans*. *Journal of Cerebral Blood Flow & Metabolism*, 31(1), 58-67. doi:10.1038/jcbfm.2010.153
- 4) Zein, A. L. (2015). *The Effect of Greenhouse Gases on Earth's Temperature*. *International Journal of Environmental Monitoring and Analysis*, 3(2). doi: 10.11648/j.ijema.20150302.16
- 5) Redlarski, G., Lewczuk, B., Żak, A., Koncicki, A., Krawczuk, M., Piechocki, J., . . . Gradolewski, D. (2015/feb/25). *The Influence of Electromagnetic Pollution on Living Organisms: Historical Trends and Forecasting Changes*. *BioMed Research International*, 2015, 1-18. doi:10.1155/2015/234098
- 6) (n.d.). Retrieved May 01, 2020, from <http://hyperphysics.phy-astr.gsu.edu/hbase/FrHz.html>

- 7) Jane B, Lisa A, Michael L, Steven A, Peter V, & Robert B.(2011) *Campbell biology*: Library of Congress (ecology)
- 8) (Steven S.Zumdahl – Susan A. Zumdahl), *zumdahl chemistry*, BROOKS / COLE
CENGAGE LEARNING ,2014 (exothermic and endothermic).
- 9) Walker, J., Halliday, D., & Resnick, R. (2014). *Halliday & Resnick principles of physics*.
Hoboken NJ: Wiley (temperature and specific heat)