THE END OF THE CULTURE OF CO_2

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Abstract

Our civilization has come to a point that we could define as a point of no return. Development based on the production and consumption of energy from fossil fuels has led to the increase of carbon dioxide, which in turn, has contributed to the rise in temperatures and acidification of the seas. This is causing climate change which can drastically alter the conditions of life on our planet. To alleviate this raised the possibility of reducing the emissions of CO2 gas through different techniques such as the kidnapping of the gas. On the other hand, environmentalists press so that it emphasizes the use of so-called green energy from renewable energy sources. The dilemma is to continue with the current model of development or investing in new technologies that are currently more expensive than the traditional ones. Do we put an end to the empire of the CO2, or do we continue until we reach the point of no return?

Keywords: *Carbon Dioxide, Renewable Energy, Pollution*

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1. INTRODUCTION

For many millennia, the development of cultures has been based on the intensive use of combustion. As cultures progressed, they became more sophisticated and needed more fuels. The development of pottery, construction and metallurgy caused the desertification of large forests, causing drastic changes in ecosystems. From the 18th century on with the use of coal, and the creation of boilers and steam engines, the industrial development and series production accelerated significantly the consumption of fossil fuels, which increased the production of CO_2 and the urban and industrial pollution. The 19th century saw the creation of the first internal combustion machines that consumed gasoline and diesel. These machines in the twentieth century caused the explosion of trade, cities, mass transit and pollution on an unprecedented scale. Flue gas emission has been accelerated in recent decades, causing climatic changes shaped by the increase of the so-called greenhouse gases. Changes that threaten the same survival of the human race on this planet.

It is time for us to change paradigms. Because we cannot continue consuming coal, petroleumor natural gas to continue producing the energy needed by our civilization.Our world consumed in 2013, 23,322TWh, equivalent to 13,541 million tons of oil for electricity, of which 41.3% were produced from carbon, 21.75% of natural gas, 16.3% for hydroelectric sources, 10.6% nuclear,4.4% petroleum and only 5.7% by renewable sources, as the wind, geothermic and solar energies. These figures contrast with the immense potential of solar energy, since on average a total of 120 x 10^3 TW hit the Earth at all times, of which photosynthesis consumes only 90 TW of total. The reason that solar energy, and renewables in general represent a small fraction of the production of energy in our world has nothing to do with its potential, but with their cost. In 2002 the cost of production of electricity from solar energy in the United States ranged between 25 and 50 cents for each kWh, compared with the oil cost that was between 6 and 8 cents or coal at a cost of between 1 and 4 cents, which represents a difference of more than 1200%.However, in 2014 the photo voltaic solar energy (FV) mark a hit with and estimated of 40GW installed, which gives a world total of 117 GW [8]. In accordance with (IRENA), between 2010 and 2014 the total cost of the photovoltaic plants has decreased between 29 and 65% and therefore the cost of electricity for this technology has been decreased to a half, so the photovoltaic projects are supplying electricity a 0.08 dollars per kWh without subsidyin in comparison with the cost of 0.045 to 0.14 dollar per kWh for the energy produced by fossil fuels [7].

On the other hand, at the end of 2013, the amount of proven global reserves amounted to 170,800 million tons of oil, and the total amount existing to 408.2 million tones. Lately has been received with great joy the discovery of vast reserves of natural gas in the so-called bituminous schists, the so-called oil shale, so it is expected that this fuel will last one hundred to two hundred years more [11]. This is, however, bad news for those who advocate for clean energy.

Despite the exorbitant difference in output prices, the interest in clean and renewable energies has increased due to the growing interest in mitigating the environmental effects of burning fossil fuels. Unfortunately, the evidence suggests that renewable energy may not play a significant role in the future in the production of electricity around the world unless our civilization develops mechanisms which dramatically decrease their production costs, which in turn can only be granted if the companies count with the support of Governments, in order to cut the cost.

1.1. The Greenhouse Effect

Climate change and human carbon dioxide production appear to be a fully related phenomena. The high levels of the carbon dioxide in the atmosphere are altering the atmospheric and ecological balance of our planet. Carbon dioxide (CO_2) is created, when something is burned or consumed. For example, carbon dioxide is formed when we drove cars that consume gasoline. Carbon dioxide is also formed when burning wood, coal or waste to produce heat or electricity. While we use more heat and more cars we drove, the greater the carbon dioxide we produce.

This increased amount of carbon dioxide in the atmosphere is effectively preventing heat from escaping from the Earth's atmosphere into space. This is called the greenhouse effect.

Everything on earth depends on the earth's atmosphere. The most important gases that absorb radiant energy are water vapor, carbon dioxide, methane and nitrous oxide. Without these, the land would remain in the ice age. Greenhouse gases, as these gases are also called, are an important natural part of the Earth's atmosphere.

Since we started to use coal, oil and natural gas, the amount of carbon dioxide that is being released into the air, has increased. There is also an increase in the amount of methane in the atmosphere that comes from things such as coal mines, paddy fields and the dunghills (or State landfills where trash is reduced).

The greenhouse effect causes that the world's climate change, which becomes warmer, therefore, in the North and South poles ice begins to melt, there are more storms, and the climate is irregular.If we appease this dangerous shift in climate, we must stop the sources of emissions of this gas, but this may lead to unprecedented economic and energetic chaos, given our dependence on fossil fuels at the same time.The more we soon break the habit of using fossil fuels, the sooner we will be able to deal with the problem of climate [1].

2. REMOVAL OF THE CO2\

In recent times, it have been discussed and employed various strategies to trap and keep frozen carbon dioxide, as ways to combat climate change, or even as a solution that allows our civilization to continue using fossil fuels without restrictions.A way to solve the problem of too much CO_2in the atmosphere is finding a way to store it, kidnap it, or dispose of it.There are certain sinks that remove part of this gas like the oceans, in which the levels are increase.Currently, there are new methods, some still in research, for depositing CO_2under the deep floor, in the geological layers. For example, in the porous layers of sand tightly closed that already exist in the empty fields of petroleum I, at the bottom of the sea or under the Earth's surface [2].

Carbon capture has the potential to reduce more than 90 per cent of emissions from the certain sources that emit it. Stationary power plants that burn fossil fuels, such as electricity or cement plants, would be candidates for this technological approach.Instead, capture carbon dioxide from small mobile sources such as cars, would be more difficult. But as power plants that consume fossil fuels are responsible for 40 per cent of global emissions of carbon from such fossil fuels, the potential reductions would have significant positive effects.

The years ahead will be the key to analyze and see if these CO_2 capture and sequestration techniques are effective and we will see the light of massive, effective and commercial processes to send this gas to deep geological formations.

3. PHOTOSYNTHESIS

Another way of sequestering CO2 is using photosynthesis. Indeed, there are many technologies that have appeared for biofuels or from photosynthetic processes that operate on our planet. Unfortunately they were chosen to produce sugarcane and corn as the main sources to generate fuels, and these affects global food. A process that seems more promising is algae.Keep in mind, that life on our planet is mainly maintained by photosynthesis carried out the algae in the aquatic environment, and the plants, which have the ability to synthesize in the Earth's environment, organic matter(essential for the constitution of living beings) from the light and inorganic matter. In fact, each year the photosynthetic organisms sets in the form of organic matter around 100,000 million tons of carbon.Thealgaedo not have effect on the price of food and the pollutant gases become fuel. Algae are the main producers of organic matter from inorganic in the sea, and a main part of the food chainsessential (current of energy and nutrients between species)[1].Algae and plants are the primary producers of organic matter, responsible for capturing solar energy and generate oxygen, a "waste" that has allowed nearly all terrestrial organisms take advantage of the aerobic metabolism. The Earth's atmosphere, with its unique composition rich in oxygen, is a consequence of the photosynthetic process carried out by cyanobacteriaover 1,500 million years. Even today, the cyanobacteria are the most abundant photosynthetic organisms of the Earth (a liter of seawater contains 100 million of these cells). Cyanobacteria, traditionally called blue algae, or blue-green algae are the only group of prokaryotes organisms(single-celled beings without differentiated cell nucleus) that has been traditionally included under the concept of algae. In addition to generating oxygen, algae stand out for their food properties, moisturizing, antioxidant and regenerating, numerous genera of algae are investigated by the cosmetic and pharmaceutical industry for their potential health benefits. But algae are also a source for producing biofuels (bioethanol, biobutanol and biodiesel) which arouse greater interest: its mass production would have no bearing on the price of food as with the cereal crops and other plants, while can grow ten times faster than vegetable crops and extract a higher energy yield from the same mass.

Also the methods of using sluiceways with large crops of algae that capture carbon dioxide and emit oxygen would be

possible, for example, to place seaweed plants to kidnap along with industries polluting carbon dioxide and convert harmful gases in raw material to produce nonpolluting biofuels. Given its potential advantages, the cultivation of algae for biofuels sector interested in start-ups; public and private research centers and even government agencies.
Achieve an adequate, economical and viable formula for the production on a large scale, resulting fuel could be used to propel all kinds of vehicles; especially noted the interest between the aerospace industry to build aircraft capable of flying with biofuel.

3.1. Artificial Photosynthesis

The secret of clean, cheap and inexhaustible energy may be found in artificial photosynthesis. Scientists worldwide are trying to reproduce in the laboratory the photosynthesis process, if they succeed, it could serve to generalize an ecological energy system based on hydrogen and solar, capable even of combat the effects of global warming by reducing the carbon dioxide (CO_2) from the atmosphere. **Photosynthesis** (from the ancient Greek *φώτο* [*Photo*], 'light', and *σύνθεσις* [*synthesis*], 'composition') is the conversion of inorganic matter into organic matter due to the energy that provides light. In this process light energyis transformed into chemical energystable, adenosine triphosphate(ATP) being the first molecule in which chemical energy is stored. Subsequently, the ATP is used to synthesize organic molecules of greater stability. The term *artificial photosynthesis* is applied to those processes that inspired in natural photosynthesis, looking to use solar energy to produce other types of energy can be exploited by man in a clean and efficient manner, in such a way that an "artificial plant" that is capable of storing energy in the form of organic compounds from oxide carboxylic and oil can be made in the future. This makes artificial photosynthesis an attractive technology not only from the practical and economical point of view, but also from the ecological point of view, because it could potentially help to mitigate or reverse some of the adverse effects caused by the consumption of fossil fuels such as global warming.Thephotosynthesisis a process essential to life on Earth, since it allows to plants, algae and some bacteria use sunlight to turn water into oxygen and hydrogen. This last element reacts with CO_2 and helps synthesize carbohydrates, which are used by these organisms store energy [20].

Currently, there are a number of chemical projects on artificial reproduction of photosynthesis, intending to capture solar energyon a large scale in a not-too-distant future. While still has not been synthesized an artificial molecule capable of lasting polarizedduring the time needed to react usefully with other molecules, the prospects are promising, and the scientists are optimistic.

If plant is changed by, for example, hydrogen car, the system could serve to generate energy ecological and cheaply.The importance of artificial photosynthesis from the economic point of view is that it is a technology (or rather a series of them) that could reduce the costs of producing electricity from solar energy in a meaningful way, since it aims to produce electricity not only efficiently, but also cheap [12].

4. SOLAR ENERGY

Solar energy is the energyobtained from the exploitation of the electromagnetic radiation from the Sun.The solar radiationthat reaches the earth can be harvested using different technologies (photovoltaic cells, heliostats, thermal collectors) that transform it into electrical or thermal energy. Is one of the so-called renewable energyor clean energy.

This renewable energy is usedmainly for two things, although they are not the only ones, first to heat things such as food or water, known as solar thermal, and the second to generate electricity, known as *solar photovoltaic*. The main devices used in solar thermal energy are water heaters and solar stoves.To generate electricity we use solar cells, which are the soul of what is known as solar panels, which are responsible for transforming it intoelectricity.Its uses are not limited to those listed here, other uses of solar energy are: drinking water, solar heaters, drying, evaporation, distillation, refrigeration.

As you can see, applications that can be given are very wide, and every day are finding new technologies to be able to take advantage of it. Within renewable energies are more used, solar is the most important so far, with investments in technology and million-dollar facilities. Dozens of solar farms around the world are built to generate hundreds of megawatts of electricity, which is generated electricity from green or clean energies which helps greatly to combat global warming. **Solar energy** is renewable energy most commonly used throughout the world, but is still not available for most countries becauseitis still very expensive [9].

Unfortunately in most countries this energy is underused. In the beginning the cost are important but the cost of producing solar energy has been decreased and in 2014 the cost of the solar modulus were 75 % lower than in 2009[10].

If the world would force, to use solar water heaters and photovoltaic cells of gas and electric energy from burning this fuel consumption could drop 30%. We know that prices go down if the production has to be greater, and that can only happen if solar energy is encouraged by the governments that have the responsibility to use it so that it is accessible for all people of this planet in the near future. A possible extension of this concept would be trees, parks and solar forests [19].

5. WIND (EOLIC) ENERGY

Wind energyis the energyobtained from the wind, i.e., the kinetic energygenerated by effect of air currents, and that is transmuted into other forms useful for human activities. Currently, wind energy is mainly used for producingelectricity through wind turbines. At the end of 2014, the global capacity of the wind generators was 370

GW [8].In 2014 the wind generated around 4% of world electricity consumption[17].

Wind energy is an abundant resource, renewable, clean and helps reduce emissions of GHG by replacing thermoelectric-based fossil fuels, making it a type of green energy. However, the main disadvantage is its intermittency [3].

The electrical energy in some countries is considered strategic for national sovereignty. Therefore, there are certain constraints to private participation and allowed foreign companies to operate in the country only through specific service contracts.

It is already currently in some countries the parks or farms forests that would make most efficient and aesthetic the use of that energy. The rapid grow of the wind energy is due to de more efficient technology. The generation capacity of a single turbine has been increased in 162 % in the last years. The air generator of today are higher and have longer blades, so they can work with all kind of winds.Also the increase in the production has helped to reduce the cost of the wind energy and so the demand increased [13].

6. ENERGY FROM WASTE

Is it possible to convert the most toxic waste in clean and renewable energy. There are currently many cities employing garbage for starting processes anaerobic methane needed to get electricity to move the collective transport.Garbage waste can be used as alternative fuel to generate energy at lower costs than natural gas or the fuel oil, according to estimates by environmental specialists and companies. In Mexico more than 80 thousand tons of garbage daily generated. According to the Institute of electrical investigation (IIE), if we seize all this garbage to generate electricity, only with the accumulated until 2003 400 MW of electricity could be generated [4].

This represents an opportunity for those municipalities that do not have sanitary landfills or, if they have them, not are taking advantage of the gas to generate electricity [14]. According to the study of the IIE, one of the reasons why municipalities have not implemented this solution is due to the ignorance of its opportunities and benefits. In addition, once created the fillings, you can request international financial support through the sale of carbon credits. [5]

7. NUCLEAR ENERGY

Nuclear or atomic energy is the energy that is released spontaneously or artificially in the nuclear reactions. However, this term includes another meaning, the exploitation of this energy for other purposes, such as electric power, thermaland mechanicalfrom nuclear reactions, and their application, either purposes peaceful or warlike. Thus, it is common to refer to nuclear energynot only as the result of a reaction, but as a broader concept that includes the knowledge and techniques that allow the use of this power by the human being the two systems more researched and worked to obtain usable energy from nuclear power on a massive scale are nuclear fissionand nuclear fusion. Nuclear energy can be transformed in an uncontrolled manner, giving rise to nuclear weapons; or controlled nuclear reactorsthat produced electricity, mechanical energyor thermal energy. Both the materials used and the design of the installations are completely different in each case.

Another technique, mainly used in many life batteries for systems that require low power consumption, is the use of radioisotope thermoelectric generators(GTR, or *RTG*), which advantage is modes of decayto generate electricity in systems of thermocouplesfrom the heat transferred by a sourceradioactive[15].

Power loose in these nuclear processes usually appears in the form of subatomic particlesin motion. These particles, to rein in the matter that surrounds them, produce heat energy. This thermal energy is transformed into mechanical energyusing external combustion engines, such as steam turbines. The mechanical energy can be employed in transportation, as for example in nuclear ships; or for the generation of electricityat nuclear power plants.The main feature of this type of energy is the high quality of energy that can be produced per unit massof material used in comparison with any other type of energy known by human beings, but surprise the low efficiencyof the process, because you wasted between 86 and 92% of the energy that is released. On the other hand, also avoided other emissions of pollutants generated in the use of fossil fuels. In addition, reduce the consumption of fossil fuel reserves, generating very little amount of fuel with a lot more energy, thus avoiding transport expenses.

Nuclear power generates a third of the electricity produced in the European Union, thus avoiding the issuance of 700 million tons of carbon dioxideper year into the atmosphere.

Disadvantages

- There is a high risk of contamination in the event of accident or sabotage.
- Radioactive waste that are difficult to store and are active for a long time will produce.
- It has a high and long-term cost of facilities and maintenance of nuclear power plants.
- It can be used for non-peaceful purposes.

CONCLUSIONS

In 2013 the world consumed23,322TWh, equivalent to 13,541 million tons of oil for electricity, of which 41.3% were produced from coal, 21.7% from natural gas, the 16.3% of hydroelectric sources, 10.6% from nuclear energy,4.4% from petroleum and the rest 5.7% from renewable sources as wind, geothermic and solar energies. These figures contrast with the immense potential of solar energy, since on average a total of 120 x 10^3 TW hit the Earth at all times, of which photosynthesis consumes only 90 TW of total.

The reason that solar energy, and renewables in general represent a small fraction of the production world has nothing to do with its potential, but with their cost. In 2002 the cost of production of electricity from solar energy in the United States ranged between 25 and 50 cents for each kWh, compared with the oil cost was between 6 and 8 cents or coal at a cost of between 1 and 4 cents, which represents a difference of more than 1200%.

However inn 2014 the photo voltaic solar energy (FV) grew to a total of 117 GW [8]. And the cost of the photovoltaic installations have decreased, so in the near future the prices will be competitive with the cost of producing energy by others means.

On the other hand, at the end of 2008, the amount of proven global reserves amounted to 170,800 million tons of oil, and the total amount existing 408.2 million tones. Despite the exorbitant difference in output prices, interest in clean and renewable energies has increased due to the growing interest in mitigating the environmental effects of burning fossil fuels. Unfortunately, evidence suggests that renewable energy may not play a significant role in the production of electricity around the world unless they develop mechanisms that decrease their production costs dramatically.

The Netherlands want to end the age of oil. So have announced it with a project that proposes to eliminate diesel cars in the Netherlands and gasoline by 2025.The measure presented by the labor party in that country already has been endorsed by the majority of members of the Tweede Kamer, the lower House of Parliament.

If approved this proposal, in 2025, the sale of any vehicle powered by fossil fuels is banned and it only will permit the sale of electric cars.As is it usually when we come to apply such measures, it does not mean that the non-electric cars that circulate in the streets should disappear. The proposal contemplates the banning of cars sale and that traditional vehicles will be removed gradually. Holland is not only one of the European countries with highest level of energy efficiency. In fact, is the one that registers a higher carbon content in the atmosphere of the entire European Union. Renewable energies represent only 5% of the energy of the country generating capacity, while the oil covers 42% of the needs. The Government wants to give a twist to that proportion.Currently on the road in the Netherlands, 9.6% of the vehicles circulating are electric. A fee that is not bad but that it is still far from 23% of Norway, the leading country in the matter

Today it seems that the battle against pollution, desertification, and the global warming, is lost by the big global interests that drive the use of oil, coal and natural gas. However, the teachers and university researchers believe that it is our duty to fight to implant the Clean Technologies thus reduce the emissions of CO_2, which is leading to climate change and pollution of the skies and seas. Awareness must begin from an early age, so that when future generations come to be in charge of major decisions in the field of energy, they will not hesitate to take the road to the conservation of our planet through the use of energy in a sustainable way.

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