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The Importance of the Generation of Energy Alternatives for Sustainability

Alina Margarita Berdugo Rodriguez[1]*, Hugo Hernandez Palma[1], Andres Rodriguez Toscano[2] and Juan David de la Hoz H[3]

[1]Universidad del Atlantico; alimaber@hotmail.com, hugoghernandezpalma@gmail.com,
[2]Universidad de la Costa, CUC; andresrodriguez39100@hotmail.com
[3]Corporacion Universitaria Latinoamericana; juandavid03@gmail.com

Abstract

Introduction: The growth of the productive activity at world level has generated great concern for including in the engineering activity new alternatives that favour the sustainability of diverse sectors. Analyze the various alternatives for power generation that can implement industries and their advantages**. Methodology:** Qualitative/explicative study, which, supported by a literature review, gathers information from the last five years, to give shape to a document that is easy to consult. **Findings:** The study derives a range of alternatives that can contribute to business plans and all stakeholders in the energy issue. **Conclusions:** There are several options that each organization currently has to explore in energy issues; each industry can be guided by the alternative that according to its social purpose can offer the best benefits.

Keywords: Electricity, Energy, Optimization, Sustainability

1. Introduction

In recent decades, there has been an exponential increase at the productive level in the engineering market, which implies the optimization of industrial processes in terms of the search for new forms of energy[1]. Considerable support has been given to sustainable development and, above all, to satisfying world demand with various devices for the proper use of types of energy[2], the discovery of new physical methods and the review of laws that contribute to a self-sustainable and versatile technological era is hardly undeniable[3].

One of the most important advances of this nature has been reflected in the positioning of large-scale types of energy, such as solar and wind energy[4]. These two types of energy have been used since the middle of the 19th century, and at the end of this century improvements are achieved in mechanisms such as the steam engine and hydraulic sources[5], which means that we are close to experimenting with a market that is barely developing and that requires the application of physics[6].

2. Methodology

For the proposed analysis, a qualitative method was structured in order to consult various sources and integrate the different visions that have become known in recent years[7]. This methodology makes it possible to put the researchers' criteria into practice and to select those aspects that, according to their experience, may serve as a reference for future research[8].

For the compilation of the information, a work plan was drawn up that consisted of three elements: Preliminary planning; Plan for the analysis of the information and Reflection of the most relevant contributions. At the end of the process, the information was consolidated in an explanatory manner so that those who consult this publication in the future can find a manageable guide with essential concepts on the subject. For the search for information, the use of information managers such as Scholar, Scielo, Publcindex, Scopus and Springer was defined.

*Author for correspondence

3. Results

When addressing the energy issue, there are several options available today. Among the best known are solar, geothermal, hydraulic and wind energy. But there are also other options that are derived for example from urban solid waste called biomass[9]. For this document we will review the essential aspects of solar and wind energy, as they are directly related and applied to physical concepts that may be useful for the aspects that are being explored in search of highly sustainable solutions for the future[10].

When we speak of solar energy, we refer mainly to the energy that emanates from the sun, inexhaustible and 100% natural, which focuses its main function on ensuring a reliable energy supply to the user taking into account its own advantages and disadvantages[11], that is, those factors that may affect the use and adaptability of this in everyday life. Currently, to use solar energy requires heavy machinery, a skilled workforce, a considerable initial investment and most importantly, a place suitable for the flow of energy to be constant or permanent[12].

On the other hand, there is wind energy, which is constituted as a clean source of polluting gases, electrical effluents or solid waste that, when incorporated into commercial activities, is capable of providing better models of energy generators and perfecting the techniques usually used[13]. Figure 1 shows the essential characteristics of the types of energy mentioned.

3.1 Alternatives for Power Generation: Application of Electromagnetism

Because energy needs to be transformed into electricity, strategies such as that of the electric generator arise, which, from mechanical motion, driven by electromagnetic induction[14], creates an alternating current, used mostly for domestic use and large-scale distribution[15]. Basically, this device is governed by the principle that suggests that, from a variable magnetic field, it is possible to obtain an induced current. In addition to this, its mechanism is related to the angular movement of a coil[16].

The variable field lines are responsible for the creation of this current that periodically changes direction, which favors the use of energy[17]. In this way, it is more viable to distribute alternating current than direct current; hence we can rescue the induction law of Faraday[18,19], which maintains that the voltage or induced electromotive force (Fem) is represented by the variation of the magnetic flux with respect to time, thus contributing to the continuous and orderly displacement of electrical charges in the system[20].

It should be noted that none of these phenomena would be possible without the conception of magnetism, where forces of attraction and repulsion are exerted on different materials creating a region in space influenced by the action of this type of forces[21]. Thanks to the existence of magnetic properties in nature, it has been possible to perfect health sciences, for example, the therapeutic use of magnets that maintain their properties by being connected to a current, improving or completely eradicating ailments in muscles and joints, without mentioning that it mitigates body aches and brings the individual's organism to normal health conditions or parameters[22].

These magnetic properties consist of the development of diverse physical procedures that need a theoretical and practical explanation for their daily realization, such as, for example, like the law of induction of Faraday[20], a primordial law is evidenced in the development of the process of magnetism called the Law of Biot-savart[22], which, by means of a line integral, a vectorial product and real circuits built on methacrylate bases, determines the induction vector, by means of a line integral, a vectorial product and real circuits built on methacrylate bases, determines the magnetic induction vector at points in space due to small finite current circuits, all this followed by a compass that, placed on the plate, moves around the circuit, changing its direction and direction[23].

After discussing and defining the various techniques for taking advantage of electrical physics in daily life, and how some physical processes have a place in the optimization, better management and solution of failures in the operation of some basic knowledge, it is necessary to recognize that there is a technique that uses tiny semiconductor materials for the manufacture and design of elements required by world demand[24], which is called *microelectronics* and contains some electronic devices derived from it, which will be specified below.

According to different authors, electronic devices make control systems such as electric generators improve their speed and have an increasingly deep implementation in this market with a futuristic vision of change and favoring the generation of energy and therefore sustainability in industry and other fields[14], these devices are capable of

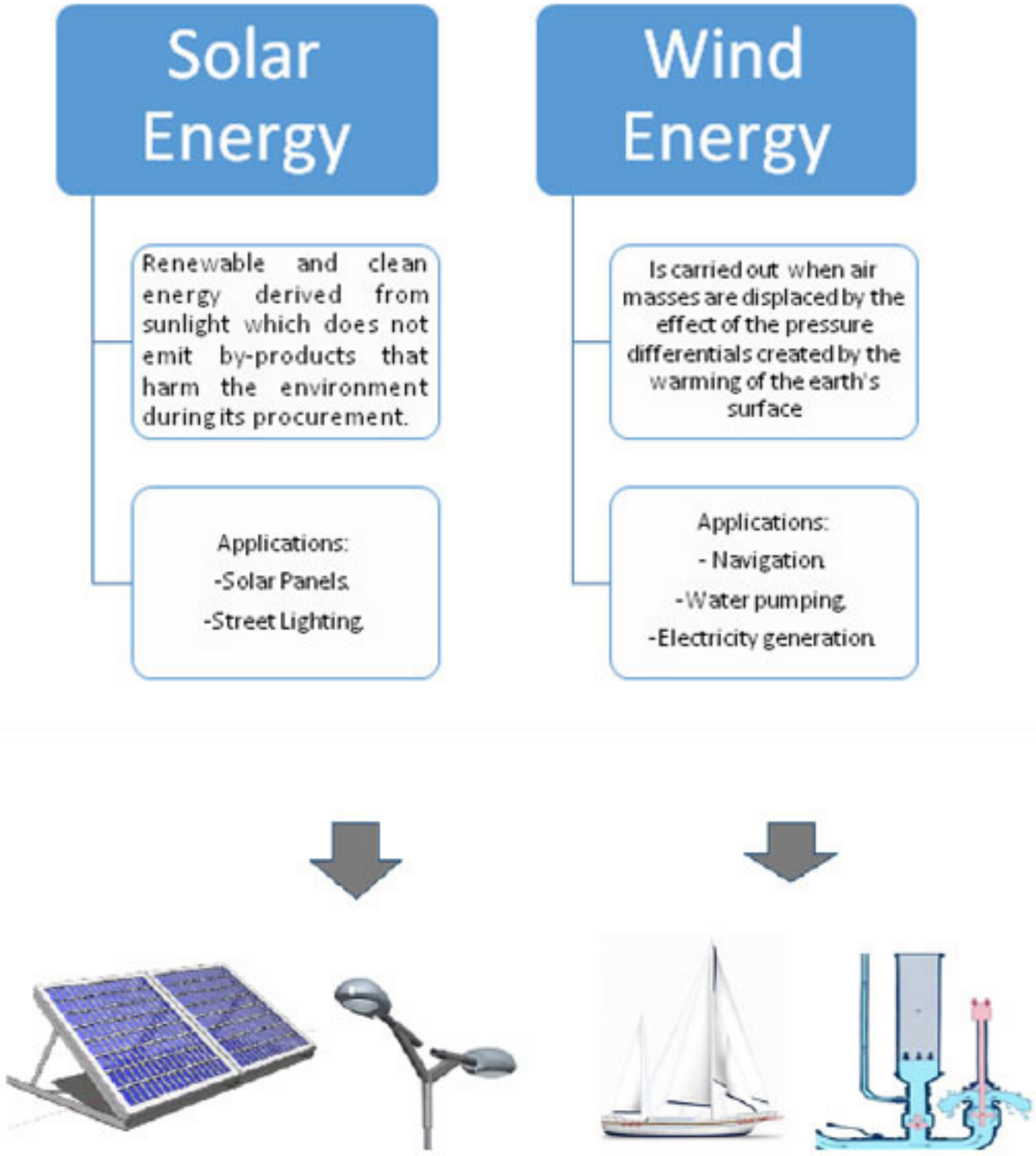

Figure 1. Characteristics of solar and wind energy.

Table 1. Components derived from microelectronics[25]

DEVICE	DEFINITION	FUNCTION	ELEMENTS	ELEMENTS
DIODE	Device that rectifies the signals of a voltage converter	Used as protection for circuits feeding a coil and DC motor	Regionofpotential AC and DC voltage converters DC coils and motors Inductors	They have been used in the mixture of frequencies and detection of the amount of power in radio frequency.
BIPOLAR Union Transistor	An amplifier that controls a certain amount of current by means of a different amount of current.	It allows the passage of a current between two of its terminals, the magnitude of which is controlled by the current of the third terminal.	Collector Base Emitter	They are mostly used when you have a led inside a circuit and it must light up but the given current is not enough.
Optocoplator	Device with a light-emitting diode	It is used as a presence detector and as an insulation element between the meshes of a circuit.	Light-emitting diode Optical sensor (phototransistor) LED	Used for measuring angular velocities of motors and generators
Relays	Electromechanical device for exchanging power lines	An electromagnet is used that opens or closes a circuit; the current of the electromagnet is controlled by a system independent of the circuit with lower power.	Coil Diode Transistor	They are used to control the flow of large currents. In addition to presenting a high demand in telephone exchanges in the past.
Microcontroller	Minimum computation integrated circuit that executes commands coming from its memory	To facilitate the tasks of census of signals and control of electromechanical systems.	CPU (Central Processing Unit) ROM Memory (Read only) RAM (Random Access) Ports of entry and exit.	They have versatility in fields such as programming and are very important in the construction of electric generators.

running a complete electric generator. Below is a comparative Table 1 with each of the components derived from microelectronics and their impact on energy conception.

Currently, large multinationals are beginning to bet on the management and exploitation of inexhaustible natural resources offered by the environment, evidencing sustainable development in the promotional part, firstly, to carry it out in the practical part, as this moves them to the plane of fuel savings, pollution abatement, handling of goods and more than anything to the satisfaction of various world needs[12].

4. Findings

As final reflections it can be sketched out that the protagonist that alternatives have been gaining as an electric generator driven by electromagnetism consists of many elements and characteristics that can be used to derive in sustainability. When it is decided to use part of the resources that nature offers us for the elaboration of this type of devices, it is betting on a modern and friendly design that in the short term will show better behaviors as for development, function and maintenance of equipment, without counting on the considerable increase of the demand that it will have for some developed countries and even developing countries that look for the form to harmonize the energetic consumption in their productive activity.

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