



## Renewable Energy Secret of interest! And to where?

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There was recently much talking about many terms in the field of energy sources. Such talk is about the renewable energy, alternative energy and sometimes the green energy, new energy and sustainable energy.

### **What is the reality of these definitions? What are these sources?**

To reply to these questions, let's start with defining the conventional energy, the energy taken from the fossil fuel, such as coal, oil or gas.

The renewable energy is defined as the energy derived from inexhaustible renewable sources that are renewed day after day and thus these sources must be derived from natural resources, and on this basis the renewable

energy resources are a sustainable. These sources include solar energy, wind energy, ocean energy, tidal energy, geothermal energy, biomass, biogas and hydropower.

The new (or alternative) energy includes the sources that replace the fossil sources of energy or that produces a fuel similar to the fuel resulting from the fossil energy. Thus, the new sources of energy include the renewable sources of energy in addition to the nuclear energy. Therefore, the nuclear energy cannot be considered as a source of renewable energy.

The green energy means all energy sources that do not result in waste or greenhouse gases, such as the carbon dioxide or harmful gases such as nitrogen oxides, thus they include part of, but not all, renewable energy sources. For example, the biogas or biomass does not fall under these sources.



The reason for the global interest in the renewable energy sources is mainly due to the increased conviction by the main players in this field, economists and politicians, that the need to sources different from the conventional sources has become clearer than ever before. i.e. the conviction of the need to new energy sources has increased, not only on the basis that they have started to exhaust, but also if the conventional energy sources remained at their current levels, as they are not sufficient to meet the humans needs during the next fifty or hundred years.

The year 1987 is considered by many as the year of entering into a new era, as the world's population has become about 5 billion people as shown in figure below. The five billion people represent the carrying capacity of the earth from the prospective of energy. Whereas the world's population is increasing continuously and steadily, the world's population shall exceed the carrying capacity of the earth. Therefore, the numbers of years expected for the ability of the conventional (fossil) energy sources to meet humans needs will be less.

Accordingly, with a simple calculation taking into consideration the year 1987 as the reference point and the increase of the world's population, estimated to be (9 billion people) by the year 2054 AM, the energy available at that time shall be sufficient only for three billion people. This simply means that about two-thirds of the world's population will be without a source of energy, the basis of life.

This simple analysis, which may have a calculation error in its estimates that may not increase (or decrease) the estimated period for the adequacy of the oil energy sources by five or ten years, however what is established is that these sources, even if they would not exhaust, they will not be sufficient to meet the humans needs, thus it is necessary to search for other sources of energy.

Therefore, oil producing countries should take more serious steps in this regard than non oil producing countries. If the world reaches in the year 2054 AD to the scenario presented above, this situation will be a major source of instability and a reason for bringing wars to the region. In that era, the logic of force, not the power of logic, shall prevail, as the case would be a matter of life or death. Therefore, no region or country should stay away from starting interaction with the global problem of energy as it affects the security of all humans.

The second question: What is the solution? Answer: It is necessary to reach the point of balance between the world's population and the available energy. But how and in what way? Theoretically, the solution is either in searching for other sources of energy or reducing the world's population (three billion people in the year 2054)!!

I do not want here to talk or think in the second scenario. The first scenario requires to answer the following question: How can we provide (secure) a source of energy sufficient to nine billion people in the year 2054 AD? There are two steps that must be followed in coincidence to solve this problem:

The first step is to exploit the currently available energy in a rational and proper way and not to waste any part thereof by following the consumption rationalization policies and using the highly efficient energy consumption devices. This step shall increase the conventional energy resource life and shall not solve the problem completely, but it certainly shall reduce the amount of shortage in energy (the new energy that the humans need) and prolonging the available conventional energy life.

The second step is to search for new sources of energy and to optimally exploit all alternative sources of energy. However, we must take into consideration that the alternative sources must be sustainable and do not negatively affect the climate because we do not want to provide energy for future generations with "lethal environmental legacy": Environment full of harmful gases or nuclear waste that may affect the human being directly or indirectly.

But how do we start? The sun is the main source of most currently known renewable energy sources. For example, the main driver of winds is the difference of the earth temperatures caused by the heat of the sun, the same as in the case of plants, where their food is produced only through the existence of the sunlight. As for the solar energy, which means here the energy that reaches us directly from the sunlight, it is considered as the most important source of renewable energy, but does enough solar energy fall to the earth to meet the needs of the world? The Arab region, especially the Middle East and North Africa (MENA), is the most important region in the world in which this source is available. We can say that the amount of the solar irradiation falling on an area of 500 km x 500 km in the Arabic Sahara is sufficient to meet the needs of the world in the year 2050 AD. But what are the obstacles that prevent the exploitation of this energy? There are technological obstacles and economic obstacles. The technological obstacles are represented in two points. First: The efficiency of converting the solar energy into

electric energy is still relatively low, as best not exceeding 30%. Therefore, there are researches based mainly on studying how to raise this efficiency, and there are many good technological indications and developments in this field, such as that the efficiency of the photoelectric cells reached currently to approximately 24%, taking into consideration that in the seventies of the last century it did not exceed 6%. The second obstacle is attributed to non-availability of this energy (including the solar and wind) throughout the day or throughout the year, taking into consideration that we need to use the energy around the clock, and to achieve this, it is necessary to store energy. The energy is currently stored either in the form of thermal energy or electrical or water energy. In all cases, the search is still on process for the best and least expensive way.

The second obstacle to this technology is its high cost. For example, the cost of producing one kilowatt – hour of electricity from the solar energy through the solar concentrates reaches to (25 cents), while the cost of its production from the conventional plants may not exceed (6 cents). I here say that this must not be an obstacle to the exploitation of these sources, because the humanity may reach a point where the price of non-production of the energy shall be much more important than the cost of its production. In addition, the cost of production of electricity from the solar energy is expected to decrease gradually as the spread of such technology increases. It may be argued that one of the reasons of the high cost, especially in the solar energy, is due to the higher price of the land required for the project. For example, generating electricity from a solar cells power plant with a capacity of (100 MW) requires an area of 1500 acres (1 acre is equal to 1000 sq. meters), taking into consideration that the conventional plant requires an area of less than a tenth of this area. As for this problem, praise be to Allah as we in the Arab region have areas in the desert sufficient to provide the humanity with energy for thousands of years to come.

I finish this article by saying that Allah Almighty gave the Arab region (Middle East and North Africa) this role in the human life through oil and solar energy and the people of this region are required to decide whether to be players or spectators. I say this because the exploitation of these sources has started as the security of the mankind depends thereupon and the world does not wait in such issues. To be key players, we must support and establish research and industrial institutions specialized in this field, and develop and encourage the private sector, and build capacities in the Arab region. All this is only achieved through a unified Arab strategic plan with specific and clearly defined action plans and specific time frames.