ECO-FRIENDLY ALTERNATIVE ENERGY SOURCES

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ABSTRACT

Even though the earth continues evolving, the resources used by humans will eventually become scarce. Conventional energy sources based on oil, coal, and natural gas have proven to be highly effective drivers of economic progress, but at the same time damaging to the environment and to human health. The potential of renewable energy sources is enormous as they can in principle meet many times the world's energy demand. Renewable energy sources such as biomass, wind, solar, hydropower, and geothermal can provide sustainable energy services, based on the use of routinely available, indigenous resources. It is becoming clear that future growth in the energy sector is primarily in the new regime of renewable, and to some extent natural gas-based systems, and not in conventional oil and coal sources. Financial markets are awakening to the future growth potential of renewable and other new energy technologies, and this is a likely harbinger of the economic reality of truly competitive renewable energy systems. In addition, the reserves of these resources are limited and will decrease over time and will eventually reach the level of depletion. For this reason, it is an essential necessity and purpose to increase the availability and use of energy sources which will be alternative to fossil fuels. Minimizing the environmental problems and pollution that may occur while supply our energy needs is very important for the healthy life of the creatures. In this study, renewable energy sources that can be used as an alternative to fossil fuels were mentioned and evaluation, discussions and suggestions were made about this subject.

Keywords: Environmental pollution, energy, fossil fuels, renewable energy sources.

INTRODUCTION

Energy is defined as the capacity to do business and energy resources are generally grouped under two groups. Renewable energy sources (wind, solar, geothermal, water, biomass, hydrogen..) are energy that is assumed to be inexhaustible, can be used again and again, derived from natural processes, ecological and put in place in a short time. Non-renewable energy sources (oil, coal, natural gas, nuclear energy..) can be used, depleted, not regenerating in a short time, carbon derived, are energy types that take a long time to renew, this kind of energies consists of fossils formed by the effects of heat and rock pressure inside the earth of organic residues such as plants and animals whose lives have ended millions of years ago. "Over decades, fossil fuels were and are still being used as the major energy source for households, industries and service providers. However, due to the limited amount of fossil fuels, energy is becoming more and more expensive, and the consequence of their consumption is having an impact on our environment and climate" (1).

Energy, which is one of the most important needs of mankind, is needed in all activities of human daily life. It is among the most important responsibilities of states and societies to obtain and exploit energy without sufficient harm to the natural environment and not to threaten our ecological wealth; because the main reason that threatens the environmental and living health is excessive use of energy and unconsciously. There is an abundance of energy among the most important reasons that differentiate the development levels of the countries, the life style of the people in these countries and increase the per-person income and differentiate people from the traditional ways of life. As a result of the research, fossil fuel sources have been decreasing very rapidly and it has been shown that human beings can no longer meet the ever-increasing energy demand. Therefore, technology and energy are among the most important issues in the country's policies, and the level of development of countries is emerging according to the technology level and energy production potentials. The countries and societies are obliged to have abundant and inexpensive energy resources, advanced technological studies and to give importance to the production activities within this scope in order to get rid of their backwardness. The process of obtaining energy by using renewable energy sources is essential to ensure the healthy and peaceful future of the ecological balance, all living things and especially humanity. As a result of the use of fossil fuels, harmful gases, especially CO_2 gas, accumulate intensively in the atmosphere, resulting in global warming. The increase in temperature on the earth will lead to the deterioration of the ecological balance, the change of climate, the melting of the glaciers in the poles, the rise of sea levels, the flooding of fertile agricultural lands and many other negativities in which the expression is insufficient. “One of the major consequences resulting from the greenhouse gas effect and global warming is causes the melting down of major glaciers and the poles resulting in the rise of the sea level; due to the trapped heat, extreme weather conditions occur, such as droughts and floods” (2).

It is necessary to make the energy infrastructure suitable for the use of renewable energies, which is among the first conditions to prevent global heat increase, to maintain the ecological balance and the health of all living things and to improve the quality of life of people (3). Electrical energy consumption is one of the most important indicators of economic development, and this type of energy is of critical importance in the energy sector and it is widely used in residential and social facilities as well as being the main input in industrial and service production (4). In our country, the energy demand arising from the increasing population and industrialization cannot be met sufficiently with limited and traditional resources, and the interval between energy production and consumption is increasing rapidly. Due to the scarcity of fossil fuel resources in our country, it can cover very little of its energy needs from its own sources and this shows the dependence of our developing country on energy raw material. The indispensability of energy, which means development, stability, development, prosperity and increasing quality of life for a country, is a fact to be underlined at all times and places. Energy, sustainable development, international politics and the social and environmental dimensions of the economy are all closely related, minimizing the environmental problems, taking into account global threats, energy resources need to be reviewed and alternative solutions should be produced.

In this study, evaluating the energy potential of our country, the effects of classical energy sources and alternative energy sources on environmental impacts and comparisons are made. As a result, in order to be able to be economically strong and independent, it is important to provide high quality, reliable and inexpensive electric energy at sufficient and timely manner.

ENVIRONMENT-FRIENDLY ALTERNATIVE ENERGY SOURCES

A. Solar Energy

The sun is a clean and continuous energy source for our world and the energy from the sun to the Earth is 20 thousand times the energy used in the world (5-8). Electricity generation from solar energy is provided by solar cells, which convert solar energy directly into usable electrical energy by generating an equal number of positive and negative charges from the photon energy they perceive. CO_2 is the most waste product of humanity and CO_2 leading to global warming or greenhouse effect, is caused by reasons such as energy production, distribution and consumption. The solar cells that will reduce the use of fossil fuels, significant reductions in carbon dioxide emission to the atmosphere are provided and this technology is able to meet most of the electricity production need (9). Compared to other energy sources, solar cells are cost-effective and are not yet economically desirable, and one of the most important goals of the companies that work on this subject is to reduce the cost of solar cells. As the cost decreases, its use will increase, and the rate of obtaining energy from fossil fuels will decrease. Although these and similar obstacles in obtaining energy from solar energy, they can be reduced each year and therefore the energy consumption increase can be reduced and the environmental pollution caused by the use of fossil fuels can be prevented and the damages of the elements that threaten the ecological balance and the living health can be reduced. Turkey is advantageous in terms of solar energy potential compared to many other countries, unfortunately this potential are not use sufficiently; in order to use this potential is very important for the future and economy of our country, concrete, sustainable, applicable policies should be followed.

B. Wind Power

Wind is one of the first sources of energy used by humanity to obtain energy, especially in maritime transport. Although the use of wind as a source of energy goes back to the old times, the increase in the use of non-renewable energy sources has led to a decrease in research and studies related to wind energy. The potential of wind energy generation varies according to the location, topographic and climatic conditions and it is a reliable and continuous energy source. Wind energy is converted into mechanical energy by horizontal and vertical axis with wind turbines and this energy is used for different purposes. Experts state that the world's electricity need can obtain by using 10% of the world's wind (10). Wind turbines can generate energy by working 24 hours, occupy 5% of their land and turbines' wings are higher than ground and the bottom can be used for agriculture, grazing and other purposes; but the turbines will not disturb people sensually and aesthetically and it should be installed in places that will not cause bird deaths and will not have other adverse effects (11). The widening of wind power plants, which are more common in some regions of our country, will contribute to our country's economy and to benefit more from our wind potential.

C. Water Energy

Water energy consists of hydraulic, geothermal and marine energy sources. Hydraulic energy is a kind of energy obtained by converting the potential energy of water to kinetic energy, which is by converting the potential energy of water into electrical energy by constructing dams on rivers. The reasons such as being an alternative, national, reliable source, the environmental disadvantage, and the minimum level of operation and maintenance costs cause this type of energy to gain importance. Although the cause of the lowering of Turkey in thermal power

plants generated energy is of a size increasing quantity of hydraulic energy ratio, the ratio will still not be underestimated. Hydraulic energy has the highest share in our energy installed capacity in renewable resources, and our country is advantageous in terms of this energy potential when the environmental disadvantages and trends in the world are compared. Geothermal energy is a kind of energy which is formed by the heat of the water that is heated as a result of the heat of the earth's crust that heats up the ground water and this energy is used mostly as heat energy and its use in industry is cheaper than other energy sources. Our country has a very advantageous position in terms of this type of energy and it is possible to use this energy in thermal springs, greenhouse heating, electricity production, heating in houses, and it is possible to heat 30% of the houses in our country with geothermal energy and this is indispensable the increase in the use of energy resources and hence their prices. The energy sources of marine origin are wave energy, sea currents, sea temperature energy and tidal energy, although the most energy is the energy obtained by the wave energy.

D. Nucleer Energy

“Nuclear energy is seen by the government as a way to diversify energy types, cheap, sustainable, environmentally friendly, and an important way to reduce energy dependence” [12]. For this reason, in Turkey, studies have been initiated on the establishment of nuclear power plants; nuclear power plants have very large opposition, and there is a significant supporter to this issue. There are about 440 nuclear power central around the world and approximately 16% of the world's electricity needs are met with energy from these plants. Energy production from nuclear energy is very efficient and does not reveal any gas that will affect global warming. The most important problem in this type of energy is related to radioactive waste. In case of taking necessary measures, this type of energy which has very high efficiency compared to other energy sources should be used. The amount of energy obtained from only one reactor is greater than the amount of energy to be obtained from several dams. Energy is the most strategic sector for countries and it is a fundamental requirement that energy needs are met in safe, sufficient, continuous, affordable prices and environmentally friendly conditions. Depending on the development of our country, the demand for energy is constantly increasing. In order to meet this demand, alternative energy sources should be increased, but these resources are not sufficient on their own and in order to maintain sustainable development, the number of nuclear power centrals used by developed countries should be increased.

E. Biomass Energy

Biomass means the substance produced from living organisms (13), all natural substances of vegetable and animal origin are biomass energy source and the energy obtained from these sources is biomass energy (14). Biomass energy is widely used in the form of biogas, bioethanol and biodiesel (15). Biodiesel is a type of fuel produced by oilseed rape, sunflower, soybean, safflower and even animal fats; bioethanol is obtained by fermentation of products such as corn, wheat, sugar beet, which has a high percentage of sugar; Biogas is obtained as a result of the fermentation of organic materials in the anaerobic environment. Considering the rich potential of our country in this regard, such energy sources are one of the important alternatives for both sustainable development and climate change and prevention of global warming.

RESULT

The most important factor in the continuous and clean energy production of our country, which is sufficient to increase the competitiveness and economic power of our country in the world markets, is to develop and implement reliable and sustainable energy policies and to continue to

increase the work in this scope. As a country that is not rich in fossil energy sources and imports more than 70% of its energy needs, it is an essential requirement that we make our new investments to use renewable and domestic energy resources, and if we fail to do so, our dependence on foreign energy will increase even more will cause problems in terms of security of supply of our country. Today, it has become a necessity for our country to determine a new energy policy based on the use of internal resources in the most favorable conditions, the least harm to the nature and maximum contribution to the economy. For this reason, it will reduce energy dependency and reduce dependence on foreign sources by taking advantage of the sources such as nuclear energy by taking serious measures against the risks of renewable and environmental damages. In addition, lack of information and barriers to market entry in the industry prevent new technologies and applications from becoming operational. In this case, support is needed from the center and local governments and non-governmental organizations, and people should abandon their old habits and adopt energy from other energy sources by taking serious measures against the risks of alternative sources and environmental pollution. Renewable energy and energy efficiency technologies in Turkey began to be seen as a source of employment. Efforts to reduce carbon emissions due to the cooperation of public and private sectors, investments in the renewable energy sector and sustainability will pave the way for other sectors in the medium and long term. In order to create sustainability, it is necessary to increase the use of renewable energy resources, to reduce environmental pollution and to use energy resources efficiently. As it is understood, renewable energy sources are an important alternative for both sustainable development and prevention of climate change and global warming. All energy facilities have negative effects on the environment with different aspects. However, we need these facilities for technological development and prosperity.

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