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Relation of Energy Resources and Environment

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ABSTRACT

The World Energy Committee states that there exists no risk free energy resource and for this reason, while choosing the energy resources, cost factors must be considered with environmental effects. Today, prevention of environment pollution and conservation of environment have a dimension exceeding national borders. The risks that result from using of fossil fuels increasingly (petroleum, coal, gas) must be decreased (air pollution, thinning of ozone layer, acid rains etc). To decrease such risks, besides to increasing of energy productivity, energy resources that emit less sera gas in the atmosphere (like Carbon-dioxide (CO_2)) must be preferred. Otherwise, destruction of ecological balance and disasters in future will be inevitable. The negative effects of renewable energy resources on environment are lesser than the conventional energy resources. Costs of renewable energy resources are lesser than the fossil origin fuels. They never consume as they are renewable and in contrary to the conventional fuels, they do not exhibit a significant threat for environment and human health. In this study, effects of energy resources on environment are considered in detail. Especially, effects of renewable energy resources on environment and criteria that must be observed in energy production to prevent environment pollution are examined.

Keywords: Energy, fossil fuels, nuclear power plants, renewable energy, environment, global warming.

INTRODUCTION

One of the most important elements to meet the essential needs of modern life is the use of electric energy. This feature makes the electric energy a sector that gives input to almost all sections in economy. Besides, as production, transmission, distribution and marketing of the electric energy are an individual investment area, it may be considered as an economical output. One of our most important needs of which consumption increases continuously and will definitely continue to increase in future is undoubtedly the energy. Rapid development in technology and industry in recent years causes increase in environmental problems. Today, negative effects of solid wastes on nature that increase rapidly in respect to both content and quantity in parallel to technological development, industrialization and urbanization have been an important environmental problem.

Energy Resources

The energy need of world rapidly grows by consuming all the stock of energy resources in nature. When the effects of the petroleum crises in 1970's and the gulf war in 1991on petroleum reserves are considered, it is clear that there is not any other option for all the world to use the reserves in hand in the best way and direct towards to new energy resources. If we also consider the effects of fuels on environment after they are processed, to get benefit from the energy resources in the best and most effective ways in a manner to produce the least waste becomes very important.

Fossil Fuels

Fossil fuels are also known as mineral fuels. They are the natural energy resources like coal, petroleum and natural gas that contain hydrocarbon. Fossil fuels are widely used in the industrial area. In electric production, the energy that comes out through combustion of fossil fuel is transmitted to a turbine as power. In former generators, the vapor obtained by combusting a fuel was used to rotate the turbine but in new energy power plants, the obtained gases directly rotate the gas turbine. The economical growth of industrialized modern societies depends on energy benefiting base they obtained from fossil fuels. At present, 80% of the world's energy need is met from fossil fuels like coal, petroleum or natural gas. These resources that are intensive in some definite areas of world exist in various forms. The human being has learned to take out such resources in different methods and obtained the energy they desire. As fossil fuels can be stored and transported easily, they are considered as a perfect fuel.

The fossil fuels are widely used in houses, commercial and industrial sectors, heat production and production of electric energy. In transportation sector, mostly petroleum products (gasoline, diesel oil, jet fuel etc.) are preferred. The heat production, space heating, is used for cooking, hot water, vapor production, direct heating or drying of many industrial products. For these purposes, three kinds of fossil fuels can be used. While very small amount of electric energy is produced in hydro or nuclear power plants, mostly coal and natural gas is preferred. Usage of fossil fuels in such high rates begins to create destructive results.

Table 1: Greenhouse gases and global warming effects

Greenhouse Gas	Global Warming Effect (%)
Carbon-di-oxide (Co_2)	50
Chlorofluorocarbons (CHF)	22
Methane (CH_4)	13
Nitrogen Oxides (NO_X)	5
Ozone (O_3)	7
Water Vapor (H_2O)	3

Effects of Hydroelectric Power Plants on Environment:

The water power is considered as an energy resource related to the geographical location. As we all know, electric is produced in barrages by using the water force. Collecting water in barrages does not negatively affect the environment and the turbines used in hydro power plants (like Kaplan turbines) produce electric without negatively effecting the environment. These plants can be defined as development and usage of water resources including their energy production purpose. In other words, hydroelectric energy ensures converting of potential energy of water to kinetic energy.

The hydroelectric power plants have climatic, hydroelectric, ecological, socio-economical and cultural effects. The water collecting part of a hydroelectric power plant (reservoir) creates environmental effect when it is in operation. As the surface area of a reservoir is wider than a river and as the vaporizing increases, climatic effects occur. In this manner, humid rate in air increases, air movements change and temperature, raining and wind events differ. The flora and animal living both on land and in water of the region enter into sudden changing and animal species that can adapt themselves in such an environment can survive. The hydrological effects result from flowing regime of stream and changing of physico-chemical parameters. To convert rivers to reservoirs cause vaporizing of water and increasing of quantity of salt and other minerals in water. In transition from stream to lake, natural cleaning capacity decreases depending on decrease in water speed diffusion and oxygen taking capacity and the lake enters into mortification process. Changes in water quality of lake cause alterations in hygrophilous living. Blocking of migration ways both on land and in water, living areas remaining under water and annihilation of some important species cause occurring of ecological effects. Dissolution of air azoth in excessive saturation level because of falling off waters is fatal for the fish.

On the other hand, the social-economic and cultural effects are felt negatively and positively since construction phase of barrage. As a result of the expropriation made depending on size and quality of the land under water, internal and external migration events are experienced and value of land changes. However, because of the manpower movement during construction phase, the regional economy enlivens and infrastructure services and social services (school, health facilities, etc.) cause positive effects especially in integrated projects. The barrage lake is a resource for recreation and production of water products.

Effects of Thermal Power Plants on Environment

The thermoelectric power production is made generally by using coal, petroleum and natural gas fuels. Only 30-40% of the energy produced in thermal power plants can be converted to electric energy. The remaining part is called as "fault energy" and comes from its boiler with radiation or discarded from funnel together with funnel gas. One of the most important environmental effects of thermal power plants is related to cooling water and the cooling water need of thermal power plants is great. For this reason, thermal power plants are generally constructed near resources like lake or sea where cooling water can be used. Disposing of wastes in sea and scattering on land is the feckless wasting method known since old days.

The gases that come out from funnel of thermal power plants and greatly affect the flora are dioxide and azoth oxides. The organ of plants mostly sensitive to such gases is their leaves. Such gases that enter into leaves by means of stomas destroy the structure of chlorophylls in leaves. Damages on plants are seen in three different dimensions. These are acute, chronicle and hidden damages. Plants expose to acute damage die immediately. Though the chronicle damage is not vital, it greatly destroys the quality of plants. The hidden damage occurs in a time.

Effects of Nuclear Power Plants on Environment

Though the Nuclear Energy Power Plants (NEPS) that leaves its mark of "atom era" on this century is a clear, reliable and settled technology in electric production, it takes reactions by the public in many countries.

The effects of nuclear plants on environment appear during taking out of uranium and thorium, preparation of fuel, production, enriching, re-treatment of fuel, storing and detaching of reactors. The biggest effect of nuclear plants on environment is emission of a radioactive matter in environment as a result of an accident. Gases and liquid radioactive wastes from nuclear plants cause significant environmental effects. However, the effects of radiation on environment vary depending on power of accident, type of reactor and security system out of reactor. If various radioisotopes disperse to environment as a result of the accident, radiation contaminated to water, soil and air taking medium effects the environment and human health. Here the important thing is that, well-conditioned storing and keeping of high level radiating wastes after the fuel completes its usage life. With contributions of countries like Canada, South Korea, Taiwan, France

and Belgium that increased their nuclear capacities, it is observed that other sera gases (greenhouse) and poisonous aside rains have decreased in great extent.

The radioactive effects reach to environment and all living beings including humans by means of two different ways. The first way: transportation of emissions arising from funnels in the atmosphere and their reaching to the earth and living beings on earth. The second way: reaching of liquid and solid wastes arising from power plants to rivers, lakes and seas and their effect on living beings and underground waters. Because of the circulation of natural life, the human beings and animals living on earth can affect from the radioactivity arising from nuclear power plants by means of both ways.

CONCLUSION

Today, the top priority resources in the world's energy production are the renewable energy resources like petroleum, natural gas and coal. Especially, as natural gas pollutes the environment less than the other resources, its share in energy production increases day by day. As it can be seen in Figure 1, the energy resource most commonly used in the world is petroleum. The mine coal of which usage increasingly decrease takes place in the second row and natural gas of which production and consumption rapidly increase in the third row. In different periods, a definite energy resource was used dominantly. Petroleum took the place of coal and in next year's, natural gas has become important. In future years, alternative energy resources will become important.

Conflicts of interest: The authors stated that no conflicts of interest.

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