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Energy and Environment: Beyond Fossil Fuels Issues

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Abstract:

The progress of our energy generation systems has been continuously marked by a multiplicity of concerns regarding environment which ranges from air quality issues and acid rain to green house effect. Almost, any growth of the energy sector and the earth's environment are inextricably linked, generating the need for a complete understanding of the opportunities to promote synergies between environmental and energy policies. Since early 1980s, the relationship between impacts of environment and energy use has received much consideration, and has become a focus of attention in several international activities. In this study, effects of environment on energy sources are discussed. Especially, impacts of environment on alternative energy generation technologies are examined. We conclude environmental priorities must be considered in research and development studies, selection of technologies and energy planning, their determination must be made correctly and be in a manner to realize the determined targets in long-term.

Key words: Energy, Environment, Fossil fuels, Power plants, Resources

INTRODUCTION

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.

Energy use and supply is of utmost importance to society and, with the possible exception of agriculture and forestry, has made the greatest impact on the environment of any human activity- a result of the large scale and pervasive nature of energy related activities. Although energy and environment concerns were originally local in character - for example, problems associated with extraction, transport or noxious emissions - they have now widened to cover regional and global issues such as acid rain and the greenhouse effect. Such problems have now become major political issues and the subject of international debate and regulation. The focus of the most of the studies on energy and environmental issues focus on the depleting fossil fuels, how the extraction process affect environment and then the polluting omission from factories and motor vehicle when these fossils are used. The popular alternative energy resources such as hydroelectric power stations, Nuclear power plants and thermal power plants are generally discussed at the time of any disaster related these sources. The paper is examining the environmental impact of these energy alternative energy generation technologies.

FOSSIL FUELS

Fossil fuels 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 economic 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.

The cleanest fossil fuel, natural gas, is used in electric production, as a raw material in industry and process electric energy. Why the fossil fuels like coal, petroleum and natural gas cause climate change is that sera gases such as CO2 and methane resulting from the combustion process keep heat in their structure. The sun gives heat and radiation in atmosphere

from sunrise to sunset. For continuance of the natural cycle, this heat must be retransferred to the space. However, sera gases resulting from the fossil fuels cause keeping of some part of the heat in atmosphere. In this manner, the world begins to heat and change the climate.

HYDROELECTRIC POWER PLANTS AND 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 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-economic and cultural effects. The water collecting part of a hydroelectric power plant 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 n 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. However, unless the natural resources and historical assets in the region are protected, cultural values may disappear.

THERMAL POWER PLANTS AND 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 [1, 10]. The environmental effects resulting from the energy resources used in thermal plant plants are as follows; Air pollution, Water pollution, Soil pollution, Effects of thermal power plants on living beings and their effects on land use.

NUCLEAR POWER PLANTS AND 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, retreatment 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 effect from the radioactivity arising from nuclear power plants by means of both ways.

CONCLUSION

The nature has resources and opportunities sufficient enough enabling people to live in balance without giving damage to the environment and even, to obtain comfortable life level by being industrialized. Unless we destroy the natural balance by giving as much as we take to the nature, if we give back what we take from environment under same conditions, give opportunity and time for reestablishment of natural balance, the nature will renew itself and compensate its lacking component. The renewable energy use is an option that increases variety in energy resources, may be replaced to fossil resources, decreases foreign dependency in fossil fuels as it is domestic, important in electric supply in rural areas and solves the air pollution sera - gas problems by being used in place of fossil fuels. Whatever its kind is, the energy production systems have an effect on environment.

The solar and wind energies that do not have any negative effect on environment is hoped to be used economically in production of electric energy in long-term. The hydroelectric

energy potential that does not have any negative environmental effect, except the agricultural lands staying under water, must be re-determined in a realistic manner by considering the new technologies. Consumptions of fossil fuels in energy production and other applications continue in its today's speed, it is clear that the ecological balance of world will be destroyed. According to the study of Frankfurt University Meteorology Institute on sera effect, it is forecasted that there will be temperature changes until 2040; 10°C in Pacific, 8°C in the Bering Gulf, 6°C in Japan, 4°C in Siberia and Antarctica and -2°C in West Africa. While restricting the use of fossil fuel energy resources, the clean energy technologies that pollute the environment less or have no polluting effect must be considered and developed. Otherwise, it will be impossible to prevent degeneration of ecological balance and arising of some disasters to be experienced by people. On the other hand, to give up energy consumption as it causes environmental pollution is to abandon the benefits of economic development. The important thing is to find optimum solution by considering the positive and negative sides of resources. For this purpose, the environmental priorities must be considered in research and development studies, selection of technologies and energy planning, their determination must be made correctly and be in a manner to realize the determined targets in long-term. Besides, development of alternative energy resources that may make contribution in solution of environmental problems created by energy in recent years and especially, may decrease the consumption of fossil fuels must be given priority.

The following criteria to minimize the environmental pollution must be paid attention; minimize the usage of fossil fuels, maximize the reliability of nuclear fuel technology and rapidly substitute new and renewable energy resources in place of that energy, maximize the production of hydraulic geothermal energy, mainly the solar and wind energies, as much as possible. Put the vegetable energy resources into

operation as much as possible with a rational method, develop and apply the energy usage systems and methods, avoid extravagancy in energy use as much as possible and try to find saving ways.

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