

# Impact of Wind, Solar & Geothermal Energy on Environment

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## Manuscript Details

Available online on <http://www.irjse.in>  
ISSN: 2322-0015

Editor: Dr. Arvind Chavhan

## Cite this article as:

Pagare Santosh Ram. Impact of Wind, Solar & Geothermal Energy on Environment, *Int. Res. Journal of Science & Engineering*, January 2018, Special Issue A4: 59-61.

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## ABSTRACT

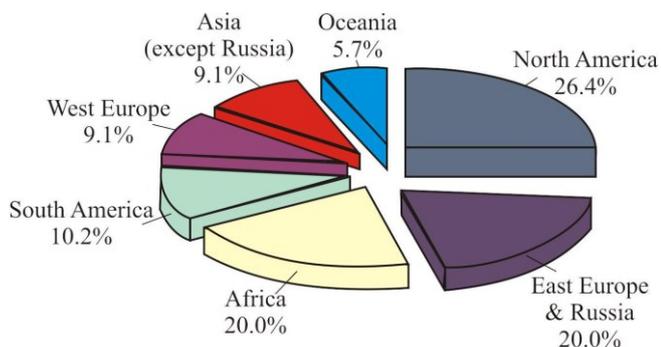
Today, prevention of environment pollution and conservation of environment have a dimension exceeding national borders. The risks that result from using of fossil fuels increasingly (petroleum, coal, gas) must be decreased (air pollution, thinning of ozone layer, acid rains etc). To decrease such risks, besides to increasing of energy productivity, energy resources that emit less sera gas in the atmosphere (like Carbon-dioxide (CO<sub>2</sub>)) 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.

**Keywords** Energy, renewable energy. Environment.

## THE WIND ENERGY

The wind energy is a clean energy resource that may contribute to the usual energy production as an energy resource under suitable conditions. There has been esteemed that until year 2017, the windmills installed capacity, should cover up about 10% of the planet's electrical energy needs. Energy to be obtained from wind completely depends on the speed of wind and blowing period. The wind is a reliable, continuous and determinant resource. The wind plants may require a wide area for turbines.

They are noisy and cause bird deaths and make parasites on radio and TV receivers. For this reason, in many European countries, mainly in England, the wind turbines are banned to be installed within boundaries of national parks or nearby to them because of their environmental effects. The wind energy is one of the clean energy resources and has positive effects on environment. A 500kW wind turbine realizes the CO<sub>2</sub> cleaning process equal to 57000 trees.

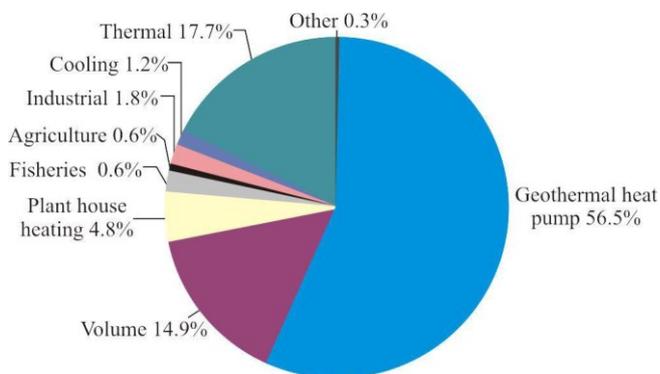


## GEOHERMAL ENERGY

It is defined as hot water, vapor and gases arising from the heat accumulated in various depths of the earth crust and of which temperatures are above the atmospheric temperature. The geothermal energy is the heat potential accumulated extraordinarily in accessible depths of the earth crust that can be benefited economically. This energy is a clean renewable energy. By aid of the energy transformation technologies, electric production is realized from hot water and vapor or they are directly used for purpose of heat energy. The waste fluid of which energy is benefited is re-injected to underground because of its negative environmental effects. As many countries that use geothermal energy apply re-injection, geothermal energy is considered the most positive energy resource in respect to environment. When geothermal energy is used in electric production, it comes before fossil fuels with its almost zero waste even though it is only evaluated with sulfide emissions. In geothermal power plants, azoth oxide emissions have much lower values than the power plants that use fossil fuels. For this reason, geothermal power plants are considered as a clean energy resource as they are classified risk free in respect to its effect on ozone layer and health. 27% of total electric

production in Philippines and 7% in California State are being covered from geothermal plants and 56MWe - capacity geothermal electric energy production is made in Papua New Guinea. 75% of energy need of gold mining is covered from geothermal. 86% of total heat energy (city heating) in Iceland is covered from geothermal.

Among the advantages of geothermal energy there are; it is environment friendly, it does not need fossil energy to heat and vaporize water and it uses natural resources. One of the disadvantages of geothermal energy is that it requires re-injection because of emission of gases like hydrogen sulfide and carbon dioxide. In Figure 1, usage areas and rates of geothermal energy other than electric production are given



## SOLAR ENERGY

It is an energy resource that comes from the sun, has a fixed force out of the atmosphere of world (1370 W/m<sup>2</sup>) and varies between the values of 0-1100 W/m<sup>2</sup> on earth. The solar energy is clean, costless and limitless. Firstly, the solar energy was used as heat energy but in recent years, it is also being used as an electric energy together with the developed technology.

The electric energy is being obtained by means of solar panels and photovoltaic (PV) cells with decreasing costs day by day. The conventional PV generation systems have two big problems that the efficiency of PV system is very low, especially under low irradiation states and the output available power of PV system is always changing with weather conditions, i.e., the intensity of the solar radiation (irradiation) and ambient temperature. In order to extract as much energy as possible from a PV system,

it is important to have an efficient maximum power point tracking algorithm. In developing nations, the PV generate system is expected to play an important role in total electrical energy demand, and solar photovoltaic energy has gained a lot of attention because it is renewable, friendly to the environment, and flexible for installation. The solar energy is inconsumable energy resource that does not cause environment pollution. Because of the increase in fuel prices experienced in recent years, the solar energy that was not considered economical a few years ago has become very economical in some usage areas. The solar energy, alternative to energy resources like petroleum and coal, is highly promising.

Among the advantages of solar energy, there are; it uses solar energy, prevents unnecessary and excessive commercial energy consumptions of buildings by using the natural heating and cooling systems, uses natural and harmless materials, meets the energy need in areas lack of electric network, is continuous, economical and not foreign dependent. The disadvantages of solar energy are; its first investment cost is very high and PV cells operating in low output. The environmental problems created by technologies that ensure using of solar energy are unimportant when compared to other technologies. Effect of planar collector systems on environment is in negligible level. However, in some conditions, there may be dangerous situations in respect to health because of high temperatures and poisonous heat transformation fluids.

## 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.

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

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