Impact of Green Technology over Environment

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ABSTRACT: ***It is critical that various researchers and practitioners have done studies on effective green building models. Global environmental destruction has compelled society to reconsider its growth path and evolve philosophy of development. The environment friendly innovations are, without a doubt, critical to achieving long-term development. Several sustainable initiatives have been taken for reducing the usage of the fossil fuels. Various green projects are being undertaken in order to protect and enhance the sustainability of the ecosystem that will thrive in the future resource effective and sustainable thought world. The importance of existing environmental issues, the newfound awareness of shared environmental priorities, and the basic role of science & technology, and particularly green technologies, in the field of assessing and reacting to environmental challenges all provide promise for the wide-world activity in the use of science and technology to solve problems related to environment. The aim of analysis done in the proposed paper is to look at the presumption that there are issues with evaluating the green building developments and energy conservation in developing countries in terms of their efficacy. Various forms of green technologies, as well as their effects, are discussed in this paper.***

KEYWORDS: Environment, Energy, Green, Sustainable, Technology.

INTRODUCTION

The word "green technology" refers to technology that is considered environmentally friendly due to its production process or supply chain. The use of alternative sources and technology that are less harmful to the atmosphere than fossil fuels [1] is referred to as green energy. In simple words, the use of renewable fuels and technology that are less detrimental to the atmosphere than fossil fuels is referred to as green energy generation.

The green technology also known as adaptive technology, takes into account a product's long- and short-term environmental impacts. Green products are, by implication, environmentally friendly. Energy saving, recycling, health and safety challenges, natural fuels, and other considerations that go into making a green product or technology. Green technology is a wide term which relates to a need of technology & science to the creation of ecologically friendly services and goods. Green technology is comparable to renewable energies, that relates to items or processes which improve operational effectiveness by slashing costs, improving energy efficiency, cutting emissions, or limiting harm to the environment. After the invention of the steam engine, the world has experienced dramatic climate change, including extreme droughts, accelerated loss of freshwater supplies, seawater acidification, rising seawater temperatures, the rapid proliferation of pathogens & macroparasites, and species extinction. Green energy is the best possibility for combating the consequences of deforestation and climate change.

Natural resources are limited in the world, and some of them have already been depleted or ruined. Household batteries and electronics, for example, also contain hazardous substances that pollute soil and groundwater, which cannot be eliminated from our drinking water sources and end up in food crops and animals raised on polluted land. The dangers to one's wellbeing alone are enormous. Starting in the 1960s, Since the earlier, 19th century companies have attempted to reduce their detrimental ecological consequences by modifying industrial techniques to produce extra byproducts. Green technology, on the other side, did not truly take off as a marketable area until the 1990s.After 1990s, the industries focused on the use of the inventions related to the green technology. Starting in the 1960s, Manufacturers have aimed to mitigate their harmful environmental effects on environment. The green technology helps to reduce usage of the fossil fuels in order to reduce the damage done to the human beings, animals and plants. The green technology reduces the waste and pollution that is caused due to the usage of fossil fuels. The green technology plays a vital role but in some aspects it is limited to the specific areas.

1. *Green technology impact over infrastructure construction industry:*

Due to the immense development of the infra-structure construction industry, depletable earth resources such as dirt, sand, stones, timber, and other natural resources are under considerable strain. The production of construction materials has an irreversible effect on the environment. The best way to construct an environmentally sustainable structure is to use environmentally friendly construction materials. The standards mentioned below can be used to classify green materials [2].

Use of localized materials: The cost and energy consumed in transporting the material used in constructing an infrastructure can be effectively reduced. The locally accessible goods can be used wherever possible to reduce the amount of resources used in transporting construction materials. Transportation energy should be calculated as the average energy expended moving goods from the point of manufacture to the point of consumption. Reduce in the energy consumption in transporting the materials reduces the overall cost of the material as well as the gas emission caused by the transportation.

Use of the recycled material: Building materials can be made from both recycled and non-recyclable materials. Recycling products benefits the atmosphere and the economy in a variety of respects. One important result is that it reduces the need for fresh, non-renewable materials in manufacturing, saving scarce resources, electricity, and the costing. The waste materials that may otherwise ended up in landfills during their usable life will now be reprocessed and reused in other products. A variety of waste products used for infrastructure construction purpose, including blast furnace slag, dirt, waste glass, dust of marbles, cinder, husk of rice and coconut, leaves of banana, fibers of jute, vehicle tyres rubber, and so on.

Impact of making energy efficient buildings: Building construction and service consume a large portion of the total energy generated. Designers and engineers will reduce energy loads on buildings with a few diligent steps, lowering energy needs and putting less pressure on natural resources. Proper building orientation in relation to solar radiation for optimum day lighting, windows that are operable for cross-ventilation which is available naturally, use of passive cooling methods which eliminates or reduces need of air conditioning), insulation of roof, water-saving systems, and more energy-efficient appliances will also help to reduce energy consumption. Alternative energy sources such as wind, solar, and tidal power might be employed to minimize reliance on traditional fossil fuels.

Durability of the materials used for construction of the infrastructure: During the production process, as well as disposal after life's end, all building materials must not affect the atmosphere, pollute air and water, or inflict harm to earth, its residents, or habitats. Non-toxic materials should be used, as well as those that lead to improved indoor air quality. Every year, billions of tones of raw materials are used in agricultural manufacturing around the world. Pollution from product excavation, refining, use, or waste may far-reaching effects on environment of the Earth's. Every year, poor indoor quality of air caused by VOC emissions can costs businesses billions in bills of medical and reduced efficiency.

DISCUSSION

1. *There are several forms of the Green technology as discussed below:*

1.1.Solar power:

Simply stated, solar radiation is the most available energy supply on the planet. In any given moment, almost 173,000 terawatts solar energy hit the Earth, that is greater than ten thousand times the overall energies need for the world.

The solar energy generation system contains solar panels which can be multiple in numbers depends on the requirement in order to generate the electricity. A bundle of several cells form a solar panel, and multiple panels that are connected in such a manner that they form a solar array. Extra solar panels are connected in array, the more electricity will be generated by them. As atoms collide with photons in a solar cell, the shook loose are electrons. Due to the fact that conductors are linked to both sides of a cell (positive and negative), an electrical circuit is created. Electricity is emitted as electrons pass through a circuit like this.

The ideal conditions for producing solar energy require a bright sunshine day. Solar panels, such as many electricals, are more effective in winters than in summers due to the incident sunlight on them. The panel generates more energy in the same period of time as a result of this. The panel absorbs less voltage and consumes less power as the temperature increases. Solar panels are effective in winters, but they do not usually generate more energy in the winters than they do in the summers. Over the summer, the temperature is usually higher. Aside from less showers, the sun is generally up for a longer period of time due to which the solar panels generate more energy in the summer as compared in the winter.

In a solar cell, as the electrons get collision with the photons, they shake out. As the photons strikes the cell, the electrons present in the valance shell gets excited and jumps into the conduction band which allows the electric current to flow in the conductors.). An electrical circuit is created due to the fact that conductors are linked to both sides of a cell (positive and negative. Electricity is emitted as electrons pass through a circuit like this.

Solar panels with photovoltaic (PV) technology are produced by the bundles of solar cell. And, this solar cell is produced by semiconductors such as silicon. They're made up of a positive and negative layer that work together to produce an electric field, much like a battery. PV solar panels generate direct current (DC) electricity. One directional flow of electrons around a circuit of DC electricity. A light bulb is powered by a battery in this case. The electron travel from the negative side of the battery to the positive side after passing through the lamp by which the lamp will be activated. Further, in order to get the alternating current supply, an inverter can be used for converting direct current into alternating current which is further used for providing electrical supply for the alternating current powered appliances.

The DC electric power from solar arrays is converted to AC electric power by a solar inverter. Inverters are the main part of these machines as they convert the direct current into alternating current. They provide ground fault safety and system statistics, such as current and voltage. In addition to inverting DC-AC power, DC & AC circuit, energy output, and overall powerpoint monitoring are also included. From the beginning, solar industry is dominated by the central inverters. One of the most significant technical changes in the industry has been advent of micro-inverters. Micro-inverters, unlike central inverters, customize for each individual solar panel rather than the entire solar system. This allows each solar panel to reach its full capacity. When using a central inverter, an issue with one solar panel will affect the entire solar array's output.

During daylight, the photons which strike the surface of the solar panels excite the electrons of the panels and these electrons starts flowing in the conductors which cause a current to flow inside the conductor. The current is stored in the battery and further converted into the alternating current by an inverter as means of using it for various purposes.

1.2.Wind energy:

Wind power is a process of harnessing wind to produce mechanical or electrical energy. Wind turbines convert the kinetic energy of the wind in to mechanical energy. The generated mechanical energy can be used for everyday tasks (like grain grinding or water pumping) or turned into electricity by a generator.

The load and size of a wind turbines is depends on the purpose of the usage and the amount of energy required for fulfilling that purpose. Residential onsite energy usage necessitates a small turbine (typically less than 10 kW) capable of generating the amount of electricity required by the home on a regular basis. Larger industrial onsite loads can be met by midsize machines that provide enough electricity. Utility-scale machines are ideally designed for utility-scale projects because they optimize generation while minimizing site infrastructure footprint and expense.

For fulfilling the residential requirements, Small residential turbines provide almost the same amount of electricity as a typical home. Since these turbines are often mounted on shorter poles, a site assessment is required to decide where the plant should be sited to ensure that it can work as intended. Many states provide tax breaks for this kind of unit in order to encourage the usage of the green technology. Usually, a comprehensive onsite resource assessment is not needed for residential-scale wind turbines.

The turbines used for small scale utilities (10 kW- 50kW) generates more energy than the average home installed turbines, but it is well suited for small businesses, farms, ranches, classrooms, office buildings, a portion of a premises, a public load as a hospital. These types of turbine usually has a higher degree of system complexity, which results in higher efficiency and power output but often requires more maintenance. These turbines, on the other hand, usually need less upkeep than larger machines.

For larger scale utilities the wind turbine have to generate industrial amounts of energy and is well suited to campuses, larger buildings, cities, and local public loads. This kind of wind turbine has much of the same technological and operating characteristics as utility-scale turbines, and it's often mounted on towers that require special approvals and cooperation with other regulatory bodies.

1.3.Hydropower energy:

The hydropower energy is basically generated by placing the blades which are connected by a turbine in front of the water stream. As the water hits the blades of the turbine with an extreme pressure, the blades get rotated and which results in the rotation of the wheel on which the blades are connected. The rotational motion of the wheel is transferred to the turbine which results in the generation of the electrical energy. The size and shape of the set up depends on the load of the work as per the user's requirement.

Hydraulic energy is the energy generated by water deposited in high-altitude lakes and rivers (so that it has gravitational potential energy). If it goes below a certain threshold, the energy is transformed from potential to kinetic energy, which is then converted to electrical energy in a hydroelectric plant. Hydroelectric power stations usually have a water tank, a gate or valve to manage the amount of water that comes out of the reservoir, as well as an exit or point where the water flows downhill. Only until water goes over the top of a dam or runs down a precipice does it develop latent energy. As water travels downhill, potential energy is transferred to kinetic energy. As water travels downhill, potential energy is transferred to kinetic energy, and is used to produce electricity. The impoundment facility is the most typical of the three forms of hydroelectric energy plants. The dams typically utilized to restrict the water flow gathered in a lakes or reservoirs in an embankment plant. Water is discharged from the dams if extra electricity is required. Gravity pulls you down. Gravity takes control whenever the liquid is freed, and the water comes downwards it in to a rotor. The turbine's blade rotates, and the electricity is generated.

A diversion facility is also a type of hydroelectric energy plant. This plant is un-usual as it do not have a dam for storing the water. Instead, running water of river is channeled into a canals system to the generators which control the turbines. A pumped storing station is indeed the third type of hydraulic plant. Such kind of plant captures and retains sun, winds, or nuclear-generated energy for later consumption. The plant gathers energy by pushing water uphill from a low latitudes' container to a greater height container. Water from the top pool is released whenever there is a high requirement for electricity. This water floats up to the generator from the higher hill with a great amount of gravitational potential energy in order to convert it into electricity by the help of the generator.

1.4.Geothermal Energy:

Geothermal radiation is heat that comes from under the earth's crust [3]. It may be discovered in crystal and liquids underneath the earth's crust, as well as in lava (hot magma). Underwater reservoirs have mile-deep wells sunk into them to tap hot water and steam, which can then be utilized to power turbine linked to energy generator. The 3 kinds of geo-thermal power plants are dry steams, flashes, and binary geo-thermal power plants. Dry steams, which collects steams from the earth and utilizes it to straight drive a turbine, is the oldest type of geothermal technology. Whereas binary plants move high-pressure warm water to cooler and reduced-pressure water, flash plants transmit high-pressure warm water to a secondary fluid with such low boiling points. that diffuses as vapors and propels the turbines.

It may be found in minerals and fluids underneath the earth's surface, as well as in magma, which is a boiling molten lava. Underwater ponds have mile-deep wells bored into them to obtain steam and hot water, which may subsequently be utilized to power turbines coupled to energy generators. The 3 kinds of geo-thermal power plants are dry steams, flashes, and binary geo-thermal power plants. Dry steams, which collects steams from the earth and utilizes it to straight drive a turbine, is the oldest type of geothermal technology. Whereas binary plants move high-pressure warm water to cooler and reduced-pressure water, flash plants transmit high-pressure warm water to a secondary fluid with such low boiling points. that diffuses as vapors and propels the turbines.

Since 1913, the technique for producing energy from high permeability hydrothermal reservoirs has remained steady. Many of today's power plants are dry steam that uses temperatures of more than 180°C to generate electricity. However, thanks to the advancement in the binary cycle technology, which uses geothermal fluid to heat a fluid processed in a closed loop using heat exchangers, fields of medium temperatures are increasingly used for generation o energy or combined power and heat. New technology, such as Enhanced Geothermal Systems (EGS) are also being developed and are in the demonstration stage.

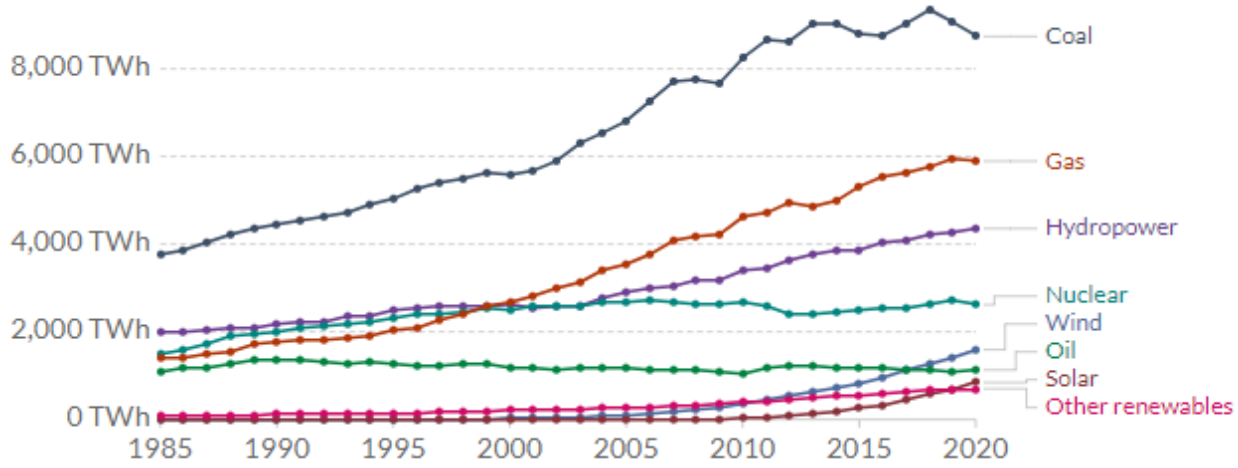

Figure 1: The figure illustrate the data regarding usage of various resources including coal, gas, hydropower etc. to generate electricity in the world.

The usage of the coal to generate electricity in the world has been gradually increased as illustrated in the Figure 1. As it can be seen clearly from the figure that the usage of the green resources such as gas, hydropower, wind and solar is also been gradually increased which is very effective by means of saving the natural environment by reducing the usage of the fossil fuels.

Green energy is good for the environment because it replaces the negative effects of fossil fuels with environmentally renewable alternatives. Green energy is frequently both renewable and clean, emitting no or few greenhouse gases and being widely available. Natural resources are used to make it. When a renewable energy source's whole life cycle is evaluated, it generates significantly fewer greenhouse gases and little to no air pollution than fossil fuels. Not only is this better for the environment, but it is also better for the health of humans and animals that must breathe the air. Because green energy is generally produced locally, it is less affected by geopolitical crises, market fluctuations, or supply chain disruptions, resulting in stable energy costs.

Economic advantages of the green energy include the advancement in the employment in the buildings constructions which support the areas where workforce are working widely. In 2018, the sustainable power industry provided 11 million jobs throughout the world, and this number is likely to climb as we push toward targets like net zero emission. The energy grid is more versatile and less reliant on centralized sources that can cause disruption, as well as being less vulnerable to weather-related climate change, due to the local nature of energy generation by sources such as solar and wind power.

CONCLUSION

Green energy works by emitting greenhouse gases, and green technology provides a lower-costs alternative for some zones of the ecosphere's energy demands. This will further improve as prices reduction, creation greener energy far more affordable, particularly in wealthy nations. For sustainable development, environmental preservation, resource management, and other socioeconomic issues must be addressed. Green policies for resource management and environmental sustainability would aid in maintaining the higher economic growth levels needed to meet critical needs while maintaining a reasonable quality of life in the future.

Only increased international recognition and large-scale improvements in production and consumption practices will lead to sustainable growth that is mindful of social justice and environmental health by enhancing the usage of the green technology rather than fossil fuels. Recognizing crippling and catastrophic effects of change in climate, nations all over the world promise to curb their carbon dioxide emissions and thereby minimize their exposure to the climate. Policymakers should recognize not only domestic economic issues, but also the significant science and technical obstacles that all countries face in order to progress toward sustainable growth.

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