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Renewable Energy for Sustainable Living

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Abstract: *Renewable energy is the energy that is derived from sources that are not depleted or depleted at a very lower rate when compared to their consumption. Recent years have seen a rise in interest in renewable and clean energy because of its promise to lower carbon emissions and encourage sustainable living. This paper emphasises the idea of clean, renewable energy and how important it is to encourage environment friendly living. As responsible citizen of the country we should believe in sustainable development, i.e, we should use our resources in such a way that the present needs can be fulfilled without destroying the opportunity for the future generations. It emphasises the use of renewable energy sources, including solar, wind, hydro, and geothermal, to produce electricity while cutting greenhouse gas emissions. The benefits of renewable energy, including enhanced air quality, less reliance on fossil fuels, and job development, are also covered in this paper. To accomplish this aim of a sustainable future, governments, businesses, and individuals must work together.*

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Definitions

According to the United Nations, "Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed. Sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us."

NCSEA (North Carolina Sustainable Energy Association) defines clean energy as energy derived from renewable, zero-emissions sources ("renewables"), as well as energy saved through energy efficiency ("EE") measures.

Green living, also known as sustainable living, is a way of life that aims to minimise how much a person or society uses both their own resources and the natural resources of the planet.

I. Introduction

The improvement of a nation's economy can be greatly aided by conventional energy sources based on coal, gas, and oil; but the negative environmental effects of these resources have forced us to use them in moderation and shifted our focus to renewable energy sources. The two most prominent challenges faced in using these resources is its depletion and adverse impact on environment. In contrast to renewable energy sources such as wind, sun, biomass, geothermal, and hydropower, fossil fuels are a limited, non-renewable natural resource. Although the process of creating fossil fuels by natural forces takes millions of years, at the current pace of use, the earth's surface's reserves will be depleted within a 300-year time frame (1750–2050). The depletion of fossil fuels by the 2030s is anticipated to have a negative effect on the world economy and political stability. A compelling body of research suggests that oil depletion is on par with climate change in terms of imminent cataclysmic problems. The main issue is the depletion of the oil that can be extracted at a reasonable price.

A change in average current weather conditions compared to what has been typical in the past is generally referred to as climate change. Climate change can be brought on by variations in natural elements including solar radiation, biotic activities, and volcanic eruptions. Yet, human actions such as the burning of fossil fuels and the alteration of natural landscapes, particularly through deforestation, are the main contributors to the climate change that is currently taking place and is popularly referred to as "global warming." The main gas responsible for this "greenhouse effect" is CO2, but other gases such as methane (CH4), nitrous oxide, ozone, and water vapour are also implicated. With growing concerns over climate change and environmental damage, renewable and clean energy sources have gained importance. By using renewable energy sources, which are thought of as environmentally friendly due to their low or zero emissions of exhaust and harmful gases, the social, environmental, and economic issues can be avoided. In this paper, we'll talk about the advantages of clean, renewable energy and how embracing it can further our efforts to live sustainably.

II. Benefits of using Renewable Energy

As the world progresses towards more ecologically friendly and sustainable energy alternatives, renewable and clean energy sources are gaining popularity. While clean energy refers to energy sources that emit little to no greenhouse gases, renewable energy is energy that comes from renewable natural resources including sunshine, wind, water, and geothermal heat. In this section, we'll go through the advantages of utilising clean and renewable energy sources.

1. Decreased emissions of greenhouse gases:

The decrease in greenhouse gas emissions is one of the main advantages of employing clean and renewable energy sources. The most widely utilised energy sources, fossil fuels, discharge a lot of carbon dioxide and other pollutants into the atmosphere, which causes climate change. On the other hand, renewable energy sources are cleaner and more eco-friendly because they emit little to no greenhouse gas emissions.

2. Enhanced Water and Air Quality:

Poor air and water quality have also been connected to the use of fossil fuels. For instance, burning coal and oil releases dangerous chemicals that may have a negative effect on both human health and the environment. As they don't emit any pollutants, renewable energy sources like wind and solar power can enhance the quality of the air and water and improve people's health.

3. Sustainability:

Because they are produced from naturally replenishing resources, renewable energy sources are also more sustainable than fossil fuels. On the other hand, fossil fuels are limited resources that will eventually run out. We can guarantee that we have a dependable energy source for future generations by investing in renewable energy sources.

4. Cost-Effective:

Renewable energy has substantially lower recurring expenses than fossil fuels, despite the fact that the initial investment in infrastructure can be larger. For instance, solar energy has become a more affordable choice for many households and companies as its cost has reduced dramatically over the years. The cost reductions linked to renewable energy over time may be substantial.

5. Creating Jobs:

The possibility to create jobs is another advantage of using clean and renewable energy sources. A trained workforce is required to develop, construct, and maintain the renewable energy infrastructure as the sector expands. This might open up new employment opportunities and support economic growth.

6. Energy Independence:

Renewable energy sources can also promote energy independence, as they are often produced locally. This can reduce our reliance on foreign oil and gas and help to strengthen local economies. It also makes our energy supply more resilient, as we are not as vulnerable to supply disruptions.

Challenges of Using Renewable Energy

As the globe moves towards more ecologically friendly and sustainable energy options, renewable energy sources like wind, solar, hydro, and geothermal power are gaining popularity. Although these energy sources have many advantages, there are also some drawbacks that need to be taken into account. We'll talk about a few of the drawbacks of using renewable energy here.

1. Energy storage difficulties

Energy storage is a problem for renewable energy sources as well. Renewable energy sources are dependent on immediate energy consumption, in contrast to fossil fuels, which can be stored and used as needed. So, extra energy must be stored for later use, which can be challenging and costly.

2. Problems with reliability

As compared to conventional energy sources, renewable energy sources can be less dependable. For instance, foggy or overcast days may prevent solar panels from producing electricity, while periods of low wind speed may prevent wind turbines from producing electricity.

3. High initial outlay

The significant initial expenditure needed to set up renewable energy infrastructure is another drawback of renewable energy sources. Even though using renewable energy can result in significant long-term cost savings, some people and companies may find the initial costs to be prohibitive.

4. Land Use Problems

Infrastructure for renewable energy also needs a lot of land, which might be difficult in places where there isn't much available. Examples include the need for massive wind farms or solar panel arrays, which can affect natural ecosystems and wildlife habitats.

5. Production of Intermittent Energy

Renewable energy sources' intermittent energy output is one of their main drawbacks. For instance, solar panels only produce electricity in the daytime and wind turbines only produce electricity when the wind is blowing. This can make it difficult to rely only on renewable energy sources to meet our energy needs since, at periods when renewable energy production is low, we might need to augment them with other energy sources.

Renewable energy sources provide many advantages, but there are also certain drawbacks that need to be taken into account. They include the production of intermittent energy, high initial investment costs, problems with land use, difficulties with energy storage, and reliability issues. In spite of these difficulties, renewable energy sources are still a vital part of the global transition to a more ecologically friendly and sustainable energy system. We can work towards a more sustainable future by tackling these issues and keeping up our investments in infrastructure for renewable energy.

Indian Government's Initiatives to promote Renewable Energy Ecosystem

The Indian government has also started a number of programmes to encourage the use of renewable energy throughout the nation. Among the significant projects are:

1. **The National Solar Mission**, which was established in 2010, intends to advance the research and application of solar energy for the production of electricity.

2. **The National Wind Mission** was established in 2014 with the goal of advancing and promoting wind energy in the nation.

3. By establishing specialised transmission lines for renewable energy installations, the **Green Energy Corridor initiative** seeks to boost the transmission infrastructure for renewable energy.

4. **The International Solar Alliance** was established in 2015 with the goal of encouraging the use of solar energy in the nations located between the Tropics of Cancer and Capricorn.

5. **The National Bioenergy Mission** was established in 2018 with the goal of promoting the use of biofuels and other bioenergy sources.

6. **BMKS (Pradhan Mantri Kisan Urja Suraksha evam) PM-KUSUM Utthan Mahabhiyan** programme, which was started in 2019, aims to install solar pumps and solar power plants that are connected to the grid in rural areas.

7. **Atal Jyoti Yojana**: Introduced in 2018, this programme intends to give rural households access to solar-powered lights.

8. **Solar Parks:** To encourage the growth of solar power projects, the government has established various solar parks throughout the nation.

These programmes have assisted India in becoming one of the world's markets for renewable energy that is expanding the quickest.

India's Achievements in the Renewable Energy Sector

Throughout the past few years, India has made important advancements in the field of renewable energy. Among the noteworthy accomplishments are:

1. **Installed Renewable Energy Capacity**: According to the stats released by Ministry of New and Renewable Energy, India ranks 4 in terms of Total Renewable Energy Installed Capacity. The country as on 31.10.2022 had an installed capacity of 172.72 GW that came from non-fossil fuel sources. Of total installed generation capacity in India, 42.26% is contributed by the non-fossil fuel sources. The country has added 14.21 GW of Renewable Energy capacity during Jan to Oct 2022 as compared to 11.9 GW during the same period in 2021. Also, India achieved a total capacity addition of 1761.28 MW of wind energy during the same period.

2. The 2.2 GW Bhadla Solar Park in Rajasthan is the largest solar power plant in the world, and it is located in India.

3. **Lowest Solar Tariffs:** India has attained some of the lowest solar rates worldwide, with prices expected to reach INR 1.99/kWh ($0.027/kWh) in 2020.

4. A 500-kW installation serving as India's first floating solar power plant was put into operation in Kerala in 2017.

5. India is the fourth-largest market for wind power in the world, with a total installed capacity of more than 41 GW as of January 2023.

6. India was a key contributor to the creation of the International Solar Alliance, which aims to encourage the use of solar energy in the nations located between the Tropics of Cancer and Capricorn.

India has made remarkable strides in the field of renewable energy, and the nation has set an ambitious goal of developing 450 GW of renewable energy capacity by 2030. If accomplished, India would become a world leader in renewable energy.

In conclusion, adopting clean and renewable energy is a huge step towards living sustainably. We may lessen our carbon footprint and lessen the negative consequences of climate change by utilising these energy sources. The promise of these energy sources is demonstrated by the recent, rapid rise of renewable energy, which has been fuelled by governmental initiatives and technology advancements. In order to create a sustainable future where renewable energy is the main source of power, it is now up to individuals, communities, and governments to collaborate. We can create a more durable and sustainable world for ourselves and for future generations by adopting renewable and clean energy.

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