

IMPACT AND ROLE OF SOLAR ENERGY IN SUSTAINABLE DEVELOPMENT IN INDIA

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ABSTRACT

Extensive fossil fuel consumption in almost all human activities led to some undesirable phenomena such as atmospheric and environmental pollutions. Consequently, global warming, greenhouse effect, climate change, ozone layer depletion and acid rain started to appear frequently. In order to avoid further impacts of these phenomena, the two concentrative alternatives are either to improve the fossil fuel quality or more significantly to replace fossil fuels with environment friendly, clean and renewable energy sources. It must be the main and common purpose of humanity to maintain environment for the betterment of future generations with sustainable energy developments and the known limits of fossil fuels force the societies of the world in the long run to work jointly for their continuing replacement by renewable energy alternatives rather than the quality enhancement of fossil sources. Among these renewable sources, solar energy comes at the top of the list due to its abundance, and even distribution in nature. Solar energy is environment friendly and a green energy source. Furthermore, it has identified the contributions of solar energy applications in creating jobs opportunities and enhancing ecological protection. Lastly, the standpoint of solar energy technology is drawn up in the application of the energy sector and affords a vision of future development in this field.

KEYWORDS : Solar Energy, Solar Energy Applications, Sustainable Development.....

INTRODUCTION

In recent years, the fastest growing thing is the energy requirement by the world, with the decrease in the conventional resources. The most difficult thing in front of the world is how to accomplish the necessity of energy. Due to the inadequacy of the conventional resources, the world has to think about the alternate sources of energy. Nowadays most of the countries are emphasizing the development of renewable energy resources. In the

renewable energy resources, solar energy plays an important role and it is a marvelous source of energy. Solar energy is energy derived from sunlight. The amount of sunlight that reaches the earth's atmosphere is adequate to power all of our needs. The solar energy hits the earth continuously, which is more than 15,000 – 20,000 times the world's total energy consumption. The sun is the planet's most powerful and most unused source of energy by humans. The sun is a free, sustainable, clean resource we can use in place of conventional electricity to command our lives. Solar energy can be used to provide heat, light, and other electricity-dependent needs.

In launching India's National Action Plan on Climate Change on June 30, 2008, the Prime Minister of India, Dr. Manmohan Singh stated: "Our vision is to make India's economic development energy-efficient. Over a period of time, we must pioneer a graduated shift from economic activity based on fossil fuels to one based on non-fossil fuels and from reliance on non-renewable and depleting sources of energy to renewable sources of energy".

In this strategy, the sun occupies center-stage, as it should, being literally the original source of all energy. We will pool our scientific, technical and managerial talents, with sufficient financial resources, to develop solar energy as a source of abundant energy to power our economy and to transform the lives of our people. Our success in this endeavor will change the face of India. It would also enable India to help change the destinies of people around the world.

The National Action Plan on Climate Change also points out: "India is a tropical country, where sunshine is available for longer hours per day and in great intensity. Solar energy, therefore, has great potential as a future energy source. It also has the advantage of permitting the decentralized allocation of energy, thereby empowering people at the grassroots level".

IMPORTANCE OF SOLAR ENERGY

As the world fights with the challenges of climate change and the burning need for sustainable energy sources, solar power is a valuable resource for both our present and future. The points which show the importance of solar energy in our daily are as under:

I. Renewability and Sustainability

Unlike fossil fuels, which are limited, the sun is an everlasting source of energy. This makes solar power a sustainable and renewable source of energy, ensuring that we do not run out of it in the anticipated future.

II. Financial Benefits

The cost of solar panels has dropped over the years, and the considerable decrease in upfront costs makes solar power a more reachable option for many. This allows individuals and communities worldwide to harvest the financial benefits of solar energy, including reduction in electricity bills, low continuation cost.

III. Energy Independence

Dependence on solar energy reduces dependence on overseas oil and imported fossil fuels, promoting energy security for nations. It also allows homeowners and businesses to lessen their dependence on the energy network.

IV. Minimal Maintenance Required

Regardless of the fact that photovoltaic panels do slowly become less efficient, with a useful lifetime of 20-25 years, the kind of post-installation safeguarding required is similar to that of a regular electrical system, with the addition of some episodic cleaning and little else, so maintenance is negligible.

V. Green until the End of Life

Solar panels are really practical, not only in the setting up stage, but also when it is time to remove or change them. They are generally easy to dismantle and the equipment's used in them can be reclaimed, recycled and reused, further sinking the ecological impact of this kind of energy.

VI. Non – Contaminating

Solar energy does not release poisonous substances or noxious waste into the air, which can be very harmful to the environment and to human beings. Poisonous substances can acidify land and water ecosystem and corrode building. Air pollutant can cause heart disease, cancer and respiratory diseases like asthma. Also solar energy does not generate waste or pollute water an extremely vital factor given the insufficiency of water.

VII. Create Wealth and Jobs

In addition, solar energy is “native” energy, because it is accessible almost everywhere on the planet, which contributes to reducing energy imports and to create wealth and local employment.

IMPACTS OF SOLAR ENERGY AND SUSTAINABLE DEVELOPMENT IN INDIA

India, a swiftly rising nation, is witnessing a flow in energy demand due to its growing population and increasing economy. To meet up this demand, the country is progressively turning to renewable energy sources (like water energy, wind energy, tidal energy, solar

energy), predominantly solar energy. Solar Energy is considered as a catalyst for environmental, social, and economic transformation.

1. Environmental Impact

❑ Reducing Greenhouse Gas Emissions

Solar energy is a clean and renewable source of energy that does not produce greenhouse gases. So, by replacing fossil fuels with solar energy, India can significantly diminish its carbon footprint and contribute to global efforts to fight climate change.

❑ Conserving Water Resources

Solar power generation requires nominal water usage compared to conventional energy sources like coal, petroleum and nuclear power plants. This is particularly important in a water-scarce country like India, where water resources are under enormous pressure due to population growth and climate change.

❑ Promoting Sustainable Development

Solar energy can support India's sustainable development goals by providing clean and affordable power to all, reducing air pollution, and promoting the efficient use of resources.

❑ Green Conservation

Solar farms, designed with biological considerations, reduce land use impact and can co-exist with local biodiversity, contributing to the protection and preservation of ecosystems.

2. Social Impact

❑ Electrification of Rural Areas

Solar energy can play a crucial role in providing electricity to remote and rural areas in India, where grid connectivity is often unpredictable or non-existent. Access to electricity will improve the quality of life for millions of people by enabling improved healthcare, education, and communication facilities etc.

❑ Empowering Women

Solar energy projects can make women powerful by providing them with employment opportunities and income-generating activities. For example, women can be skilled to accumulate, fix, and maintain solar products, or they can become solar entrepreneurs, selling solar-powered appliances in their societies.

❑ Advancing Health

Switching to solar energy reduce health risks connected with pollution from conventional energy sources. In healthcare services, reliable solar-powered electricity ensures continuous medical services, critical for community health.

❑ Ensure Food Safety

Solar-powered irrigation system and farming technologies can improve food production, predominantly in drought-prone areas, contributing to food safety and sustainable agriculture.

❑ Reducing Energy Poverty

Solar energy can help in improving energy shortage by providing inexpensive and clean electricity to low-income households. This will permit them to access necessary services, such as lighting, cooking, and heating, without incurring elevated energy costs.

3. Economic Impact**❑ Job Foundation**

The solar energy region has the potential to produce many job opportunities in India. As the business expands, there will be a demand for expert professionals in various roles, such as engineers, technicians, and sale representatives. This will contribute in reducing joblessness rates and boosts the nation's economy.

❑ Energy Safety

India can decrease its reliance on imported fossil fuels by investing in solar energy, which is subject to price fluctuations and geopolitical tension. This will improve the country's energy safety and save valuable foreign exchange reserves.

❑ Attract Investments

The Indian governments motivated solar energy targets and encouraging policies have fascinated considerable investments from both domestic and international players. This invasion of capital will rouse economic growth and create a competitive market for solar products and services.

❑ Addressing Metropolitan Energy Requirements

In metropolitan areas, solar energy reduces dependence on unsustainable power sources such as coal; LPG, kerosene etc., decreases pollution, and can yet eradicate urban heat islands, making cities more livable and sustainable.

CONCLUSION

Impact of Solar energy in achieving the Sustainable Development Goal is comprehensive and insightful. From powering homes and schools to driving financial growth and shielding the environment, solar energy is a key enabler of sustainable development. It's potential to transform communities and economies underscore the necessity of accepting this clean, long lasting and renewable energy source.

Further, solar energy has the potential to transform India's financial, social, and environmental landscape. By accepting this renewable energy source, the country can create jobs, improve living standards, and safeguard the environment for upcoming generations. As India continues to invest in solar energy, it will not only protect its energy future but also helps in emerging out as a global leader in the renewable energy region.

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