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AN ANALYSIS THE ROLE OF ECO-FRIENDLY ENERGY SOURCES

Dr. NAGARAJA POOJARI
Assistant Professor,
Dept. of Economics and Rural Development,
SDM College (Autonomous), Ujire. 574240
9900502422,
nagaraj.poojari@gmail.com

ABSTRACT
The rise in economic value throughout economy has strengthened both the industries as well as its people that eventually demands higher energy sources with optimal capacity and energy conversion ratio to meet personalized demands. Even being a mixed socio-economic stature, Indian people need cost effective and eco-friendly energy solution to meet its demands. Undeniably, in this industrial arena, electricity consumption has become one of the important indicators essential commodities for economic growth, development and livelihood of the people. The high expectation on the commodity for its continuous availability has increased the demand year after year whereas the supply is not matching the pace of the demand due to which there is a gap in between energy availability of facilitation and demands. To meet these demands in last few years' inclination towards using eco-friendly renewable energy sources has increased significantly and its exponential growth trend has been witnessed across the country

KEYWORDS:
Solar Energy, *environmental energy sources, and Demands for Clean and Sustainable Energy Source*

INTRODUCTION

Undeniably, in last few years, Indian economy has witnessed high pace growth and overall development across all socio-economic horizons. The rise in education, technologies, industrial revolution, economic growth, quality resource availability, foreign investment, policy enrichment and need based manufacturing growth and development has strengthened overall socio-economic index of India. This as a result has given rise to a modern Indian culture where an individual demands more efficient, productive and friendly solution. Exploring in depth, it can be found that Indian economy has been maintaining first rank globally in development and higher GDP globally since last two consecutive years that signifies pace of the economic development and customer's buying characteristics. The rise in economic value throughout economy has strengthened both the industries as well as its people that eventually demands higher energy sources with optimal capacity and energy conversion ratio to meet personalized demands. Even being a mixed socio-economic stature, Indian people need cost effective and eco-friendly energy solution to meet its demands. Undeniably, in this industrial arena, electricity consumption has become one of the important indicators essential commodities for economic growth, development and livelihood of the people. The high expectation on the commodity for its continuous availability has increased the demand year after year whereas the supply is not matching the pace of the demand due to which there is a gap in between energy availability of facilitation and demands. To meet these demands in last few years' inclination towards using eco-friendly renewable energy sources has increased significantly and its exponential growth trend has been witnessed across the country

OBJECTIVES

- To analysis needs of environmental energy sources.
- To analysis the Demands for Clean and Sustainable Energy Source

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METHODOLOGY

Need of Environmental Sustainability

While many individuals and communities have long recognized the damage that can be caused to the (human) environment and that of the plants and animals we share our planet with, it is only relatively recently this has been acknowledged globally. The air it (i.e., human) breathe and the rivers and oceans don't recognize local, national or even continental boundaries – so it is must for all take care of them for each other. For example, air pollution episodes in the UK are often made worse by air masses from the continent of Europe, litter lasts decades in oceans travelling the globe on ocean currents and industrial pollution and fertilizers have led to toxic algal blooms in the rivers and seas including those of China, the US and Europe. Looking after human environment is something it must all be a part of. There are many environmental projects promoting sustainable living – large and small, local, national and global – that one can participate in. Looking after environmental health is crucial to ensuring human lives, can all go green and can live healthy lives on a healthy planet. Individual or household environmental projects can include carrying out own environmental impact assessment to ensure it uses energy and water efficiently and make sure the food, furniture and clothing is from sustainable sources. To help make a difference to others in global community, there are numerous projects underway, which range from campaigns to for clean seas and beaches, to educating children about sustainable living and empowering women to support their communities and combat the impacts of climate change.

Sustainable Energy Sources

Sustainable energy is energy that is consumed at insignificant rates compared to its supply and with manageable collateral effects, especially environmental effects. Another common definition of sustainable energy is an energy system that serves the needs of the present without compromising the ability of future generations to meet their needs. Renewable energy is not a synonym of sustainable energy. While renewable energy is defined as one that is naturally replenished on a human timescale, sustainable (often referred to as 'clean') energy is one the use of which will not compromise the system in which it is adopted to the point of not being fit to provide needs in the future. The organizing principle for sustainability is sustainable development, which includes the four interconnected domains: ecology, economics, politics and culture. Sustainability science is the study of sustainable development and environmental science. Technologies promote sustainable energy including renewable energy sources, such as hydroelectricity, solar energy, wind energy, wave power, geothermal energy, bioenergy, tidal power and also technologies designed to improve energy efficiency. Costs have decreased immensely throughout the years, and continue to fall. Increasingly, effective government policies support investor confidence and these markets are expanding. Considerable progress is being made in the energy transition from fossil fuels to ecologically sustainable systems, to the point where many studies support 100% renewable energy.

Sustainable energy is energy that we will never use up or deplete. It is in exhaustible**.** Several forms of energy can be considered sustainable. In addition to the most commonly considered sources—wind, solar, and water—there's also bioenergy and geothermal energy. Bioenergy is the process of creating energy from biological masses such as straw, manure and other agricultural byproducts. Geothermal energy is energy from Earth's internal energy sources, like geysers. Energy sustainability can also be achieved through improved energy conservation and efficiency. Sure, the sources of energy most commonly used may meet our current needs, but at the rate we're using our current sources, like coal and natural gas, we'll burn through them (no pun intended), leaving none behind for our children. Future generations will then be forced to do what we could already be doing—finding new ways to generate energy. Sustainable energy is not only naturally replenished, but it causes no harm to the environment, as there are no greenhouse gasses or other pollutants emitted.

Benefits of Renewable Energy

Because of the global concern to reduce air pollution, and in order to improve public health, renewable energy, such as solar energy and wind energy as an alternative has been welcomed around the world. Renewable energy has numerous benefits which are described below.

Environmental benefits

Renewable energy comes from sources that do not need the use of fossil fuel so they do not give out carbon dioxide, a byproduct of burning coal and gas. , Therefore, the more we stop burning fossil fuels the more we are reducing the environmental pollution and harmful chemicals.

Economic benefits

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Renewable energy is economic for the reason that renewable energy does not need transmission lines for serving users with power. Nevertheless, transmission lines are very expensive part of the power system. Therefore renewable energy is always connected to the distribution network and therefore nearer to the load which results in saving cost and reducing power loss.

Human Health

Flue gases emitted by combustion of fossil fuels pollute the atmospheres which result in diseases, such as asthma and even cancer. , With the use of renewable it can reduce these harmful substances in the air.

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RESULTS AND DISCUSSION

Energy Sources: Energy sources are classified into two categories, that is conventional and non- conventional energy sources based on usage, and renewable and non- renewable sources based on availability. Energy is most important to all types of development activities as well as determines the standard of living. Rate of energy consumption and economic growth rate are positively interdependent. Fire wood, agricultural waste, kerosene, petrol, coal, natural gas, electricity, biogas LPG and solar systems are used for household and industrial needs.

Environmental Impact of Various Sources of Electricity Generation:

Power generation is very important to economic development but it depends on different sources of energy. Nuclear, coal, diesel natural gas hydro energy sources have been used to generate electricity in large scale which is **(79.94%)** comparatively economically feasible but the availability of natural sources have decreased which is not environmentally feasible.

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International Journal of Engineering Technology Research & Management

Table: 1 Environmental impact of energy sources

Fuel Type	Co2 Emissions per kWh	Power Availability	Ongoing Fuel Costs	Other Environmental Impact
Coal	Per kWh electricity discharged the around 91kg of CO_2 and emissions	Every day of the year harvesting and use to power generation but naturally decreased the Availability	Needful of fuel cost coal price also varies in the market	Strip mining & groundwater contamination Airborne mercury contamination Non-renewable fuel source
Natural Gas	Per kWh electricity discharged the around 51kg of CO_2 and emissions	Every day of the year harvesting and use to power generation but naturally decreased the Availability	Needful of fuel cost coal price also varies in the market	Non-renewable fuel source
Nuclear	There is no production of emission but radio actives very dangerous on human health	Every day of the year harvesting and use to power generation but naturally decreased the Availability	Needful of fuel cost coal price also varies in the market and export and import restricted	Extremely dangerous toxic waste Non-renewable fuel source
Wind	No emission and no problems on ecosystems	Directions and speed variation but Every day of the year and unlimited Availability	No need of any cost-free gift of nature.	Potential bird kill Highly visible Noise issues
Solar	No emission and no problems on ecosystems	Every day of the year and unlimited Daytime only Availability but, affected by clouds	No need of any cost-free gift of nature.	High energy used in manufacture Toxic silicon tetrachloride waste
Water (Reservoir Hydropower)	No emission but Soil pollution and deforestation	affected by seasonal variation and Quality of rain fall	No need of any cost-free gift of nature.	Flooding behind dam Impact on fish migration (if not mitigated)
Water (Streaming Hydropower)	No emission but hot water management and process of using fuel and fuel produced the emission	affected by seasonal variation and Quality of rain fall	No need of any cost-free gift of nature.	Reduction in stream water flow

Table :1 Explains the generation of emission from the different sources of energy usage to electricity generation process. Coal, Natural Gas and Nuclear has produced the emissions which have negative impact on human health and global warming however Wind and Hydropower electricity generation has not produced the emissions but wind energy creates undesirable noise pollution and kills the birds. Flooding and evaporations have depleted the agricultural land by degrading the water flow. Solar energy has not produced any emissions and there is no wastage of the agricultural land and water sources. Solar radiation average of 5 to 6 hours is available every day and yearly average of 220 day is used for solar energy generation. This is comparatively a better option because there is no emission in process of electricity generation. Solar sources have positively impacted the landscape, water sources, human health, birds and animals so it is comparatively a better option

Small Hydro Power, Wind Power, BM Power, Waste to Energy and Solar Power also generated (**20.06%)** the electricity which is economically little much costlier but environmentally feasible. Electricity generation process from the Coal, Natural Gas and Nuclear energy has produced the emissions that have impacted on human health and global warming. Wind and Hydropower electricity generation has not produced the emissions but wind energy creates the noise pollution and kills the bird's .Flooding and evaporations damaged the agricultural land with the reduced water flow. Solar energy has not produced the emissions and there is no wastage of the agricultural land and water sources.

Demands for Clean and Sustainable Energy Source:

Energy is the most important to economic activities as well as human activities. Industrialization, urbanization mechanization and growth of transporting vehicle have rapidly increased the demand for energy. Energy supply increased from various energy sources but more energy demand than energy supply have been created the energy crisis. Present status of energy supply has not been able to fulfill the energy demand of the country. India is more dependent on non renewable energy sources than renewable energy sources. Non renewable energy consumption has increased the level of emissions, smoke and carbon dioxide. Expected estimation of carbon dioxide increased by 6.3% in 2018.Electricity (310.3MT, 27.50%) manufacturing sector (2025MT, 17.95%) Steel (127.1MT, 11.26%) transport (121.3MT, 10.81%) and chemical industries (102.2MT, 9.05%) produced the carbon dioxide emissions. Carbon dioxide emissions has produced 1363.5MT in 20017, it has increased to 2344.2MT 2006 to 2016 annual growth rate of emission increased 4.4% to 6.3% and globally India's share is 7.0% of carbon dioxide emissions (BP Statistical review of world energy June 2018). Present energy supply is scarce compared to the energy needs and rapid increase in the carbon dioxide emissions. There is a need to use the alternative sources of energies to overcome the scarcity without carbon dioxide emissions, as a result there is the demand for clean and sustainable energy sources.

Solar energy as a Sustainable Energy Source

Solar energy is outstanding alternative energy source due to its 'never ending' reputation and it additionally can be transformed into different kinds of energy such as thermal, chemical, electric etc. Solar radiation average 5 to 6 hours is available every day and yearly averages of 220 days are sufficient for solar energy generation. That is comparatively better option because there is no emission in process of electricity generation. Solar sources have positively impacted the landscape, water sources human health, birds and animals making it the better source of electricity. Solar energy is eco-friendly and clean energy sources and various user friendly technological application available.

CONCLUSION

The need for renewable energy sources arises due to the various factors that are listed below:

- The Exhaustible sources of energy are limited, nonrenewable sources of energy decreased so more importance should be given to renewable energy sources.
- Economic development process, problems of nonrenewable sources of energy and feasibility of renewable sources of energy has encouraged green energy sources. So solar, wind, geothermal energy contributes maximum amount of energy to development process in future. Dissatisfaction of nonrenewable sources of energy and satisfaction of renewable sources of energy is favorable to economic development (UN, 2010).
- Clean energy sources decrease the level of pollution.16 per cent of emission decreased from usage of renewable sources of energy in India during 2013 (Renewable Energy Prospects for India 2014).
- Renewable energy sources contributed to the socio economic and environmental benefits.
- Nonrenewable sources of energy have negative impacts on economic and environmental status and renewable sources of energy positively affects the socio-economic and environmental status.
- It is safe to consumer today and does not have the uncertainty risk for future generations like undesirable forms of pollution; have little or no emissions of green house gases or net carbon.
- Economic growth is influenced by the rate of energy consumption. The economic activities and energy consumption have increased the economic empowerment but increased the level of emission and waste from usage of non renewable sources of energy.
- Sustainable approach encouraged the green energy sources of energy because non renewable are exhaustible and creates the problem of global warming. This approach encouraged the unlimited renewable sources of energy as well as pollution free sources (clean) of energy. Both expectations are fulfilled by renewable

energy sources and are helpful to sustainable development. Renewable energy technology provides the benefits to consumers and cost effectiveness in long run.

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