IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, July 2024

Green Energy : An Essential for 21st Century Living - A Study with Respect to India

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Abstract: *The term Green Energy can also be referred to as that type of energy which is actually non-polluting and normally comes from renewables sources which means it does not go on to harm or damage the sorrounding environment. Now-a-day's as most of the countries of various continents or parts of the modern world are trying to combat the negetive effect of adverse climate changes by reducing their carbon emissions by reducing their dependence on and usage of fossil fuels the scope of utilising Green Energy in the modern societies is expanding at a very rapid pace . In this paper we have tried to study and understand the importance of green energy in modern day's environmental situations and how we can increase the usage of green energy in the modern world countries to protect the current and future generations from various types of environmental hazards and the required data needed for the study has been collected by applying both the primary and secondary methods of data collections ..*

Keywords: Green Energy , Clean Energy, Renewable Energy, Non-Renewable Energy, Solar Energy, Hydropower, Wind Energy, Geothermal Energy

I. INTRODUCTION

History shows that human beings has been using various froms of green energies from ancient times where we see that various ancient civilisations used the power of the solar energy , wind energy , or water power for a variety of purposes to perform various types of activities like using wind powered water pumps to irrigate their crops or using water wheels to grind grain .

- **Green Energy :** Green Energy can be referred to as that type of energy which can be produced from some sort of natural resources like sunlight , water power or wind power , which are limitless and does not emit greenhouse gases and in most cases causes no harm to the sorrounding natural environment .
- **Clean Energy :** Clean Energy can be referred to as that type energy which basically comes from some renewable , zero emissions sources that do not go on to pollute the surrounding atmosphere by producing greenhouse gases like CO2 , etc , which goes on to cause climate changes . One example of clear energy can be Nuclear energy as in most nuclear reactors only water vapour is emitted into the atmosphere and no other types of gases like CO2 or methane are emitted to pollute the surrounding atmospheric environment .
- **Renewable Energy :** Renewable Energy refers to those types of energies that comes from some sources which are available in abundance in the surroundings and in most cases are inexhaustible and which are natural and self- replenishing and usually have a low or zero carbon emissions .
- **Non Renewable Energy :** Non Renewal energy mainly comes from those types of sources which are finite or has limited amount of resources , which normally takes thousands of years to form and which when used to produce required energy normally emits harmful greenhouse gases . Some examples of non renewable energy sources are coal , natural gas, oil ,etc .

Similarity between Green Energy , Clean Energy and Renewable Energy :

The most important point which Green Energy , Clean Energy and Renewable Energy has in common is that they are basically used to generate energy to reduce or stop the use of fossil fuels like coal , natural gas , oil , etc which are the main causes of modern day's adverse climate changes throughout the world .

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Difference between Green Energy and Renewable Energy :

The term ' Green Energy ' and Renewable Energy ' are normally used in the same sense but there is one big difference between them which is while most green energy sources are renewable all renewable energy sources cannot be considered as green as because in some cases of renewable energy sources when there will be some amount of carbon emissions those types of sources cannot be considered as a green energy source .

Difference between Renewable Energy and Clean Energy :

The basic difference between renewable energy and clean energy is that renewable energies basically comes from sources which are naturally provided like the Sun light , wind power or water power , whereas clean energy is basically that type of energy which produces little or no pollution and includes not only renewable sources but also includes nuclear energies and those types of technologies which has some carbon-neutralising impact .

Sources of different types of Green Energy :

Some of the common types of green energy are as follows :

1. **Solar Energy :** The most common and abundant source of energy is Solar energy and we see that the entire solar energy is much more than the actual amount of solar energy which is consumed by the human beings of the modern world . The technologies which are used actually goes on to convert the natural sunlight into electrical energy either through photovoltaic panels or through mirrors that concentrate solar radiations .
2. **Wind Energy :** Wind energy which normally comes from the usages of the kinetic energy of moving wind by using wind turbines which are either located on land (onshore) or in sea-or freshwater (offshore) has been in use for more than thousands of years but the usage of onshore and offshore wind energy technologies have recently increased to a great extent to increase the electricity production .
3. **Hydropower :** Hydropower energy goes on to utilise the energy of moving water from higher places to the lower places . Hydropower is at present one of the largest source of green energy in the electricity sector and is basically dependent on stable rainfall in the regions.
4. **Ocean Energy :** This energy is derived from the kinetic and thermal energy of sea water or sea waves or sea currents to produce electricity or heat but the technologies which uses this ocean energy are still at a early stages of development and needs to be further developed .

Advantages of Green Energy :

Some of the basic advantages of using green energy is as follows :

1. The first and foremost advantages of using green energy is that green energies actually comes from inexhaustible energy sources which does not generate polluting gases into the atmosphere .
2. This type of energy is actually environmental friendly and normally goes on to reduce the overall environmental degradation .
3. The usage of green energy helps various countries of the modern world in creating and opening up of various opportunities of domestic energy production process to reduce energy imports and be self sufficient in supplying to the demands of domestic energy requirement .
4. The usage of green energy actually goes on to provide a greater amount of overall sustainability for the living beings of the entire world .

Disadvantages of Green Energy :

Some of the Disadvantages of Green Energy can be stated as below :

1. The basic problem of Green energy is that in most cases green energy sources are not normally available round the clock of the day .
2. As observed , although shifting to green energy technologies will save some expenses in the long run but the initial cost of implementing green energy technologies are very high .
3. Most of the green energy power generation facilities are actually location dependent which means farms which utilises technologies to convert solar energies into other forms of energies actually requires continuous flow of

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unobstructed sunlight or farms which generates hydropower actually requires continuous flow of unobstructed water flow or technologies which utilises wind energy needs greater open spaces to utilise the wind movement or organisations which utilises technologies to generate geothermal power should actually be set up near hot water sources.

4. Green energy generations is also dependent on the existing local weather situations as we see that solar power generations can be affected on cloudy days or hydropower generations can be affected by droughts or wind power generations can normally be affected on normal days when there is no wind and so we see that this type of adverse environmental situations normally goes on to affect the normal flow of targeted power generations .
5. The volatile nature and situation of green energy power generations has actually created or increased the need of some proper , better and costly storage facilities to store the already generated power to supply or distribute in a controlled way to maintain the flow of power in days of slack productions .

Objective of the Study :

The basic idea and objective of this study has been to find out the importance and emergency of using green energy in the modern world countries to counter the adverse effects of modern day environmental degradations to protect the current and future generations of living being from various kinds of environment related hazards .

II. LITERATURE REVIEW

As observed through various types of studies and research work the day to day developmental work of various countries throughout the world has created various types of environmental problems for the modern day living beings and so now-a- day's various research work are coming up for finding out the benefits of promoting and implementing the usage of various types of green energies throughout the societies and some of them are as follows :

1. Danielle Gagnon in his article , " 5 Types of Renewable Energy and their Impact on the Environment " , stated that as government agencies , corporate leaders and individuals worldwide seek to slow the impact of climate change and create a more sustainable future several types of renewable energy have seen significant growth and five types of renewable energy includes solar energy, wind energy , hydropower , geothermal energy and biofuels .
2. Paul Collins in his report , " Green Energy : Advantages , Examples , and Suppliers " , stated that green energy plays an essential key role in the energy transition due to its low environmental impact and it actually goes on to offer an alternative to non-renewable energy and helps fight global warming by not producing greenhouse gases or increasing carbon emissions .
3. Alice Gomstyn in her article , " The advantages and disadvantages of renewable energy " , stated that when the entire world is busy in fighting the negative effects of climate changes and global warming there has been much innovations and improvements in using renewable energies like solar energy , wind energy , hydropower , geothermal , etc to do away with the burning of fossil fuels like coal , oil and natural gas .
4. Rahul Kumar in his Project Report titled " A Project Report on Green Energy ", said that India is one of the largest consumers of energy , but the gap between consumption and domestic output is still a cause of concern and so India is still dependent to the extent of 30-35 percent on non-commercial fuel sources like cow dung , firewood , agriculture waste , etc . Thereafter it is also seen that the growing energy needs of the emerging economics like India actually goes on to enhance the risk of more and more environmental damages from the conventional carbon based sources of energy
5. Hannah Ritchie , Max Roser and Pablo Rosado , in their article titled , " Renewable Energy sources are growing quickly and will play a vital role in tackling climate change , " stated that since the industrial revolution , the energy mix of most countries across the world has become getting dominated by fossil fuels which has major impacts on the global climate as well as on the human health as it is observed that almost three quarters of the global green house gas emissions do results from the burning of fossil fuels for energy , causing fossil fuels to be basically responsible for large amounts of local air pollution as well as health related problems which leads to a huge numbers of premature deaths each year . Therefore to reduce the CO2

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emissions and local air pollution the world needs to rapidly shift towards low-carbon sources of energy which will include nuclear and renewable technologies .

III. RESEARCH METHODOLOGY

This study has been basically exploratory in nature and the data needed for the study has been obtained by applying both the direct and indirect methods of collection of data .

1. **Direct Methods :** Primary data needed for this research study has been obtained by applying two stage sampling technique where first some areas or organisations were selected and then personal interviews was conducted on some randomly selected respondents of those areas or organisations on the basis of a questionnaire which was specifically structured for this research study .
2. **Questionnaire :** A Specifically designed questionnaire to suit this research purpose was developed to collect information from various types of respondents who works at various types of institutions and organisations of the Kolkata city and Hooghly district of the state of West Bengal of our country India .
3. **Interview :** The method of a personal offline face to face interview was arranged with some randomly chosen respondents who works with various types of organisations or institutions of the Kolkata city and Hooghly district of West Bengal of India .
4. **Indirect Method :** Secondary data needed for this research work was collected from various types of published journal articles , magazine articles, newspaper articles, blog articles and website articles.

IV. FINDINGS

As observed and studied we see that the use of green energy has been there from ancient time and various ancient civilisation of the world has utilised the power of solar energy , wind energy and water energy to carry out their various activities for various purposes and the oldest way of generating electricity has been the use of hydroelectric power .

Then we see that from the 18th and 19th Century and specifically after the industrial revolution the use of fossil fuels increased to a huge extent which actually went on to cause a decline in the use of green energy or energies from renewable sources .

Therafter from and during the 20th Century due to the detoriation in the surrounding environmental conditions and due to increase in various types of environmental movement throughout the world which actually went on to increase the awareness about the negative impact of the excessive usage of fossil fuels the demand for green energy started increasing again .

Current Status of Green Energy in the World :

Although today in the modern world we see that energies from coal , oil and natural gas goes on to constitute almost 75 % of global energy usage , the normal use of fossil fuels has a declining trend and the importance and demand of green energy or energies from renewable sources has been increasing with the availability of the various types of modern technologies to generate energies from renewable sources .

Current Status of Green Energy in India :

India alongwith her huge population , various developmental work including greater and better urbanisation alongwith more and more industrial growth is currently the third largest consumer of energy in the world and the Indian power sector consists of both types of fuel sources which includes both fossil fuels like coal , oil , gas , etc , alongwith other green energy sources like solar energy , wind power energy , water energy etc .

Modern India with various types of environmental movements throughout the country and growing awareness about the bad impacts of fossil fuels , is still dominated by the usage of fossil fuels and has coal as the primary source of energy in the country followed by oil , biomass and natural gas.

Thereafter we see that India has specific goals to significantly increase the generations of other types of energies like renewable energy and nuclear energy to reduce the greenhouse gas emissions alongwith increasing the energy security but this transition from coal or fossil fuel energy to green energy sources will actually take decades and so it is suggested to depend on the natural gas and other cleaner forms of fossil fuels during this interim period .

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Suggestions to increase the use of Green Energy :

Some suggestions to increase the use of green energy among the modern day's societies of the world are as follows :

1. **Education :** Proper educational measures has to be implemented in the modern day's societies to increase the awareness among the normal people about the bad or negetive impacts of excessive usage of fossil fuels on modern days climate change problems and how it can be rectified by introducing more and more usage of green energy methods and techniques .
2. **Policy :** Proper and favourable rules , regulations and policies should be prepared and adopted by the governments of the various countries of the modern world to promote more and more usages of green energy in the society .
3. **Implement Strategies to reduce energy wastages and save energy expenses :** The most important strategies will be to invest in the energy-efficient technologies to reduce energy wastages and save on unnecessary energy expenses .
4. **Purchase Renewable Energy Certificates :** By purchasing Renewable Energy Certificates we can go on to support renewable energy projects as these certificates normally represents that the environmental attributes of renewable energy generations has been followed .
5. **Implement Energy Audits :** Corporates and various other types of organisations should also if possible introduce energy audits to find out the loopholes of energy wastages and work on it to improve on those points and stop unnecessary energy wastages and save on unnecesssry expenses .
6. **Invest in Solar Power Generation Techniques :** Proper and methodical investment is needed to install solar panels at various places like workplaces, rooftops and various other places for proper usages of solar energy and reduction of carbon emissions and energy expenses .
7. **Promote utilisation of Wind Energy :** As studied and observed more and more usage of wind energy will obviously go on to reduce the excessive usage of fossil fuels which in turn will go on to reduce the greenhouse gas emissions which in turn will help in betterment of the surrounding environment .

V. CONCLUSION

As observed throughout the world that various types of modern day activities of the human beings be it for developmental purposes or for any other purposes has actually gone on to increase the greenhouse gas emissions from the burning of fossil fuels like coal , oil and natural gases which has actually been the main cause of modern day's adverse climate changes.

Thereafter we also see that day by day the world population is increasing out of which a great portion of current population are normally living in the modern day's cities which is actually causing a higher worldwide demand for energy which in most cases will not be possible to get satisfied by the energies generated from fossil fuels as according to the estimates the reserves of oil , natural gas and coal is likely to get exhausted within the next 50 (Fifty) years and also these fossil fuels normally goes on to emit those types of gases which actually creates adverse climate changes and global warming .

Therefore in such a situation it is always better for all the living beings of our planet earth that we go for those types of energy sources which are much more safer , inexhaustible and cause less or no damage to the environment and so we see that day by day the importance of green energy sources is increasing to a great extent .

Therefore in conclusion we can say that proper and smooth transition to green energy usage is the only way to live a healthy life as well as to make our planet earth a proper and livable place to live in not only for the current generations of living beings but also for the future generations of living beings .

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