Technoarete Transactions on Renewable Energy, Green Energy and Sustainability
Vol-2, Issue-1, March 2022
e-ISSN: 2583-1968

An Environmental Impact Review of Renewable Energy Use and Mitigation Strategies through Implementing Most Suited Engineering and Material Science Insights

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Abstract

This study mainly focuses on the environmental impact of renewable energy resources. Several types of energy resources are available such as: solar energy, tidal energy, hydro power energy and wind power. Solar panels are used for strong extra energy sources. Turbines are also essential tools for making hydropower energy globally. Reservoirs and dams are mainly used to alter natural flow of rivers. Natural electricity is made with the help of these renewable resources. Green practices are also helpful for making electricity in a successive manner. Emission of greenhouse gases and other harmful gases are also mitigated by this particular process.

Tidal energy sources are effectively environmentally friendly and also cost effective. Bio diversity is managed with the help of this renewable sources. Experienced employees are needed to install solar panels and turbines in different places. Job opportunities for a person are also enhanced by these natural resources. Secondary data are collected for this study with the help of qualitative data analysis. Advantages and issues related to renewable resources are also helpful for this study. This creates a positive impact on financial growth and performance of a nation.

Keywords

Natural resources, Renewable energy, solar energy, and turbines.

INTRODUCTION

Energy derived from natural sources is known as renewable energy. Sunlight and wind are natural sources that help to maintain environmental impact [1]. Renewable energy sources are effectively beneficial for everyone to manage environmental factors in a significant way. Emissions of greenhouse and other harmful gases are also mitigated by these renewable energy sources. Environmental factors are also maintained properly with help of these energy sources. A key factor to address climate crisis is also controlled by these sources. Several types of fossil fuels like oil, coal and gas are known as non-renewable sources that take more than hundred years to produce. Environmental change is not maintained properly by non-renewable resources globally. Natural resources are effectively cheaper in market and also these sources are available in a large amount [2]. Carbon emission from workplace is also reduced with help of using renewable resources. Environmental sources are also beneficial for human beings as these materials are organic and natural.

Several types of renewable energy sources are available such as: wind energy, tidal energy, hydro energy, biomass energy, geothermal and solar energy. A plentiful source of clean energy is wind. Wind power is always available everywhere, this wind power is beneficial to provide a contribution in National Grid. Wind farms are increasing on a daily basis in the UK market. Wind is the most suitable energy source to make electricity. Turbines are used to generate natural electricity, by which environmental factors are not disturbed [3]. National grid also uses turbines to produce energy from wind power. Domestic energy generation framework is available in the UK market; hence every local energy generation system is not suitable for producing natural energy. Solar energy is immensely suitable to maintain environmental impact. Sunlight is one of the best freely available energy resources. Amount of solar energy is more than total energy requirement for an entire year that reaches in the earth's surface in one hour. These should be beneficial to produce several natural energy sources.

OBJECTIVES

This study aims to an environmental impact review of renewable energy use and mitigation strategies through implementing most suited engineering and material science insights globally. Mission of this study is to provide a better and healthy lifestyle to each and every person.

- To understand usage of renewable energy resources.
- To identify environmental impact review of renewable energy.
- To evaluate issues related to generating electricity.
- To understand strategies to tackle those challenges in an organised way.

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MATERIALS AND METHODS

Research design is effectively beneficial for researchers to maintain a proper procedure of work. Suitable and relevant strategy is maintained with help of this research design. “Inductive” research design helps to maintain theoretical analysis in a significant way. Research type helps to gather several information related to this topic. Characteristics of a study is known to everyone by this research type. Internal and external features of a study are also helpful for a researcher to maintain proper strategy and planning. “Qualitative” research type is used for this study to gather authentic information. Secondary data are effectively beneficial for this study. Existing data are included for this particular study. Data are collected from peer reviewed journals which are published after 2019. Authenticity of a research is also maintained by this methodological view. Every research work needs more time and budget to accomplish a work in a successive manner. Time and budget are totally saved to collect secondary data with help of a qualitative research type. Theoretical analysis is also advantageous for a study to gather data. Subjective and intersubjective information related to this topic are also collected for this study. Coherent and logical way of a research work is also maintained in this research work to manage proper framework.

RESULTS

Renewable energy sources are immensely advantageous to manage environmental impact. Natural resources are available in a large amount. In case those resources are not used properly, this creates a negative impact on environment. In recent days pollution increases on a daily basis due to lack of trees. Wind, solar, tidal, hydro, biomass and geothermal energy resources are known as renewable energy sources. One of the most commercially developed resources is hydropower. A dam, large reservoir is used to create controlled flow of water. Turbines are mainly used to generate electricity with help of hydro energy.

This particular energy source is more reliable than wind and solar energy. Demand of electricity in market is immensely high, these natural resources are beneficial to generate electricity. Renewable energy installation includes dysprosium, cadmium, tellurium, gallium, neodymium and selenium. These materials are used to generate energy sources in market; hence any recycling system is not available yet. Renewable energy resources are immensely beneficial in the entire world. Net capacity additions of renewable energy worldwide are 278 gigawatts in the year of 2020 [4]. It is nearly 45 percent in comparison to capacity additions of renewable energy in the entire world. This is the highest renewable energy capacity within last five years.

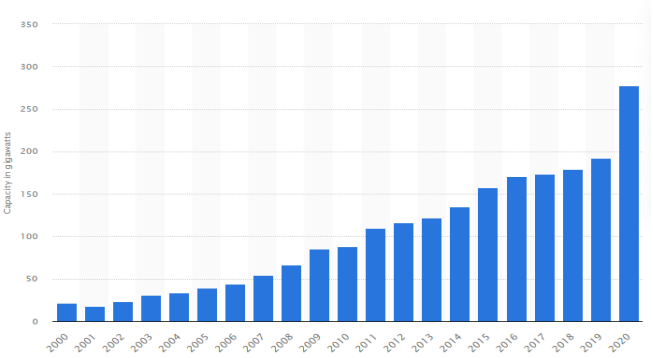

Figure 1: Net capacity additions of renewable energy

Global renewable energy market size helps to enhance financial growth and performance of the nations. This growth is expected to reach 1.1 trillion US dollars by 2027 [5]. Environmental concerns are also maintained properly with help of this global renewable energy market size. Fossil fuels and rapid urbanisation are also managed by these renewable energy resources in the global market. Renewable energy sources help a country to manage their economic growth. Demand of electricity is also fulfilled with the help of this global energy market size.

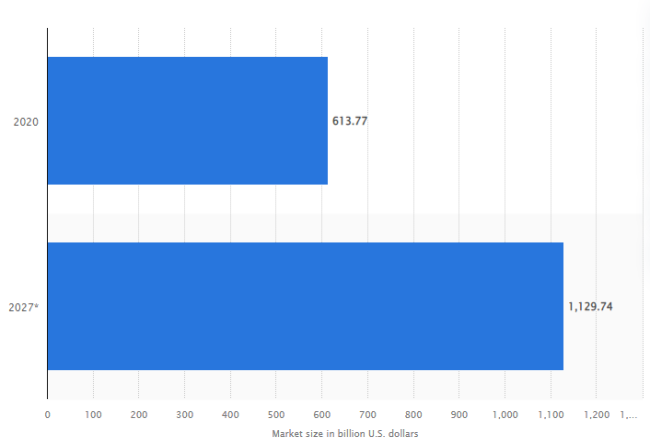

Figure 2: Renewable energy market size worldwide

Electricity generation, water, space cooling, heating and transportation are used as renewable energy resources. Hydro power and wind power are the most suitable energy consumption in the entire world [6]. Every country always tries to maintain their environmental impact to produce their electricity in an organised way. Benefits of this energy are: improvement of public health, less global warming, inexhaustible energy, stable energy prices and maintaining reliability and validity of energy. Natural resources are mainly used for generating energy. Emission of carbon dioxide is enhanced with help of human activities. Global warming is also enhanced by the emission of carbon dioxide. Harmful gases are not emitted for generating electricity by natural resources. Emissions of global warming mainly occur from electricity sector [7]. Fossil fuels like natural gas and coal are responsible for this particular global warming. Hence renewable energy sources are effectively beneficial to maintain social responsibility and environmental concern.

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Most prevalent greenhouse gas is carbon dioxide, which causes global warming in the entire world. As a result, pollution is also enhanced. Methane is also a responsible air pollutant which can affect environmental factors and pollution. Renewable energy resources help to maintain this global warming in a successive manner. Several modern technologies are used for generating electricity without affecting environmental factors. 0.6 to 2 pounds of carbon dioxide is emitted for burning natural gases to generate electricity [8]. However, this creates a positive impact on environmental concerns and responsibility. Every nation has a responsibility to maintain their pollution in an organised way. Consequently, nations always try to use natural resources to maintain their responsibility. 1.4 to 3.6 pounds of carbon dioxide is emitted to burn coal [9]. Public health is also improved with help of this renewable energy resources in global market. Pollution is immensely bad for each and every person. Several types of diseases such as: heart attacks, cancer, breathing problems, neurological damage and premature death, are faced by a person with help of this pollution. These diseases are immensely bad for each and every person.

Everybody always tries to maintain a healthy lifestyle on a daily basis, for this reason, these individuals try to grab better and sustainable products from market. Pollution is also mitigated with help of these renewable energy resources. Burning of coal is mostly affected by lifestyle cost and the amount of estimation is near about $74.6 billion every year. This is similar to 4.36 cents per kilowatt-hour of electricity production [10]. This amount is mainly one third of average electricity rate. Air and water pollution creates a negative impact on public health. Clean energy technologies are not used for producing electricity. Water is not used for making solar and wind energy. Water pollution is totally mitigated with help of these renewable energy resources. Agricultural framework is also affected with help of this pollution globally. In case a country focuses on economic benefits and jobs, renewable energy resources are immensely beneficial for them.

Compared to fossil fuel technologies, renewable energy resources need experienced employees to install several types of solar panels. Wind farms also need technicians and maintenance teams to manage proper strategy of work [11]. More job opportunities are enhanced with help of these renewable energy resources. Price of energy is stable in a country to maintain prosperity of nation. A nation is known to everyone as a responsible by using natural resources in an organised way. Demand of energy is effectively high in global market, for this reason, natural resources are advantageous to maintain environmental concerns. Wind turbines are also used to generate electricity globally. Wind power and solar energy are also responsible for renewable energy resources. Cheap electricity can easily be obtained with help of these renewable energy resources. 65% of the world's total electricity supply is maintained by renewable energy resources within year of 2030. Emission of carbon dioxide is also reached net zero by 2050 globally to maintain their social responsibility. Clean, accessible, affordable and sustainable sources of energy maintained with help of these renewable energy sources.

Hydroelectricity is also beneficial to generate sustainable and accessible electricity in global market. Several types of dams and reservoirs are generated to control flowing of water. Kinetic energy is used to generate electricity by these sources. This particular energy helps to run turbines which generate electricity. Energy of tides and wave power is converted in tidal power which helps ocean waves for power generation [12]. Huge potential in electric power generation is also enhanced with help of these two forms of hydropower. Geothermal energy is produced by thermal energy in worldwide, which is stored in the earth. This heat energy is gained from several sources such as: volcanoes, hot springs. This heat is particularly used by industries for heating water and other purposes. Volcanoes are natural resources for geothermal energy and also this is helpful for creating renewable energy resources. Living organisms and plant derived materials are used for biomass energy globally.

Biofuels are mostly used by industries to maintain usage of biomass energy. This biomass energy is converted to other usable forms of energy such as: transportation fuels like biodiesel, ethanol and methane gas. Renewable energy is effectively efficient for an industry to maintain impact of environmental pollution and performance. Economic and environmental benefits are also collected by industries by this renewable energy. Greenhouses and other harmful gases are not emitted from workplace for producing electricity [13]. Renewable energy sources help an industry to maintain air pollution and also water pollution. Every industry always tries to maintain their waste management to enhance their responsibility. Hence these renewable energy sources allow to mitigate several issues related to generating electricity. Several types of challenges are faced by power grid to maintain natural resources. Number of renewable sources is enhanced in workplace to maintain strategy of an industry.

Green energy is produced with help of this renewable sources throughout the entire world. Weather and climate change is not responsible for these sources. Operational and organisational performance of power grid is managed by these natural resources. Power grid corporations are not capable enough to manage their internal environment. Management framework is not controlled properly by this grid imbalance. Electricity accumulation is a suitable way to maintain growing amount of renewable energy resources [14]. A huge amount of energy is created from wind power and solar power. Several types of batteries and other energy storages are used by industries to store their extra energy. Waste management of energy is controlled by this procedure. Unused energy is stored within a battery to save money and time related to energy sources. This renewable energy source allows to maintain artificial intelligence for more accurate weather and energy consumption. Planning and strategy of industries is improved with help of these natural resources in

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a successive manner.

Decision making process related to energy resources is also enhanced by this electricity accumulation. Problem solving ability of employees is increased with help of natural resources. These natural resources are available in a large amount and this should be beneficial for every industry to maintain their performance. Smart management solutions are also needed for an industry to solve any problems in the entire world [15]. Green energy is converted into a reliable alternative energy resource. Sometimes industries face issues related to electricity transmission losses. Electricity is produced in one place and delivered everywhere with help of these power lines. Maintenance process of an industry for these power lines is effectively important to enhance their performance and responsibility. Natural resources are mainly used by power grid industry to produce energy in a significant way. Long distance electricity transmission causes a bad impact on economic growth of an industry. A certain amount is needed for maintaining long distance supply of electricity.

Customers have to pay those extra charges for long distance electricity supply. Natural resources are available everywhere for this reason, these individuals do not pay more for these renewable resources. Natural resources are effectively beneficial to maintain transmission losses. Energy power stations are also implemented by power grid to maintain a smooth process of delivering electricity [16]. Energy decentralisation process is also managed by power grid corporations to impact environmental policies. Several types of rules and regulations are available related to supply of energy sources. Better services of power supply are also maintained with help of these renewable energy resources. In recent days, everybody uses several types of electronic gadgets on a daily basis. For this reason, high power consumption is needed for using those gadgets. These gadgets are useful for each and everybody to maintain a healthy lifestyle. In case natural resources are not used for managing those gadgets, environmental pollution is also enhanced by usage of natural resources.

Frequent power cuts are an issue in global market to maintain performance and culture. This creates a negative impact on environmental policy. Installation of renewable energy capacity creates a positive impact on economic growth of a country. Financial performance and culture are also maintained by an industry with help of this renewable energy capacity. China occupies the highest position throughout the world. The value of this energy capacity for China is 1020 gigawatts [17]. This creates a positive impact on financial and organisational performance. Us occupies second highest position in the global market to maintain their growth. The capacity is 325 gigawatts for Us market to install renewable energy capacity. Climate change and environmental factors are also maintained by these natural resources in a successive manner. Mitigating consequences of phenomena is also managed by an industry in the global market.

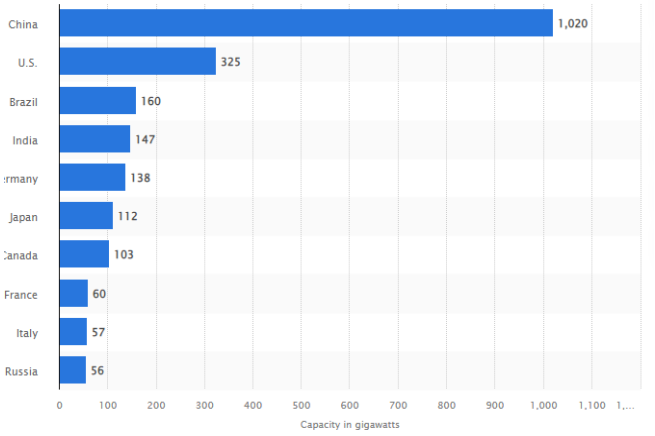

Figure 3: Installation of renewable energy capacity

Clean energy is also useful and helpful for an industry to maintain their performance. Every industry needs new investors in workplace, by which a company can easily purchase their necessary materials. The speed and efficiency of work is managed properly to achieve aims and objectives of an industry. Internal and external fractures of an industry are also managed by these renewable energy resources. Several investors are engaged in workplace to get proper investment in proper time. Work process and strategy is also managed by proper investment processes of an industry. New investment in clean energy is about 301.7 billion US dollars in the year of 2019 [18]. Growth of economy is also enhanced by this particular strategy. Clean energy resources are also useful for each and every industry globally. Clean energy investments are totally just under 37 billion US dollars in the year of 2004 [18]. This creates a positive impact on performance of an industry. Clean and sustainable energy helps an industry to manage proper process and framework of work.

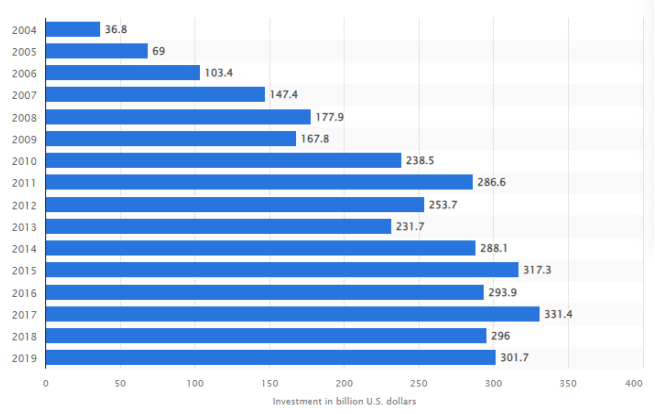

Figure 4: Worldwide investment in clean energy

Air, water and environmental pollutants are reduced with help of these renewable natural resources. Carbon emissions are totally mitigated by an industry with help of green natural sources. Green practices are also maintained in the workplace to control usage of carbon footprint and other inorganic products. Organic and natural raw materials should be used by an industry to maintain their performance [19].

e-ISSN: 2583-1968

Greenhouse gases and other air pollutants are not emitted from workplace for using natural resources. In case an industry totally depends upon natural resources to produce several types of products, this industry does not depend upon any suppliers. For this reason, supply chain related issues are not faced by an industry in the global market. Lifestyle of a person is also maintained properly with help of these renewable energy resources. Global scale for natural energy resources is also managed by these sources.

DISCUSSION

Several types of renewable energy are available such as: solar energy, wind energy, biomass energy, hydro energy, tidal energy, geothermal energy. Sunlight is the essential source of this solar energy in the global market. Heat and energy of sunlight is stored in a solar panel and uses that energy later. Experienced employees should be engaged with help of these natural resources. Solar panels are effectively beneficial for each and every industry to store their energy and resources. In case an industry faces challenges related to frequent power cuts globally, solar panels are effectively beneficial for those industries in the global market. Turbines are useful tools for an industry to maintain wind power. Wind energy is also a natural resource in global market to maintain their performance in a successive manner. Employees of an industry always try to enhance their skills by this particular process of natural resources. Hydro energy is also responsible for an industry to maintain their performance.

Geographical location is also responsible for an industry to get proper supply of energy in proper time. Solar energy is supplement usage for an industry to enhance their economic growth. Solar panels are effectively advantageous to maintain renewable resources. Water pollution is also mitigated by these natural resources within workplace. Wind farms are also responsible for making wind power in a successive manner. Power Grid Corporation is also helpful with help of these renewable natural resources. Wind energy electricity is also mitigated by natural resources. Several challenges are faced by an industry for using renewable energy resources. Cost related problems, transmission issues, political and environmental changes are also faced for renewable energy resources. For adopting renewable resources in global market, a certain amount of initial cost is needed for using natural resources. Hydro energy is a renewable source of energy that helps to generate electricity in a significant way. Several types of dams and reservoirs are used to make this hydro energy. Dams and reservoirs help to alter natural flow of rivers and other water bodies.

Several advantages are available for this hydro energy such as: cheapest source of energy, agile and responsive hydropower stations are available, enormous energy resources are also gained, lower indirect emissions of harmful gases, secondary water flow for small plants. Environmental impact is also enhanced with help of these hydropower stations. Role of these stations is to maintain a smooth path of water flow in several dams and reservoirs. Domestic and local purposes of water are also managed by these hydro power stations. Drainage systems can be easily maintained by these hydropower stations globally. Environmental impact is also measured by these resources. These stations are also helpful to mitigate flood related issues within a country. Movement of tides and oceans is created with the help of tidal energy. An Environmentally friendly atmosphere is maintained, high energy density is managed by this particular tidal energy resource.

CONCLUSION

The Study has depicted the overall contribution of renewable energy to environmental sustainability. Solar energies and biomass energies also have been highlighted in the study. Utilisation of energy science insights helps to reduce the environmental pollution and enhance the quality of ecological balance. Mitigation strategies for reducing the adverse impact of environment disruption has been focused in the study. Remarkable reduction of the carbon emissions and conservation of natural resources are prior concerns of the renewable energy implication by the industries along with society. Waste management also has been discussed over here considering biomass energy production. Application of wind and solar energy reduce the production of waste products that can hamper the sustainability of the environment. Considering the pros and cons influence of renewable energy on environment sustainability has been depicted here.

Cost effective approach of renewable energy has a more effective influence on the reduction of environmental pollution. Hydrogenated resources also reduce the carbon emissions in the air and increase the quality of the ecological balance. Biodiversity also has been driven by the renewable energy engagement in nature to mitigate the effect of pollutants on the environment. Several types of renewable sources are mentioned in this study. Dams and reservoirs are also used to make tidal and hydro energy in an organised way. Environmental factors should be maintained to control usage of natural resources. Clean energy resources are also beneficial for an industry to use several types of sources in their workplace. Emissions of greenhouse and other harmful gases are also mitigated with the help of these natural resources. Solar panels and turbines are essential tools for renewable resources in global market. Jobs opportunities are also enhanced for installing solar panels and turbines. Mitigation processes of issues related to renewable energy resources are also maintained in this study.

REFERENCES

[1]. Naderipour, Amirreza, et al. "Effect of COVID-19 virus on reducing GHG emission and increasing energy generated by renewable energy sources: A brief study in Malaysian context." *Environmental technology & innovation* 20 (2020): 101151.

[2]. Pandit, Pintu, Gayatri T. Nadathur, and Seiko Jose. "Upcycled and low-cost sustainable business for value-added textiles and

e-ISSN: 2583-1968

fashion." *Circular Economy in Textiles and Apparel*. Woodhead Publishing, 2019. 95-122.

[3]. He, Yaoyao, et al. "Electricity consumption probability density forecasting method based on LASSO-Quantile Regression Neural Network." *Applied energy* 233 (2019): 565-575.

[4]. Jaganmohan,M. Net capacity additions of renewable energy worldwide from 2000 to 2020. *Statista*. (2021) *https://www.statista.com/statistics/1004700/global-renewable-capacity-additions/*. Accessed 28th December, 2022.

[5]. Jaganmohan,M. Net capacity additions of renewable energy worldwide from 2000 to 2020. *Statista*. (2021) https://www.statista.com/statistics/1094309/renewable-energy-market-size-global/. Accessed 28th December, 2022.

[6]. Dawn, Subhojit, et al. "Wind power: Existing status, achievements and government's initiative towards renewable power dominating India." *Energy Strategy Reviews* 23 (2019): 178-199.

[7]. Peters, Glen P., et al. "Carbon dioxide emissions continue to grow amidst slowly emerging climate policies." *Nature Climate Change* 10.1 (2020): 3-6.

[8]. Climate. Benefits of Renewable Energy Use. *Union of Concerned Scientists.* 2019. *https://www.ucsusa.org/resources/benefits-renewable-energy-use.* Accessed 28th December, 2022.

[9]. Energy. Benefits of Renewable Energy Use. *Union of Concerned Scientists.* 2019. *https://www.ucsusa.org/resources/benefits-renewable-energy-use* Accessed 28th December, 2022.

[10]. Transportation. Benefits of Renewable Energy Use. *Union of Concerned Scientists.* 2019. *https://www.ucsusa.org/resources/benefits-renewable-energy-use.* Accessed 28th December, 2022.

[11]. Tusar, Md Imran Hasan, and Bhaba R. Sarker. "Maintenance cost minimization models for offshore wind farms: A systematic and critical review." *International Journal of Energy Research* 46.4 (2022): 3739-3765.

[12]. Zaidi, Sajjad, et al. "Renewable Tidal Power Generation Significance & Challenges." *2021 International Bhurban Conference on Applied Sciences and Technologies (IBCAST)*. IEEE, 2021.

[13]. Kumar, Mahesh. "Social, economic, and environmental impacts of renewable energy resources." *Wind solar hybrid renewable energy system* 1 (2020).

[14]. Kabeyi, Moses Jeremiah Barasa, and Oludolapo Akanni Olanrewaju. "Sustainable energy transition for renewable and low carbon grid electricity generation and supply." *Frontiers in Energy Research* 9 (2022).

[15]. Abbas, Khizar, et al. "A blockchain and machine learning-based drug supply chain management and recommendation system for smart pharmaceutical industry." *Electronics* 9.5 (2020): 852.

[16]. Yavuz, Levent, et al. "Transformation of microgrid to virtual power plant–a comprehensive review." *IET generation, transmission & distribution* 13.11 (2019): 1994-2005.

[17]. Jaganmohan,M. Leading countries in installed renewable energy capacity worldwide in 2021. *Statista*. (2021) https://www.statista.com/statistics/267233/renewable-energy-capacity-worldwide-by-country/ Accessed 28th December, 2022.

[18]. Jaganmohan,M. New investment in clean energy worldwide from 2004 to 2019. *Statista.* (2021) https://www.statista.com/statistics/186807/worldwide-investment-in-sustainable-energy-since-2004/ Accessed 28th December, 2022.

[19]. Diacono, Mariangela, et al. "Recycling agricultural wastes and by-products in organic farming: Biofertilizer production, yield performance and carbon footprint analysis." *Sustainability* 11.14 (2019): 3824.