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Sustainable Energy: A Systematic Review Of Renewable Energy Sources, Technologies, And Public Opinions

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ABSTRACT

The energy sector is one of the important key for economic development; they are a strong relationship between the economical growth and more energy consumption. The various countries have different levels of renewable energy sources exist. The development countries are additional resembling to applied for getting job opportunity. T

A systematic review of the literature was conducted from 2009 to 2018. During this process, more than 300 articles were classified and 42 papers were filtered for critical review. The literature analysis showed that despite serious efforts at all levels to reduce reliance on fossil fuels by promoting renewable energy as its alternative, fossil fuels continue to contribute 73.5% to the worldwide electricity production in 2017. Conversely, renewable sources contributed only 26.5%. Furthermore, this study highlights that the lack of public awareness is a major barrier to the acceptance of renewable energy technologies. The results of this study show that worldwide energy crises can be managed by integrating renewable energy sources in the power generation. Moreover, in order to facilitate the development of renewable energy technologies, this systematic review has highlighted the importance of public opinion and performed a real-time analysis of public tweets. This example of tweet analysis is a relatively novel initiative in a review study that will seek to direct the attention of future researchers and policymakers toward public opinion and recommend the implications to both academia and industries.

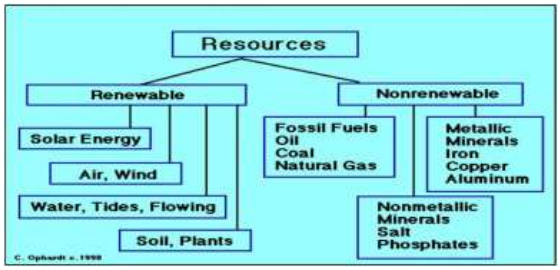
KEYWORDS :

Sustainable Energy Renewable Energy Sources Solar Power Wind Power Biomass Energy Hydropower Geothermal EnergyEnergy Technologies Public Perception Energy Policy Environmental Sustainability Energy Transition Technology Adoption Community Attitudes Economic Impact Energy Efficiency Climate Change Mitigation

INTRODUCTION

The increasing of population, the energy source demands are also increases. The amount of energy requirement is different between the countries around the world. The developed country need more energy compare to developing country. The present people are most concern about renewable energy sources because it is pollution free, simply available and less costly and more amounts exist in the earth. In renewable energy technology we have to use the natural source of energy for example, solar radiation energy, wind

energy, tidal energy, biomas energy and geothermal energy etc.



This energy sources are environmental friendly in nature. In fig shown that the various renewable energy resources. The last two decades people are most concern about the clean energy sources for sustainable development purposes. They are many factors contribute to the achievement of sustainable development. The most important is climate change due to the renewable energy sources. The main opportunities are getting from the use of renewable energy sources are social and economical development, more energy security, climate change reduction and improving environmental and health energy

The world is fast becoming a global village due to the increasing daily requirement of energy by all population across the world while the earth in its form cannot change. The need for energy and its related services to satisfy human social and economic development, welfare and health is increasing. All societies call for the services of energy to meet basic human needs such as: health, lighting, cooking, space comfort, mobility and communication and serve as generative processes The interaction through social media provides a variety of useful opinions that can be a guideline for making better plans for the future. The opinions capture certain sentiment words which are useful in diverse areas, such as marketing, education, business, and health care. Further, they can attract more fields to utilize their significance . Opinions can be recorded and analyzed using survey studies and/or sentiment analysis techniques in order to determine the present and future intentions of users related to RE and explore new insights . Hence it is believed that opinions influence public decision to use any services and technologies. While most of the research has focused on technical, policy, and financial challenges to RE deployment, less attention has been paid on its social dimensions, yet public opinion is highly relevant. In this age of technology, opinions created by social networks provide an exceptional opportunity to mine valuable insights from them that can be used for the development.

The aim of this survey paper is to study the worldwide need of RE, types of RES used at domestic scale and draw useful conclusions on use and acceptance of the public opinion on the use and acceptance of RET and RES. explains the research method; presents the results analyze the opinions regarding renewable energy; provides the discussion; discuss the implications of the study and concludes the study.

RESEARCH PROBLEM

The most effective renewable energy technologies currently in use, and how do they differ in terms of efficiency, cost, and environmental impact?How do public opinions influence the adoption and implementation of these renewable energy technologies? What factors shape public perceptions of renewable energy, and how do these perceptions vary across different demographics and regions?How do policy initiatives align with public opinion and technological capabilities to promote sustainable energy practices the growing importance of renewable energy sources in mitigating climate change and promoting sustainable development, there remains a significant gap in understanding the interplay between technological advancements, public perceptions, and policy frameworks. Specifically, the following questions arise:

RESEARCH METHODOLOGY

To advance our understanding of utilizing RES effectively the present study consists of a systematic literature review (SLR) with a specific focus on RES and RET. Recently a SLR has been carried out in the combination of computer science and RE field and a detailed SLR was performed about public opinions . A SLR is a means of identifying, evaluating and interpreting available research relevant to a particular research question or topic area . The design of the SLR reported in this paper started in December 2017. After several refinements and improvements, publication search was started in March 2018. The following subsections present the research questions of the review, search strategy, searched database, search terms, inclusion/exclusion criteria and the quality criteria of the SLR.

OBJECTIVE

To Identify and Analyze Renewable Energy Sources: Examine various renewable energy sources (solar, wind, biomass, hydropower, and geothermal) to evaluate their technological advancements, efficiency, cost-effectiveness, and environmental impact.

To Assess Technological Innovations: Investigate the latest technologies related to renewable energy generation and storage, highlighting their potential to enhance sustainability and reduce carbon footprints.

To Explore Public Perceptions: Analyze existing literature to understand public attitudes towards renewable energy technologies, including factors influencing acceptance, perceived benefits, and barriers to adoption.

To Examine Policy Implications: Review how public opinion shapes energy policy frameworks and initiatives aimed at promoting renewable energy adoption, including the role of government, community engagement, and education.

To Identify Knowledge Gaps: Highlight gaps in the current research regarding the interplay between technological developments, public perceptions, and policy measures in the context of renewable energy.

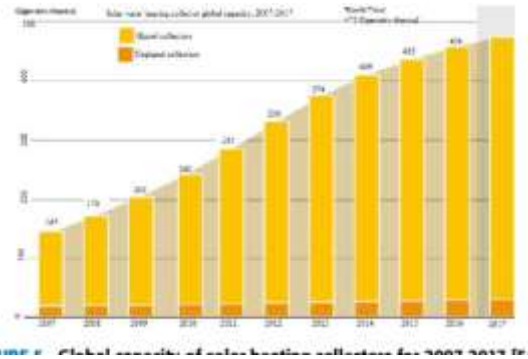
Renewable energy sources

The various sources of renewable energies section in the world is represent in American solar and wind generation are breaking records and being integrated into the national electricity grid without compromising reliability. Since the Industrial Revolution, the energy mix of most countries across the world has become dominated by fossil fuels. This has major implications for the global climate, as well as for human health. Three-quarters of global result from the burning of fossil fuel for energy. And fossil fuels are responsible for large amounts of local air pollution – a health problem that leads to at least 5 million premature deaths each year. Renewable energy is an alternative to the traditional energy that relies on fossil fuel, and it tends to be much less harmful to the environment. There are several opportunities to make an impact on improving the environment through the choice of a greener energy solution. The energy allows consumers to choose green energy options that help you reduce your footprint with energy offsets. Add just green to your electricity or natural gas plan to lower your impact today. The renewable power is booming, as innovation brings down costs and starts to deliver on the promise of a clean energy future.

LITERATURE REVIEW

- Renewable Energy Sources: The review discusses various renewable energy sources such as solar, wind, and biomass1.Technologies: It highlights renewable energy technologies for domestic Public Opinions: The review includes an analysis of public opinions on renewable energy, including a real-time analysis of public tweet Literature Analysis: Over 300 articles were classified, and 42 papers were critically reviewed between 2009 and 20181.Energy Production Statistics: Despite efforts to reduce reliance on fossil fuels, fossil fuels still contributed 73.5% to worldwide electricity production in 2017, while renewable sources contributed 26.5%1.Public Awareness: Lack of public awareness is identified as a major barrier to the acceptance of renewable energy technologies1. Impact Studies: Research on how climate change affects weather patterns, ecosystems, and human health.Mitigation Strategies: Evaluating carbon reduction technologies, renewable energy adoption, and carbon capture methods.

Adaptation Measures: Studying how communities can adapt to climate impacts, such as rising sea levels and extreme weather



FINDINGS

- High potential for adoption due to decreasing costs of photovoltaic (PV) technologies.
- Barriers include land use concerns and the intermittency of solar energy.
- Significant growth in both onshore and offshore wind farms.
- Public acceptance varies; local benefits can enhance support.
- Established technology but faces environmental and social concerns, particularly regarding ecosystem impacts and displacement.
- Offers a way to recycle waste but raises issues related to land use and competition with food production.

PUBLIC OPINIONS

- Public attitudes towards renewable energy are generally positive, but concerns about specific technologies (e.g., wind turbines) can lead to NIMBY (Not in My Back Yard) sentiments.
- Awareness campaigns and education can improve acceptance and understanding of renewable energy benefits.
- Economic factors, such as job creation and local investment, play a vital role in shaping public support.

CHALLENGES

- Intermittency: Some sources like solar and wind are not always available, necessitating energy storage solutions or backup systems.
- Infrastructure: Transitioning to clean energy requires significant investments in new infrastructure and technology.
- Land Use: Some renewable energy projects may require large land areas or impact local ecosystems.

SUGGESTIONS

1)Use multiple databases (e.g., Scopus, Web of Science, Google Scholar) to gather a wide range of studies.

2)Include both peer-reviewed articles and grey literature (e.g., reports from NGOs, government publications) to capture diverse perspectives.

3)Define criteria for including studies (e.g., publication date, geographic focus, study type) to ensure relevance and quality.

4)Exclude studies that do not meet quality standards or that focus solely on non-renewable sources.

5) Organize findings by type of renewable energy (solar, wind, biomass, etc.) to facilitate comparison.

6) Highlight unique challenges and benefits associated with each source.

7) Examine advancements in energy storage, grid integration, and energy efficiency technologies.

FUTURE SCOPE

- Technological Innovation: Advances in energy storage (like batteries) and smart grid technology are improving the efficiency and reliability of clean energy.
- Policy and Regulation: Many governments are implementing policies to promote clean energy adoption and reduce fossil fuel reliance.
- Public Awareness: Growing awareness of climate change is increasing demand for cleaner energy solutions.

renewable energy sources for energy production in India

The renewable energy is becoming an important part of the mix of energy production in various parts of India. Renewable energy still faces major hurdles to wider adoption. Some are associated with various renewable energy technologies, and others are due to the modern realities of the marketplace, regulations and infrastructure.

CONCLUSION

Renewable energy factors like emission of greenhouse gases, availability of resources, land requirements, water consumption, social impacts and price of power generated are taken into consideration for the classification of renewable energy sources. Renewable energy will account for 55% of the total installed power capacity by 2030. It is expected that by 2040, around 49% of the total electricity will be generated by renewable energy as more efficient battries will be used to store electricity, which will further cut the solar energy cost by 66% as compared to the current cost. In addition, the renewable energy has the potential to create many employment opportunities at all levels, especially in rural areas. The Government of India wants to develop a 'green city' in every state of the country, powered by renewable energy. The technological innovations of the emerging economies are mainly directed towards the economic sustainability while ignoring the environmental recovery.

The conventional energy resources like oil, gas and coal are very important for the improvement in economical conditions of the country. In this study, the renewable energy strategy for sustainable development is key parameters for development. The renewable energy is a beneficial for environmental and health. The energy resources and their utilization are related to sustainable development. In energy technology storing of natural resources (fossil and nuclear) are focused to shifting renewable energy technology like solar energy, wind energy, tidal energy, geothermal energy, hydrogen energy and biomass energy.

Energy is a requirement in our everyday life as a way of improving human development leading to economic growth and productivity. The return-to-renewables will help mitigate climate change is an excellent way but needs to be sustainable in order to ensure a sustainable future for generations to meet their energy needs. Knowledge regarding the interrelations between sustainable development and renewable energy in particular is still limited. The aim of the paper was to ascertain if renewable energy sources were sustainable and how a shift from fossil fuel-based energy sources to renewable energy sources would help reduce climate change and its impact.

A qualitative research was employed by reviewing papers in the scope of the study. Even though, the complete lifecycle of renewable energy sources have no net emissions which will help limit future global greenhouse gas emissions. Nevertheless, the cost, price, political environment and market conditions have become barriers preventing developing, least developed and developed countries to fully utilize its potentials. In this way, a creation of global opportunity through international cooperation that supports least developed and developing countries towards the accessibility of renewable energy, energy efficiency, clean energy technology and research and energy infrastructure investment will reduce the cost of renewable energy, eliminate barriers to energy efficiency (high discount rate) and promote new potentials towards climate change mitigation.

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