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Studies on Advanced Technologies for Climate Change- A Review

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Abstract

Climate change is the broader term which signifies to long term effects in the shifting of temperature and weather patterns. The shifting of the temperature and weather patterns disrupt the balance of the natural activities and creates the risk to the all kinds of life on the earth. The significant changes in weather patterns and increase in global temperature is mainly the cause of greenhouse gas level increment. In these studies, the various technologies along with the restrictions like financial crisis, locations and public norms are described.

Keywords: *Renewable Energy Technology, Negative Emission Technology, Green House Gas*

1. INTRODUCTION

Rigorous growth of the industrial sector and increase in the population, the consumptions of the resources also increases. Due to excessive uses of the natural resources the emissions of the harmful gases increases. These gases faster the rate of climate changes as they trap in the atmosphere for the long time duration hence it increases the atmospheric temperature. The increase in the earth temperature and the climate change leads to the formation of several problems like melting of the glaciers, clouding of the green house gases, rise in the sea level, rise in the sea heat content, temperature over land and temperature near surface. Also climate change influences human life too. The greenhouse gases composition in the atmosphere notably consist of Carbon di-oxide along with Methane and Nitrous Oxide. The GHG growth is expressed in terms of CO2 equivalent. The increment in the greenhouse gases gives the essence of climate change and if it continues, the upcoming decades will see the significant growth in response to the world population, economic development and other factors that increases greenhouse gases emissions. The potential impact of climate change will leads to create impact on global warming and it will seriously destroy human health. On the basis of the evidences only humans are responsible for the climate change.

There are varied and complex sources of greenhouse gases emissions, to mitigate the problem of climate change needs the uses of potential strategies and climate change technologies. On the basis of current science to prevent the climate change and dangerous impacts the constraints to be provided for no more rise in the global temperature than 2^0c. .The technological ramifications and obstacles of achieving such an objective are enormous. To achieve the large reduction in the greenhouse gas emissions, there are different pathways for different solutions according to the cost of the technology and future availability. To accomplish significant reductions in global GHG emissions, major technological change will be required. Any comprehensive response to global climate change must include the development and deployment of new technology but it will take time also some decades. Any successful approach to significantly reduce GHG emissions will necessitate efforts that not only deploy low-emission technologies that are currently available, but also promote innovation on new technologies that are required.GHG emissions are mostly determined by the sorts of energy sources and technology employed to supply society with the goods and services it desires. Improved technology can make it possible for machines like cars, machinery, and appliances to use energy more efficiently, lowering their energy consumption and GHG emissions per unit of usable product or service.

2. EARLIER STUDY OF ADVANCED TECHNOLOGIES FOR CLIMATE CHANGE

Ahmad Shamoon et al. [1] clarify view on the role of energy technologies in the response to climate change. The main purpose of this studies is to find advance ideas that will help us create enough energy while also taking into account the environment's effect. We may address this energy shortage by incorporating the widespread usage of renewable energy sources, which do not rely on fossil fuels and appear to be environmentally beneficial. The development of new materials for energy applications may lead to increased efficiency. Despite the technical advancements, we still face several hurdles. Renewable energy technologies efficiencies maybe improved by improving the necessary accessories and infrastructure. Assuring a combination of dependable energy generation technologies while minimizing environmental effect will lead us into the future. Energy generation that is both efficient and resilient will meet our upcoming energy goals at a cheap price. Hydrogen is a fuel that may be used instead of gasoline. It has the maximum energy density per unit weight and should be used in energy related technologies. Different questions regarding climate change has been covered in this report.

The current classification framework of the technology promotion list, technology demand list, and upcoming technology list is proposed in this study by Can Wang et al. [2]. Then, with the help of framing of four technologies list: Chinese working technical promotional list in the view of climate change reduction technology, key factor for addressing climate change along with leading technology, different methodologies are integrated. Also this study gives the overview of depth reductions and zero emissions of carbon as well as Geo-Engineering technologies (CDR and SRM), all of these plays major roles in determining the framework of world abatement in reaching the zero emissions along neutrality in future carbon compositions.

In this study Riu Huang et al. [3] investigated the effect of technology spillover over the climate and economy using a unidirectional connection of the emissions embodied in bilateral trade (EEBT) approach and a dynamic integrated climate and economy model. The results obtained from this study indicate that technological advancements in the electrical sector may help to mitigate climate change and reduce ssc. The framework followed by this study includes EEBT method subsequently followed by the investing the impact of technology spillover on the CO_2 emissions through the construction of four technological progress scenario and lastly estimated the effect of industrial CO_2 emission variations induced by technology spillover on the global atmospheric carbon concentration.

In this study Jennifer F Morris et al. [4] presented new technical model in energy economy the assessment of change for climate and make the use of the equations which are parameterized on the basis of observations while incorporating components the adjustment costs on rent and real basis increases. To find out the role of low carbon technologies in electric power industry, the formula is used for a globally computable generalized algorithm. Other modeling techniques typically use particular expansion constraints but the approach used in this paper is based on assumptions and observations that these limitations are not accurate, and the pace at which new technology spread is determined by economic incentives.

Moreira et al [5] discussed IC Engines for LDV switch fueled with gasoline by replacing plug in hybrid Light duty vehicles (PHEVs) which are powered by advanced technologies for the production of ethanol and electricity from sugarcane, illustrating the achievement of a fair cost estimate. Also for capturing the carbon dioxides (CO_2) along with the addition of biomass which is consist of wood for the extension of operation of sugar mills which are converted during the sugar fermentation into ethanol are the only developments in

such ethanol-producing technologies. This study calculates greenhouse gas emissions in the term of CO_2equivalent and net present value cost of operation of LDV worldwide for the 60 years. For the abatement of GHG emission partly through negative emissions the PHEV's are powered by sugarcane products at cheaper price than gasoline fueled ICE engine vehicles. The total possible reduction in GHG emissions is large, but it falls short of what is necessary for the transportation sector to meet international obligations.

The purpose of this study by Francesso et al. [6] is to present an impartial and proof based review of the current state of worldwide creativity in CCMT's. This research provides a thorough analysis to evaluate worldwide innovative activity using a precise methodological approach capable of capturing and using the information potential of patent data. A number of indicators are established and used to track technological progress, innovation globalization, and collaborative networks. This article examined international creative activity in order to offer quantifiable proof of measures done to create climate change mitigation technology (CCMTs).To utilize patent data as a proxy for invention, a specific methodological approach is used. This technique makes full use of patent data and does not limit the investigation to certain geographic locations.

In this study Taru Palosuo et al. [7] stakeholder knowledge and simulation modelling were used to uncover ways to sustainably boost cereal output in Finland's North Savo area. In two sessions, stakeholders highlighted promising intensification techniques. The cropping model named as APSIM was used for the evaluation of sustainable intensification and climate adoptions as well as their combinations. For the historical baseline circumstances find out by calculation model for different scenarios like yield of cerals, nitrogen content in grains, leaching of nitrate and water productivity this model was used. Although the increased climate temperature with the combination of higher carbon dioxide in atmosphere increases the levels of yield, N uptake and productivity of water and risk with higher Nitrogen leaching because of increment in precipitation poses threat to crop production sustainability, according to the simulation results.

To assist fulfill the Paris Climate Agreement commitments, many GHG reduction technologies, also known as Negative Emission Technologies (NETs), have been proposed. However, due to their varied levels of technical advancement, there are significant difficulties in estimating their effective GHG removal capacity. Although the assessment of life cycle has been presented as one viable tool for holistically assessing the potential of various GGRT removal options, no uniform structure for benchmarking and policy creation is presently

available. In this study Goglio et al. [8]. Examined and explored the problems of LCA as well as various alternate ways to GGRT evaluation. GGRTs, in particular, provide issues in terms of the functional unit, the LCA assessment's system boundary, and emission time. It is a difficulty to utilize consequential LCAs for the analysis of the differentiable efficacy of the new GGRT technologies, but it is vital to do so. To address this issue, recommendations were offered that provided a uniform foundation for knowing the potential of GGRT along with drivers and obstacles and comparisons between them.

As the need of sustainable energy needs, the research in the field of global warming and abatement of climate change on power production system is fast rising. As a result, electricity supply, with its growth in share, utilizes energy supply in the end. In this article Norouzi [9] modeled a collection of six power production technologies using an energy based model, which is then used to mimic each single technology reactions to climate change consequences. With the help of these responses obtained from studies the establishment of relationship between systems performance in various environmental situations as well as index of dimensionality to quantify the reliability of every single power technology opposite to climate change impacts known as the Pehlev index of reliability in power technology. In terms of climate change, the results suggest that solar technology is the most dependable power generating technology, while wind and gas turbines are the least trustworthy.

With use of sensing remote and a Halder et al. [10] focuses on used and changed in covered land and thermal variance in the Bilaspur planning region (GIS). The urban growth in the previous 40 years (1981–2020) was tracked using multi-temporal Lands at imagers. Population pressure, urban household changes, climate change, and catastrophic occurrences all contribute to the conversion of agricultural and forest land to built-up land. The accessibility of transportation in an urban agglomeration has risen, as has the volume of traffic. This research aims to detect, monitor, and understand the changes in used and covered land as well as urban growth, in Bilaspur, Chhattisgarh, India. Urban planning and administration are also implemented using artificial intelligence (AI) algorithms. Bilaspur's road network and rail station have grown as a result of the city's accessibility to transit. This research strategy will also aid future studies of any location with appropriate modifications related to zonal conditions.

Kozarcanin et al.[11] in this article identify the most cost-effective design for decentralized heating in European houses. By fixing the cost he modeled heat demand and supply by downscaling the temperature data room the model consists of 9 combinations of 5

global climates. Four regional climate models have been developed as part of the EURO-CORDEX project. In the results he stated that climate plays a vital role for decentralized heating infrastructure of cost optimal design. Despite his findings indicate a greater use of heat pump which is ground sourced in Europe over the last decade, the bulk of pumps sales in Europe have been for the use as a source of air heating, particularly both heating and cooling can be offer by reversible air to air heat pumps.

In these study Omoregbe et al [12] performed a thorough analysis the articles related to CCT published in the recent 20 years to highlight the state along with the trends in the three technology named as pre-combustion capture, post combustion capture and oxy-fuel combustion. The results obtained by his studies are the terms like post-combustion, pre-combustion and oxy-fuel combustion.

In this paper Pires [13] discussed that how he approaches to the abatement of the CO2 concentration below 5000 ppm to mitigate the climate change. This paper gives the information of the Negative Emission Technology, by integrating the technologies to reduce the overall cost by optimizing the reduction in the carbon dioxide emissions. He tested the Negative Emission Technology at scaled model for different environmental conditions and results in the impact that he stated in the diagrammatic way.

In this paper Rolf Ims et al. [14] discussed by Using experience of change of climate on Arctic Tundra, also proposes how eco-system based on surviliencing of climate effects might be made more effective for both science and management (COAT) In this studies he uses conceptual food web models .and derives the direct and indirect impact pathways on the basis of human interventions and climate change on ecosystem. He stresses in his studies that model should play the same essential function in the ecological surviliencing as they do in other scientific endeavor, namely, directing monitoring designs a priori and guiding data analyses a posteriori. Also he promises that the method is well-suited to dealing with the challenges that many ecosystems may face in the future.

Erin Baker et al.[15] in his paper provides the framework for implementing partially correct data on the energy technology research and development policies in the response to the mitigation of climate change that integrates economics and decision analysis. With help of the database knowledge and use of mathematics he provides the results along with given financial restriction, the ideal research and development portfolio is highly diverse and resilient to climate related risks. However, the best investment in technological progress is dependent (in a non-monotonic fashion) on the danger of climatic harm. Finally, it shows that

in order to correctly value the research and development the action on the reduction must be included as recourse.

3. CONCLUSION

As the climate change and change in weather patterns creates its own impact on the living lives. There are several factors which cause climate change like greenhouse gas emissions and many other gases which trap into the atmosphere which increases the global temperature. For the abatement of these climate change and mitigation of the greenhouse gases requires the development in the technology. As a consequence of the preceding literature research, the following are the different topics that will be explored in this study:

- The cost optimization for the development of the efficient technology to mitigate climate change for the financial feasibility.
- The latest modifications in the automobiles by using different blending in the fuels to reduce the emissions.
- To maintain the balanced in the ecosystem, the knowledge base framework is developed with the help of data science
- The integration of economics and decision analysis to mitigate the climate change along with the financial restrictions.

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Declaration of Competing Interest

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