

An Analysis of Renewable Energy Resources

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ABSTRACT- Regardless of fact that earth's form cannot alteration, world is fast becoming a global community as world's populace consumes more energy on a frequent basis. Energy & related services have become progressively crucial for human economic & social development, well-being, & healthcare. Turning to renewable to address climate alteration is a fantastic concept, but it should be sustained with intention of meeting energy capacity of upcoming generations. Research examined benefits of renewable sources of energy, like security of energy, access of energy, socio-economical development, mitigating climate alteration, & reduced health & ecological impacts. Notwith&ing se benefits, re are still barriers to renewable energy sources' long-term sustainability in terms of mitigating climate alteration. Among se difficulties include market distortions, deficiency of information, procurement of raw resources for foreseeable renewable resource deployment, & everyday carbon impact. Research suggests policies & activities that, if followed, would assistance in attaining objective of renewable energy, lowering emanations, dealing with climate alteration, & delivering sterile atmosphere & clean energy to all present & upcoming generations.

KEYWORDS- Bioenergy, Hydro Power, Renewable Energy Resources, Solar Energy, Wind Energy.

I. INTRODUCTION

Study suggests policies & activities that, if followed, would aid in attaining objective of renewable energy, lowering emanations, dealing with climate alteration, & delivering sterile atmosphere & clean energy to all present & upcoming generations(1). All civilization require energy service for providing utmost human necessities like healthcare, electricity, eating, spatial comfort, transport, & conversation, as well as to operate as producing processes. On path to a sustainable society, power sector's two overriding concerns are assuring supply of energy & decreasing energy's influence on changing climate(2). It is mind-boggling to realise that 1.4 billion individuals worldwide absence electricity access, with 85 percent living in village area(3). As consequence, proportion of rural people reliant on biomass for energy is predicted to upsurge from 2.7 billion now to 2.8 billion by 2030(4). Ecological sustainability has recently come to top of many countries' national policies, initiatives, & development projects(5). At United Nations in New York, Open Working Group produced a list of global Sustainable Development Objectives (SDGs) that involved 17 goal &

169 target. A prototype set of 330 indications was also published in March 2015. SDGs prioritise science & set more dem&s on it than Millennium Development Goals. Altering climate, energy which is renewable, food, healthcare, & water supply all need global monitoring & modelling of a wide range of social, economical, & environment factors(6).

A. Renewable Energy & Climate Alteration

phrase "climate alteration" is now causing quite a stir across globe, in both scientific & political circles(7). Changing climate has from dawn of creation, but speed of development in recent years has scary, & it could be one of world's most serious problems. Carbon dioxide levels have grown during previous 36 years (1979–2014), "averaging roughly 1.4 ppm per year before 1995 & 2.0 ppm per year afterwards." United Nations Framework Convention on Climate Alteration defines climate alteration as a differences in composition of atmospheric composition due to human activities & resulting in natural climate variability witnessed over similar time period(8). Renewable technologies are regarded as solar & wind power, & ir best use avoids ecological consequences, generates little secondary garbage, & is sustained in light of current & forthcoming economical & social requirements. Renewable energy solutions, by substituting convective energy, provide a great opportunity to minimise greenhouse gas emanation& global warming(9).

B. Renewable Energy Sources & Technology

These are derived from natural & continuous energy flow that occurs in our immediate surroundings. Bioenergy, direct solar energy, geormal energy, hydropower, wind, & ocean energy are among m(10).

1) Hydro Power

It is vital energy source that usages water travelling from high elevations to low elevations to operate turbines & create electricity(11). Dam projects consisting of reservoirs, run-of-river, & in-stream projects all fall under category of hydropower projects, & y differ in size. se are technically established, & its projects take use of variable resource. Hydropower reservoirs' operation frequently reflects ir various purposes, such as flood & drought managing, irrigation, downing water, & navigation. Gravity & height at which water falls onto turbine generate principal energy(5). Water mass, gravity factor ($g = 9.81 \text{ ms}^2$), & head, which is well-defined in form of alteration among dam level & tail water level, make up potential energy of stowed water. When water is discharged, reservoir level drops to some amount, which

has an impact on power output(11). Turbines are designed to handle a variable amount of water flow. Hydropower emits almost no particle pollution, can be upgraded fast, & can store energy for several hours(12).

2) Bioenergy

It is type of renewable energy that comes through biological sources. It is valuable source of energy that may be utilised for biodiesel-powered transportation, electricity generation, cooking, & heating(13). Forest leftovers like as wood remains, agrarian remains like sugar cane leftover, & animal husbandry residues like cow manure are all used to generate electricity from bioenergy. Fuel is typically side-product, remains, or left-over produce from foregoing sources, which is benefit of biomass energy-based power(14). It does not, for example, generate a rivalry among & used for food & used for fuel. Biofuel production is currently low in world, but it is steadily rising. In 2006, United States consumed 15 billion litres of biodiesel annually. It has increasing at pace of 30–50 percent each year for reaching aim of 30 billion litres per year by end of 2012(15)(16).

3) Direct Solar Energy

phrase "direct" solar energy denotes to energy source for renewable energy systems that take power from sun. After being collected & altered to diverse types on earth, solar energy is utilised in some renewable technologies like wind & marine (17). Solar energy technology harnesses solar radiation to generate electricity via photovoltaic (PV) & concentrated solar power (CSP), to supply energy, to meet urgent lighting needs, & potentially, to provide fuel for transport & or applications. According to World Energy Council (2013)[7], total energy from solar radiation falling on globe was more than 7,500 times world's total yearly primary energy consumption of 450 EJ(18).

4) Geothermal Energy

As a source of heat energy, geothermal energy is derived naturally from earth's interior. source of heat is connected to planet's interior structure & physical processes that occur there. Despite fact that heat exists in large amounts throughout earth's crust, even deepest sections, it is irregularly distributed, seldom concentrated, & frequently at depths too vast to be utilised mechanically.

geothermal gradient is around 30 °C/km on average. there are parts of earth's interior that can be drilled into that have gradients that are far higher than norm. Wells & or methods are used to extract heat from geothermal reserves. Hydrothermal reservoirs are naturally sufficiently hot & permeable, whereas enhanced geothermal systems are reservoirs that are sufficiently hot but may be increased with hydraulic stimulation (ESG). Fluids of varying temperatures can be brought to surface & utilised to create power & or uses that require utilisation of heat energy.

5) Wind Energy

Wind energy's rise to prominence as key source of world-wide energy has brought it to frontline of renewable sources of energy. Wind may be present all over planet, with some locations having highest power density. Wind energy produces electricity by using kinetic energy of moving air. production of energy from large turbines on land or at ocean is most important application of relevance

to climate alteration prevention (in sea or fresh water). Onshore wind energy solutions are already being mass-produced & implemented. Wind turbines are machines that transform wind energy into electricity.

6) Ocean Energy (Tide & Wave)

Whenever wind blows across water, it creates surface waves (Ocean). larger distance travelled by wind, greater height of wave, & greater wave energy formed, quicker wind speed is continued. In form of waves, tides, currents, & heat, ocean stores enough energy to fulfil whole global need for power several times over. first units of first generation of commercial Ocean energy devices were placed in United Kingdom (SeaGen) & Portugal (Pelamis) in 2008. Wind, tides, waves, & tidal variations among deep & shallow sea water are currently four ways to acquire energy from marine regions.

C. Renewable Energy & Sustainable Development

It has direct relationship to ecological sustainability because of its influence on human growth & economical efficiency. These sources provide benefits in terms of energy security, socio - economic development, access to energy, mitigating climate alteration, & reduced ecological & health impacts. Figure 1 depicts many renewable energy potential for long-term growth.

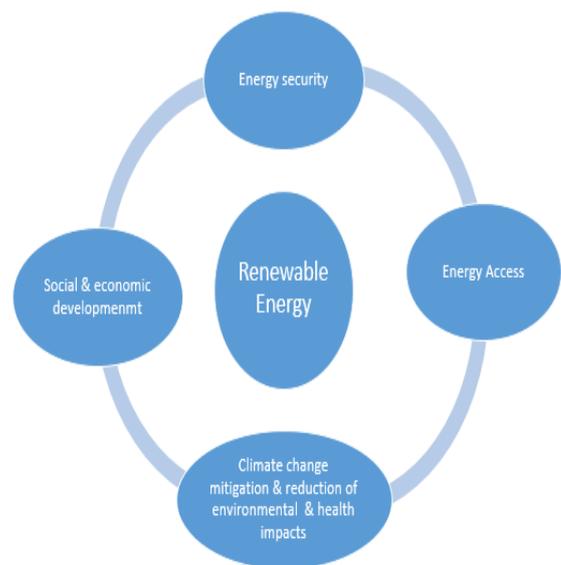


Figure 1: Representation of several chances of renewable energy sources concerning sustainable development

1) Energy Security

Although term "energy security" is extensively used, there is no consensus on how it should be defined. However, concern over energy security is dependent on premise that there is steady supply of energy required for commercial operations. Even though growth in energy consumption are so inextricably linked, exposure to a reliable electricity supply is a priority for government as well as a technological & money related struggle for both developed & emerging nations, because protracted interruptions would cause severe economic & basic configurability problems in most societies. Renewable resources are more equally distributed over world that are less traded on market than fossil fuels. Renewable energy reduces energy

imports, diversifies supply options, reduces an economy's exposure to price volatility, & has potential to improve global energy security. Renewable energy can also assist to enhance dependability of energy services, especially in areas with limited grid access. A diverse portfolio of energy sources, as well as effective administration & system design, can help to increase security.

2) *Social & Economic Development*

Energy business has long viewed as vital to economic & social development, with robust correlation among rising energy usage & economic expansion. Globally, per capita income is highly related to per capita energy consumption, & economic development has identified as key driver of increased energy consumption in recent years. It, in turn, creates jobs; according to a 2008 study, renewable energy technology produced around 2.3 million jobs globally, boosting healthcare, literacy, gender equality, & environment protection.

3) *Energy Access*

seventh Sustainable Development Goal (cheap & hygienic energy) goals to assurance energy is hygienic, inexpensive, accessible, & reachable to people, & renewable energy sources can help with this because y are widely spread across world. Admittance issues must be addressed in native context, & in maximum countries, re is a clear distinction among urban & rural electrification, which is specifically factual in Sub-Saharan Africa & South Asia. In rural regions with large distances from national grid, distributed networks based on renewable energy are typically more competitive, & lower level of rustic electrification present major opportunities for renewable energy-dependent mini-grid systems for providing m with power access(19,20).

4) *Mitigation in Climate Alteration & Lessening of Ecological & Health Influences*

se sources utilised in energy generation help to lower greenhouse gases, that helps to combat climate alteration, as well as ecological & health risks connected with pollutants emitted by fossil fuel energy sources. Among 1990 & 2012, greenhouse gas emanation decreased by 14% in 33 EEA nations. Noneless, re was variance among individual member nations; whereas 22 EEA countries saw a drop in GHG emissions, 11 EEA members saw a rise. In EEA nations, GHG emanation per capita decreased by 22% among 1990 & 2012.

D. Challenges Affecting Renewable Energy Sources

Renewable energy sources may eventually replace fossil fuels as dominant source of energy in low-carbon countries. Disruptive modifications in all energy systems are necessary to exploit broadly available renewable energy sources. fundamental issue of first half of twenty-first century is often regarded as organising energy transition from non-sustainable to renewable energy sources. policies & policy instruments of a country, which determine cost & technological innovation, are a major hurdle to use of renewable energy sources. Furrmore, technological developments impact cost of renewable energy technologies, resulting in market failures & low renewable energy technology uptake.

As consequence, prosperous renewable energy approach must consider in account interconnectedness of variables

affecting renewable energy supply & sustainability. study's policy suggestions, which can help minimise climate alteration & its effects, are as follows:

- By capitalising in renewable energy technology & policies to help lessen it, all industries & regions have opportunity to contribute.
- Reducing carbon footmark via fluctuations in lifestyle & behaviour outlines can make significant contribution to climate alteration mitigation.
- Investigation into ideas & technology that can minimise l& usage while simultaneously reducing renewable energy-related accidents & danger of resource competition, such as in Bioenergy, where food production competes with energy production.
- Improving international collaboration & support for emerging nations in terms of infrastructure expansion & technological upgrades for modern supply & maintainable energy services as a means of reducing climate alteration & its consequences.

II. LITERATURE REVIEW

Shahrouz Abolhosseini et al. discussed Renewable Supply of Energy & Energy Efficiency Technologies in which y discussed how during next 2 decades, power will account for emergent percentage of world-wide dem& of energy. escalating charge of fossil fuels, accompanied by concern about ecological repercussions of greenhouse gas emissions, has shown awareness in development of alternative energy supplies in recent years. Fukushima Daiichi disaster, in particular, was a watershed moment in push for alternative energy sources. Due to lack of danger & hazards, renewable energy is today regarded more attractive source of energy than nuclear power(21).

Ellabban O et al. discussed current status, upcoming projections & permitting technology of renewable energy resources in which y discussed how Although electric security of energy is critical, higher rate & restricted availability of fossil fuel, as well as desire to decrease greenhouse gas emissions, have made renewable resources appealing in world energy-dependent economies. These resources have great potential since y may, in ory, exponentially surpass global energy dem&; as a result, y will play crucial role in forthcoming world-wide energy portfolio, that is presently to focusing on exp&ing ir pool of renewable energy resources(22).

Rabiul Islam M et al. discussed how Bangladesh's non-renewable energy resources are quite limited. In rural regions, it is dealing with an energy crisis & a major desertification problem. If renewable energy is used in form of major source of energy in rustic regions, se problems might be solved. Finding sustainable energy resources & viable technologies is critical for scientists & researchers. Bangladesh has abundant renewable energy resources, including biomass & solar radiation. Hydro & wind power can also be considered promising renewable energy sources. Using se resources to improve quality of life for rural villages looks to be a potential option(23).

III. DISCUSSION

Air, sunlight, & hydro power are instances of renewable energy technologies that might be used as primary sources in order to satisfy energy sector's de carbonization aim.

However, there is a big difference among modern & traditional power plants. Renewable energy's contribution has made a difference & faced a number of problems, particularly in power generating system. electricity system's dependability can help accomplish the carbonization goal, however this goal is frequently met with a slew of obstacles & breakdowns that make meeting goal extremely risky. Despite this, difficulties & technical solutions are rarely explored in literature. This research focused on a variety of technical solutions & difficulties, particularly in power system area. most essential components to develop in forthcoming are findings of solution matrix assessment & linked technological difficulties. This paper discusses several concepts related to renewable energy resources.

IV. CONCLUSION

Energy is required in our everyday lives in order to further human development while also improving economic growth & productivity. Switching to renewables is an excellent strategy for combating climate alteration, but it must be maintainable in order for subsequent generations to satisfy their energy needs. interdependence among sustainability & renewable energy, in specific, is incompletely understood. article's purpose was for determining if renewable energy sources were sustained & whether transitioning from fossil fuel-based power sources to renewable energy sources would aid in mitigating climate alteration & its repercussions. To conduct qualitative research, a review of articles within topic of study was employed. Despite fact that renewable energy sources produce no net emanation during their entire lifetime, they will help to minimize forthcoming global greenhouse gas emissions. Costs, pricing, political settings, & market conditions, however, have become obstacles to developing, least competent, & developed nations fully using their potential. In this way, international collaboration will create global opportunity by assisting least developed & developing nations in attempting to access renewable energy, fuel efficiency, clean renewable energy technology, investigations, & energy investments in infrastructure, as well as lowering cost of renewable energy, eliminate obstacles to energy efficiency (high discount rate), & implementing innovative potential sources of energy..

research emphasised benefits of renewable energy sources in regards to energy security, access to energy, socio - economic development, mitigating climate alteration, & decrease of ecological & health consequences. there are a variety of impediments to renewable energy sources' long-term sustainability & ability to tackle climate alteration. Among challenges include market failures, a lack of information, availability of raw materials for forthcoming renewable resource deployment, & most importantly, our (humans') inefficient energy usage.

REFERENCES

- [1] Faheem M, Butt RA, Raza B, Alquhayz H, Ashraf MW, Raza S, et al. FFRP: Dynamic Firefly Mating Optimization Inspired Energy Efficient Routing Protocol for Internet of Underwater Wireless Sensor Networks. *IEEE Access*. 2020;
- [2] Gola KK, Gupta B. An energy-efficient quality of service (QoS) parameter-based void avoidance routing technique for underwater sensor networks. *Jordanian J Comput Inf Technol*. 2019;
- [3] Khan G, Dwivedi RK. Energy efficient routing algorithm for void avoidance in UWSN using residual energy and depth variance. *Int J Comput Networks Commun*. 2018;
- [4] Büyükožkan G, Güleriyüz S. An integrated DEMATEL-ANP approach for renewable energy resources selection in Turkey. *Int J Prod Econ*. 2016;
- [5] Kumar A, Jain A. Image smog restoration using oblique gradient profile prior and energy minimization. *Front Comput Sci*. 2021;
- [6] Jenniches S. Assessing the regional economic impacts of renewable energy sources - A literature review. *Renewable and Sustainable Energy Reviews*. 2018.
- [7] Gupta S, Mishra T, Varshney S, Kushawaha V, Khandelwal N, Rai P, et al. Coelogen ameliorates metabolic dyshomeostasis by regulating adipogenesis and enhancing energy expenditure in adipose tissue. *Pharmacol Res*. 2021;
- [8] Destouni G, Frank H. Renewable energy. *Ambio*. 2010;
- [9] Zerrahn A, Schill WP, Kemfert C. On the economics of electrical storage for variable renewable energy sources. *Eur Econ Rev*. 2018;
- [10] Jun W, Mughal N, Zhao J, Shabbir MS, Niedbała G, Jain V, et al. Does globalization matter for ecological degradation? Nexus among energy consumption, economic growth, and carbon dioxide emission. *Energy Policy*. 2021;
- [11] Khan G, Gola KK, Ali W. Energy Efficient Routing Algorithm for UWSN - A Clustering Approach. In: *Proceedings - 2015 2nd IEEE International Conference on Advances in Computing and Communication Engineering, ICACCE 2015*. 2015.
- [12] Lund H. Renewable energy strategies for sustainable development. *Energy*. 2007;
- [13] Jain RK, Kumar A, Singh BK. Track etch parameters and annealing kinetics assessment of protons of low energy in CR-39 detector. *Nucl Instruments Methods Phys Res Sect B Beam Interact with Mater Atoms*. 2012;
- [14] Zafar M, Kumar S, Kumar S, Dhiman AK, Park HS. Maintenance-energy-dependent dynamics of growth and poly(3-Hydroxybutyrate) [p(3hb)] production by *azohydromonas lata* mtcc 2311 using simple and renewable carbon substrates. *Brazilian J Chem Eng*. 2014;
- [15] Jain N, Awasthi Y. WSN-AI based Cloud computing architectures for energy efficient climate smart agriculture with big data analysis. *Int J Adv Trends Comput Sci Eng*. 2019;
- [16] Pelc R, Fujita RM. Renewable energy from the ocean. *Mar Policy*. 2002;
- [17] Gola KK, Gupta B. Underwater Acoustic Sensor Networks: An Energy Efficient and Void Avoidance Routing Based on Grey Wolf Optimization Algorithm. *Arab J Sci Eng*. 2021;
- [18] Saavedra M. MR, Cristiano CH, Francisco FG. Sustainable and renewable energy supply chain: A system dynamics overview. *Renewable and Sustainable Energy Reviews*. 2018.
- [19] Avtar R, Sahu N, Aggarwal AK, Chakraborty S, Kharrazi A, Yunus AP, et al. Exploring renewable energy resources using remote sensing and GIS-A review. *Resources*. 2019.
- [20] Wang Y, Xu L, Solangi YA. Strategic renewable energy resources selection for Pakistan: Based on SWOT-Fuzzy AHP approach. *Sustain Cities Soc*. 2020;
- [21] Abolhosseini S, Heshmati A, Altmann J. A Review of Renewable Energy Supply and Energy Efficiency Technologies. *IZA Discuss Pap*. 2014;(8145).
- [22] Ellabban O, Abu-Rub H, Blaabjerg F. Renewable energy resources: Current status, forthcoming prospects and their enabling technology. *Renewable and Sustainable Energy Reviews*. 2014.
- [23] Rofiqul Islam M, Rabiul Islam M, Rafiqul Alam Beg M. Renewable energy resources and technologies practice in Bangladesh. *Renewable and Sustainable Energy Reviews*. 2008.