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Renewable Energy Sources, Sustainability and Environmental Protection: A Review

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Abstract:

Energy plays a vital role in any country`s economic development. As such proper and adequate supply of energy is fundamental for environmental, social, and economic development. Renewable energy has ticked all the boxes to be considered the best energy source because it is environmentally friendly. Renewable energy is considered a clean source of energy because it generates limited secondary pollutants from burning fossil fuels. Conventional fossil fuels, which are a limited resource, provide a significant share of the main energy demand, but renewable energy development represents a significant step towards social, economic, and environmental growth. Due to the ever-increase demand for energy as a result of over growing human population which cannot be modified by the current shape of the earth due to how fast the world is becoming a virtual community. The requirement for energy and related services to meet human growth can be seen in welfare, social, health, and economic development. The need for renewable energy sources to combat climate change and protect our environment is a great strategy that needs to be sustainable to satisfy future generations' energy needs. This paper describes the development opportunities related to renewable energy sources and their sustainability, environmental safety, social, and energy security, economic strength, and expanding access to affordable, safe, and cheaper energy. This helps provide a foundation for addressing the demand for sustainable development.

Keywords: *Renewable energy, environment, sustainability.*

Introduction

When fossil fuels are burned to produce power and heat, they release significant greenhouse gases that cover the earth and trap solar radiation (Bogdanov et al., 2019). Up until recently, efforts to sever the link between rising greenhouse gas (GHG) emissions and economic growth have generally failed, whereas marginal global emissions growth is increasing (REN21, 2019). Long-term energy supply is likely to be constrained by the atmosphere's finite capacity to absorb extra greenhouse gases, not by the fact that humanity is running out of fossil fuels. A transformational road toward significant reductions in GHG emissions is necessary to mitigate climate change to a bearable level (Lu et al., 2020). And to avoid the worst effect of climate change, GHG emissions must be significantly reduced in the coming years. For this reason, we must start investing in a safe, scalable, reliable, sustainable, and economical alternative source of energy (Aleklett et al., 2010). The wind, sun, waste, water, and heat

from the earth are all abundant sources of renewable energy that replenish themselves naturally with little to no air pollution or greenhouse gases being released into the atmosphere (Zou et al., 2016). Comparatively, renewable forms of energy are accessible worldwide and have not yet reached their maximum potential. According to the International Renewable Energy Agency (IRENA), by the year 2050, ninety (90) percent of the world's electricity will be generated from renewable energy sources. With the help of renewable energy sources, nations may diversify their economies, shield themselves from the erratic price fluctuations of fossil fuels, and promote inclusive development, job creation, and the reduction of poverty (Aleklett et al., 2010).

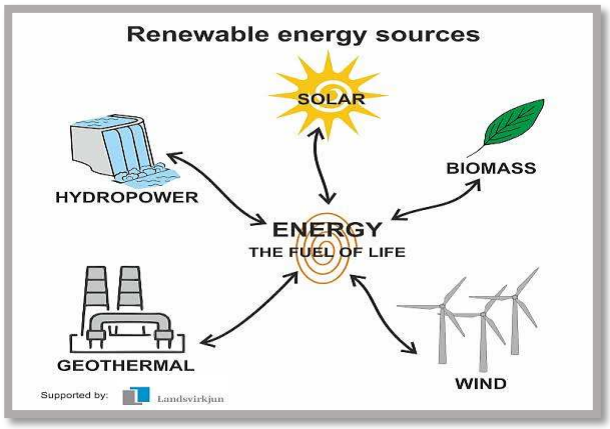

Figure 1. Renewable Energy Sources Brent, 2021.

Renewable Energy Sources

Since renewable energy sources might theoretically supply much more energy than the world needs, renewable energy sources have significant potential. Based on the usage of commonly accessible, indigenous resources, renewable energy sources like wind, biomass, hydropower, geothermal, and sun can deliver sustainable energy services (Herzog et al., 2001). As their costs fall, oil and gas prices continue to vary, and a switch to renewable energy systems is becoming more and more likely. In the past few decades, sales of solar and wind power systems have increased quickly, their capital costs and electricity generation prices have decreased, and they have kept getting better at what they do (Strielkowski et al., 2021). The cost of social and environmental expenses as well as the price of fossil fuels and renewable energy are moving in opposing directions (Chel and Kaushik, 2018).

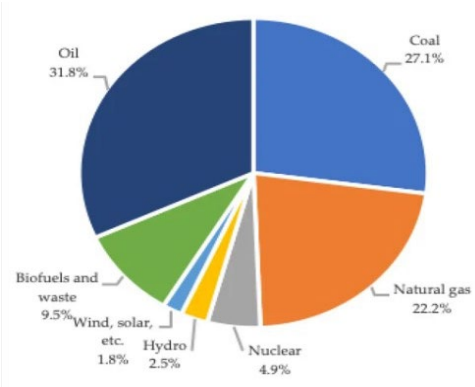

Figure 2. Energy World Total Primary Supply
Source: Halkos and Gkampoura, 2020

Data from the IEA (International Energy Agency), show that in 2020 renewable energy sources made up 13.9% of the world's total primary energy supply(Halkos and Gkampoura, 2020). Further, 9.5% of the total primary energy supply was provided by biofuels and waste, 2.5% by hydropower, and 1.8% by solar, wind, and other RES. More than 80% of all energy is produced from fossil fuels (Halkos and Gkampoura, 2020).

The economic and political frameworks necessary to promote the wide adoption and long-term viability of markets for renewable energy systems are rapidly changing (Sawin et al., 2016). It is becoming increasingly obvious that the new regime of renewable energy and, to a lesser degree, natural gas-based systems will be the primary drivers of future growth in the energy sector, as opposed to conventional oil and coal sources(Garba and Adamu, 2021). Due to these developments, there is now a market opportunity to both innovate and capitalize on developing markets to support renewable energy

technology, with the help of governmental and public attitudes (Herzog et al., 2001). The creation and use of renewable energy sources can increase market diversity in the energy sector, help secure long-term sustainable energy supplies, reduce local and global atmospheric emissions, and offer commercially appealing options to meet particular energy service needs, especially in developing nations and rural areas, which can lead to the creation of new jobs in those regions (Nastasi et al., 2022).

Biomass

Biomass is a source of energy and it includes waste food, municipal solid waste, agricultural waste, forestry, agricultural residue, industrial waste, and garden tripping (Pehlken et al., 2020). Plants like the aforementioned corn and soy are the most prevalent types of biomass that are used for energy production. These creatures' energy can be used to generate electricity or be burned to produce heat. The energy in biomass is initially obtained from the sun: through photosynthesis, plants transform carbon dioxide and water into nutrients (carbohydrates). These creatures' energy can be directly and indirectly converted into usable energy. Biomass can be directly burned to provide heat, directly transformed into electricity, or directly transformed into biofuel (indirect) (Pehlken et al., 2020). The carbon cycle on Earth depends heavily on biomass. The exchange of carbon takes place between the atmosphere, hydrosphere, biosphere, and lithosphere in a process known as the carbon cycle (Basu, 2010).

There are various stages in the carbon cycle. The amount of sunlight that reaches the Earth's atmosphere is regulated in part by carbon. Through photosynthesis, decay, respiration, and human activity, it is exchanged (Panwar et al., 2011). For instance, carbon that is absorbed by soil during an organism's decomposition may be recycled when a plant uses photosynthesis to release nutrients including carbon into the biosphere. Before being retrieved through natural or human activities, the decomposing organism could transform into peat, coal, or petroleum under the correct circumstances (Basu, 2010). Carbon is secluded or kept in between exchanges. For millions of years, the carbon in fossil fuels has been locked away. Carbon that has been stored by fossil fuels is released into the atmosphere when they are removed and burned for energy. Carbon is not reabsorbed by fossil fuels (Basu, 2010).

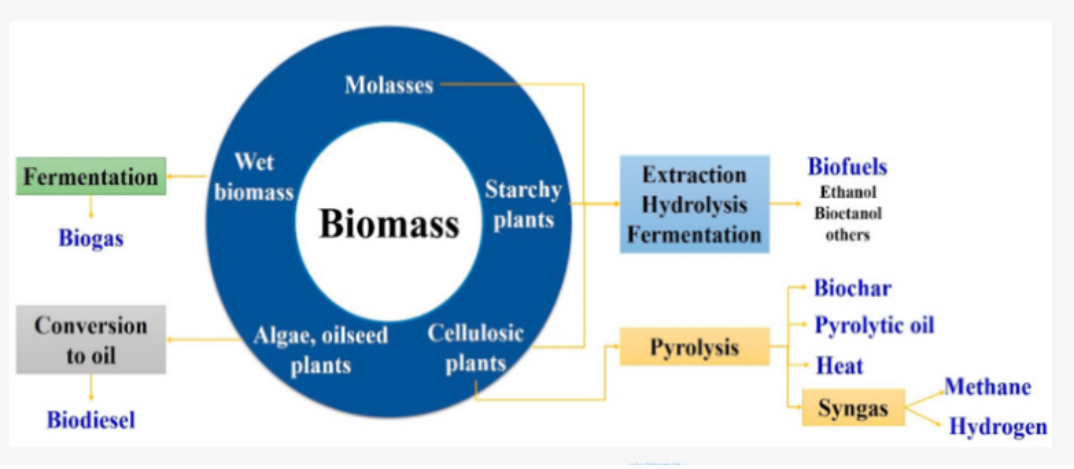

Figure 3. Lignocellulosic Types of Biofuel Products from Biomass
Source: Clauser et al., 2021

Through thermochemical or biochemical processes, bioenergy can be produced from biomass as heat, power, or biofuels (solid, liquid, or gaseous) (Clauser et al., 2021). It is possible to burn biomass directly, however it is a less desirable choice. The components of biomass

are created through photosynthesis, which uses CO2 from the air, water, and sunlight to create carbohydrates. Replanting offsets the carbon dioxide released during the burning of biomass, allowing it to be once more absorbed and returned for a new growth cycle (Clauser et al., 2021). As an environmentally acceptable energy source that can be generated wherever in the world where biomass is present, biofuels are a viable substitute in the transportation sector. This ensures the sustainability and growth of forestry, agriculture, and allied businesses (Garba et al., 2022).

Biomass, as opposed to fossil fuels, is made from recently living creatures. In the carbon cycle, the carbon in biomass can still be traded (Panwar et al., 2011). But biomass resources like plants and forests need to be managed responsibly if we want to effectively allow Earth to continue the carbon cycle process (Herzog et al., 2001). Reabsorbing and sequestering carbon takes decades for trees and plants like switch grass. The process might be severely hampered by uprooting or soil disturbance. For the environment to remain healthy, there needs to be a consistent and diverse supply of trees, crops, and other plants (Outhred et al., 2002).

Hydroelectric Energy

This is energy from a renewable source. Around 70% of all renewable energy in the world comes from hydropower(Siri et al., 2021). Geothermal, wave, tidal, wind, and solar energy are some additional renewable energy sources(Allan Tisdell, 2019). Unlike conventional power plants, which may pollute the air, land, or water, hydroelectric power plants also known as hydropower plants do not consume resources to produce electricity. The growth of the country's electric power sector has been significantly aided by hydroelectric energy. The early development of the electric power industry benefited from both minor and large hydroelectric power plant development. Water in motion and water at work generate hydroelectric power (Said et al., 2022). The sun drives the hydrologic cycle, which provides water to the people. In some cases, it can be viewed as another type of solar energy. In the hydrologic cycle, precipitation is how atmospheric water gets to the surface of the earth. The majority of this water either percolates into the soil or forms surface runoff, while some of it evaporates. Eventually, water from rain and snowmelt finds its way to ponds, lakes, reservoirs, or oceans where evaporation is always taking place (Siri et al., 2021). For most developed and developing countries, hydroelectric power is essential for their socioeconomic development. Modern technology and the increasing human population have led to an enormous demand for energy for different purposes such as electricity generation, pumping water, construction, and transportation(Pickl, 2019).

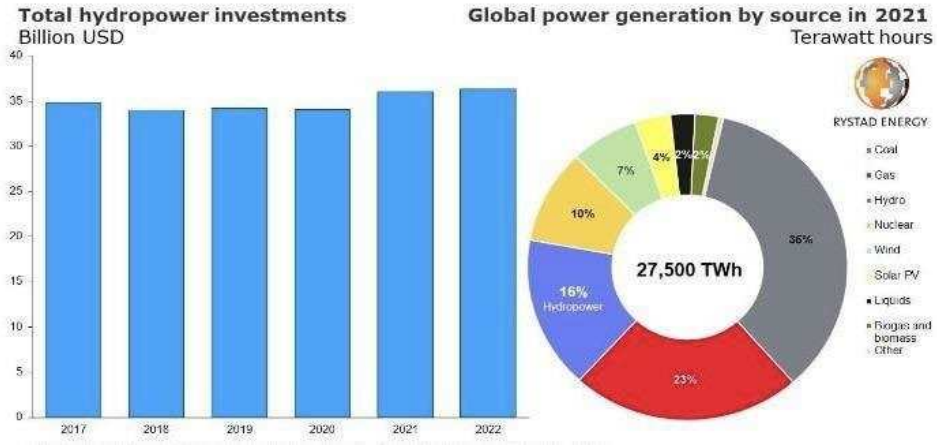

Figure. 4. Current Trend and Prospect of Hydropower Energy
Source: Halkos and Gkampoura, 2020

Currently, the projected hydropower market may surpass 1,200 GW of global capacity and $36.3 billion in investments in 2022 (Abdildin et al., 2021). Coal and natural gas have been the chief main conventional energy used for decades. These sources of energy are the major cause of our environmental degradation. They emit harmful gases like CO_2, SO_x, and NO_x. Hydropower energy produces close to one-sixth of the total world energy (Wan et al., 2022). The sector contributes more to power generation than all other renewable sources combined, including wind, solar PV, biofuels, and geothermal, by around 60%. In 2021, hydropower generated 4,414 TWh of electricity, up from 4,360 TWh in 2020, while capacity increased by 14 GW in 2021 and by 17 GW in 2020 (Wan et al., 2022).

Although the energy in the natural world cannot be created or destroyed, it can be changed from one form to another. There is no fresh energy created when producing electricity (Siri et al., 2021). In reality, energy can only be transformed from one form to another form. Water must flow to generate power. The energy transforms into mechanical (machine) energy as flowing water turns blades in a turbine(Panwar et al., 2011). This mechanical energy is transformed into another energy form which is electricity energy as the generator's rotor is turned by the turbine. This type of energy is known as hydroelectric power, or simply hydropower because water serves as the source of the energy(Brent, 2021). Hydropower energy is produced in plants known as hydroelectric power plants. Some power plants are situated on rivers, streams, and canals, but dams are required for a dependable water supply (Siri et al., 2021). Dams hold water in reserve for later release to be used for power generation, domestic and industrial uses, and irrigation. The reservoir functions similarly to a battery, storing water that may be released when electricity is needed (Chel and Kaushik, 2018).

Wind Energy

The most affordable large-scale renewable energy source at the moment is wind power (Darwish & Al-Dabbagh, 2020). It involves producing electricity using the wind's innate ability to blow. Within the region where their blades sweep, wind turbines collect wind energy (Tong, 2010). A generator that generates electricity to export to the grid is powered by rotating blades (Darwish & Al-Dabbagh, 2020). Because of technological advancements in the field, wind turbines are now bigger, more effective, and employ sophisticated technology (Outhred et al., 2002). To collect more energy per turbine, rotor diameters and hub heights are required to produce the same amount of energy because of advancing technology, and wind farms are becoming more and more flexible (Sun, 2018).

Geothermal Energy

Geothermal energy is a type of energy conversion that uses heat energy from within the Earth to generate electricity, heat homes, and other uses (Massachusetts Institute of Technology., 2006). Lava flows, geysers, fumaroles, hot springs, and mud pots are just a few of the natural phenomena that are produced on the earth's surface by the heat from its interior(Salazar et al., 2017). The heat is principally created by the radioactive decay of potassium, thorium, and uranium in the Earth's crust and mantle, as well as by friction created at the edges of continental plates(Salazar et al., 2017). Between 50 and 70 milliwatts (mW) per square meter are the global averages for the ensuing annual low-grade heat flow to the surface(Younger, 2015). On the other hand, 342 watts per square meter per year are produced by incoming solar radiation striking Earth's surface (see solar energy)(Salazar et al., 2017). This is equal to about three times the yearly global energy consumption of all kinds, geothermal energy extraction techniques and depth affect the amount of useful energy that can be extracted(Huttrer, 2020).

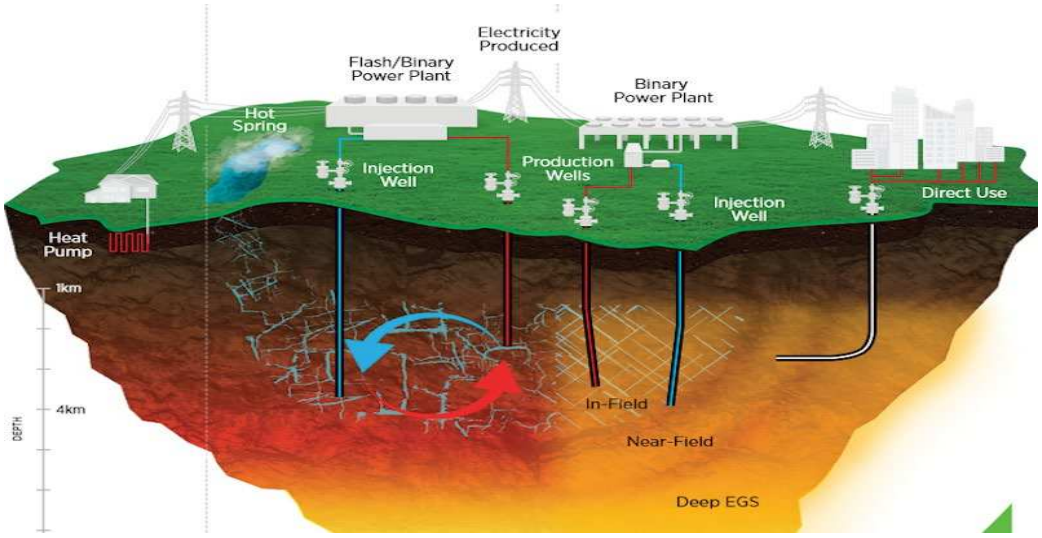

Figure. 5. Geothermal Energy
Source: Younger, 2015

In the upper part of the lithosphere, the temperature of rocks and other subsurface materials rises by an average of 20–30 °C (36–54 °F) each kilometer (0.6 miles), and this rate of increase is significantly higher in the majority of Earth's recognized geothermal regions(Salazar et al., 2017). To transport the energy to the top for heat extraction, a fluid (or steam) is typically required. It might be difficult to find and exploit geothermal resources. This is particularly true for the high-temperature materials required to produce power(Younger, 2015). Such resources are usually restricted to regions of the earth with recent volcanic activity, those at plate borders, or those found inside crustal hot zones (Kreith et al., 2016). Even though Earth is a constant source of heat, using the resource must be done sustainably because heated fluids and steam can be extracted at a faster pace than they can be replenished (Huttrer, 2020).

Solar Energy

Solar power is a potent energy source that may be utilized to heat, chill, and light buildings (Boxwell, 2010). The sun emits more energy into the atmosphere in one hour than the entire planet does in a year. Sunlight is converted into useful energy for buildings using a variety of ways. Solar photovoltaics for electricity, passive solar architecture for space heating and cooling, and solar water heating are the most widely used solar technologies for residences and commercial buildings(Boxwell, 2010). Solar technology helps businesses and industries diversify their energy sources, increase productivity, and cut costs. Solar photovoltaic and concentrating solar power technologies are used by utilities and energy producers to generate electricity on a large scale to power cities and small towns(Wang et al., 2009).

Photovoltaic or solar cells transform light from the sun directly into electricity. The photovoltaic effect, which is the conversion of light (photons) to electricity (voltage), gives the field of photovoltaics (commonly abbreviated as PV) its name (Boxwell, 2010). Soon, solar cells were being utilized to power clocks, computers, and even space spacecraft. Today, photovoltaic systems are being installed on a massive scale to help power the electric grid. Electricity generated by solar cells is now economically viable in many places (United Nations. Economic and Social Council. & United Nations. Office for ECOSOC Support and Coordination., 2008).

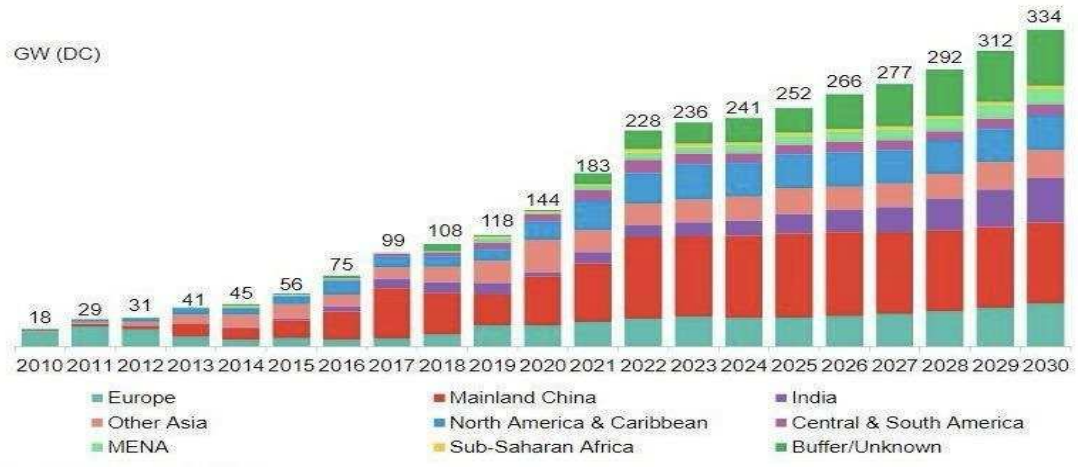

Figure. 6. Global PV Installation Estimate and Forecast
Source: Syahputra and Soesanti, 2020

Role of Renewable Energy

To prevent climate change and lessen its most dire effects, clean energy production is essential (Shrestha et al., 2020). The year 2019 was found to be the second-warmest on record. In its special climate change issue published in November 2015, National Geographic claims that the Earth's temperature has increased by an average of 0.85 °C since the turn of the 20th century (Gielen et al., 2019). A little over 1.1 billion people (or 17% of the world's population) live without electricity(Li et al., 2022). In addition, 2.7 billion people (38% of the population) use conventional biomass for heating, lighting, and cooking in their homes, putting their health in considerable danger (Alper and Oguz, 2016).

On the global economy and in terms of development, switching to an energy system based on renewable technology will have very favourable economic effects. According to the International Renewable Energy Agency (IRENA), increasing the proportion of renewable energy in electricity generation to 57% globally by 2030 will be required to satisfy the goals outlined in the Paris Agreement(Li et al., 2022).

Therefore, local economies benefit from the indigenous nature of clean sources, which also lends the concept of "energy independence" meaning (Kabeyi and Olanrewaju, 2022). Dependency on imported fossil fuels places a nation under the control of its supplier's short-term political and economic objectives, which jeopardizes the security of its energy supply(Li et al., 2022). Whether it is water, wind, sun, or organic material, there is a renewable resource available anywhere in the world for creating energy responsibly. Green energies, sometimes known as "renewables," are just as easily accessible as the sun from whence they originate and can be adjusted to the cycles of nature, unlike traditional energy sources such as coal, gas, oil, and nuclear, whose reserves are limited (Gielen et al., 2019). As a result, they are essential to a sustainable energy system that enables today's growth without threatening that of incoming generations (Karatayev et al., 2021).

Sustainability Development

The Sustainable Development Goals (SDGs) are the road map for building a better, more sustainable future for all people(Nastasi et al., 2022). They represent a global call to action to eradicate poverty, safeguard the environment, and guarantee the prosperity and peace of all (Nyasapoh et al., 2022). The Encyclopedia of Life Support Systems (EOLSS, 1998) presents a better concept of global sustainable development. The prudent use of resources by

paying close attention to policy, social, economic, technological, and ecological management of natural and human-engineered capital to foster innovations that guarantee a higher standard of living degree of life support, or meeting basic human needs, in every corner of the world while also promoting intergenerational justice (Sathaye et al., 2011).

It is generally acknowledged that a society's ability to access renewable energy sources is a necessary, but insufficient, condition for progress. The majority of the time, societies—such as nations or regions—that experience considerable industrial and economic development have access to a supply of renewable energy (Dincer & Rosen, 2012). There are additional conditions that must be addressed for long-term sustainable growth. Such societies primarily need to have access to and use energy resources that are sustainable in a broad sense, i.e., that can be obtained safely and reliably, used safely to provide the intended energy services with little harm to the environment, human health, or society, and can be purchased for a fair price (Allan-Tisdell, 2019).

There are various aspects to sustainability, which shall be discussed in this paper as economic, environmental, social, and technical sustainability (Welch and Venkateswaran, 2009). Noting that these aspects may not be completely autonomous and may entail conceptions of community at the state, local community, and household levels, we'll employ them in the following ways, whether they're at the national or international level.

Economic Sustainability

The ideas of productive, allocative, and dynamic efficiency are all crucial to economic sustainability; dynamic efficiency is the most significant in this context because it pertains to transforming an economy from one that is less sustainable to one that is (Alper and Oguz, 2016). Because we must devote both human and material resources to enhancing sustainability, we also need to take into account the long-term economic viability of individual households, communities, nations, and the entire human society (Alper and Oguz, 2016). For instance, it has been argued that a load of their international debt threatens the ability to develop nations to live sustainably (Jianzhong et al., 2018).

It has been found that the employment of local labor from rural areas, local goods and services, local investors, and local bank services makes renewable energy projects advantageous economically (Kichonge et al., 2016). The establishment of a trust fund that attempts to invest the money made from selling electricity in the local economy is another way that renewable energy projects have benefited the local communities. Fewer communities now find it simple to fund any small business of their choosing (Wan et al., 2022). Solar power plants provide extremely few jobs compared to biofuel projects, but as the percentage of workers in various industries rises, more jobs will be created for others by using their economy's portion for restaurants, entertainment, and other leisure-related activities. Due to the availability of numerous alternatives for producing electricity utilizing the various renewable energy sources accessible in that location, the entire economy will be improved while the consumers will receive electric power at a lower cost than that of conventional energy sources (He et al., 2021).

Social Sustainability

It may not be acceptable to expect specialized expertise or equipment to be available within a local community; rather, social sustainability incorporates the concepts of human knowledge and ingenuity, quality of life, equity, and social skills which assist in developing or preserving a society (Brent, 2021; Sawin et al., 2016). Examples include worries about the aesthetic impact of wind farms and local employment prospects related to the production, installation, and use of renewable energy technology (Nyasapoh et al., 2022). These resources also offer social benefits like improved health, depending on consumer preferences, technological advancements, and employment opportunities, but some fundamental factors should be taken into account for the benefit of

people, such as climatic conditions, level of education and living standards, and region whether urban or rural from an agricultural perspective (He et al., 2021). The fundamental factors for any nation's development are social ones. Renewable energy systems can result in local employment, improved health, employment opportunities, and consumer choice (Awosusi et al., 2022).

Environmental Sustainability

Renewable energy sources, such as wind, biomass, etc., address specific challenges that range from local (such as bird strikes on wind turbines), regional (such as salinity control), and global (such as climate change) in addition to the upkeep of entire ecosystems (Welch and Venkateswaran, 2009). Projects utilizing renewable energy have also improved environmental effects by lowering carbon dioxide emissions and educating the public about climate change. Several studies found relatively minor effects on residents, tourism, energy supply costs, and educational outcomes (Awosusi et al., 2022). The enhancement of life standards, the formation of social ties, and community development all showed significant effects (Garba et al, 2022). They also noted that renewable energy projects require complicated installation and are sensitive to the local ecology (Chen et al., 2022). In comparison to other initiatives, its forecasting, execution, and planning demand greater thought and expertise. The two main environmental issues are air and water pollution, which are typically brought on by sewage from homes and businesses, filthy rain, and the disposal of spent oils and liquids that contain toxic compounds and heavy metals like mercury and lead (Awosusi et al., 2022).

Technical Sustainability

It entails utilizing best-practice goods, services, working methods, and institutional arrangements while also encouraging appropriate creativity in regulatory arrangements, hardware, and software with a proper balance of local, national, and global self-sufficiency goals (Nastasi et al., 2022). The availability and technical limitations of renewable energy sources are crucial in determining elements when evaluating whether to generate power from them (Strielkowski et al., 2021). Each resource has some restrictions; photovoltaic systems can only create power during the day, barring foggy seasons, because they acquire their heat energy from the sun during that period. Speed shouldn't go above 25 m/s for wind turbines; otherwise, the turbine will be harmed (Sathaye et al., 2011). Additionally, wind speeds of less than 3 m/s will not be adequate for the production of electricity (Strielkowski et al., 2021). Although geothermal energy can produce power for 24 hours a day, it is geographically constrained by the availability of resources. Hydroelectric power plants are among the most readily available, dependable, and adaptable renewable energy sources since they are simple to start, stop, and operate within minutes (Sathaye et al., 2011). Hydroelectric power ranks highest in terms of efficiency, whereas wind, solar, and geothermal power are the least efficient types of renewable energy. The efficiency of solar systems varies greatly due to the variety of cells that are available(Charles-Rajesh-Kumar and Majid, 2020).

Environmental Protection

Everyone should be concerned about environmental preservation and energy management. The actual eco-cities should prioritize waste reduction, risk prevention, clean air and water, energy conservation, and the protection of natural species, among other things (Kabeyi and Olanrewaju, 2022). The effects of the climate changes brought on by the 20th century are getting more sensitive today. The general public and decision-makers are becoming more conscious of the need to maintain the natural environment as a result of the hazards they pose. It is in reaction to concerns brought up at international summits that urban planning and design be addressed as a method that respects the environment (Cuker et al., 2019). The development of "solar" and "bioclimatic" architecture makes it possible to

incorporate this reflection into both theory and routine-built environment creation. By reducing the consumption of non-renewable energy, the negative effects on the environment, and the expenses of investment and operation, this phrase principally aims to increase the comfort that a built environment can produce. Utilizing renewable energy sources is one of the tactics used today to safeguard the environment because they have the benefit of being infinitely available (Siri et al., 2021). By using them, energy needs can be satisfied while protecting the environment. The primary renewable energy sources, including solar, wind, biomass, geothermal, hydropower, and other sources, are developed on this site. The idea of environmental responsibility is now a component of a wider strategy that takes sustainable development concerns into account (Panwar et al., 2011). Therefore, the government needs to exercise greater economic, social, and environmental accountability. This helps to improve working conditions and economic growth in addition to protecting and enhancing the environment. Additionally, it aims to persuade state employees, community members, and ultimately all users of the necessity of changing their daily habits (Cuker et al., 2019).

Conclusion

The study highlighted the advantages of renewable energy sources, including biomass, solar, geothermal, wind, and hydroelectric. It also addresses the sustainability of renewable energy sources, as well as environmental protection. Our daily lives depend on energy to improve human development, which in turn promotes productivity and economic growth. Returning to renewable sources of energy is a great way to slow down climate change, but it must be sustainable if future generations are to be able to satisfy their energy needs. There is still little understanding of the interactions between sustainable development and renewable energy in particular. Even so, using renewable energy sources will help reduce future global greenhouse gas emissions because their entire lifecycle has no net emissions. However, the cost, pricing, political climate, and market circumstances have turned into obstacles that prohibit emerging, least developed, and developed countries from making the most of their potential. In this way, the development of global opportunities through a multilateral community that aids least focused on addressing countries in the availability of sustainable energy, energy efficiency, sustainable energy technology and research, as well as the investment in decarbonization, will lower the cost of renewable energy, remove obstacles to energy efficiency (high discount rate), and foster new opportunities for mitigating climate change.

Recommendation

The following recommendations are made based on the review to help address concerns about renewable energy sources being sustainable and to lessen the environmental impact by safeguarding the environment from the speed of ozone layer depletion caused by Greenhouse gases;

1. Shifts in the way that we, as people, nations, and the globe at large, use energy. The world's energy grid will benefit from the increased use of clean fossil fuels and renewable energy, which will lessen climate change's effects.

2. Expand research in these areas to allay concerns about potential dangers associated with various renewable energy sources in the future.

3. Boost institutional and interpersonal capacity for protection, modification, economic impacts, and forecasting of environmental issues. The industry, energy, agriculture, forestry, health, transportation, water management, construction, and other industries that can increase greenhouse gas emissions should all be subject to carbon reduction policies and methods.

If these recommendations are put into practice, it would be essential to solve the reliability of renewable sources of energy, guarantee everyone has access to affordable, dependable, sustainable, efficient energy, mitigate climate

change, and lessen its negative environmental effects.

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