

PAPER • OPEN ACCESS

## Renewable Energy Sources: A Review

To cite this article: Neha and Rambeer Joon 2021 *J. Phys.: Conf. Ser.* **1979** 012023

View the [article online](#) for updates and enhancements.

### You may also like

- [Research Trend on Climate Change Mitigation and Resilience: Bibliometric Analysis for the Period 2011-2022](#)  
Radhika Dev Varma Arora and Manpreet Kaur
- [Mental health and wellbeing outcomes of climate change mitigation and adaptation strategies: a systematic review](#)  
Elaine C Flores, Laura J Brown, Ritsuko Kakuma et al.
- [Health impacts of fine particles under climate change mitigation, air quality control, and demographic change in India](#)  
Asya Dimitrova, Guillaume Marois, Gregor Kieseewetter et al.

# Renewable Energy Sources: A Review

Ms. Neha<sup>1</sup>, Mr Rambeer Joon<sup>2</sup>

<sup>1</sup>Department of Computer Science and Engineering, Shree Guru Gobind Singh Tricentenary University, Gurugram-Badli Road, Gurugram, HR, India

[neha\\_fet@sgtuniversity.org](mailto:neha_fet@sgtuniversity.org)

<sup>2</sup>Department of Electronics and Communication Engineering, Shree Guru Gobind Singh Tricentenary University, Gurugram-Badli Road, Gurugram, HR, India

[rambeer\\_fet@sgtuniversity.org](mailto:rambeer_fet@sgtuniversity.org)

**Abstract:** As a result of the rising everyday energy demand of the entire world population, the earth becomes an increasingly global village, while the earth cannot swing its form. For meeting human communal as well as economic development, education as well as health, drive and its related assets are increasingly needed. The return to sustainability to help fight temperature change is an ideal way to meet potential energy demand. The study looked at prospects related to renewables such as energy security, access to energy, social as well as economic development, and temperature change mitigation and environmental and health issues reduction. Given such benefits, the growth of clean energy sources is hindered by obstacles to climate change mitigation. This include market failures, lack of awareness, access to raw materials for future use of clean energy and our daily carbon footprint. The report has recommended a number of measures and policy recommendations to help meet the goal of carbon reduction, climate change mitigation and the safeguarding of a clean atmosphere and affordable resources for future generations.

**Keywords:** Clean Energy, Carbon Footprint, Climate Change Mitigation, Renewable Energy Sources, Sustainability Issues.

## 1. INTRODUCTION

As a result of the rising everyday energy demand of the entire world population, the earth becomes an increasingly global village, while the earth cannot shift its form. In order to resolve individual, social and economic growth [1], education and health there are increasing demands for energy and related services. All companies are demanding energy resources to satisfy fundamental humanoid requirements, including security, illumination, food preparation, spatial luxury, flexibility as well as networking, as well as act as reproductive processes. The power industry is a two-way barrier on its way to a prosperous future to securing electricity supplies and reducing the exposure of emissions to climate change. In today's country, the shortage of electricity is alarming and 85% of people live in rural areas. Accordingly, in 2030, there are projected to be a rise from 2.7 - 2.8 billion in rustic societies that rely on traditional biomass.

The paramount industrial withdrawal of coal historically known was in 1750, nearby Richmond in the place of Virginia. In fact, coal is the greatest favored energy for steam locomotives because of its greater drive consumption than the conforming amounts of biomass. Interestingly, coal has been relatively cheaper in recent decades as well as a much cleaner fuel. In recent decades, a prevailing output of fossil-fuel electricity (coal, oil and gas) and increased population growth has caused in an increased request for drive that has led to worldwide defies related to fast development in the emission of CO<sub>2</sub> [2]. Main tasks of the 21st century have been a major climate change. If efforts are made to reform existing energy networks, the major impacts will also be eliminated. The key potential of clean energy sources is the



replacement of emissions of greenhouse gas because of production of fossil-fuels and thereby to reduce climate change.

A priority of many countries' recent national strategies, programs and growth plans has been sustainable development. Sustainable development. A series of Global Sustainable Development Goals (SDGs), which involve a UN Uncluttered Employed Assembly in New York, have been developed by the UN. In addition, it released a provisional collection of 330 metrics in March 2015. The SDGs emphasized more than the Millennium Development Objectives on the science community and the requirements. In order to deal with climate change, food, water health and health, renewable energy needs coordinated, national monitoring and simulation of many social, economic and environmental variables.

## **2. RENEWABLE ENERGY SOURCES AND SUSTAINABILITY**

In addition to the population, global energy needs have contributed to the continued utilization of the fossil fuel supplies, which have been troublesome because of the generation of many problems, including loss of vestige fuel stocks, releases of GHG and other environmental worries as well as geopolitical or defense volatility and stepping up fuel prices. These problems can create insecure situations that eventually pose a danger to human societies that is potentially irreversible. Nevertheless, sustainable energy sources are the right option and the only answer to the problems that emerge. In 2012, 22% of world electricity demand, which was not possible ten years ago, was generated by renewable energy sources.

Reliable energy supply is important for heating, lighting, industrial machinery, transport and so on in all economies. Supplies of renewable energy dramatically reduce greenhouse gas emissions if combined with fossil fuels. Given the fact that sources of renewable energy are naturally obtained from ongoing climate energy flows, it should be affordable. Unlimited clean solar energy and environmentally friendly goods and services are needed. For starters, sustainable biofuels [3] should not, nor should they jeopardize food safety and biodiversity in any way increase their net CO<sub>2</sub> emissions.

About the excellent advantages of renewable energy sources, certain weaknesses exist, for example the discontinuity of the production since seasonal fluctuations, as most renewable energy supplies depends on the environment. Fortunately, ongoing technical advances in computer hardware and software enable scientists to use green and sustainable energy-specific computer equipment to address these optimization challenges.

## **3. RENEWABLE ENERGY AND CLIMATE CHANGE**

In scientific and political discussions, the name "climate change" is evidently of considerable significance worldwide as a whole. Since life began, the environment has changed, but the rate of transition recently is worrying and may be single of the global challenges. The degree of carbon productions has been rising from last few decades to "about 1.4 ppm/year prior to 2.0 ppm/year later". Environmental change is described by the UN on Temperature Change as existence straight or ramblingly caused by human actions which modify the conformation of the global atmosphere and in effect demonstrate variability over comparable periods in the natural environment.

For more than a decade, international climatic discussions have focused on maintaining climate change under 2°C. As a result of a global upsurge in carbon emanations, the consumption of vestige fuels has increased since 1850. Data from the last of 2010 showed that the use of vestige fuel accounts for the bulk of world greenhouse gasses, with concentrations above a pre-industrial average increasing to over 390 ppm (39 percent).

Renewable energies [4] are referred to as renewable sources of energy, as well as the optimal utilization of such assets diminishes ecological consequences, produces negligible subordinate leftover as well as is affordable depending on economic and community demands at present and in the future. Renewable

energy solutions provide an unparalleled chance to offset greenhouse gas secretions and minimize global warming through the substitution of conventional bases of energy (fossil fuels).

#### **4. RENEWABLE ENERGY SOURCES AND TECHNOLOGY**

Renewable energy resources are natural and constant energy resources in our local world. The energy sources are the energy sources. This includes geothermal, bioenergy and hydropower etc.

##### **4.1 Hydropower:**

Hydropower [5] constitutes a primary source of water-based energy, primarily utilized to process turbines as well as generates electrical energy, from greater to lesser altitudes. Reservoir dam schemes, river run-of-water and in-stream projects spanning a variety of projects include hydro power projects. Hydropower technologies are physically advanced and their schemes take advantage of a temporarily variable resource. The operations in the hydropower reservoir also reflect their numerous uses, including flood and drought management, irrigation, drinking water and navigation. Gravity and the height at which the cascades join the turbine provide primary electricity. Water mass and the gravitational factor and a head are the potential energy of the deposited water as the distance between the height of the dam and the level of the tail water. As water is released and therefore energy output affects, the reservoir level adjusts to some degree downwards. An optional water flow is provided for turbines. Nearly no particles can be discharged, upgraded and electricity can be stored for hours.

##### **4.2 Bioenergy:**

Bioenergy [6] is a form of biofuel green energy. Bioenergy is a major energy source that can transportation of biodiesel [7], electricity generation and heat generation. Electrical energy from energy based on biomass utilizes a diverse spectrum of materials, such as timber byproduct's; farming remainders, including sugar cane leftover; as well as manure of animals filtrates, including dung of cow. One of the benefits of energy based on the biomass is that energy is mainly a byproducts or leftover merchandise belongs to aforementioned sources. It can't substantially make antagonism between nourishment and energy ground. At present, worldwide creation of biofuels is relatively limited, but constantly increasing. The US consumed 15 billion liters of biodiesel annually in 2006. It increased at 30–50 percent a year to meet the annual goal of 30 billion liters by the end of 2012.

##### **4.3 Direct Solar Energy:**

The name 'direct' solar power [8] denotes the power ground of clean energy systems which rely directly on Sun's energy. After solar energy is consumed and transformed into other forms, such regenerative technology such as the wind and thermal oceans. Photovoltaic (PV) power generation, solar power generation (CSP), thermal energy generation, the production of direct lighting needs, and theoretically, the production of fuel that can be used for transport and other uses are derived of solar energy technologies. "Total energy in the Earth's felling solar energy has exceeds 7,500 folds the yearly cumulative main energy ingesting of 450 EJ worldwide, according to the council of World Energy (2013).

##### **4.4 Geothermal Energy:**

Geothermal energy [9] is produced naturally from the soil's inner as a warmth basis. The temperature origin is linked to the inner system of earth as well as the corporeal procedures. While the Earth's crust contains vast amounts of thermal heat, not to mention the deepest sections, it is dispersed, never localized and sometimes too large to be used in depth mechanically.

About 30°C/km is the mean geothermal gradient. There are areas of the world within which the gradient is much above the normal gradient by means of drilling. Heat extracts geothermal tanks are exploited utilizing wells as well as other methods. Hydrothermal tanks are of course called reservoirs which are sufficiently hot and permeable, whereas reservoirs which are hot and hydraulically enhanced are known

as geothermal regenerating systems (ESG). Fluids with various temperatures can be used for power generation and other applications including heat energy use when drawn to the surface.

#### 4.5 Wind Energy:

Wind has taken a significant lead from renewable sources as a major source of electricity worldwide. Winds exist all around the world and in some locations have considerable energy density. Wind energy is fed by the kinetic energy from flowing air. Climate reduction is mainly applied to extracting electrical energy from big turbines or underwater. Mass-produced and installed onshore wind energy systems. The wind turbines convert wind power into power.

#### 4.6 Ocean Energy:

Waves on the surface [10] form from moving wind over surface of the water. The greater the speed of the wind, more the breeze is carried, the longer it goes, the more the airstream goes, higher height of the wave, as well as higher the drive that the wave produces. The marine provides sufficient resources to encounter global energy requirement multiple times the form of surface waves, tides, winds as well as temperature. In 2008 year analyses the arrival in the UK-SeaGen as well as Portugal-Pelamis of the first commercial generation of Ocean energy equipment. There are four ways in which energy can be extracted from marine conditions, including the differences between wind, waves and thermal deep and shallow seawaters.

### 5. RENEWABLE ENERGY & SUSTAINABLE DEVELOPMENT

The worldwide clean drive distribution is universal and relatively less traded relative to fossil fuels. It reduces oil imports and diversifies supply options inventory and reduces a vulnerability of the economy to demand volatility and offers prospects of improving global energy stability. Implementation of renewables will also boost efficiency of energy supply, particularly in areas where access to grids remains inadequate. The wellbeing can also be improved by a large variety of drive bases, better controlling as well as design.

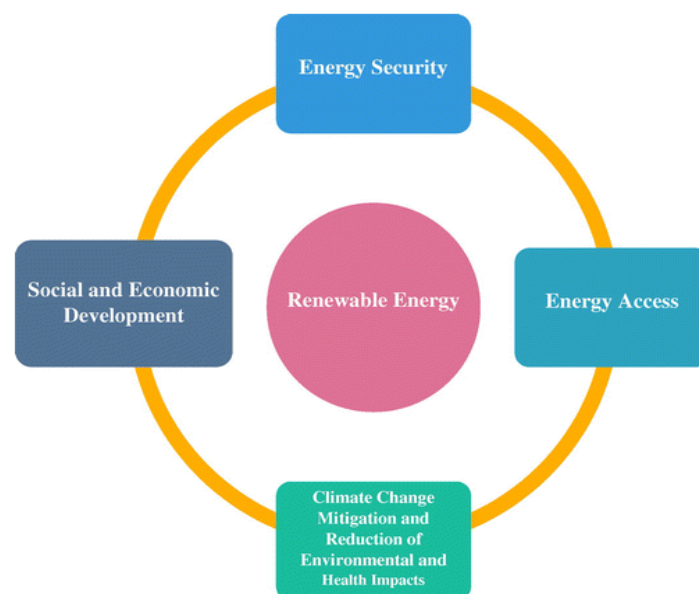


Fig. 1. Opportunities Associated with Renewable Energy Sources

### 5.1 Security of Energy:

The idea of drive protection is usually utilized, but its exact meaning cannot be defined in any way. However, energy protection concerns are grounded on assumption that can have a constant stream of drive is necessary for a budget to work. Taking into account the interdependence between financial development as well as consumption of energy, the connection of developed and developing countries

to a stable supply of energy is of great significance in the political environment, given that sustained interference would cause substantial economical and essential working difficulties for the greater part of society. The worldwide distribution of renewables is uniform in comparison with fossil fuels and is usually less traded. It decreases oil imports and diversifies the inventory of source choices as well as reduces an economy's susceptibility to instability of the demand and gives prospects for improving global energy stability. Implementation of renewable energies would also contribute to increased energy supply reliability, particularly in areas where access to grids is still insufficient. A wide range of drive resources, along with better supervision and device architecture, can contribute to health improvement.

### 5.2 Development in Social and Economic Perspective:

Traditionally the drive market was seen as a portal to financial prosperity, with a direct connection among economic development as well as extension of drive usage. The global per capita income is absolutely connected with the utilization of power per unit, and the most significant reason behind increased energy use over recent decades can be defined as economic growth. In 2008, green energy studies found that worldwide renewable energy technology workers were about 2.3 million, even improving health, schooling, gender equity and environmental safety.

### 5.3 Energy Access:

Sustainable Development Goal seven is aimed at ensuring that electricity is safe, sustainable, usable and open to everyone, and this can be accomplished with renewable energy sources because it is commonly spread around the world. There are problems of access to electrify in city as well as rural regions, in particular in Sub-Saharan African as well as South Asian regions, which are clearly different in the vast majority of countries. Clean energy grids distributed normally provide significant possibilities for renewable-energy micro- grid projects in remote areas with vast gaps to the national grid and limited rural electrification rates.

## 6. CONCLUSION

Energy is a need to enhance human progress that contributes to economic growth and competitiveness in our daily lives. The move to renewables to assistance with temperature change is a positive way forward, but it must be affordable in order to have a stable future in which to satisfy its energy requirements. Awareness of the ties among supportable development as well as renewable resources of energy in specific is tranquil negligible. The paper explored the feasibility of green energy technologies and how the transition from conventional to renewable fuels will lead to the mitigation and impacts of climate change. Analysis of records used qualitative analyzes in the field of analysis. Since the entire clean energy loop has no net emissions that contribute to offset futuristic worldwide greenhouse gas releases. The costs, prices, the radical climate and business dynamics have however been obstacles to emerging, least-developed and industrialized countries exploiting their full potential. It will lower the cost of renewable energies by creating global opportunities concluded worldwide collaboration which backings less-developed as well as developing nations through access to renewable energy as well as energy conservation, green energy technologies and research and power infrastructure innovation, breaking down energy conservation barriers (high discount rates) and encouraging new climate change.

## References

- [1] D. de la Croix, "Economic Growth," in *International Encyclopedia of the Social & Behavioral*

*Sciences: Second Edition*, 2015.

- [2] C. Le Quéré *et al.*, “Global Carbon Budget 2016,” *Earth Syst. Sci. Data*, 2016, doi: 10.5194/essd-8-605-2016.
- [3] Y. Demirel, “Biofuels,” in *Comprehensive Energy Systems*, 2018.
- [4] J. Mohtasham, “Review Article-Renewable Energies,” in *Energy Procedia*, 2015, doi: 10.1016/j.egypro.2015.07.774.
- [5] F. Schrader, A. Kamolidinov, M. Bekchanov, M. Laldjebaev, and S. Tsani, “Hydropower,” in *The Aral Sea Basin: Water for Sustainable Development in Central Asia*, 2019.
- [6] M. Guo, W. Song, and J. Buhain, “Bioenergy and biofuels: History, status, and perspective,” *Renewable and Sustainable Energy Reviews*. 2015, doi: 10.1016/j.rser.2014.10.013.
- [7] W. Du, R. Kamal, and Z. K. Zhao, “Biodiesel,” in *Comprehensive Biotechnology*, 2019.
- [8] T. Pavlovic, “Solar energy,” in *Green Energy and Technology*, 2020.
- [9] J. L. Renner and M. J. Reed, “Geothermal energy,” in *Energy Conversion, Second Edition*, 2017.
- [10] P. Singh, *Surface plasmon resonance*. 2014.
- [11] Natarajan, B., Obaidat, M.S., Sadoun, B., Manoharan, R., Ramachandran, S. and Velusamy, N., 2020. New Clustering-Based Semantic Service Selection and User Preferential Model. *IEEE Systems Journal*. DOI: 10.1109/JSYST.2020.3025407.
- [12] Nataraj, S.K., Al-Turjman, F., Adom, A.H., Sitharthan, R., Rajesh, M. and Kumar, R., 2020. Intelligent Robotic Chair with Thought Control and Communication Aid Using Higher Order Spectra Band Features. *IEEE Sensors Journal*, DOI: 10.1109/JSEN.2020.3020971.
- [13] Babu, R.G., Obaidat, M.S., Amudha, V., Manoharan, R. and Sitharthan, R., 2020. Comparative analysis of distributive linear and non-linear optimised spectrum sensing clustering techniques in cognitive radio network systems. *IET Networks*, DOI: 10.1049/iet-net.2020.0122.
- [14] Sitharthan, R., Yuvaraj, S., Padmanabhan, S., Holm-Nielsen, J.B., Sujith, M., Rajesh, M., Prabakaran, N. and Vengatesan, K., 2021. Piezoelectric energy harvester converting wind aerodynamic energy into electrical energy for microelectronic application. *IET Renewable Power Generation*, DOI: 10.1049/rpg2.12119.
- [15] Sitharthan, R., Sujatha Krishnamoorthy, Padmanaban Sanjeevikumar, Jens Bo Holm-Nielsen, R. Raja Singh, and M. Rajesh. "Torque ripple minimization of PMSM using an adaptive Elman neural network-controlled feedback linearization-based direct torque control strategy." *International Transactions on Electrical Energy Systems* 31, no. 1 (2021): e12685. DOI: 10.1002/2050-7038.12685.