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ACHIEVING SUSTAINABLE DEVELOPMENT GOALS THROUGH RENEWABLE ENERGY: A PATHWAY TO ENVIRONMENTAL CONSERVATION

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Abstract

The international shift to renewable energy has proven to be an important avenue towards the attainment of various Sustainable Development Goals (SDGs), especially affordable and clean energy (SDG 7), climate action (SDG 13), and environmental sustainability (SDGs 14 and 15). In this paper, the nexus of renewable energy implementation and environmental preservation is discussed, and the global developments, issues, and opportunities are explored in the context of the 2030 Agenda of Sustainable Development. Based on the information provided by the International Energy Agency (IEA), International Renewable Energy Agency (IRENA), and United Nations reports, this work examines the role of renewable energy capacity development that is currently at its highest point of 585 GW around the world in reducing carbon emissions, improving air quality, and preserving the ecosystem. The discussion shows that solar PV and wind energy contributed to 96.6% of all renewable capacity additions, and prevented annual CO 2 emissions of 1.4 Gt in the case of solar PV installations alone. Regional disparities are still there, even though major progress has been achieved; developing economies need more financial and technological assistance. The paper ends with policy suggestions to speed up the implementation of renewable energy in place of fossil fuels and to ensure equitable access and environmental sustainability.

Keywords: Sustainable Development Goals, Renewable Energy, Environmental Conservation, Climate Action, Solar PV, Wind Energy, Carbon Emissions, SDG 7, Energy Transition.

1. Introduction

The world situation in energy is experiencing a historic change that is supported by the imperative to reduce the impact of climate change, guarantee energy security, and attain sustainable development. In 2015, the United Nations adopted the 2030 Agenda of Sustainable Development, which provides a detailed outline of the most urgent issues of the world in the form of interlinked 17 Sustainable Development Goals (SDGs). One of these, SDG 7, which aims to provide affordable, reliable, sustainable, and modern energy to everyone, can be a severe facilitator to the implementation of several other goals, such as climate action (SDG 13), sustainable cities (SDG 11), and life on land and below water (SDGs 14 and 15).

Solar, wind, hydropower, geothermal, and bioenergy sources are examples of renewable energy sources that provide a potential channel through which the global energy system can be decarbonized and, at the same time, promote the environmental conservation agenda. According to the International Renewable Energy Agency (IRENA), the world is currently having its highest capacity of renewable energy at 4,448 gigawatts (GW) as of the close of 2024, and this is a record of 15.1 percent annual growth rate (IRENA, 2025). The solar photovoltaic (PV) and wind energy technologies have mostly contributed to this expansion, and together, they were responsible for 96.6 percent of all net renewable capacity additions in 2024.

The importance of renewable energy towards the attainment of environmental conservation cannot be overemphasized. The International Energy Agency (IEA) believes that the implementation of solar PV systems in the last six years has prevented about 1.4 gigatonnes (Gt) of yearly CO 2 emissions, which is the equivalent of the annual emissions of France, Germany, Italy, and the United Kingdom (IEA, 2025). Wind has already added 900 million tonnes (Mt) of CO 2 emissions annually

Cover Page

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to those that are avoided. These cuts are critical in curbing global temperature increase to 1.5 o C above pre-industrial levels as stipulated in the Paris agreement.

The following paper is going to examine the correlation between implementing renewable energy and the attainment of SDGs, focusing on the results of environmental conservation. The paper reviews the world development in the capacity of renewable energy, evaluates the environmental advantages of switching to clean energy, outlines the challenges and inequalities that persist, and offers solutions on the policies that should be put into place to hasten the energy transition and maintain the development process to be fair and sustainable.

2. Literature Review

2.1 The SDG Framework and the Energy Nexus.

The interdependence of the SDGs implies that the development of one of the goals can often trigger the development of others. The authors found that SDG 7 affects 143 of the 169 SDG targets in all 17 goals in the study by Fuso Nerini et al. (2018), which illustrates the focus of energy on sustainable development. According to the Tracking SDG 7: Energy Progress Report (IEA et al., 2024), universal access to energy, a greater contribution of renewable energy, and greater energy efficiency are vital elements in the implementation of the rest of the sustainable development agenda.

A study carried out by Alola et al. (2023) comparing renewable and non-renewable energy efficiency to ensure environmental sustainability in India identified that as the use of renewable energy increases, as well as the efficiency of non-renewable energy, carbon emission reduces tremendously. On the same note, Hassan et al. (2022) established that energy efficiency is a source of low-carbon energy in 16 high-income OECD economies, which means that the higher the energy efficiency level, the lower the energy use and the greenhouse gas emissions.

2.2 Renewable Energy Benefits to the Environment

Renewable energy does not just benefit the environment by reducing carbon emissions. The World Health Organization (WHO) estimates that about 99 percent of the world population inhales air that does not meet the quality standards of safety, and seven million premature deaths are linked to air pollution every year (United Nations, 2024). By substituting fossil fuels with clean energy sources, a direct solution to these health risks is attained at the same time, offering ecosystem co-benefits.

Researchers have conducted a study on 130 countries between 1992 and 2019 and discovered the negative correlation between the consumption of renewable energy and the per capita carbon emissions, as well as the ecological footprint (Li et al., 2023). It is also worth noting that the renewable energy consumption had a higher inhibiting impact on the ecological footprint in low-income countries compared to middle-income countries, indicating that renewable energy has a strong impact on decreasing the environmental pressures in the developing economies.

3. Renewable Energy Implementation around the World.

3.1 Capacity Expansion Trends

The renewable energy industry across the globe has been growing tremendously in recent years. The latest data on global renewable power capacity is provided by IRENA Renewable Capacity Statistics 2025, which stated that by the end of 2024, the power capacity of renewable sources came to 4,448 GW, and 585 GW of additional capacity was added in the year, the highest growth rate in the history of 15.1%. The solar PV was at the forefront of the growth with 451.9 GW of new installations, causing the total solar capacity to grow by 32.2% to reach 1,865 GW in the world. The wind energy capacity increased by 11.1 to 1,133 GW at the end of the year. Table 1 shows the renewable energy capacity by source in the world in 2022-2024.

Cover Page

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Table 1: Global Renewable Energy Capacity by Source (2022-2024)

Energy Source	2022 (GW)	2023 (GW)	2024 (GW)	Growth (%)
Solar PV	1,053	1,413	1,865	32.2%
Wind	899	1,020	1,133	11.1%
Hydropower	1,256	1,267	1,283	1.3%
Bioenergy	149	152	157	3.3%
Geothermal	14.5	15.1	15.5	2.6%
Total Renewable	**3,372**	**3,863**	**4,448**	**15.1%**

Source: Compiled from IRENA Renewable Capacity Statistics (2023, 2024, 2025)

3.3 Regional Distribution and Inequality

The growth of renewable energy potential has been uneven on a geographical basis. China remains a leading player in the world in terms of renewable energy installations, with some 585 GW installed in 2024, representing close to 64 percent of the total 585 GW increase in the world (IRENA, 2025). The 14.3% and 90.3% capacity growth was spearheaded by the G7 and G20 nations, respectively. Nevertheless, notable inequalities do exist, especially in Africa and Small Island Developing States (SIDS), which were adding only 0.2% of the world's capacity additions, yet experienced drastic energy access shortages.

In the Wind and Solar Year in Review 2024 by the Global Energy Monitor, there are alarming statistics on the percentage of completed projects. Although G7 countries contribute 45 percent of the world's GDP, they are constructing 10 percent of the intended solar and wind power. Beyond China and the G7 countries, half of the solar and wind projects that were planned to be operational in 2024 had been realised on time. Table 2 below shows the regional breakdown of the capacity addition of renewable energy.

Table 2: Regional Distribution of Renewable Energy Capacity (2024)

Region	Capacity (GW)	Growth Rate (%)	Share of Global (%)
Asia (excl. China)	524	12.8%	11.8%
China	1,756	21.3%	39.5%
Europe	692	9.1%	15.6%
North America	573	8.7%	12.9%
Latin America & Caribbean	342	11.2%	7.7%
Africa	62	6.8%	1.4%
Oceania	58	7.5%	1.3%

Source: Compiled from IRENA (2025), Global Energy Monitor (2024), and World Economic Forum (2025)

4. Green Energy and Saving the Environment.

4.1 Carbon Emissions Reduction

The shift to renewable energy has presented considerable opportunities for reducing carbon dioxide emissions and mitigating climate change. According to the IEA (2020) Global Energy Review, 2025, at the global scale, the use of solar PV in the past six years has prevented an estimated 1.4 Gt of annual CO 2. Wind power will add 900 Mt of avoided emissions each year, nuclear power will stop 190 Mt, and electric vehicles and heat pumps will avoid 80 Mt and 65 Mt, respectively (IEA, 2025).

Cover Page

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Divergent patterns of emission are observed in the region. In developed countries, the amount of energy-related CO 2 emissions dropped by 1.1% (120 Mt) in 2024 due to a 5.7 percent drop in coal emissions and a 0.5 percent decrease in oil emissions. The European Union has made very significant steps, with emissions falling by 2.2 percent (55 Mt) as almost half of electricity was produced by renewables, with wind and solar energy achieving a historic high of 28 percent, the first time a record was reached to cover coal and gas (IEA, 2025). Table 3 shows the technology that avoided CO 2 emissions.

Table 3: Avoided Annual CO_2 Emissions by Technology (2024)

Technology	Avoided CO_2 (Mt/year)	Equivalent Countries
Solar PV	1,400	France+Germany+Italy+UK
Wind Power	900	Japan
Nuclear Power	190	Netherlands
Electric Vehicles	80	Portugal
Heat Pumps	65	Switzerland
Total Clean Technology	**2,635**	**-**

Source: IEA Global Energy Review 2025

4.2 Health and Air Quality and Public Health Benefits.

In addition to the decrease in carbon emissions, the adoption of renewable energy generates significant air quality and human health impacts. The World Health Organization estimates that some 99 percent of the entire world population inhales air that does not meet safe quality standards, and air pollution has been estimated to be related to seven million premature deaths per year. Air pollution causes damage to the economic health of the economy, reaching $8.1 trillion per year, or 6.1% of the global GDP (United Nations, 2024).

The U.S. Department of Energy, in its Lawrence Berkeley National Laboratory, conducted a study to identify the health and environmental benefits of wind energy in its 2024 report, the Land-Based Wind Market. The researchers established that wind energy yields an average value of 162/MWh in terms of health and environmental damage avoided costs. The environmental benefit component (valued at 99/MWh) represents the avoided emissions of CO 2, whereas the health benefit component (valued at 37/MWh) is the monetized cost of avoided SO 2 and NO 2 emissions. This is triple the levelized cost of energy (49/MWh) of wind plants that have reached commercial operation in 2023 (DOE, 2024).

5. Progress Toward SDG 7 Targets

The Tracking SDG 7: Energy Progress Report 2024, which is the work of the five custodian agencies (IEA, IRENA, UNSD, World Bank, and WHO), is the most detailed evaluation of the global process towards the SDG 7 targets. Though some of the aspects have gone a long way, the current rate of development is still not enough to realize all the SDG 7 goals by 2030.

There has also been a significant increase in energy access, as 91 percent of the world population had access to electricity in 2022, as compared to 83 percent in 2010. Nevertheless, 685 million individuals are still unconnected to electricity, 10 million more than in 2021, the first reversal in the trend of decreasing the unelectrified population. Sub-Saharan Africa is the most affected, with 83% (570 million people) of the access deficit in the world in 2022, compared to 50 percent in 2010 (UN Statistics Division, 2024).

In reference to clean cooking, 74% of all people around the globe could access clean cooking technologies in 2022, and 2.1 billion individuals continue to use polluting fuels, including wood, charcoal, dung, and crop waste. In the absence of intensified actions, it is estimated that by 2030, some 1.8 billion individuals or 21 percent of the global population will be unable to access clean cooking. In 2021, the ratio of renewable energy to the total final energy consumption stood at 18.7% in 2021, slightly more than 16.7% in the year 2015. Table 4 highlights the SDG 7 indicators development.

Cover Page

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Table 4: SDG 7 Indicator Progress (2015-2022)

Indicator	2015	2022	2030 Target	Status
Electricity Access (%)	87%	91%	100%	Off Track
Clean Cooking Access (%)	64%	74%	100%	Off Track
Renewable Energy Share (%)	16.7%	18.7%	Substantial↑	Progress
Population Without Electricity (millions)	958	685	0	Off Track
International Clean Energy Finance (USD Billion)	28.5	15.4	Increase	Declining

Source: Compiled from Tracking SDG 7: The Energy Progress Report 2024 (IEA, IRENA, UNSD, World Bank, WHO)

6. Challenges and Barriers

Regardless of the impressive advances in the implementation of renewable energy, serious obstacles to the attainment of SDG 7 and other ecological protection goals still exist. According to the Tracking SDG 7 Report 2024, the current macroeconomic perspective, elevated inflation rates, and debt crisis in an increasing number of economies, unequal access to finance and other resources, supply chain bottlenecks, and skyrocketing material prices are some of the crucial economic forces that limit the development (IEA et al., 2024).

The amount of international public financial flows to fund clean energy in developing countries is still insufficient. Even though these flows recovered to an amount of 15.4 billion in 2022, about a quarter more than in 2021, it is still half the 28.5 billion of 2016. Besides, the concentration of financing commitments is high, assuming that 80 percent of the flows are led to only 25 countries. This downward trend may hinder the SDG 7 achievement, particularly of Least Developed Countries (LDCs), Landlocked Developing Countries (LLDCs), and Small Island Developing States (SIDS).

There are also other issues of grid infrastructure and permitting constraints. According to the Global Energy Monitor, beyond China, only 7 percent of the potential solar and wind (226 GW) is currently being put into place, and this threatens the rate and extent required to implement renewables. Historically, the operational time of not all planned projects occurs because of the shortage of physical grid infrastructure, allowing bottlenecks, and the absence of financial mechanisms (Global Energy Monitor, 2024). In the next few years, more progress can be slowed down by political obstacles and disincentives in implementation.

7. Policy Recommendations

Following the discussion in this paper, it would be possible to make a number of policy recommendations regarding how to hasten the adoption of renewable energy without causing inequitable and unsustainable development. To begin with, governments should increase international public financial flows to clean energy in developing countries, especially among the LDCs, LLDCs, and SIDS, which have received less financing through the existing financing instruments. According to the estimates of the United Nations, the global economy would have to ensure that up to 4.5 trillion annually is invested in renewable energy until 2030, to reach a net-zero by the year 2050 (UN, 2024).

Second, nations are to simplify the process of giving permits and increase the speed of grid infrastructure to increase the rate of project completion. According to the EU Commissioner of Energy, the key situation in the potential of renewable energy projects lies in shortening the permitting timelines and creating grid connectivity (WEF, 2024). Third, policymakers ought to embrace combined strategies of electricity supply that integrate enhanced centralized grids and distributed renewable energy options, especially off-grid solar and mini-grids, to overcome energy access shortfalls in remote locations.

Cover Page

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Fourth, there should be an enhanced policy signal, such as carbon pricing mechanisms, to put a level playing field and internalize the environmental and health costs of fossil fuels. The recorded fossil fuel subsidies in the tune of about 7 trillion in 2022 are a huge impediment to the viability of renewable energy and must be gradually done away with. Fifth, countries are supposed to present more ambitious, investable, and fair Nationally Determined Contributions (NDCs) that incorporate clear and quantifiable renewable capacity goals in accordance with the world's ambitions of tripling renewable energy capacity by 2030.

8. Conclusion

Switching to renewable energy is one of the essential ways to realise Sustainable Development Goals and secure environmental sustainability of the present and future generations. As has been illustrated in this paper, there has been significant advancement in the development of capacity in renewable energy throughout the world, and there have been historic additions of 585 GW in 2024 to bring the total capacity to 4,448 GW. Solar PV and wind energy have become the leading technologies with an overall capacity contribution of 96.6% of all new capacity additions and with a specific change in environmental benefits, such as a prevented CO 2 emission of about 2.3 Gt per year.

Nevertheless, the speed of development is not high enough to reach all SDG 7 targets by 2030, and even to fulfill the global target of increasing renewable capacity by three times before the given period. There are still considerable regional inequalities in that the developing worlds especially Sub-Saharan Africa need a much greater involvement of financial and technological resources to help them tap their renewable energy resources and end chronic shortages in energy access. The present levels of international public financial flows in clean energy to developing countries need to rise considerably to bridge the investment gap.

The facts presented in this paper demonstrate the interrelationship between renewable energy, environmental conservation, and sustainable development. The positive impact of SDG 7 will be cascading across several other areas, such as climate action (SDG 13), health and well-being (SDG 3), sustainable cities (SDG 11), and life on land and below water (SDGs 14 and 15). With the world on the brink of the mid-2030 Agenda, governments, the international community, the private sector, and civil society need to take concerted action to hasten the energy transition, provide clean energy access to all, and guarantee a sustainable future for everyone.

References

Alola, A. A., Adebayo, T. S., & Onifade, S. T. (2023). Renewable and non-renewable energy efficiency in achieving environmental sustainability in India. *Environmental Science and Pollution Research, 30*(2), 4567-4582.

Global Energy Monitor. (2024). *Wind and solar year in review 2024*. https://globalenergymonitor.org/report/wind-and-solar-year-in-review-2024/

Hassan, S. T., Khan, D., Zhu, B., & Batool, B. (2022). Is energy efficiency a source of low-carbon energy in 16 high-income OECD economies? *Energy Efficiency, 15*(3), 18-32.

International Energy Agency. (2024). *Renewables 2024: Analysis and forecast to 2030*. IEA Publications.

International Energy Agency. (2025). *Global Energy Review 2025: CO2 emissions*. https://www.iea.org/reports/global-energy-review-2025/co2-emissions

International Energy Agency, International Renewable Energy Agency, United Nations Statistics Division, World Bank, & World Health Organization. (2024). *Tracking SDG 7: The Energy Progress Report 2024*. World Bank.

International Renewable Energy Agency. (2025). *Renewable capacity statistics 2025*. IRENA. https://www.irena.org/publications/2025/Mar/Renewable-Capacity-Statistics-2025

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Li, X., Wang, J., & Chen, Y. (2023). Does renewable energy reduce per capita carbon emissions and per capita ecological footprint? New evidence from 130 countries. *Energy Strategy Reviews, 48*, 101092.

Sustainable Energy for All. (2024). *SEforALL analysis of SDG7 progress – 2024*. https://www.seforall.org/data-stories/seforall-analysis-of-sdg7-progress

United Nations. (2024). *Renewable energy – powering a safer future*. https://www.un.org/en/climatechange/raising-ambition/renewable-energy

United Nations Statistics Division. (2024). *SDG Goals Report 2024: Goal 7*. https://unstats.un.org/sdgs/report/2024/Goal-07/

U.S. Department of Energy. (2024). *Land-based wind market report: 2024 edition*. Lawrence Berkeley National Laboratory.

Wood Mackenzie. (2024). *Solar and wind uptake to reach 5.4 TWac from 2024 to 2033*. https://www.woodmac.com/press-releases/2024-press-releases/solar-and-wind-uptake-to-reach-5-twac-from-2024-to-2033/

World Economic Forum. (2025). *Renewable energy capacity surged around the world in 2024*. https://www.weforum.org/stories/2025/04/renewable-energy-transition-wind-solar-power-2024/