

Powering Sustainable Development: Unravelling the Transformative Potential of Renewable Energy in India's Pursuit of SDGs

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Abstract- Energy is playing a substantial role in shaping the countries' development and there should be sustainable energy for sustainable development. United Nations launched Sustainable Development Goals in 2015 for countries' sustainability, achievable by 2030. India is the fastest-growing country in the world. It has been tremendous progress in renewable energy sectors in the last few years. Renewable energy has huge potential and for utilizing those potential this paper unravels the transformative potential of renewable energy in India's pursuit. The review of academic literature, reports, and statistical data shows that India's energy supply and consumption are still denominated by non-renewable energy sources. The FDI sector of energy is also dominated by non-renewable energy. This paper identifies the research gap, particularly in terms of linking the renewable energy sector with SDGs by showing the contribution of renewable energy towards the achievements of SDGs.

Keywords:- Sustainable Development Goals, SDGs Renewable resources, Energy, Environmental Sustainability.

I. INTRODUCTION

India, a developing country, must simultaneously ensure environmental sustainability while pursuing economic progress. In light of this, India's quest for sustainable development has made renewable energy sources an essential part of the country's strategy. The United Nations Sustainable Development Goals are to be achieved by 2030, which is the dream of the whole world but there may be many factors in every country that may create hindrances in the achievement of SDGs. Energy is playing one of the important roles in the achievement of SDGs. When it comes to achieving the SDGs, energy is a key factor, and using sustainable energy will be the cherry on top (Ali et al. 2023). SDGs are based on three dimensions social, economic, and environmental. Renewable energy is contributing to approx. every dimension of SDGs such as providing affordable and clean energy (Social), promoting sustainable cities and communities (Economic), and combating climate change (Environmental). In the world, India has been a leader in the adoption of renewable energy as part of its energy transformation. By August 2022, installed renewable energy capacity including large hydro had increased from a few megawatts (MW) in 2010 to 163 GW (Buckley 2022). India currently holds the

top spot in the globe in terms of population, and because it is one of the emerging nations with the greatest rates of growth, energy consumption is rising daily. India is trying to satisfy these demands with both energy sources, renewables, and non-renewables. India's geographic location makes it a country with significant potential for renewable energy (Bajpai and Kidwai 2018). The 10 states in India that are wealthy in renewable energy are Tamil Nadu, Karnataka, Gujarat, Rajasthan, Andhra Pradesh, Maharashtra, Madhya Pradesh, Telangana, Punjab, and Kerala; their share of solar and wind energy is significantly higher than the national average of 8.2%. In Karnataka, solar and wind power generates about 29% of the state's yearly electricity, compared to 20% in Rajasthan, 18% in Tamil Nadu, and 14% in Gujarat (financial year [FY] 2020/21) (International Energy Agency, 2021). This study focuses on unraveling the transformative impact of renewable energy across multiple dimensions of sustainable development. By analyzing the existing literature, government reports, and empirical data, this study aims to assess the contributions of renewable energy in achieving the specific national indicators of the SDGs in India. Furthermore, the study aims to identify the interdependencies, synergies, and potential trade-offs between renewable energy deployment and the SDGs. The objectives of this research paper are twofold. First, to evaluate the extent to which renewable energy contributes to achieving specific SDGs in India. Second, to identify the enabling factors and barriers that influence the effective integration of renewable energy into India's sustainable development agenda. By understanding these factors, policymakers can formulate targeted strategies to unlock the transformative potential of renewable energy in the Indian context. The findings of this research will provide valuable insights into the role of renewable energy in India's pursuit of sustainable development and help bridge the gap between theoretical discourse and practical implementation. The study aims to inform policymakers, practitioners, and researchers about the potential benefits, challenges, and policy considerations associated with renewable energy deployment. Ultimately, this research paper seeks to contribute to the existing knowledge base and stimulate further discussions and actions toward a sustainable and resilient future in India.

II. OVERVIEW OF THE RENEWABLE ENERGY SECTOR IN INDIA

➤ *Journey of Renewable Energy in India:*

At the time of independence, India was wholly dependent on coal for its energy demand. However, India was also working on searching for an alternative source of energy for sustainable development. To ensure the nation's long-term energy independence, the Bhabha Atomic Research Centre (BARC) was established in the 1950s (Anon 2022c). The establishment of a Commission for Additional Sources of Energy in the Department of Science and Technology in 1981 marked the official beginning of renewable energy development in India. 1982 the Department of Non-Conventional Energy Sources was established as a separate entity. In 1992 the Department became the Ministry of Non-Conventional Energy Sources (MNES). In October 2006, the MNES was renamed the MNRE (Ministry of New and Renewable Energy) (Bhattacharya and Jana 2009). Hydropower played a vital role in the establishment of India's energy economy, as notable hydroelectric power facilities surfaced. When it comes to potential for use of hydroelectricity, India is now ranked fifth in the world. The 1960s saw the start of wind energy research in India. Fortunately, wind blows constantly, especially in the south, west, and northwest. As a result, we presently have the fourth-highest wind-generating capacity in the world. Millions of Indians have benefited from numerous solar energy-based applications that provide for their lighting, cooking, and other energy needs in an environmentally responsible manner (Anon 2022c). India ranks fourth globally in terms of its capacity to generate solar energy. (Anon 2022d). The International Solar Alliance was created as a cooperative initiative between France and India to coordinate efforts against climate change by deploying solar energy technologies (Anon n.d.-a). India pledges to fulfill 50% of installed capacity with nonfossil fuel energy sources as part of its updated Nationally Determined Contribution (NDC) and to cut the emission intensity of its economy by 45% from 2005 levels by 2030 (Anon 2022c).

➤ *Current Scenario of Renewable Energy in India:*

India currently ranks fourth in the world for renewable energy production (including large hydropower), with 40% of its installed electrical capacity coming from non-fossil fuel sources (Anon 2022c, Anon 2022d). India is one of the top renewable energy-generating and consuming countries, India is a developing country with the development of the country, GDP that is expected to grow and the population is also growing with this energy demand will also be grown (Thambi, Bhattacharya, and Fricko n.d.). Due to its large population and expanding economy, India has few traditional energy supplies compared to its need for energy (Anon 2023a). Still Energy sector in India is dominated by Coal (Foundation n.d.). Figure 2.2.1. Presents the sector-wise cumulative installed capacity as of 31.12.2022 which shows that the installed capacity of solar power is 63.30 GW which is higher than other sources of energy in India. India stands at 4th in solar power capacity globally (Anon 2022d). Large hydro power's installed capacity is 46.85 GW which is the top 2nd source of energy in India whereas wind power's

installed capacity is 41.93 GW which leads to India being 4th in the world's wind power capacity. Small hydro power's installed capacity is 4.94 GW and Bio energy's installed capacity is 10.73 GW in India. There are significant ongoing schemes for renewable energy in India during the year. These are Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM), Roof Top Solar (RTS) Programme Phase-II, Central Public Sector Undertaking (CPSU) Scheme for Grid-Connected Solar Photovoltaic (PV) Power Projects, Development of Solar Parks and Ultra Mega Solar Power Projects, PLI Scheme: 'National Programme on High-Efficiency Solar PV Modules', Green Energy Corridor, Human Resource Development Programme, Renewable Energy Research and Technology Development (RE-RTD), etc (Anon n.d.-b).

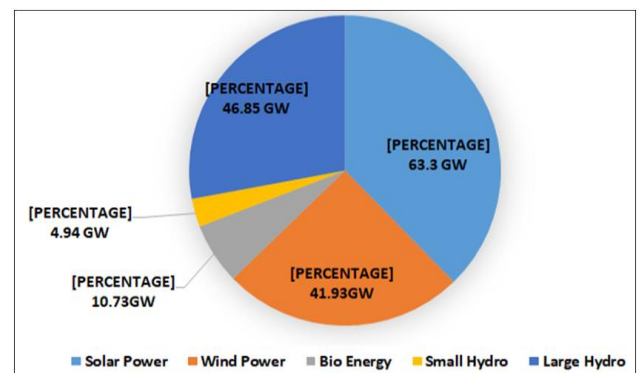


Fig 1 Sector-Wise Cumulative Installed Capacity (GW) (as on 31.12.2022)Source: (Anon n.d.-b)

➤ *Trends of Renewable Energy Supply and Consumption:*

India's ongoing urbanization and industrialization would put enormous demands on its energy sector (Energy Agency 2021). India's electricity needs, according to the Central Electricity Authority (CEA), are expected to increase and reach 817 GW by 2030. The expected increase in electricity consumption from 4,926 TWh in 2012 to 15,280 TWh in 2040 is due to the expansion of the economy (Foundation 2023b). Figure 2.3.1 presents the total energy supply by sources in India and Figure 2.3.2 presents the total energy consumption by source in India, both figures are showing that fossil fuels are on the top in both supply and consumption. For energy supply, India is heavily dependent on coal whereas in the case of energy consumption India is heavily dependent on oil products. Figures are showing the overall increase in the supply and consumption of non-renewable energy sources. India has the lowest per capita CO₂ emission due to the largest population in the world. India's CO₂ emissions are only 1.8 tonnes per capita whereas the US's 14.7 tonnes and China's 7.6 tonnes (Anon 2022c). Since 2000, India's energy consumption has nearly doubled, and there is huge potential for additional rapid expansion (Agency, 2015; Thambi et al., n.d.).

➤ *Targeted Renewable Energy in India:*

There has long been evidence of Indian leadership in the fight against climate change. As part of its vision, the country aims to achieve Net Zero Emissions by 2070. Short-term targets include reaching 500 GW of renewable energy capacity by 2030, using renewable energy to meet 50% of

energy needs, lowering cumulative emissions by one billion tonnes by 2030, and lowering the GDP's emissions intensity by 45% from 2005 levels by 2030 (Anon 2022c). By 2030, more trees and forests will have been planted, contributing 2.5 to 3 billion tonnes of CO₂ equivalent to the global carbon sink. (India 2022b).

A goal of commissioning 100 MW of small hydro projects was set for 2022–2023. The States/UTs have been given a target of installing 22500 small biogas plants for the FY 2022–23 with the launch of the biogas program on November 2, 2022 (Anon n.d.-b). There may not be many targets remaining to display here besides these.

➤ *Existing challenges in Renewable energy at present:*

India is confronting a number of difficulties, some of which are highlighted here: (1) How to increase consumer access to cost-effective, reliable energy while maintaining the financial security of electricity distribution companies; (2) How to safely and reliably integrate increasing shares of renewable energy; and (3) How to reduce emissions to meet both economic and ambitious social and climate goals (Agency 2021). Lack of R&D, contemporary development facilities, and industrial infrastructure are the main obstacles to solar power generation (Company 2022).

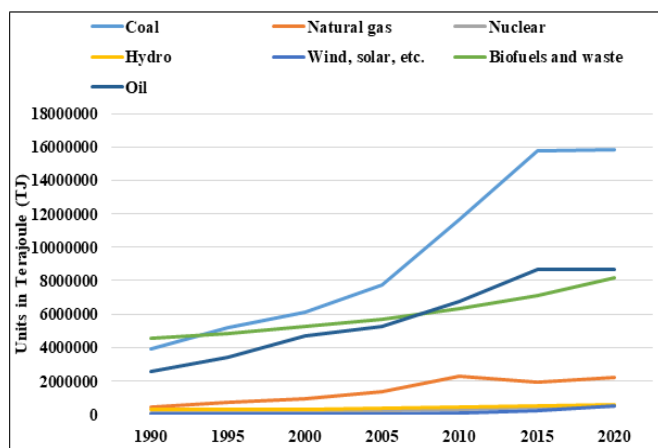


Fig 2 Total Energy Supply (TES) by Source- India
Source: (Agency 2022) IEA World Energy Balances 2022

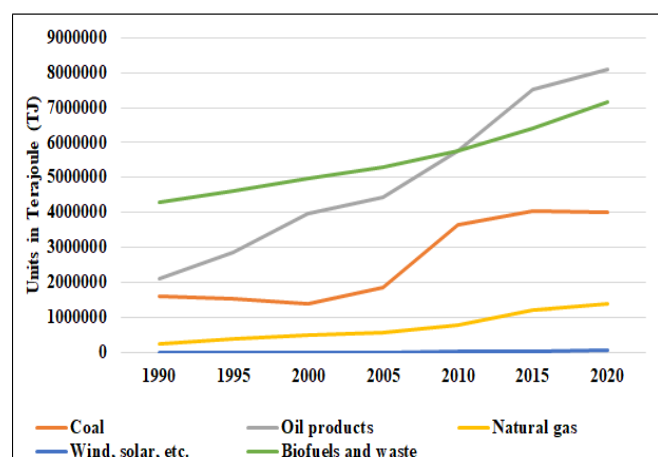


Fig 3 Total Energy Supply (TES) by Source- India
Source: (Agency 2022) IEA World Energy Balances 2022

III. LITERATURE REVIEW

The Sustainable Development Goals (SDG) agenda has set a benchmark for policies related to the environment, society, and government. As lawmakers create legislation that can help these agendas get off the ground, the SDGs are becoming more and more crucial (Moreno et al., 2023). Thus, Yalew (2022) investigates how Ethiopia's energy transformation may contribute to the Sustainable Development Goals (SDGs) for Sustainability. Economic growth that occurs without depleting any resource is a prerequisite for sustainable development (Salman & Hosny, 2021). What obstacles must Egypt overcome in order to achieve sustainability? Since energy is linked to practically every SDG, it is widely acknowledged that energy plays a significant part in accomplishing all of the SDGs. When the energy transition is seen in this light, we can see that it either directly or indirectly supports nearly every SDG. It involves increasing the per capita energy supply, diversifying the overall as well as end user-specific energy sources, and supporting decentralised energy systems (Yalew, 2022). Achievement of the SDGs is associated with access to electricity, renewable energy, and energy efficiency; therefore, these points should be considered while defining policies regarding SDGs (Fotio et al., 2023). India's energy needs are rising at the moment in order to meet its ambitions for economic development. The country will quickly and globally switch to renewable energy technology in order to achieve sustainable growth and prevent catastrophic climate change. Renewable energy sources are necessary to ensure sustainable energy with lower emissions (Charles Rajesh Kumar and Majid 2020a; Kumar and Madlener 2016). The increasing energy demand brought on by industrialization and population growth in response to the depletion of fossil fuel supply has prompted the nation to embrace the production of electricity from renewable energy sources (Nagamani et al. 2015). While they have examined the significance of energy and how it relates to the SDGs, this study examines how renewable energy might help India achieve the SDGs.

IV. CONTRIBUTION OF RENEWABLE ENERGY TO THE ACHIEVEMENTS OF SDGS

Broadly speaking, renewable energy sources involve solar energy, wind energy, biomass energy, hydropower, etc. Renewable energy is one of the fastest-growing industries in emerging nations like India, and if nations wish to pursue sustainable growth, If nations desire sustainable development, they must be concerned with clean energy; else, they will pay a high price for that development. The SDGs are an expression of both the ambitions of the entire world and a brave attempt to advance development. The SDGs demand improvement in all three pillars at once: social, economic, and environmental (Ayog Niti 2020). SDGs has three dimensions such as: social, economic, and environmental. Renewable energy relates to all these three dimensions. We discuss the significance of renewable energy potential in this study in relation to India's pursuit of sustainable development goals. In the case of India, Table 4.1 attempts to investigate the relationship between renewable

energy and the SDGs. It displays how renewable energy contributes to the accomplishment of national indicators. Data accessibility is taken into consideration when choosing the Indicators and Goals. Each of these three aspects is

related to renewable energy. We discuss in this study the significance of renewable energy potential for accomplishing India's aspirations for sustainable development.

Table 1 Contribution of Renewable Energy Towards the Achievements of SDGs

SDGs	Global Targets of SDGs and their description (“Data Snapshot on SDGs National Indicator Framework Progress Report, 2023 Ministry of Statistics and Program Implementation Government of India,” n.d.).	National Indicators of SDGs and their Description (“Data Snapshot on SDGs National Indicator Framework Progress Report, 2023 Ministry of Statistics and Program Implementation Government of India,” n.d.).	How could renewable energy support the SDGs in India?
1	(1.1) eliminate extreme poverty worldwide for everyone , By 2030	(1.1.1) Reduce the Poverty Gap ratio	By making clean, inexpensive energy available, especially in underserved and rural areas, supplying freestanding solar photo voltaic (SPV) systems for unwired homes in remote, challenging-to-reach towns or settlements where grid extension is not practical or economical under SAUBHAGYA ELECTRIFICATION SCHEME (Power 2023).
	(1.2) By 2030, cut the proportion of men, women, and children living in poverty in all its forms by at least half.	1.2.1: Percentage of the populace that is impoverished	By improving livelihood and income generation through employment generation, 1.64 lakh people are employed in India's solar and wind sector as of FY22 – a 47 percent increase from FY21 (According to CEEW-NRDC India-SCGJ, the number of Indians employed in the clean energy sector increased by 47% between FY21 and FY22. , n.d.).
2	(2.2) By providing equal and secure access to land, other productive resources, knowledge, financial services, markets, and opportunities for value-adding and off-farm jobs, small-scale food producers can double their agricultural output and income. By 2030	(2.1) Agriculture productivity of wheat and rice	By providing energy security to the farmers for improving productivity and income, over 1.16 lakh standalone solar pumps have been installed under "Ministry of New & Renewable Energy - Government of India," PM-Kusum scheme, 2023
	(3.9) By 2030, significantly lower the number of fatalities and diseases caused by dangerous substances as well as contamination and pollution of the air, water, and soil.	(3.1) Mortality rate due to unintentional poisoning, (3.2) Percentage of men and women reporting Asthma	through lowering CO2 emissions through raising the proportion of renewable energy in all energy production and the proportion of homes utilising clean cooking fuel. India wants to achieve net zero emissions by 2070 and use renewable energy sources to cover half of its energy needs (Chaturvedi and Malyan, 2021).
4	(4.4) By 2030, significantly raise the proportion of young people and adults with the necessary skills—technical and vocational—for employment, respectable occupations, and entrepreneurship.	(4.4.1) The percentage of children and adults that are proficient in information and communication technology (ICT)	By launching training initiatives under the human resource development plan of the Ministry of New and Renewable Energy to address the need for skilled and trained labour in the nation. Numerous programmes are included in it ("MNRE - Human Resource Development," n.d.).
	(4.7) Guarantee that all students receive the instruction and training required to promote sustainable development, including, but not limited to, instruction on subjects like gender equality, human rights, and the development of a	(4.7.1) The degree to which (a) national education policies; (b) curricula; (c) teacher preparation; and (d) student assessment integrate (i) education for sustainable development and (ii) education for global	Through spreading knowledge about sustainable development and renewable energy. The Ministries of Climate and Energy of the Kingdom of Denmark and the Ministry of New and Renewable Energy of the Government of the Republic of India have a Memorandum of Understanding on Indo-Denmark and Renewable Energy Cooperation. Priorities and programs to promote communication

	peaceful, nonviolent culture as well as global citizenship and an understanding of cultural diversity and its significance for sustainable development.	citizenship	in the sectors of education, information, and culture are recommended. The following initiatives could be taken: Establishing networks and long-term alliances between top Indian and Danish academic and research institutions; increasing the exchange of scientists in higher education; increasing the number of scholarships; developing networks for distance and virtual learning; cooperating in the preservation of cultural heritage; and strengthening cultural ties across the board, including museums and libraries, the fine and performing arts, as well as sports (“MNRE - International Relation Memorandums,” n.d.).
5	(5.4) Acknowledge and encourage unpaid caregiving and household labour by providing governmental services, infrastructure, and social protection legislation; additionally, promote shared responsibility within the family and home as suitable for your nation.	(5.6.1) Percentage of time devoted to unpaid caregiving and household tasks	By demonstrating safety with renewable energy-powered household appliances. By employing solar energy-based decentralised and distributed applications to meet their energy needs in an environmentally responsible manner for cooking, lighting, and other uses, millions of people in Indian villages have profited. In addition to lowering the risk of lung and eye diseases, the social and economic benefits include less hardship for rural women and girls who must travel long distances to gather fuel wood and cook in smoky kitchens ("Current Status Ministry of New and Renewable Energy, Government of India," 2021).
	(5. b) Increase the support for women's empowerment by utilising enabling technology, particularly information and communications technology.	(5.b.1) Percentage of women working in the IT and ITeS sectors	By empowering women in renewable energy. MNRE has been encouraging the participation of women in the renewable energy sector, under its various programmes and schemes. The following categories are recognized by the MNRE for the work done by women in the renewable energy sector: Supporting a workplace that is gender diverse Outstanding Women Entrepreneurs (excluding rural areas and start-ups) Rural women business owners Civil society organizations that support women using renewable energy 5. Women Leading the Change for Renewable Energy in Rural and Urban Areas (“MNRE - Ministry_of_New_and_Renewable_Women_Energy_Government_of_India,” n.d.).
6	(6.1) By 2030, ensure that everyone has equitable access to safe and reasonably priced drinking water.	(6.1.1) percentage of the population receiving pipe water supplied within buildings to ensure it is safe and sufficient to consume	By providing safe and affordable drinking water. By the Jal Jeevan Mission, isolated, remote, tribal, or hilly villages are to have standalone solar-powered water supply systems installed; single-village water supply schemes are to preferably use solar power pumping arrangements; and multi-village water supply schemes are to potentially consider concurrent use of solar powerbased pumping systems (Sakti n.d.).
7	(7.1). By 2030, make sure that everyone has access to energy services that are reliable, affordable, and modern.	(7.1.1) %age of households electrified	Under the SAUBHAGYA ELECTRIFICATION SCHEME (Power 2023), providing standalone solar photo voltaic (SPV) systems for unconnected homes in remote, challenging-to-reach villages or towns where grid extension is not feasible or economically viable.
		(7.1.2) The percentage of homes that utilise clean fuel for cooking	. In India, about 14% of rural households exclusively use biomass, and another 66% collect it to supplement clean fuels (’Mani 2021).

	(7.2). By 2030, significantly raise the proportion of renewable energy in the world's energy mix.	(7.2.1). Share of Renewable energy in the total installed electricity generation	As of September 9, 2022, India is third in the world for renewable energy production, with 40% of installed capacity coming from renewable sources ("Renewable Energy in India," n.d.).
	(7.3), By 2030, quadruple the pace of increase in energy efficiency worldwide	(7.3.1). Energy intensity expressed in terms of GDP and primary energy (in megajoules per rupee)	Renewable energy technologies contribute to reducing the overall energy intensity because they produce energy with higher efficiency and lower conversion losses compared to conventional fossil fuel-based sources (Ministry of New and Renewable Energy (MNRE), Government of India. (2021). Renewable Energy Statistics 2021).
	(7. b). Implement initiatives to modernise technology and expand infrastructure by 2030 so that all developing countries, particularly the least developed countries, small island developing states, and landlocked developing countries, can access modern, sustainable energy services.	(7.b.1). Installed renewable energy production capacity, expressed as watts per capita.	India ranks 4 th in the world for installed capacity of renewable energy (including large hydro), wind power, and solar power (RENEWABLES 2022 GLOBAL STATUS REPORT, 2022).
8	(8.1) Maintain economic growth per capita in accordance with national circumstances; in particular, the least developed nations must see yearly GDP growth of at least 7%.	(8.1.1) GDP growth rate per capita on an annual basis.	By boosting investment, creating jobs, lowering energy costs, and opening up export prospects, renewable energy in India has the potential to support GDP growth. The renewable energy sector is open to 100% FDI, thanks to India's lax foreign investment regulations (Foundation, 2023) .
	(8.5) By 2030, ensure equal compensation for equal work, full and productive employment, and decent work for all men and women, including youth and those with disabilities.	(8.5.2) Unemployment rate	By providing employment opportunities for reducing the unemployment rate, The solar and wind energy sectors in India added more than 52,000 new jobs in FY22. As of FY22, 1,64 lakh people work in India's solar and wind energy sectors, rising 47% from FY21. These individuals comprise 84% of the solar energy industry (CEEW-NRDC India-SCGJ, n.d.) The number of Indians employed in the clean energy sectors increased by 47% between FY21 and FY22.
9	(9.2) Encourage fair and sustainable industrialization; by 2030, considerably raise the sector's employment and GDP share while accounting for regional differences; and double its share in the least developed countries.	(9.2.2) Manufacturing employment is a proportion of all jobs.	By creating jobs in manufacturing; the Solar industry can create jobs in manufacturing. Based on installed capacity the solar manufacturing business creates 29,900 new jobs annually (Standard, 2022)
	(9.4) By 2030, every country should use its resources to upgrade its infrastructure, restructure its industries to become more sustainable, and implement greener, more ecologically friendly industrial processes and technologies.	(9.4.1) The electricity sector's overall CO2 emissions as a percentage of GDP	By boosting the proportion of renewable energy in all energy generation and decreasing CO2 emissions through the replacement of fossil fuels. According to Manohar Amit (n.d.), India has achieved its target of having 40% of its installed power capacity originate from non-fossil sources.
11	(11.1) By 2030, make sure that everyone has access to essential services and decent, safe, and affordable housing. Slums should also be upgraded.	(11.1.1) The percentage of people living in urban slums, unofficial settlements, or subpar housing.	With renewable energy, housing can become more economical and sustainable as a result of access to affordable and sustainable energy for homes. Since the start of SAUBHAGYA, 2.817 crore homes have been electrified, as of 31.03.2021 (Kumar. J & Majid, 2020).
	(11.2) By 2030, ensure that everyone has access to safe,	(11.2.1) The proportion of urban homes with convenient	.Electric vehicles and public transportation networks can be powered by renewable energy,

	cheap, accessible, and sustainable transportation options. This will improve road safety, particularly through increasing public transportation and paying particular attention to the needs of the elderly, women, children, and people with disabilities.	access to public transport.	making transportation more accessible and sustainable. By utilizing renewable energy sources, we may further lessen the impact that charging our vehicles has on the environment. With the installation of 20 solar-powered EV chargers, Bharat Heavy Electricals Limited (BHEL) has made the Delhi-Chandigarh route the first e-vehicle friendly highway in the nation. According to "BENEFITS OF ELECTRIC VEHICLES," n.d., India's total number of charging stations climbed by 285% in the fiscal year 2022.
	(11.6) By 2030, lessen the negative effects of cities on the environment per person, especially by focusing on air quality and managing municipal and other trash.	(11.6.3) How many days have favourable air quality when PM 10 levels are below the federal threshold?	By replacing fossil fuel-based energy systems with renewable energy the pollutants can be reduced and can have good air days. Renewable energy is also promoting electric vehicles which can help in reducing pollutants. The Central Government launched the National Clean Air Programme (NCAP) as a long-term national strategy to address the issue of air pollution throughout the nation, with targets to achieve a 20% to 30% reduction in Particulate Matter concentrations by 2024, using 2017 as the base year for comparison of concentrations ("Long-Term, Time-Bound, National Level Strategy to Tackle Air Pollution- National Clean Air Programme (NCAP)," n.d.).
12	(12.2) By 2030, attain the effective and sustainable utilisation of natural resources.	(12.2.1) Percentage change in the amount of natural resources used by each person	Renewable energy sources, such as solar and wind power, are sustainable and do not deplete natural resources, in contrast to fossil fuels, which are finite resources. By promoting the use of renewable energy, India can ensure sustainable management and efficient use of its natural resources ("India Plans to Produce 175 GW of Renewable Energy by 2022 Department of Economic and Social Affairs," 2021).
	(12. c) Justify inefficient fossil fuel subsidies that encourage unnecessary consumption by removing market distortions, considering national circumstances, such as simplifying taxes and gradually eliminating those detrimental subsidies where they exist, to reflect their environmental effects, and fully taking into account the particular requirements and circumstances of developing nations while minimising any potential negative effects on their development in a way that protects the environment.	(12.c.1) Fossil fuel subsidies relative to GDP.	by cutting back on subsidies for fossil fuels, as they encourage consumption that is not sustainable. Subsidies for fossil fuels exceeded those for renewable energy by a factor of 7.3 in FY 2020. Despite a gradual decline since FY 2014, coal subsidies remain 1.74 times larger than those for renewable energy sources (Viswanathan et al. 2021).

V. CONCLUSION

This paper attempted to provide a broad overview of the Indian renewable energy sector, including its history, potential, energy production and consumption, and prevailing challenges at present. It then discusses the implications of renewable energy for achieving sustainable development goals by drawing from the renewable energy

sector overview. India is largely dependent on coal for energy supply, whereas it is largely dependent on oil products for energy consumption. Long-term projections show that energy demand in India is growing rapidly. It can be argued that the renewable energy sector is not sufficiently satisfying the energy demand of India. India is largely dependent on non-fossil fuels for satisfying energy demand.

The results show that renewable energy has become a key factor in sustainable development, offering numerous economic, social, and environmental benefits. This study emphasizes that renewable energy holds tremendous promise for India's pursuit of the Sustainable Development Goals by analyzing the Indian context and demonstrating how the integration of renewable energy sources can significantly contribute to the achievement of SDGs, including affordable and clean energy, climate action, economic growth, and job creation. India can accomplish numerous SDGs, including affordable and clean energy, climate action, economic growth, and social well-being, at once by realizing its transformative potential. Adopting renewable energy is an essential step toward a robust and sustainable future.

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