

# Role of solar energy in sustainable development

On the other hand, the analysis shows that non-renewable energy causes a decrease in sustainable development. Therefore, this study suggests prioritizing solar energy to increase the level of sustainable development and enable countries to reach the United Nations 2030 Sustainable Development Goals more easily.

Historically, economic development has been strongly correlated with increasing energy use and growth of greenhouse gas (GHG) emissions. Renewable energy (RE) can help decouple that correlation, contributing to sustainable development (SD). In addition, RE offers the opportunity to improve access to modern energy services for the poorest ...

Energy comes from the natural environment and ecosystems. It is the basis of human activities, the driving force of socioeconomic development, and necessary for improving human well-being and living conditions [3, 4]. The use of energy also has feedback effects on the environment [5]. Therefore, energy is linked broadly with the sustainable development of ...

The use of science with technology has been widely accepted as a major source to achieve sustainable development of any country. Similar role of science in achieving millennium goals has also been recognized at the Millennium Summit of United Nations held in 2000 (SciDev 2023). The principles and methods of physics, the most fundamental science, ...

This chapter explores how renewable energy can support sustainable development in South Africa. It reviews the literature on four topics: the current and future trends of renewable energy use and production; the factors that influence renewable energy adoption and diffusion; the effects of renewable energy on different aspects of sustainability; and the ...

In this chapter, we aim to discuss and compare the non-conventional (renewable) energy sources for electricity generation and their role in sustainable development. The impact of electricity generation on environment by the various renewable sources namely hydro, solar, biomass, wind, geothermal in terms of greenhouse gas emission is also ...

In their review study [98], investigate the role of solar energy especially photovoltaic and thermal technologies to maintain sustainable development. They state that solar energy consumption significantly reduces carbon emissions as well as air pollution as a medium of fossil fuel substitute, thus it is a prospective tool for achieving global ...

But our data and analysis show that the current and planned policies fall well short of achieving our critical

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energy-related sustainable development objectives. There has been tremendous progress in delivering universal electricity access (SDG 7.1.1) in Asia and parts of sub-Saharan Africa, with the number of people without access declining to ...

Energy is critical to sustainable development, and energy research is essential to achieving the SDGs. Contrasting with the Millennium Development Goals, the United Nations has explicitly incorporated energy as one of its SDGs-SDG 7, "Affordable and clean energy" (United Nations 2023). The explicit inclusion of energy in the SDGs highlights the recognition of its ...

This paper highlights solar energy applications and their role in sustainable development and considers renewable energy's overall employment potential. Thus, it provides insights and analysis on solar energy sustainability, including environmental and economic development. Furthermore, it has identified the contributions of solar energy ...

Moving towards sustainable modern energy will require that renewable sources make up 60 per cent of power generation by 2030, and in turn, will support resilient industry and infrastructure in developing countries, speakers stressed, as the high-level political forum on sustainable development -- held under the auspices of the Economic and Social Council -- ...

Overview of renewable energy options Solar energy The most obtainable renewable energy source is solar energy. The sun radiates solar energy at a rate of  $3.8 \times 10^{23}$  kW, from which the Earth captures roughly  $1.8 \times 10^{14}$  kW (Panwar et al. 2011). They receive solar energy in a range of methods, which would include sunlight and warmth. This energy dis-

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The remainder of the paper is sectioned into five: Section 2 discusses renewable energy sources and sustainability and climate change, Section 3 elaborates on the various renewable energy sources and technologies, Section 4 elaborates on the renewable energy sources and sustainable development, Section 5 elaborates on challenges affecting ...

This chapter presents an overview of robotic technologies for agriculture workspaces and describes the role of solar energy in novel agricultural practices. In Chapter 11, different solar energy technologies that could potentially be used in the agriculture and food sectors are discussed, evaluating both their economic and environmental aspects ...

Energy is a prerequisite for development and sustainable energy systems are a prerequisite for sustainable development [1]. While the world has seen rapid development over particularly the last few decades with

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penetration levels of renewable energy sources reaching double-digit percentages in electricity supply in several countries, many other countries and ...

A 2022 survey on the research on 100% renewable energy systems demonstrated a wide consensus on the technical and economic feasibility of these types of systems in the research community, and that wind and solar power could play pivotal roles in future fully renewable energy systems [10]. There are of course technical, economic, resource, ...

This significance is recognized globally, as evident in the United Nations' seventh Sustainable Development Goal (SDG7), which aims to "ensure access to affordable, reliable, sustainable, and modern energy for all" by 2030 [7], [8]. The goal acknowledges that energy is not just a commodity but a foundational element of societal advancement ...

Furthermore, sustainable development within a society demands a sustainable supply of energy resources (that, in the long term, is readily and sustainably available at reasonable cost and can be utilized for all required tasks without causing negative societal impacts) and an effective and efficient utilization of energy resources.

DOE's Solar Futures Study presents various scenarios for solar energy deployment that could help the United States achieve a carbon-free electricity grid by 2035. According to the study, solar energy development could require as much as 5.7 million acres of land, which is about 0.3% of the contiguous U.S., by 2035.

Energy plays an important role for any country for modernization, development, economic growth, and industrialization (Harish and Kumar 2014). Approximately 32-35% of the world's overall energy consumption is in industries and 30% of the fraction of that is used for the thermal applications below 150 °C, whereas 22% of the fraction is at the moderate ...

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