Integrating Renewable Energy into The Indian Business Landscape to Achieve Sustainability for a Greener Future Ahead

Authors: Dr. Rishi Kant; Kartikey

Affiliation: Assistant Professor, Department of Commerce, University of Lucknow; Research Scholar, Department of Commerce, University of Lucknow

E-mail*: rishikant.lu@gmail.com; kartikeykumar11@gmail.com*

https://doi.org/10.26821/ijsrc.14.2.2026.140201

ABSTRACT

Solar parks, the cornerstone of India's renewable energy revolution, are crucial to accomplishing the country's ambitious clean energy goals. Large-scale electricity generating Solar plants in designated areas allow for pooled infrastructure, effective use of land and simplified regulatory procedures. This paper describes the role of solar parks in India's energy landscape and how sustainability is integrated into business models by balancing economic viability, social inclusion, and environmental benefits. This paper focuses on significant solar parks such as Bhadla, Pavagada, and Rewa, it investigates various business models, such as those driven by the private sector, public-private partnerships, and the government. The study emphasizes upon the promotional role of these models in promoting sustainable growth by leveraging innovative financing, community engagement, and favorable policy frameworks. It underscores how this business models minimize costs, provide economic opportunities, involve communities, and protect the environment. The paper also emphasizes upon several damages made to the soil, vegetation and natural habitat of the region and effective ways to minimize the damage using proper measures and effective strategies. It also highlights how social justice, economic growth, and environmental preservation can co-exist in unity by making sustainability a guiding principle for business and development, along with a clear roadmap for policymakers for making effective policies for a sustainable future. Despite the challenges like land acquisition and regulatory complexity, Solar parks demonstrate how sustainability is integrated in their business models and promotes adoption of clean energy and aid India's shift to a greener future.

Keywords: *Solar Parks, Renewable Energy, Sustainability, Business Models, Economic growth*

1. INTRODUCTION

With a total renewable energy capacity of more than 200 GW (gigawatt), India has achieved a major milestone in its renewable energy path, aligning with the nation's ambitious renewable energy goal of reaching 500 GW from non-fossil fuel sources by 2030. India has gradually developed a diverse renewable energy source, ranging from expansive solar parks to wind farms and hydroelectric projects. These developments have improved the country's energy security simultaneously lowering dependency on fossil fuels for energy and with renewable energy making up a sizable amount of the power mix, as of July 31st, 2025, India's total installed electricity capacity is 490 GW, comprising 119.02 GW in solar and 223.07 GW in coal [1]. The country's increasing reliance on cleaner, non-fossil fuel-based energy sources is reflected in this significant change in India's energy landscape.

India's improved Nationally Determined Contributions (NDCs) under the Paris Agreement, which include the five components mentioned during COP26 in Glasgow, demonstrate the country's commitment to combating climate change [2]. Considering national circumstances, these initiatives are in line with the Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) and equality principles. India committed to reduce its emissions intensity by 45% by 2030 (compared to 2005 levels), and achieve 50% of total power capacity from non-fossil sources by 2030, and promote a sustainable way of life. [3]. These goals also help India achieve its long-term objective of having net-zero emissions by 2070, which is backed by the "Long-term Low Carbon Development Strategy" that was presented to the UNFCCC in November 2022 [4].

Solar park consists of several solar photovoltaic panels dispersed over vast tracts of land that uses sunlight to produce electricity [5]. Solar parks are developed under a multiple developer system with the aid of state or federal government to avoid excess utility infrastructure [6]. Mega Solar parks have a capacity of 500 MW and ultra mega Solar parks have capacities in GWs. Large tracts of land are searched which could be utilized for thirty years for Solar Park's development. Land topography, soil characteristics, geographic position, population demographics, distance to grid infrastructure, and water availability, are significant factors that impacting capital and operating expenses [7].

Solar panels, inverters, transformers, and supporting infrastructure are essential parts of a Solar park that helps in combating climate change, lowers carbon emissions, reduce dependence on fossil fuels, large scale energy production, efficient land use, energy security and diversification, adopting sustainability practices. They have grid connectivity, real-time data monitoring, and operational efficiency [8].

Solar installation prices dipped over the last decade making it cost-effective than other sources of electricity generation, it also protects the environment, lessens reliance on fossil fuels, reduces air pollution and GHG's emissions, by not emitting toxic substances like conventional fossil fuels do [9], [10]. Solar power plants need only routine checks and occasional cleaning, leading to significant savings in operational costs over the years and the primary component of solar power plants, tend to last between 25 and 30 years [11]. Solar parks have low energy densities and prompt a notable land use change [12] and thus could have important impacts on ecosystem services and natural capital [13].

Smaller-capacity individual projects are dispersed leading to high cost for site preparation, constructing separate transmission lines to the closest substation, acquiring water, and building other required infrastructure. The project is ultimately delayed since it takes longer for project developers to obtain land, obtain various approvals and permissions, etc. To address these issues, the "Development of Solar Parks and Ultra-Mega Solar Power Projects" plan was introduced on 12 December 2014 by the Ministry of New & Renewable Energy with the goal of assisting solar project developers in quickly establishing projects. To achieve 20,000 MW of installed solar power capacity in 5 years, beginning in 2014–15, the plan called for the establishment of at least 25 Solar Parks and Ultra Mega Solar Power Projects and the scheme's capacity was raised from 20,000 MW to 40,000 MW on March 21, 2017. All states and union territories were eligible for benefits under the scheme and the solar parks to be established must have a minimum capacity of 500 MW. Smaller parks are also taken into consideration in areas where non-agricultural land is severely lacking and where getting parallel land could be cumbersome due to steep topography. Respective State Governments and their agencies, CPSUs, and private business owners work together to build the Solar Parks. The Solar Power Park Developer (SPPD) is the name of the implementing organization [14].

Solar Park development in India create jobs in construction, operations, maintenance, and ancillary services, which drives local economic development particularly in rural and underdeveloped regions [15]. IRENA reported that Indian renewable energy sector attracted over $10 billion investment in 2020 alone and SECI brought in over ₹10,000 crores, or almost $1.4 billion, thus creating jobs, and they generate revenue for the government by selling solar power, collecting taxes, royalties, lease agreements.

2. REVIEW OF LITERATURE

[16]investigates how the Gujarat Solar Park (GSP) disproportionately burdens marginalized populations through its water and electrical infrastructures. Using mixed methods, including surveys and interviews, the research found that the GSP, despite its climate mitigation goals, exacerbated water scarcity and food insecurity for dryland farmers and lower-caste women. The project involved land dispossession and broken promises of local infrastructure, channeling resources away from communities and perpetuating infrastructural violence and intersectional injustice.

[17] assesses India's solar photovoltaic (PV) energy advancements, emphasizing its role in mitigating global energy demands and climate change. It discusses governmental policies, such as the Jawaharlal Nehru National Solar Mission (JNNSM), which aimed to deploy 20,000 MW of grid-connected solar power by 2022. The challenges identified include delays in land acquisition and a significant reliance on imported wafers for cell manufacturing. The study came to conclusion that the future prospects of solar power in India are

supported by government support and rapid expansion.

[18] details the planning and development of the 750 MW Rewa Ultra Mega Solar (RUMS) Park, focusing on its innovative risk mitigation strategies. Utilizing interviews and project document reviews, the study found that RUMS achieved a record-low tariff of Rs 3.30 per unit by implementing transparent acquisition of barren government land, optimal risk distribution, and securing financially sound power procurers *before* commissioning. The project also generated employment opportunities, serving as a blueprint for future large-scale solar developments.

[19] explore India's substantial solar energy potential, positioning it as a critical alternative for green energy and sustainable growth. It highlights government initiatives like the Jawaharlal Nehru National Solar Mission, which targets deploying 20,000 MW of grid-connected solar power by 2022 to reduce generation costs. The paper stresses solar energy's vital role in enhancing energy security and transforming the rural economy, aiming to establish India as a global leader in the sector.

[20] provides an overview of India's solar energy policies, achievements, and future outlook, focusing on sustainable national development and energy security. It highlights that government incentives, tax exemptions and attractive tariff plans, have significantly reduced solar power costs and contributed to an ambitious 100 GW solar target by 2022. Challenges include land scarcity in urban areas and the need for public awareness and skill development programs like Suryamitra.

[21] critically analyzes distributional justice concerns at the Charanka Solar Park, asserting that regional and national entities accrued benefits, while local host communities bore adverse impacts. Through qualitative interviews, the research revealed that vulnerable pastoralists and small farmers suffered land dispossession and livelihood loss, receiving only temporary, low-wage jobs. The project ultimately reinforced existing inequalities, as upper-caste and economically better-off groups capitalized on opportunities, demonstrating a clear case of injustice.

[22] conducted a performance analysis of a 50 MW grid-integrated solar PV system at the Kurnool Solar Power Park in South India. The research aimed to evaluate the performance parameters according to IEC 61724 standards, utilizing monitored SCADA data from April 2018 to March 2019, and to compare fixed-tilt versus single-axis tracking systems. Findings revealed an annual average performance ratio of 79.94% and a capacity utilization factor of 24.65%. Crucially, the single-axis tracking system improved power generation by 20% compared to a fixed-tilt system, highlighting its advantage.

[13] developed the Solar Park Impacts on Ecosystem Services (SPIES) decision-support tool (DST) to identify management practices that maximize ecosystem co-benefits and minimize degradation at solar parks. The methodology involved a systematic review of 457 articles, stakeholder co-development, and evaluation using two commercial case studies and empirical data from nine UK solar parks. Findings showed that SPIES DST provided an accessible, evidence-based assessment, with commercial applications demonstrating its utility in enhancing ecosystem services. Empirical data broadly aligned with the DST's predictions of increased biodiversity and pollinator abundance in managed solar parks.

[23] reviewed the impacts of solar parks, focusing on socio-economic externalities, and investigated agrivoltaics as a mitigation mechanism through techno-economic analysis in India, and found that poultry integration is the most profitable livelihood option, according to findings, with an additional revenue of 83%.

3. INTEGRATION OF SUSTAINABILITY INTO BUSINESS MODELS OF SOLAR PARKS

India's solar parks facilitate rapid construction of solar power plants, as pre-approved land, rapid development of essential infrastructure, fast track regulatory procedures accelerating the process, and by combining several solar plants in one area, solar park's generate economies of scale, leading to solar energy more competitively priced and less expensive than traditional energy sources due to lower procurement, installation, and maintenance costs [24].

Public financial institutions provides capital subsidies, low-interest loans, tax holidays and exemptions to developers to cover a portion of the solar park development and project execution costs [25].

4. BHADLA, PAVAGADA AND REWA SOLAR PARKS AND HOW THEY ATTAINED SUSTAINABILITY INTO THEIR BUSINESS MODELS

Bhadla is India's largest solar park spread over an area of 5,783 hectares-located in Bhadla village of Phalodi tehsil, Jodhpur district-Rajasthan with an installed capacity of 2,245 megawatts. The Land was allocated by Rajasthan Renewable Energy Corporation (RREC). It was developed in 4 phases with Rajasthan Solar Park Development Company Limited (RSPDCL) developing Phases I and II, Saurya Urja Company of Rajasthan developed Phase III and Adani Renewable Energy Park developed Phase IV (Majumder, 2024).

On the front of integration of sustainability, Bhadla solar park integrates environmental, economic and social sustainability through the following:-

Environmental sustainability - By installing high tech tracking systems which helps solar panels face sunlight throughout the day helping them to absorb more solar energy and increases the solar efficiency of the solar panels. It has high efficiency inverters installed along with smart grid integration system and advanced batteries for storage of energy. As the Solar Park is situated in the Thar desert, it is exposed to dust and wind frequently and rain at times, so advanced robotic cleaning systems have been set up for cleaning and maintaining the solar panels, as cleaning them manually could be a time-consuming process [27].

Economic sustainability - In the economic sphere, it has created employment opportunities and [27]. On the economic spectrum, it has created around 10,000 jobs and a bid was made for its 500-megawatt phase at just Rs. 2.44 per unit of electricity. The surrounding areas now have better connectivity of road and infrastructure with reliable power. In the case of environmental sustainability, it helps in reducing around 4 million tonnes of carbon dioxide gas emissions annually [28].

Social sustainability - The park has socially uplifted the local communities by boosting the economy locally, creating jobs, and encouraging people to get involved [28], along with upgrading the schools and providing services like mobile health and veterinary services (Majumder, 2024).

The **Rewa Ultra Mega Solar (RUMS)** project consists of 750 MW, located in Madhya Pradesh, known for its innovative development model and record-breaking low tariffs. Commissioned in 2020, the first solar project in the country to break the "grid parity" barrier, where solar powered electricity was less costly than electricity from conventional fossil fuels [29], situated on 1,590 acres of land in the Gurh tehsil of the Rewa district. It is comprised of three 250 MW solar generating units. Solar Energy Corporation of India (SECI) and Madhya Pradesh Urja Vikas Nigam jointly developed the project and was built on a large, single tract of barren government land, minimizing the risk of land disputes and delays associated with private land acquisition.

The Rewa Ultra Mega Solar (RUMS) Park has integrated economic, environmental, and social sustainability through various strategic planning and development measures.

Economic sustainability: First time in the Nation, solar power generated electricity was economic than electricity from conventional fossil fuels with record breaking low tariff of ₹2.97 per unit in the first year with levelized tariff of ₹3.30 per unit for 25 years. The financial risk had been reduced due to the involvement of World Bank and International Finance Corporation which boosted investor confidence, secured long term Power Purchase Agreements (like Delhi Metro Rail Corporation).

Environmental Sustainability: By replacing fossil fuels with clean energy, the RUMS project is expected to cut carbon emissions by approximately 1.5 million tons annually [29]. This project is built on barren, rocky and unfertile land which helps in utilizing India's extensive wasteland. The site selection ensures shadow free surroundings, adequate water availability and proximity to transmission utilities. This park leverages state's high solar potential of approximately 300 days of sunshine and 5.5kWh/m$^{2/}$day insolation [18].

Social Sustainability: The land acquisition process was transparent and the resettlement and rehabilitation issues were minimized as the private land owners (approx. 10% of the total land selected) were compensated fairly. It also provided employment opportunities around the project site such as small shops, hotels and local jobs.

Pavagada solar park, also known as Shakti Sthala, is a prominent and large solar park around the globe, based in Karnataka. It is spread across 5 villages in the Pavagada taluka of Tumkur District. This facility was inaugurated in 2019 with a capacity of 2,050 megawatts (Joe, 2024).

Karnataka Solar Power Development Corporation Limited (KSPDCL), was incorporated in the year 2015 under the Companies Act, 2013 as a Joint Venture Company between SECI (Solar Energy Corporation of India), Government of India and KREDL (Karnataka Renewable Energy Development Limited), Government of Karnataka with an objective to plan, develop and operate solar parks in the state of Karnataka under MNRE Scheme for Development of Solar parks in the country. KSPDCL, as a part of this alliance, with an estimated investment of Rs16.5bn ($2.5bn) solar park development, has identified and taken possession of land required (on lease basis) and has developed various infrastructures like the internal transmission system, water supply, road connectivity, street lights, drainage system amongst others. KSPDCL has negotiated the land lease from land owners on a 28 years lease rental basis and has allotted the land to the SPDs who are chosen through the bidding process conducted by NTPC / SECI / KREDL [31].

Economic Sustainability - The Pavagada Solar Park on economic sustainability leased 13,000 acres from 2,300 agricultural landowners to develop a 2,000 MW solar park. The rents increase landowners' financial stability while preserving their ownership of the land [32]. The farmers who land has been leased are being paid a rent of Rs. 21,000 per acre and the amount may be increased by 5% every 2 years [33]. Around 1,500 jobs were constructed during the construction phase and over 100 ongoing positions [34].

Environmental sustainability – Pavagada Solar Park reduces CO_2 emissions by 3.6 million tons annually. It produces about 4.5 billion units of solar electricity every year. Pavagada highlights India's commitment to counter greenhouse gas emissions and meet its international renewable energy commitments [35]. The park was set up rapidly and in efficient manner, and it currently generates a sizable amount of renewable energy, helping to meet both state and nation's climate goals [32].

Social sustainability – Park helped the villagers in reshaping their lives by enabling them to invest in property, improve housing, and enroll children in quality schools due to improved income stability (Aggarwal, 2024). ReNew Power has helped about 15,000 people through community work in 16 villages. Karnataka and Fenice Energy see the Solar park as a crucial element for a greener future [34]. Computer literacy initiatives, restrooms, sports equipment at a primary school are some examples of the social infrastructure projects that have been completed in the region [32].

5. CHALLENGES AND ISSUES

Benefits were acquired mostly by affluent section of society, while small farmers and pastoralists suffered the most from loss of land resources and associated livelihoods in case of Charanka Solar Park [21].

Securing large tracts of land used for agriculture purposes or holding cultural significance, became a conflicting issue with local population, which happend, in Nandgaon, Maharashtra, where Tata Power's 100 MW solar project faced protests and hunger strikes from farmers who viewed the project as a land grab, leading to a temporary halt by the forest department.

Long term halt in transmission facilities development, developers imposing high charges-discourages private investment lead to delays. Maintaining solar panel efficiency requires regular cleaning, which consumes significant amounts of water—a scarce resource in many regions where solar parks are located, which can be tackled by emerging innovations like drone-based cleaning systems. The development of solar parks in ecologically sensitive areas can disrupt local flora and fauna [15].

The high cost and time required to develop necessary infrastructure such as roads, water supply, and transmission lines can delay projects. Delays in securing clearances can slow down project development [36].

Since Pavagada is situated in a drought-prone area, there is a constant worry regarding water scarcity; however, nothing is known about the effect on soil quality because the solar panels obstruct direct sunlight and Solar waste disposal, could pollute soil for farming in the future [32]. Farmers' statements, lead to observation that construction of the park, led to increased PPM level that prevented entry of pollinators like bees and butterflies affecting farm yields [37]. The flora and fauna in the region have been disturbed due to the solar park. Villagers near the Ramagiri West Forest Range warned that local animals such as jackals, rabbits, deer, and peacocks are disappearing due to habitat reduction, and local plants such as tamarind, rose apple, and custard apple were uprooted during the installation of the solar plant [35].

The cost incurred by developers for setting up plants in solar parks is high, consequently, the power produced becomes more expensive by Rs 0.20 to 0.40 per unit. With delays in the development of park infrastructure, the cost incurred by developers often works out to be more than that of buying individual land and setting up their own evacuation infrastructure [38]. Women farmworkers of Pavagada or women who grazed cattle in Bhadla, meanwhile, have found no alternative course of work after the solar parks became operational [39]. Large solar projects also created a potential risk of gender discrimination that limited women's ownership and access to land, leading to greater risk of inequitable compensation and engagement [40].

Due to the unavailability of adequate number of transmission lines, overburden on the already established transmission lines and weather issues the grid connectivity issues arise, leading to reduced benefit from the solar parks .[41]

6. CONCLUSION AND FUTURE SUGGESTIONS

India's achievement of crossing 200 GW non-fossil capacity, which accounts for over 46% of the national generation mix, marks a transformative chapter in its energy trajectory, underpinned by ambitious targets and robust policy frameworks. Expansion of Solar parks is a major strategy towards achieving India's renewable energy goals and parks like Rewa, Bhadla, and Pavagada demonstrates record-low tariffs and economies of scale, proving economic viability and showing considerable progress towards these goals. These Solar parks reduce carbon emissions, reliance on fossil fuels and generates employment in the region, but also have shortcomings like vulnerable population around the region are frequently marginalized, losing both their land and their means of survival while others prosper, along with environmental issues like habitat destruction and water usage in drought prone areas are persistent in the region and needs due consideration. Adoption of eco-friendly techniques like agrivoltaics, equitable benefit-sharing, active community involvement, reducing social inequalities should be focused for ensuring long-term sustainability in the region.

7. LIMITATIONS AND FUTURE RESEARCH AVENUES:

Due to time constraints the study's scope was limited upto secondary data and concentrated on three major solar parks in India. Qualitative studies involving interviews with local populations, legislators and business specialists must be followed for a thorough understanding of renewable energy infrastructure in future.

More Solar parks should be considered in future, for a thorough evaluation of their business model, practices followed, their differences, operations and sustainability outcomes. Future research can ascertain the contribution of Solar parks towards regional economic growth and development, social integration and environmental protection, towards India's shift to renewable energy transition. Such extended research will help policymakers to determine whether India's renewable energy trajectory is in line with its development goals.

8. REFERENCES

[1] "India's Power Sector | Capacity & Generation Mix." Accessed: Sep. 22, 2025. [Online]. Available: https://iced.niti.gov.in/energy/electricity/generation

[2] "Press Release:Press Information Bureau." Accessed: Jan. 09, 2026. [Online]. Available: https://www.pib.gov.in/PressReleaseIframePage.aspx?PRID=1882840&reg=3&lang=2

[3] "Nationally Determined Contribution (NDC) to the Paris Agreement: India – Policies - IEA." Accessed: Jan. 09, 2026. [Online]. Available: https://www.iea.org/policies/6025-nationally-determined-contribution-ndc-to-the-paris-agreement-india

[4] "Press Release:Press Information Bureau." Accessed: Jan. 08, 2026. [Online]. Available: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2073038&reg=3&lang=2

[5] "Solar park: what it is and how it works." Accessed: Jan. 08, 2026. [Online]. Available: https://www.repsol.com/en/energy-move-forward/energy/solar-park/index.cshtml

[6] A. M. González, H. Sandoval, P. Acosta, and F. Henao, "On the Acceptance and Sustainability of Renewable Energy Projects—A Systems Thinking Perspective," *Sustainability 2016, Vol. 8, Page 1171*, vol. 8, no. 11, p. 1171, Nov. 2016, doi: 10.3390/SU8111171.

[7] R. Stock, "Triggering resistance: Contesting the injustices of solar park development in India," *Energy Res. Soc. Sci.*, vol. 86, p. 102464, Apr. 2022, doi: 10.1016/J.ERSS.2021.102464.

[8] "Solar Parks: Maximizing Utilization & Sustainability ." Accessed: Jan. 08, 2026. [Online]. Available: https://www.novergysolar.com/solar-parks-maximizing-utilization-sustainability/

[9] "Solar Industry Research Data – SEIA." Accessed: Jan. 08, 2026. [Online]. Available: https://seia.org/research-resources/solar-industry-research-data/

[10] A. Laaroussi, O. Laaroussi, and A. Bouayad, "Environmental impact study of the NOOR 1 solar project on the Southern Region of Morocco," *Renewable Energy and Environmental Sustainability*, vol. 8, p. 9, 2023, doi: 10.1051/REES/2023007.

[11] P. Patwari, "Top 10 Benefits of Solar Power Plants | Sustainable Energy Solutions." Accessed: Jan. 08, 2026. [Online]. Available: https://avaada.com/benefits-of-solar-power-plant/

[12] D. J. Murphy, R. M. Horner, and C. E. Clark, "The impact of off-site land use energy intensity on the overall life cycle land use energy intensity for utility-scale solar electricity generation technologies," *Journal of Renewable and Sustainable Energy*, vol. 7, no. 3, May 2015, doi: 10.1063/1.4921650/672072.

[13] R. J. Randle-Boggis *et al.*, "Realising co-benefits for natural capital and ecosystem services from solar parks: A co-developed, evidence-based approach," *Renewable and Sustainable Energy Reviews*, vol. 125, p. 109775, Jun. 2020, doi: 10.1016/J.RSER.2020.109775.

[14] "Development of Solar Parks and Ultra Mega Solar Power Projects | MINISTRY OF NEW AND RENEWABLE ENERGY | India." Accessed: Jan. 08, 2026. [Online]. Available: https://mnre.gov.in/en/development-of-solar-parks-and-ultra-mega-solar-power-projects/

[15] "Best 6 Discover the Solar Park in India: A Complete Guide." Accessed: Jan. 08, 2026. [Online]. Available: https://www.soleosenergy.com/6-discover-the-solar-park-in-india-guidance/

[16] R. Stock, "Illuminant intersections: Injustice and inequality through electricity and water infrastructures at the Gujarat Solar Park in India," *Energy Res. Soc. Sci.*, vol. 82, p. 102309, Dec. 2021, doi: 10.1016/J.ERSS.2021.102309.

[17] S. K. Sahoo, "Renewable and sustainable energy reviews solar photovoltaic energy progress in India: A review," *Renewable and Sustainable Energy Reviews*, vol. 59, pp. 927–939, Jun. 2016, doi: 10.1016/J.RSER.2016.01.049.

[18] B. K. Vyas, A. Adhwaryu, and K. Bhaskar, "Planning and developing large solar power plants: A case study of 750 MW Rewa Solar Park in India," *Clean. Eng. Technol.*, vol. 6, p. 100396, Feb. 2022, doi: 10.1016/J.CLET.2022.100396.

[19] S. Suman, J. A.-I. J. of Engineering, and undefined 2018, "Solar energy potential and future energy of India: an overviewQ1International Journal of Engineering Science; H-Index: 118 SJR: Q1 CoNRS: NA CORE: NA AJG: NA ABDC: NA FT50: NA 1International Journal of Engineering Science; H-Index: 118 VHB: N…," *researchgate.netSK Suman, J AhamadInternational Journal of Engineering Science, 2018•researchgate.net*, Accessed: Jan. 08, 2026. [Online]. Available: https://www.researchgate.net/profile/Santosh-Suman-4/publication/325170101_Solar_Energy_Potential_and_Future_Energy_of_India_An_Overview/links/5dd246dea6fdcc7e138a3784/Solar-Energy-Potential-and-Future-Energy-of-India-An-Overview.pdf

[20] A. Kharesaxena, S. Saxena, and K. Sudhakar, "Solar Energy Policy for India: An Overview," *CSEE Journal of Power and*

Energy Systems, vol. 10, no. 6, pp. 2308–2320, 2024, doi: 10.17775/CSEEJPES.2020.03080.

[21] K. Yenneti and R. Day, "Distributional justice in solar energy implementation in India: The case of Charanka solar park," *J. Rural Stud.*, vol. 46, pp. 35–46, Aug. 2016, doi: 10.1016/J.JRURSTUD.2016.05.009.

[22] V. Boddapati and S. A. Daniel, "Performance analysis and investigations of grid-connected Solar Power Park in Kurnool, South India," *Energy for Sustainable Development*, vol. 55, pp. 161–169, Apr. 2020, doi: 10.1016/J.ESD.2020.02.001.

[23] S. J. Thomas, S. Thomas, S. S. Sahoo, R. Gobinath, and M. M. Awad, "Allotment of Waste and Degraded Land Parcels for PV Based Solar Parks in India: Effects on Power Generation Cost and Influence on Investment Decision-Making," *Sustainability 2022, Vol. 14, Page 1786*, vol. 14, no. 3, p. 1786, Feb. 2022, doi: 10.3390/SU14031786.

[24] "Best 6 Ways Solar Parks: Understanding Impact and Benefit." Accessed: Jan. 08, 2026. [Online]. Available: https://www.soleosenergy.com/6-ways-solar-parks-understanding-benefits/

[25] "Conceptualizing Solar Parks: Business Models and Opportunities – Firstgreen Consulting Pvt Ltd." Accessed: Jan. 08, 2026. [Online]. Available: https://firstgreen.co/conceptualizing-solar-parks-business-models-and-opportunities/

[26] R. Majumder, "Solar Power in India: A Case Study of the Bhadla Solar Power Park - Centre for Financial Accountability." Accessed: Jan. 08, 2026. [Online]. Available: https://www.cenfa.org/solar-power-in-india-a-case-study-of-the-bhadla-solar-power-park/

[27] "Pioneering Solar Technologies: Advancements in Bhadla Solar Park." Accessed: Jan. 08, 2026. [Online]. Available: https://freyrenergy.com/solar-innovation-at-scale-technologies-used-in-bhadla-solar-park/

[28] "Bhadla Solar Power Plant: India's Solar Marvel." Accessed: Jan. 08, 2026. [Online]. Available: https://feniceenergy.com/bhadla-solar-power-plant-indias-renewable-energy-ambition/

[29] "PM to dedicate to the nation the 750 MW Rewa Solar Project." Accessed: Jan. 08, 2026. [Online]. Available: https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1637549&reg=3&lang=2

[30] ritimo, "Pavagada Solar Park: A Case Study on How Renewable Energy Projects Threatens People & Ecology – ritimo," *https://www.ritimo.org*, Accessed: Jan. 08, 2026. [Online]. Available: https://www.ritimo.org/Pavagada-Solar-Park-A-Case-Study-on-How-Renewable-Energy-Projects-Threatens

[31] "Energy Finance Conference 2019 - Centre for Financial Accountability." Accessed: Jan. 08, 2026. [Online]. Available: https://www.cenfa.org/programmes/efc-2019/

[32] "India: A Large-scale Solar Park on Drought-prone Agricultural Land," 2021. Accessed: Jan. 08, 2026. [Online]. Available: https://www.wri.org/snapshots/india-large-scale-solar-park-drought-prone-agricultural-land

[33] "Solar Park | District Tumkur, Government of Karnataka | India." Accessed: Jan. 08, 2026. [Online]. Available: https://tumkur.nic.in/en/solar-park/

[34] "ReNew Power Commissions 300 MW Solar Plant in Karnataka." Accessed: Jan. 08, 2026. [Online]. Available: https://www.saurenergy.com/solar-energy-news/renew-power-commissions-300-mw-solar-plant-karnataka

[35] T. Das Kumar, "Pavagada Solar Park in Tumkur, Karnataka: All You Need to Know." Accessed: Jan. 08, 2026. [Online]. Available: https://dasenergie.com/blog/pavagada-solar-park/

[36] "India's Mega Solar Parks: A Step Towards a Sustainable Future." Accessed: Jan. 08, 2026. [Online]. Available: https://vcgreen.in/blog/India%E2%80%99s-Mega-Solar-Parks-A-Step-Towards-a-Sustainable-Future/

[37] A. Menon, "Pavagada solar park busts notions of renewable energy as inherently good." Accessed: Jan. 08, 2026. [Online]. Available: https://india.mongabay.com/2022/02/pavagada-solar-park-busts-notions-of-renewable-energy-as-inherently-good/

[38] A. Abbhi, "Hurdles in the Way: Implementation challenges in solar park development - Renewable Watch."

Accessed: Jan. 08, 2026. [Online]. Available: https://renewablewatch.in/2017/02/05/hurdles-in-the-way/

[39] "India's solar energy boom fuels local struggle for green justice | News | Eco-Business | Asia Pacific." Accessed: Jan. 08, 2026. [Online]. Available: https://www.eco-business.com/news/indias-solar-energy-boom-fuels-local-struggle-for-green-justice/

[40] V. Gupta, "Are Environmental, Social Concerns Being Considered in India's Rapid Solar Energy Expansion? – The Wire Science." Accessed: Jan. 08, 2026. [Online]. Available: https://science.thewire.in/economy/energy/are-environmental-social-concerns-being-considered-in-indias-rapid-solar-energy-expansion/

[41] "Grid Infrastructure Challenges India Solar Growth." Accessed: Jan. 08, 2026. [Online]. Available: https://hartek.com/post/grid-infrastructure-challenges-amid-indias-aggressive-solar-targets/