

## Research Article

### A BIBLIOLOGICAL SURVEY ON SOLAR PANELS AND THEIR FUTURE SCOPE

<sup>1</sup>Santhosh A, <sup>2,\*</sup> Dr.S.Prabakaran, <sup>3</sup>Dr.N.Ashokkumar

<sup>1</sup>P.G Student, Department of Electrical and Electronics Engineering, SCSVMVUNIVERSITY, Kanchipuram, India.

<sup>2</sup>Associate Professor, Department of Electrical and Electronics Engineering, SCSVMVUNIVERSITY, Kanchipuram, India.

<sup>3</sup>Assistant Professor, Department of Electrical and Electronics Engineering, SCSVMVUNIVERSITY, Kanchipuram, India.

Received 15<sup>th</sup> January 2023; Accepted 16<sup>th</sup> February 2023; Published online 25<sup>th</sup> March 2023

#### ABSTRACT

This literature survey focuses on roughly twenty research articles in a thorough manner. This literature survey was systematically planned into five modules. Module one deals with the papers related to the design and structure of panels and their utilisation. Module two comprises literature dealing with the future of solar energy both in India and in foreign countries. Module three comprises literature dealing with the comparisons between solar and other renewable sources of energy. Module four deals with the future applications of solar energy in specific arenas. Module five deals with literature's dealing with design tools available to effectively tap the solar energy according to the geographical conditions. This literature survey is a combination of five different modules that are essentially needed for the present scenario.

**Keywords:** design of solar panels, geographic significance, solar energy, solar panels.

#### INTRODUCTION

##### Module-1: Literatures deals with design and structure of panels and their utilisation

Sambhaji, S.Shankar *et al.*, (2019): "Literature Review on Solar Panel Cleaning System." The main objective is to remove the dust from the photo-voltaic modules to improving the power generating efficiency of the solar power generation system. The performance analysis of the experimental setup is purely based on the amount of power generated on the dusty panel and a cleaned panel. Finally, they concluded that regular, periodic cleaning ensures the variation of power measured in both before and after cleaning conditions by showing the significant performance of the cleaning technology.

Er. Srishti Goyal *et al.*, (2020): "A Review Paper on Solar Energy from Solar Panels to Solar Skins." This paper aims to review the evolution of solar energy from ground-mounted solar panels to wearable solar panels and solar tracking mounts. Innovation in solar technology continues to improve efficiency, size, and cost, making it more pervasive in society. Finally, this study concludes that solar power can be used as directly usable energy and ultimately creates other resources: biomass, wind, hydropower, and wave energy. Due to increasing the demand of solar PV cells to steady electricity

demands. Direct use of solar energy is the only renewable means capable of ultimately supplanting current global energy supply from non-renewable sources, but at the expense of a land area of at least half a million kilometres.

Shivam Sharma, AnushulManocha (2017): "Literature Review on Solar Powered Wheel Chairs." In this paper, an attempt is made at fabricating the solar powdered trike that can be used in both indoor and outdoor environments, and it consists of components like a solar PV panel, a brushless PMDC motor, a charge controller and battery, a hub motor, etc. This paper discussed about component ideas and emphasis work of other researchers on solar powdered project. As a result, the desired functionality of the steering mechanism is achieved. The wheel chai can provide an uninterrupted journey of 8 km, or it can travel up to 4 hours continuously.

Yazeed Alsuhaibany, YanLi (2017): "Estimation of Rooftop Solar Photovoltaic (PV) Potential: A Systematic Literature Review and Guidelines for Future Research." This systematic literature review aims to provide researchers and practitioners with a road map to select suitable data tools and techniques to estimate rooftop PV potentials. A total of 43 related studies are renewed and classified based on three elements: (1) PV roof area estimation; (2) solar radiation estimation; and (3) PV module technology efficiency estimation. Finally, this study presents a review frame work for synthesizing literature in roof top PV potential estimation.

TABLE: Criteria used for Coding

SOLAR IRRADIATION ESTIMATION											
Solar insolation	global	Plane of insolation	array	POA	Azimuth angle	Inclination angle	Inter-row criterion	shading	Tools/ Approaches	Data	Evaluation
AVAILABLE ROOFTOPS ESTIMATION											
Rooftop Relationship	area	population	Building Orientation	Ground Ratio (GCR)	Coverage	Building Footprint	Setback (SBR)	ratio	Tools/ Approaches	Data	Evaluation
PV TYPES (EFFICIENCY)											
PV module efficiency	System losses			Weather	Wiring	Tools/ Approaches	Data	Data	Evaluation		

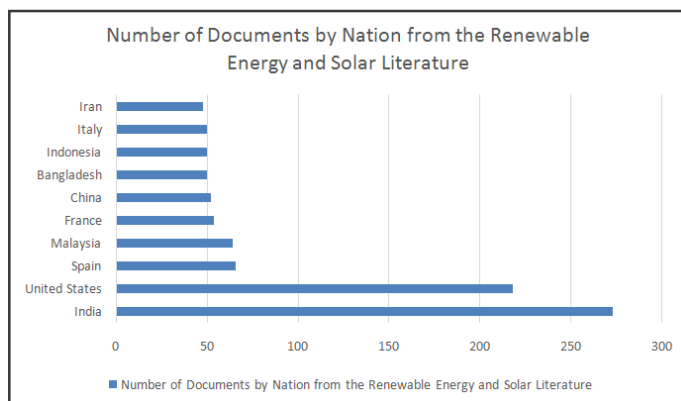
## Module-2: Literatures deals with the future of Solar Energy

Deepu B. P., Dr. H. Kamala (2022): "Literature Study on Solar Energy Resources—A Geographical Analysis." In this paper, the authors reviewed the solar energy resources in India through a geographical analysis. The Government of India has made impressive progress in recent years in attaining self-sufficiency in producing green energy through the National Solar Energy Mission—2020. By the end of 2030, India is planning to bring secure, affordable, and sustainable energy to all its citizens by reducing the use of traditional biomass in cooking. Finally, this study concluded that all the respondents have good knowledge of solar energy, and there should be both technical and market support for the evolution of sustainable green energy production.

MahipalSoni, Dr. Deepika Chauhan (2018): "Analysis of a Solar Tracker System to Increase the Efficiency of Solar Panels: A Study." This paper presents a study and analysis of a solar tracking system to increase the efficiency of solar panels. by using two methods to increase the efficiency: solar tracking with a mirror booster and an automated cleaning system. A programmed microcontroller controls the system by communicating with the sensor and motor driver based on the movement of the sun. As a result, it was observed that the efficiency of solar trackers using Mirror Booster is about 71%.

Amal Herez *et al.*, (2016): "Short Review on Solar Energy Systems." This paper aimed to make a short review on solar energy systems, according to types of collectors and applications used. In a comparative study on the world energy consumption that in 2050 solar arrays installation will provide about 45% of world energy demand. As a result, solar energy is one of the most widely used renewable energy sources, which motivates scientists to get deeply involved in their studies about it due to its importance in reducing the effects of the energy crisis and keeping the environment clean.

MochamadChoifin *et al.*, (2021): "A Study of Renewable Energy and Solar Panel Literature Through Bibliometric Positioning During Three Decades." This paper suggested the status and visual map position of research in the internationally renewable energy and solar panel literature indexed Scopus that used a bibliometric positioning overview and technique. The study reveals that National University of Singapore and India studies were the active affiliated institutions scientists and nation in renewable energy and solar panel literature. The results of this research revealed that there is an annual trend towards a spike in the number of international publications in renewable energy and solar panel literature in 2020.



\*Corresponding Author: Dr.S.Prabakaran,  
2Associate Professor, Department of Electrical and Electronics Engineering,  
SCSVMVUNIVERSITY, Kanchipuram, India.

## Module-3: Literatures deals with comparisons between solar energy and other renewable energy

Surbhi Aggarwal, Parag Nijhawam (2016): "Review on Solar and Wind Power Potential in India." This paper presents a review of renewable sources like wind and solar. With the advancement of technology, the integration of renewable sources into the grid is a great step, but the power quality problems cannot be avoided. As a result, the world is heading towards a more sustainable system. By introducing solar and wind power, the demand is being fulfilled, but the integration of solar and wind leads to a power quality problem. Vijay Prakash Sharma *et al.*, (2002): "A Literature Review on Renewable Energy Resource and Optimization ". In this paper author's reviewed the renewable energy's power and warmth, which is produced using sun-based, wind, sea, hydro power, biomass, geothermal assets, bio engages and hydrogen. Finally, this study concludes by giving the data about the undeniable interest of energy and weight the board in the future, this dissected information can be utilized to make the arrangement outline of power. The study will in addition be significant for those areas, which are unmindful of the manageable power creation by virtue of absence the sun-based energy.

## Module-4: Literatures deals with the future applications of solar energy in specific arenas

Dr.SubratSahu (2017): "Solar Energy Technology Adoption: A Select Literature Review and Indian Evidences." This paper discussed the primarily look into the diffusion process of new solar energy technologies in the industry, analyse the business and marketing practises of select national and international companies in terms of their technology-enabled market offerings, and comment on the sustainable business and marketing approach. Finally, the utility sector represents a fascinating example of the potential for significant disruption after the rapid commercialization of solar technology. The long-term growth of PV manufacturing would be critically dependent on government-supported backward integration into polysilicon and water manufacturing, which would fundamentally help the industry become more cost-wise as well as technologically competitive.

RavirajAhire *et al.*, (2016) "Solar PV/T Hybrid System and its Techniques: A Review." In this paper a review present on photovoltaic & thermal (PV/T) Hybrid System, behind the PV/T and the operation of the system were briefly introduced, and standards for evaluating technical, economical performance of the PV/T systems were addressed. From the literature survey, it can be concluded that PV and T are very capable devices, and there is an extensive scope, making them more competitive in the market. Nilesh Patel *et al.*, (2017): "Literature Review on Solar Wiring Systems." In this paper authors review the making reliable wiring for grid tied solar system. It develops to solve the problems with the transmission of electricity in institutional areas. The features of this system is it battery less system which reduce the cost of the system. This system is not related about the replacing the current system but it including the better connection which make current system better with minor replacement. Finally, the modules show degradation in power output through years of operation. It is observed that quality modules are very important in determining the extent of degradation. The improvements in technology and quality assurance have reduced this degradation considerably.

Tarek Safwat Kabel, MohgaBassim (2019): "Reasons for Shifting and Barriers to Renewable Energy: A Literature Review." A literature review was performed in this paper to determine the reasons for shifting from conventional energy to renewable energy and to identify

the barriers to the development of renewable power generation. Finally, barriers to renewable energy in the literature were classified into three categories: economic, policy, legal, and technical. Although high costs have been cited in the literature as one of the major barriers to shifting to renewable energy sources.

SAURAV KUMAR *et al.*, (2018): "A Literature Survey on Drive Systems Based on Solar for Aerial Vehicles." This paper deals with the design considerations and development of a solar power system capable of providing endurance for more than 12 hours. The battery management stage monitors and controls the charge and discharge processes of the Li-Ion polymer battery modules. This paper helps to improve the results of solar-powered UAV configuration, propulsion, and performance designs. Mr. Amitkumar Gupta *et al.*, (2016): "A Review on Solar Powered Air Conditioning Systems." In this paper, the authors reviewed the solar-powered air-conditioning system, which used for solar energy to save our environment from greenhouse gases and keep our environment clean and green for the coming generation. Many places were solar energy can be used and it also have long life. The investment cost can be recovered within 4-5 years of span.

#### **Module-5: Literatures deals with designing tools and effectively tap the solar energy according to the geographical conditions**

Ali O.M. Maka *et al.*, (2022): "Solar Energy Technology and its Roles in Sustainable Development." This paper suggested the solar energy applications and their role in sustainable development and renewable energy's overall employment potential. The perspective of solar energy technology is drawn up in the application of the energy sector and affords a vision of future development in this domain. Finally, this study concludes that a comprehensive experimental and validation process for such applications is required to develop cleaner energy sources to decarbonize our planet. Sakshi Gupta *et al.*, (2016): "A Literature Review of Maximum Power Point Tracking from a PV Array with High Efficiency." In this paper, we present a review of MPPT techniques to optimise the efficiency of an overall PV system. The energy conversion efficiency of a PV generation system (PGS) is low because the solar cell exhibits non-linear current versus voltage (I-V) and power versus voltage (P-V) characteristics. In order to maintain efficient operation (MPPT) uses an efficient and reliable rule to determine the end of charging, avoids the overcharging of battery and extends the lifetime of battery. To utilise solar PV, MPPT was incorporated into the controller.

MahipalSoni, Dr. Deepika Chauhan (2018): "Analysis of a Solar Tracker System to Increase the Efficiency of Solar Panels: A Study." This paper presents a study and analysis of a solar tracking system to increase the efficiency of solar panels. by using two methods to increase the efficiency: solar tracking with a mirror booster and an automated cleaning system. A programmed microcontroller controls the system by communicating with the sensor and motor driver based on the movement of the sun. As a result, it was observed that the efficiency of solar trackers using Mirror Booster is about 71%.

Viren Waluny *et al.*, (2018): "Literature Survey on Intelligent Energy Metering Systems to Transfer Solar Power to DISCOMs." A literature survey was performed in this paper by using Microcontroller to take down the meter reading and also the consuming and the amount producing is also being noted in residential. By using a 500-mA, 5-volt power supply and three terminal voltage regulators for voltage regulation, a bridge rectifier is also used. As a result, to establish an effective way of generating power and to show a glimpse of the immense potential that renewable energy resources hold.

Arpita Banik *et al.*, (2021): "A Literature Review on PV Inverter Topologies Connected to the Grid." This study incorporates a short dialog on network-associated PV inverters and the overall development of PV system classifications of inverter topologies in terms of their pros, cons, cost, and rating. Finally, this study concludes the performance parameters of inverters and their pros and cons.

## **CONCLUSION**

Through this literature survey an elaborative study of over twenty literatures from top notch journals have been thoroughly made. This bibliographical survey is extensively done and clearly enumerates the techniques followed by the researchers to identify a problem and find solutions for the research problem. Since the techniques have been elaborately segmented into five modules, future researchers can find useful leads through this work.

## **REFERENCES**

- [1] Deepu B.P., Dr.H. Kamala "Literature study on solar energy resources – a geographical analysis" INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT) Volume 10, Issue 4 April 2022
- [2] MochamadChoifin et.al "A study of renewable energy and solar panel literature through bibliometric positioning during three decades" Library Philosophy and Practice (e-journal) 2021
- [3] Dr.SubratSahu "Solar Energy Technology Adoption: Select Literature Review and IndianEvidences" IPASJ International Journal of Management (IJM) Volume 5, Issue 4, April 2017
- [4] Vijay Prakash Sharma et.al "A Literature Review on Renewable Energy Resource and Optimization" IOP Conf. Series: Earth and Environmental Science, ICSEEGT 2022
- [5] Sambhaji S. Shankar et.al "Literature Review on Solar Panel Cleaning System" International Journal of Research in Advent Technology, Special Issue, Convergence 2019
- [6] Er. Srishti Goyal, Er. Shalini Tripathi "A review paper on solar energy from solar panels to solar skins" IJARIE, Vol-6 Issue-1 2020
- [7] Shivam Sharma, Anshul Manocha "Literature Review on Solar Powered Wheelchairs" International Journal of Engineering Research & Technology (IJERT), 2017
- [8] YazeedAlsuhaibany, Yan Li "Estimation of Rooftop Solar Photovoltaic (PV) Potential: A Systematic Literature Review and Guidelines for Future Research" Twenty-third Americas Conference on Information Systems, Boston, 2017
- [9] Surbhi Aggarwal "Review on Solar and Wind Power Potential in India" IEEE-2016
- [10] RavirajAhire ,Dr.Santosh Dalvi, Sushant Pawar "Solar pv/t hybrid system and its techniques: a review" JETIR, Volume 3, Issue 8, August 2016
- [11] Nilesh Patel et.al "Literature Review on Solar Wiring System" International Journal of Innovative Research in Science, Engineering and Technology, Vol. 6, Issue 5, May 2017.
- [12] Tarek Safwat Kabel, MohgaBassim "Reasons for Shifting and Barriers to Renewable Energy: A Literature Review" International Journal of Energy Economics and Policy, December 2019
- [13] Sakshi Gupta, Neha Sharma "A Literature Review of Maximum Power Point tracking from a PV array with high Efficiency" International Journal of Engineering Development and Research, Volume 4, Issue 1,2016

- [14] MAHIPAL SONI, DR. DEEPIKA CHAUHAN "Analysis of Solar Tracker System to Increase the Efficiency of Solar Panel: A Study" ICONIC RESEARCH AND ENGINEERING JOURNALS, Volume 1 Issue 9, MAR 2018
- [15] SAURAV KUMAR et.al "A literature survey on drive system based on solar for aerial vehicles" International Journal of Pure and Applied Mathematics, Volume 119 No.12, 2018.
- [16] Amalherez et.al "Short Review on Solar Energy Systems" AIP Conference Proceedings 1758
- [17] Viren Walunj, Tejal Mule, PayalTayade "Literature Survey on Intelligent Energy Metering System to Transfer Solar Power to DISCOMs" International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 02 | Feb-2018.
- [18] Arpita Banik et.al "A Literature Review on PV Inverter Topologies Connected to Grid" An Edited Volume, 9–16. © 2021 River Publishers
- [19] Ali O.M. Maka, and Jamal M. Alabid "Solar energy technology and its roles in sustainable development"Clean Energy, 2022, Vol. 6, No. 3
- [20] Mr. Amitkumar Gupta et.al "A Review on Solar Powered Air Conditioning System" International Research Journal of Engineering and Technology (IRJET), Volume: 03 Issue: 04 | Apr-2016.
- [21] N. Ashokkumar, M. RathinaKumar, M. Yogesh "Flexible AC Transmission Devices as a Means for Transmission Line Congestion Management -A Bibliographical Survey", International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3 Issue-1, March 2013.
- [22] Dr.S.Prabakaran "Literature Review – Economic and Emission Dispatch Problems" International Journal of Research Publication and Reviews, Vol (2) Issue (6) (2021) Page 73-76.
- [23] Dr.S.Prabakaran "Economic Dispatch- A Comprehensive Survey" International Journal on Recent Technologies in Mechanical and Electrical Engineering (IJRMEE), Vol. 4, No.6, 2017.

\*\*\*\*\*