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Solar Canal System

Nandini N[1], Bharath N J[2], Likith A[3], Nithin A[4], Vijay Kumar H K[5]
Visvesvaraya Technological University, Raja Rajeswari College of Engineering, Mysore road, Bangalore(560074).

Abstract: ***The solar conduit system combines photovoltaic(PV) panels with irrigation conduits to cause renewable energy and prevent water wastage. It minimizes evaporation by shading the conduit face, primarily in parched and semi-arid areas. This dual- use strategy improves land- use efficiency without compromising on greenfield land. Solar panel shading restricts sunlight exposure, inhibiting algae growth in the conduit water. Reduced water temperature due to shading could benefit submarine ecosystems. The system accommodates both clean energy pretences and sustainable agrarian behaviours. Optimization of design enhances energy affair and water saving performance.***

One of the most prosperous sources of future renewable energy is solar energy. The solar energy can be removed by a PV system. there are many designs for PV installation that are executed, such as rooftop PV systems, levee top PV systems, floating PV, conduit top PV systems, etc. In the conduit top system, PV panels are installed over the water conduit, which conserves installation area and minimizes evaporation loss. The efficiency of any PV system relies significantly on the intensity of light, and hence by implementing a concentrating PV system power affair can be maximized. The operation of a concentrated PV system can decrease the cost of investment per kWh. The design reflects a sustainable outcome that favours both clean energy pretences and farming water operation. The paper discusses the design, practicability, energy business, and ecological advantages of imposing solar conduit systems.

Keywords: Photovoltaic panel; Algae; Ecosystem.

I. INTRODUCTION

Preface Renewable energy systems have undergone rapid-fire progress globally, and some renewable energy diligence, such as solar and wind, have reached periodic growth rates of 20 or more. Renewable energy is a vital inevitable source of energy that offers a platform for sustainable development in the energy sector. Solar photovoltaic(PV) technology is the most prevalent renewable energy source for clean energy production. As the power generation from the sun is truly valuable, it isn't used on a large scale. Without relying on traditional energy sources, we can minimize environmental impact. The electrical current generated in a solar cell, in principle, is commensurable with the solar radiation intensity on the cell face. Solar concentrators are employed to enhance the irradiance on the cell face, and hence the electricity product. Thus, concentrating systems have the possibility of lower cost of solar electricity as a consequence of less cell area. In this research, an aeroplane conduit top solar system is examined. mirrors towards the attention of the sun. The major parameters that influence the PV performance are irradiation, temperature, and shading and these are optimized. fresh cooling isn't required because of the availability of water within the conduit, which condenses to provide a cooling effect. The evaporation loss of water can be further minimized and fresh solar radiation can strike the panel through the application of a glass.

II. LITERATURE REVIEW

1) Canal Top Solar Energy Harvesting using reflector

- The solar radiation intensity, temperature, shading, and exposure of the panel are the major parameters to influence the PV panel's performance. Solar radiation can be improved as well as optimum panel temperature through aeroplane mirrors. Therefore, aeroplane mirrors are the fashionable option for the CPV power production. Glass accoutrements must also be selected appropriately.
- Suhas Bannur (2018): Reported that concentrated solar power in India current status, challenges, and future outlook. In this paper, some of the challenges that have hindered the development of concentrated solar power are attributed and potential outcomes proposed.
- Shubojit Dawn (2016): Reported that Anatomized the latest trends in the evolution of solar energy in India. The research suggests that climate change and its effect of natural disaster.

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2) The Canal Top Solar Power Generation Project.

- A new concept that efficiently utilizes land and saves water is the conduit top solar power factory. It provides a better executive frame for irrigation, smart megacity, and smart enterprise.
- Samuel et.al(2019): Described that mindfulness and utilization of solar energy as imperative sources of energy for ICT facilities in Nigerian university libraries and information centres.
- Ehsanul Kabir et.al(2018): Indicated that Solar energy possibility and potential. In this essay, the blessings and imperfections of solar energy technologies are bandied. A number of specialized issues impacting renewable energy exploration are also emphasized.

3) Effect of Solar Canals on Evaporation, Water Quality, and Power Production.

- M.A. Bou Rabee et.al (2015): Reported that Characteristics of solar energy in two extreme seasons.
- Young-Kwan Choi: "A Study on Power Generation Analysis of Floating PV System Considering Environmental Impact. "

III. OBJECTIVES

1) Model Preparation to generate the electricity.
2) Facilitate simple electricity generation.
3) Solar energy is produced without pollution using solar modules.
4) You can use the electricity produced by a solar power plant when there is no power.

IV. RESEARCH METHODOLOGY

1) Solar PV modules: Solar panels are installed on a support structure above the canal. These panels are connected in series and parallel, which provides effective voltage and current.
2) Buck-boost: This power electronic device can step up the input voltage, producing the desired output.
3) Solar charge controller: A solar charge controller regulates current flow from solar panels to a battery, preventing overcharging and ensuring efficient charging.
4) Battery: Three lithium-ion batteries are connected in series, providing a total voltage of 11.1 volts.
5) Inverter: These are required to convert the DC electricity to alternating current (AC) for connection to the utility grid.

V. DATA ANALYSIS

1) Project data of the canal.

Details of the canal

Length of the canal.	36 cm
Length of the canal covered by the solar panel.	30 cm
Width of the canal.	15 cm
Area covered by a solar panel.	450 cm2

2) Solar panel data.

Solar panel details.

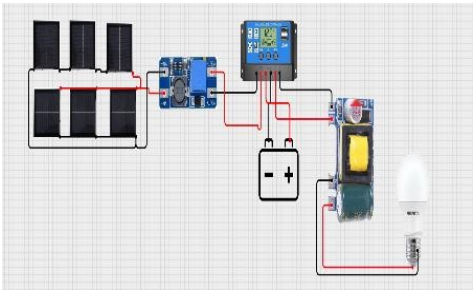
Panel size.	70X70 mm
Number of panels used.	06

3) Overall output.

Performance of the solar panel.

Voltage	24V
Current	0.2A
Power	4.8W

VI. CIRCUIT DIAGRAM



VII.FUTURE SCOPE

1) The installation of this solar canal project in the rural area provides multifunctional applications, such as powering motor pumps and borewells for adjacent agricultural farmlands and household needs.

2) The electricity generated from this project can be used to power an EV charging station located within the canal premises.

VIII. CONCLUSION

The canal solar power project is an innovative and efficient solution that offers dual benefits. It harnesses solar energy to generate clean electricity while simultaneously reducing water evaporation from canals. This environmentally friendly approach optimizes land use, conserves vital water resources, and is particularly well-suited for regions with abundant sunlight and limited water availability.

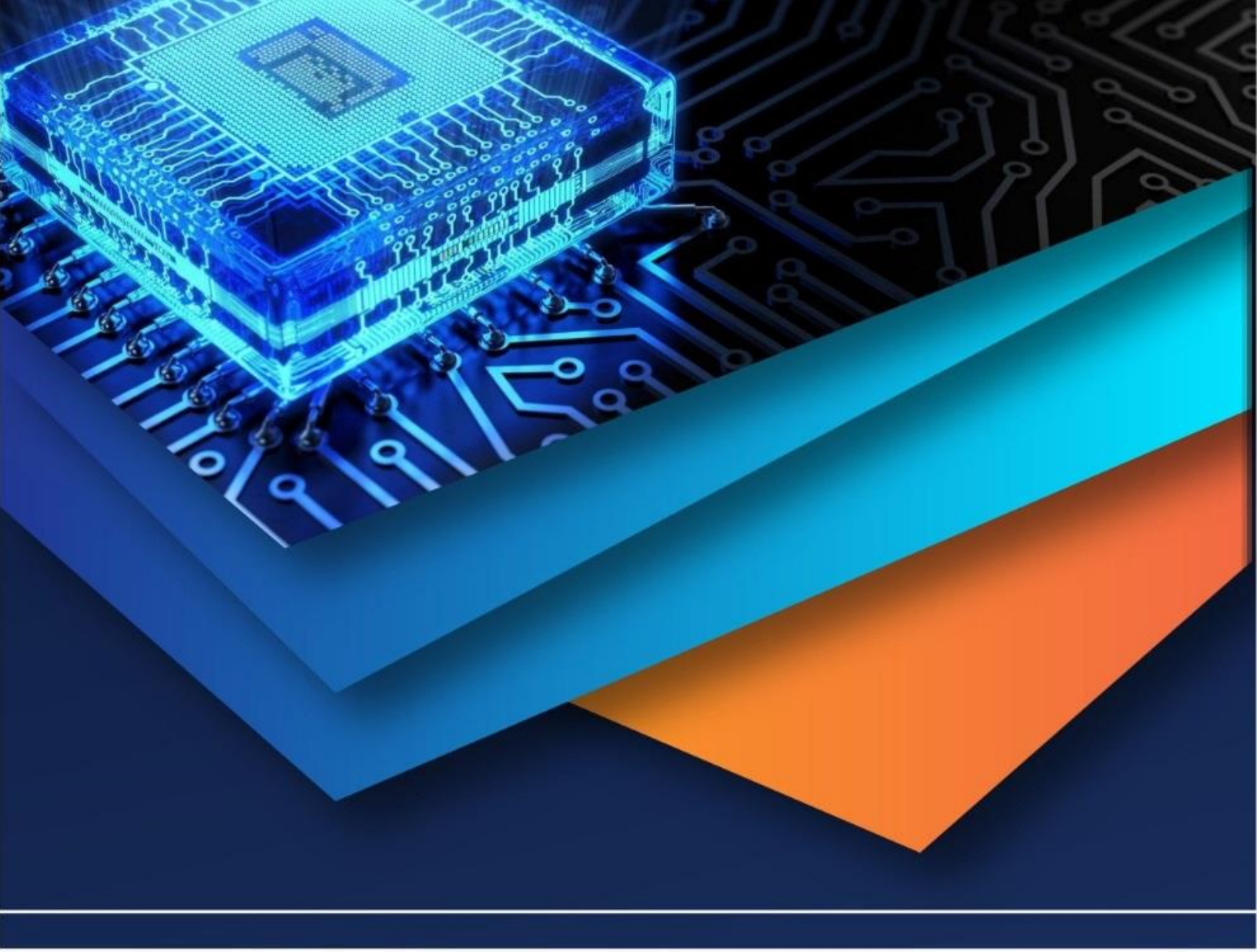
IX. PROBLEM STATEMENT

To conserve valuable land used for the solar farm, manage water evaporation in the canal, and reduce the cost of land acquisition for the project.

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