

# FINE-TUNE OF SOLAR FARM USING IOT

Dr. Deepak P. Kadam<sup>1</sup>, Rahul J. Nikam<sup>2</sup>

<sup>1</sup>Associate Professor, <sup>2</sup>Assistant Professor

Department of Electrical Engineering, MET's Institute of Engineering, BKC, Nashik.

**Abstract:** In solar energy, solar panels are the main generation elements. Whereas gained power from the photovoltaic solar panel is a main factor & reflects the panel performance. This affects by many parameters like dust density, light intensity, ambient temperature. To generate energy at full efficiency timely maintenance like cleaning & solving electrical issues is must. Delay in maintenance causes reduction in generation & even damage to the system. Also by knowing the expected amount of generation of energy from solar panels, it is also possible to manage the utilization & consumption of power in better way. In this paper, a current and voltage sensor will be used to measure generating power from solar panel. By detecting generation deficiency, we can found defective panels & improve the generation by completing maintenance on-time. By detecting dust in air tentative day of maintenance will be predicted. With the help of vibration sensors physical damage to the panel mounting will be detected. Also safety measures can be taken related to theft by detecting movement of panel. By measuring amount of sunlight, a generation can be predicted for the day so that energy can be managing in efficient way. With the help of IOT all the parameters & alert will be shown on webpage.

**Keywords:** solar panel, Buzzer with Microcontroller.

## 1. INTRODUCTION

Solar energy has been recognized as the most promising source of renewable energy all over the world. Solar energy possesses the potential to replace highly carbon intensive technology. As per the recent IEA declaration renewable is not a niche fuel any more it has become a mainstream fuel. Solar and wind is surpassing the other renewable energy sources, to be the largest share in renewable market. The drastic decline in the cost of solar PV modules has accelerated its growth and has led the energy enthusiasts all over the world to consider it. Because of the increasing demand for solar energy, the efficiency of solar panels is more important than ever. However, solar panels are very inefficient. Soiling of PV panels drops the panel efficiency even farther. This accumulation of dirt on the panels is a well-documented effect that can cause a loss of efficiency.

Many factors are affecting the solar panel performance. Some factors are proportional positively on the obtained electrical power, while other factors are affecting negatively. Light intensity level represents an important parameter with respect to the effectiveness of the solar panel, the collected solar energy which converted to the electrical power is proportional with the instantaneous level of light intensity. Dust density level is the other parameter which represents an obstacle between light beams and the front surface of the solar panel. The dust's particles deposits on the panel which will reduce the amount of radiation falling on the PV cells from the sun light. Besides the variety of dust density in every region, the angle of the surface can collect more dust. The more horizontal is the surface, the more dust particles will be collected on that surface. Ambient temperature has high priority effect on the solar panel effectiveness. In other word, increasing panel temperature value is leading to reduce the delivered power from the panel. Ambient humidity also affects negatively the panel performance.

Many electronic monitoring systems are proposed in literature for continuous measuring, recording, and/or controlling functions. Microcontroller unit is used for the mentioning/controlling functions in many studies due to the easy programming and

connection with the personal computer for interaction activities, i. e. programs loading, data collecting and analysis.

Since solar energy generation system is high cost investment, it must be run at full efficiency. In this project, an automation is performed with the help of sensors to make sure that solar farm run at full efficiency and detect situation in case of any maintenance. IOT technique is used to visualization and alert.

## 2. LITERATURE REVIEW