

**Sri Lanka Institute of Advanced Technological  
Education  
(SLIATE)**

**A proposal on  
Arduino based to measure solar power system**

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## **1. Introduction**

This project proposal is submitted” to meet the requirements of the Individual Project module conducted by the” Sri Lanka Institute of Advanced Technological Education (SLIATE), 2020.

Rising fossil fuel and burning fuel such as coal, global warming and severe weather conditions have compelled many nations to look for alternative sources to reduce reliance on fossil based fuels. Solar energy is one of the most promising renewable sources that is currently being used worldwide to contribute for meeting rising demands of electric power. Solar power is a conversion of sunlight into electricity, sunlight was collect either directly by using photovoltaic or indirectly using concentrated of solar energy.

Solar Energy is inexhaustible and pollution free energy. Solar energy resource is the amount of sunlight available to the solar panels to generate electricity. Solar electric technology is developing very quickly; its worldwide use is increasing rapidly as prices of other electric energy sources rise.

In this project, I have designed a simple system called Arduino based to measure solar power system, to measure solar panel parameters through multiple sensor data acquisition.

## **2. Background and Motivation**

Solar monitoring system is widely used because monitoring and maintenance plays key role in solar power plants. A user of the system would typically want to know what a renewable energy system is generating, the amount of voltage, current, temperature and light intensity readings at specific times of a 24 hour day. In order to implement a successful monitoring system, devices known as sensors need to be used.

The temperature was measured using temperature sensor. The light intensity was measured using light dependent resistor (LDR) sensor. The voltage was measured using the voltage divider because the voltage generated by the solar panel are large for the arduino as receiver.

These parameters as the input value for the arduino and the output was display at the Liquid Crystal Display (LCD) screen. The LCD screen display output of the temperature, the light intensity, the voltage and the current value. The purpose of arduino to convert the analog input of parameter to the digital output and display via LCD screen. Other than that, this project also involve with a design to ensure that device case are easy to be carry around.

The main part in this project are the solar panel, the light sensor, the temperature sensor, a voltage divider, the current sensor and the LCD screen to display.

### **3. Aim & objectives**

#### **3.1 Aim**

This project aims to develop a measurement of solar energy using arduino Board technology. In this system, four parameters that been measured are temperature, light intensity, voltage and current. The purpose of this project to improve the power collection efficiency with developing the track of solar panel.

#### **3.2 Objectives**

The main objectives of proposed system to design and implement an intelligent smart monitoring and management system that is capable of monitoring the solar panel and stores parameters in order to analyze performance of the system.

- To measure solar panel parameter such as the temperature, light intensity, voltage and current.
- To find the best position and time for the solar power effectively energize the electricity.
- To develop a portable device for measuring the solar energy can be achieve with developing the light in weight of the casing of the device and the neat arrangement of the electrical component inside the casing.

## 4. Proposed solution

The goal of this project is to measure solar panel parameters through multiple sensor data acquisition. In this system different parameters of solar panel like current, voltage, temperature and light intensity are monitored. It is to facilitate common small scale installations with more efficient and cost effective and reliable monitoring system. Finally a centralized monitoring of PV system also reduces the cost of system operation and maintenance.

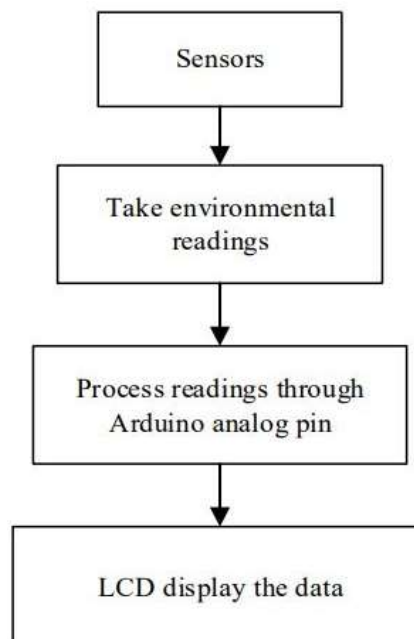
### 4.1 Planning & Analysis

In this case, the objectives and goals of the projects are to improve the process of efficient and cost effective and reliable monitoring system. Identify the tools that going to use in the development process.

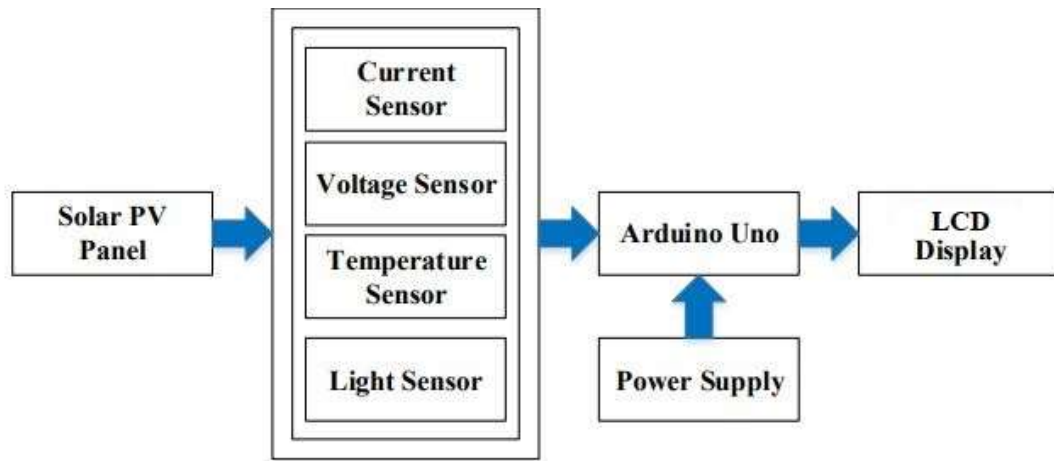
In this project methodology model takes the fundamental process activities of Project Plan, specification, Analysis, Design, development, validation and evolution and represents them as separate process phases.

### 4.2 Design

This system can monitor solar panel parameters related to solar power plant operation and maintenance with the help of multiple sensors. Appropriate monitoring improves efficiency of plant and operating conditions.



*4.2.1 Work flow of the system*



*4.2.1 Block diagram of the Solar Monitoring System*

## **5. Requirements**

- System measure solar panel parameter such as the temperature, light intensity, voltage.
- System find the best position and time for the solar power effectively energize the electricity.
- System can intelligent smart monitoring and management that is capable of monitoring the solar panel and stores parameters in order to analyze performance of the system.

## **6. Resource Requirements**

### **6.1 Software Specifications**

Arduino Compiler

Programming Language: C

### **6.2 Hardware Specifications**

- Arduino Uno R3
- Solar Panel
- LM35 Temperature Sensor
- LDR Sensor 5MM Photoresist
- Voltage Sensor
- Current Sensor
- LCD's
- Resistors
- Capacitors
- Transistors
- Cables & Connectors
- Diodes
- Transformer/Adapter
- Push Button



## 7. References

Arduino Project Hub. 2020. *Solar-Powered Compost Monitoring System and Database*. [Online] Available at:  
<[https://create.arduino.cc/projecthub/kkim20/solar-powered-compost-monitoring-system-and-database-50b4f5?ref=tag&ref\\_id=solar&offset=5](https://create.arduino.cc/projecthub/kkim20/solar-powered-compost-monitoring-system-and-database-50b4f5?ref=tag&ref_id=solar&offset=5)> [Accessed 25 February 2020].

Khan, S., 2020. Solar Panel Parameters Monitoring Using Arduino. [Online] Engineers Garage. Available at:  
<<https://www.engineersgarage.com/contributions/solar-panel-parameters-monitoring-using-arduino/>> [Accessed 25 February 2020].