

**SINGLE PHASE INVERTER FOR PV STAND ALONE  
APPLICATION**

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## **ABSTRACTS**

Power electronics is application and conversion of electric power. Powers electronic need some of the semiconductor devices to convert electric power from one form to another form. The example of Semiconductor device is a transistors, diodes, and thyristors. One of the converter types are an inverter. Inverter refers to the DC input signal convert to AC output signal. This project is about how to design a single phase inverter for photovoltaic (PV) stand-alone application circuit with Sinusoidal Pulse Width Modulation (SPWM) as switching technique. In this project, IGBTs are used as the switching. SPWM are applied to IGBT gate driver. PSIM is used as a software simulation to simulate the single phase inverter. This project will be represented in two parts which are single phase inverters for PV application with simulation and hardware construction with include microcontroller circuit. In this project, the PIC16F877A will be used as microcontroller circuit and driver circuit. The low pass filter is implemented before the step up transformer to filter the harmonic component. The output from the hardware will be compared with the output from the simulation.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background Of Study

Solar energy comes from the sun's heat and light. In order to use this energy, there are varieties of technologies that have been developed such as concentrating solar power system, passive solar heating and day lighting, photovoltaic system, solar hot water, and solar process heat and space heating and cooling. Solar power can be used in both large-scale and small-scale applications. The usage of this source of energy promotes the many advantages such as improve efficiency and save money [1].

The sun energy helps to develop renewable energy. The best method to implement it is with the use of photovoltaic (PV) systems. A photovoltaic is a packaged interconnected assembly of solar cells, also known as photovoltaic cells. The solar panel is used as a component in a large photovoltaic system to offer electricity for commercial and residential application. A photovoltaic installation typically includes an array of solar panel, an inverter, batteries, and interconnected wiring. Photovoltaic system is used for either on-grid or off-of grid application. [2]

Off-grid or stand-alone system are usually divided into several application such as lighthouses, remote sensing and rural development application such as, water pumping, street lighting, and solar home system. Power rating of such application typically varies from a few hundred of watt to 10kWatt. The stand-alone system is designed to electrify communities such as a small village or networks of houses usually located on the islands or at a distance from the nearest electrical network [3].