

## Using The Solar Panel Connected To The Backpack For Special Purposes

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**ABSTRACT:** In this study, a solar panel with a size of 255x185x17mm was installed in the backpack with a capacity of 5 Watt and 8.5V voltage and 0.6A current were produced. By connecting the output of the panel to the USB cable, a direct connection to the powerbank has been made. With this connection both the powerbank can be charged and the phone connected to it can be charged. The solar panels produce DC voltage. If an alternative signal is required, the AC signal can be obtained using the Inverter. People who have to do work in places where electricity is not available, as well as shepherds in the mountains and soldiers who are on guard duty can easily use this work. Placing the system in the backpack will provide great convenience in the transport angle and the required electrical energy will be achieved in whatever environment.

**Keywords:** Bag, Solar Panel, Powerbank

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### I. INTRODUCTION

#### 1. Solar energy

The sun is an abundant, unlimited, renewable and, most importantly, an energy source that is easily accessible without paying any price. A very large energy ( $3.47 \times 10^{24}$  kJ per unit time) is released by nuclear fusion reactions in the sun. Only  $5 \times 10^{-11}$  of this energy reaches the earth's surface. It is also a clean and environmentally friendly energy due to the fact that environmental problems that arise from the use of other fossil fuels do not generate energy from sunlight. Different forms of solar energy can be grouped under three titles [1].

##### 1.1. Solar Batteries

Photovoltaic is the property of producing electrical voltage difference (voltage) when exposed to visible or other light temperatures. The word ustur photovoltaic is formed by the combination of the words "photo elektrik meaning" lightanlam and "voltaic anlam meaning electricity. Photovoltaic technology, that is, the term used to describe equipment that converts solar energy into usable power, produces electricity from light. Ir Photovoltaic battery ol is the photovoltaic unit that produces electrical energy. Although the definition of ir photovoltaic battery fot is widely used, it is also called "barrier layer photopile", "üreten self-generating battery", "op solar battery" and "rağmen phototronic photopile" [2]. Solar cells (Fig. 5) are therefore one of the cleanest available sources of renewable energy, including semiconductors that convert directly into electrical energy by using sunlight to their surface [3].

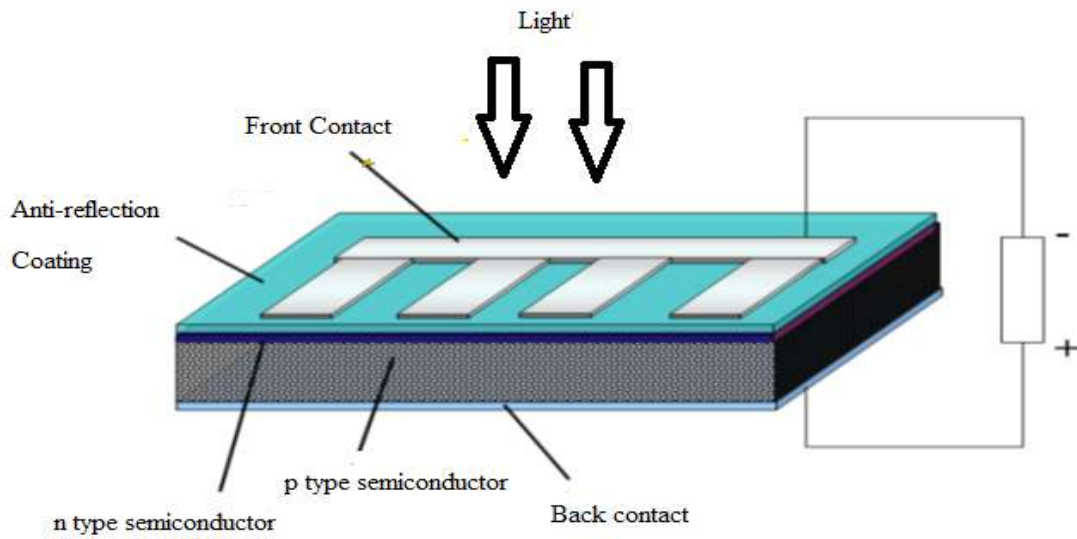


Figure 1. An overview of the solar battery [4]

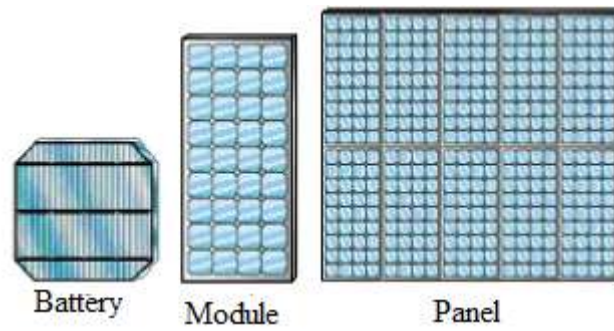


Figure 2. View of solar battery, module and panel [5]

The modules are absorbed to protect the solar cells and electrical connections from the outside. Photovoltaic panels are obtained by connecting the photovoltaic modules in parallel or in series. In this way, it is possible to obtain a voltage between 12-600 V [6] (Figure 6-7).

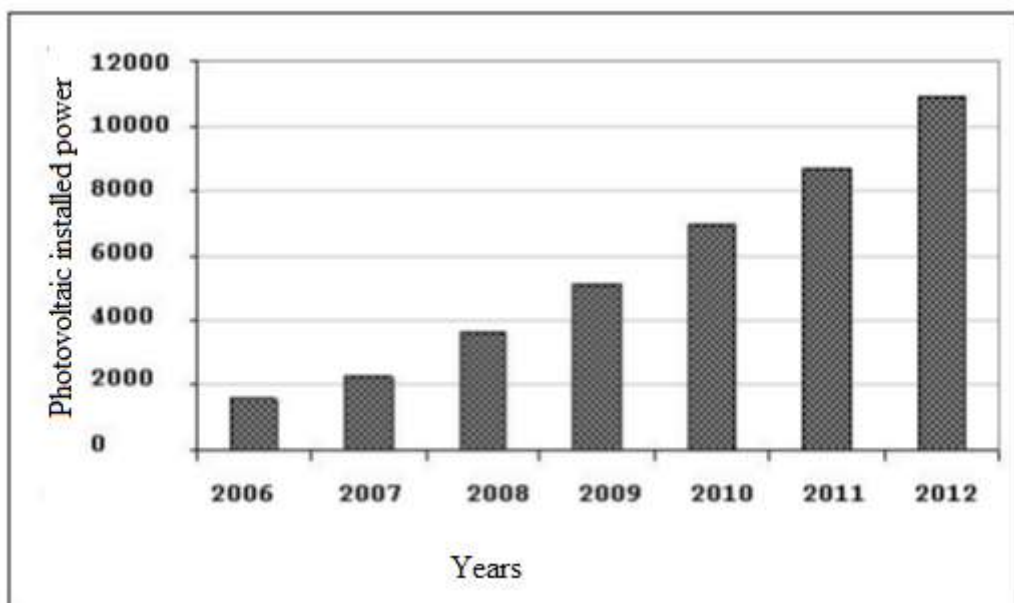


Figure 3. Photovoltaic installed power worldwide by 2012 [7]



Figure 4. Examples of photovoltaic applications; solar trolley [8], photovoltaic roof [9], traffic light [10] and street lamp [11].

## 2. Used Materials

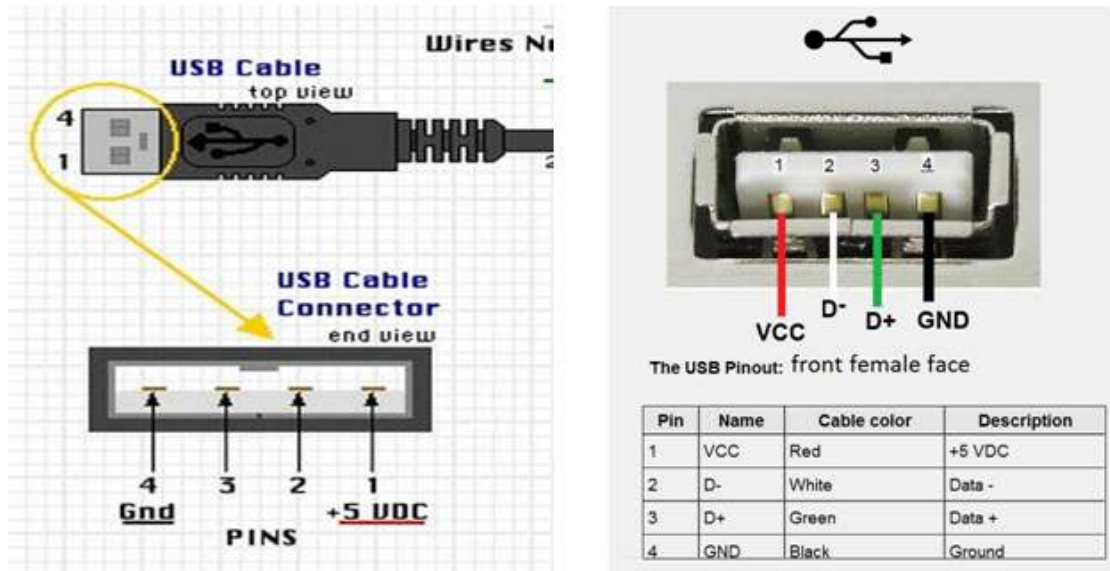


Figure 5.USB pinleri [12]

### 2.1. Kullanılan Panelin Özellikleri

Model No :TT5-18P  
 Maximum güç:5W  
 Maximum güçte çıkış voltajı:8.51V  
 Maximum güçte çıkış akımı:0.63A  
 Açık devre voltajı:10.51V  
 Açık devre akımı:0.67A  
 Boyutu : 255x185x17cm  
 Ağırlığı:0.57kg



Figure 6. Structure of the panel used

**2.2. Powerbank Özellikleri**

Kapasite:3000mah~5000mah

Marka:Remax

Input

Voltage

:5V~8V

Output

voltage

:5V~8V

Input

Current

:1A~2A

Output Current

:1A~2A

Usb

Output

Number

:1

Led Battery Indicator: Yes



Figure 7. Using powerbank



Figure 8. Panel attached to the bag



Figure 9.LED light bulb (6V-5W-6500K)

**3. Experiments**

Installation of the solar panel is made on the backpack. The solar panel's electrical outputs are connected to the powerbank to be charged. In the experiment, the powerbank was charged in about 5 hours. The graphs below show the graphs obtained in the experiments.

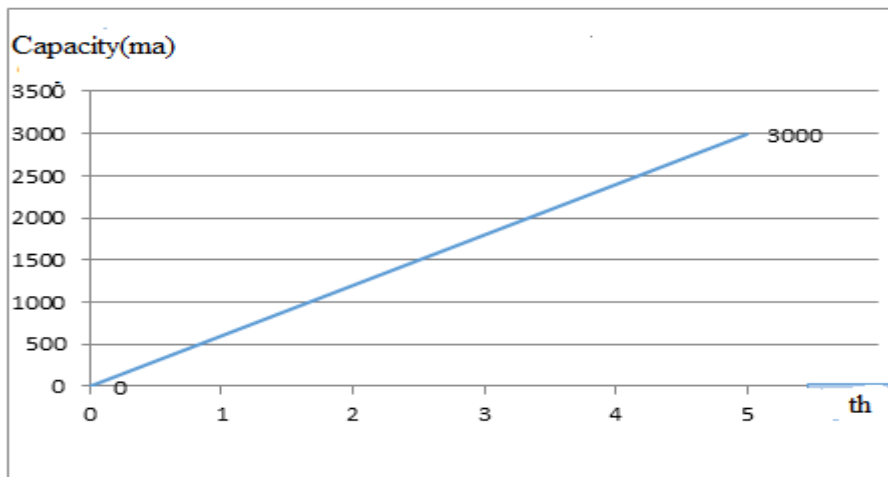


Figure 10. Powerbank's charge chart

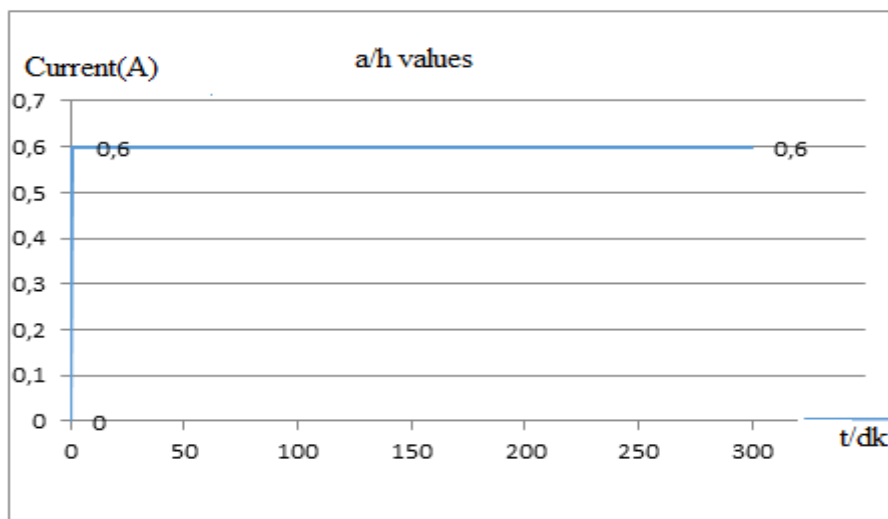


Figure 11. Powerbank's graph of values taken during charging

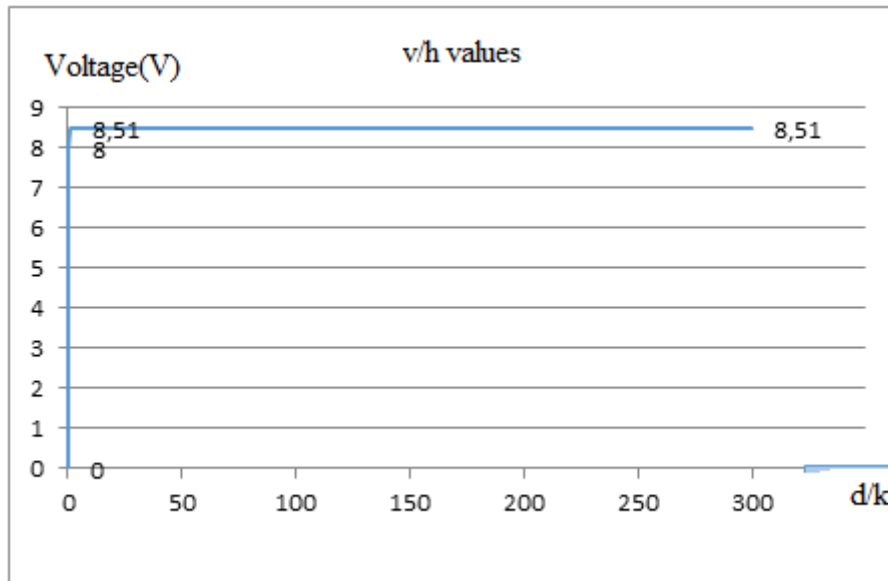


Figure 12. Powerbank's graph of values taken by the voltage during charging

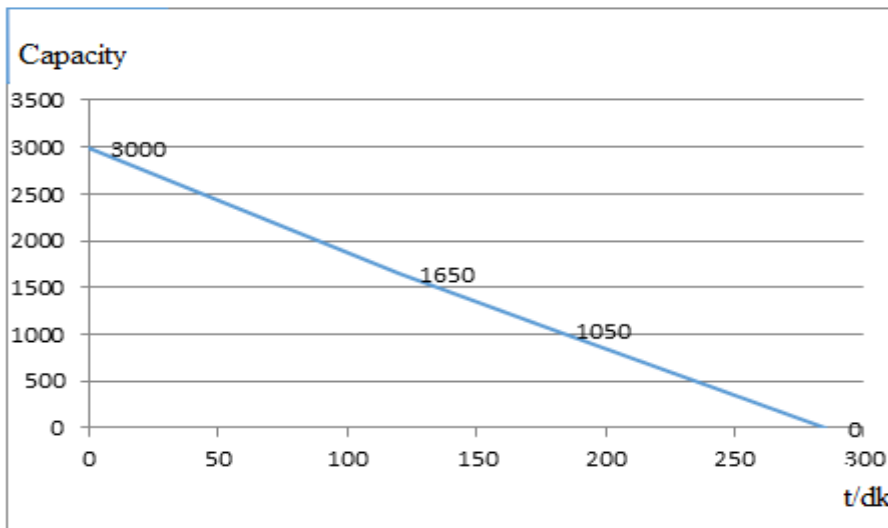


Figure 13. Powerbank's discharge chart

## II. RESULTS

In this study, a solar panel with a size of 255x185x17mm was installed in the backpack with a capacity of 5 Watt and 8.5V voltage and 0.6A current were produced. By connecting the output of the panel to the USB cable, the powerbank is now available. With this connection both powerbank can be charged and the phone to be connected to it can be charged. The solar panels produce DC voltage. If an alternative signal is required, the AC signal can be obtained using the Inverter. Powerbank can charge 1350mAh alkaline phone battery in 2 hours, but the 5w USB bulb only burns 165 minutes. In this way, approximately 3000mah of energy is used. The design and application of the solar bag is easy to carry because of the non-electric settlements can be easily used in remote locations.

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