



# Solar Panel Based TV and Set Top Box

**Gaurav Arun Kolhekar**

Electrical Engineering  
Government College of Engineering, Jalgaon, India, 425002  
[gauravkolhekar2017@gmail.com](mailto:gauravkolhekar2017@gmail.com)

**Abstract:** Coal is depleting day by day and electricity per unit cost is also increasing. Generally, T.V and receiver are consuming 100watt so tv runs 4 to 5 hours daily (Energy consumed=0.1 kilowatt × 4 hour = 0.4 units per day). To reduce utility consumption and run television set on solar cells we introduce this technique.

From home to home 0.4 unit per day reduces so much amount of electricity from non-renewable source is save. In today's time energy sources are limited and pollution is high from non-renewable sources and waste is also more.

Using solar panel-based T.V system the problem of cost per unit is negligible, pollution reduces only one time installation cost is required. T.V set is run efficiently using renewable source of energy (Sun). This idea is useful to T.V and Set top box manufacturer to encourage people to use green energy. Small revolution against self-energy generation.

## INTRODUCTION

Solar panel are mounted on satellite dish which gather energy from sun rays and convert it to electricity and feed to T.V set. Solar cell produces DC, direct current electricity. Here for most efficient running process monocrystalline type solar cell is use which gives constant voltage at limited sun rays.

Here are some electronic components use to protect, voltage boost, battery charging control.... are as follows:

### 1.1 Satellite dish with solar panel

Solar panel (photovoltaics) collect energy from the Sun in the form of sunlight and convert it into electricity that can be used to power T.V set. solar panel is installed on surface of satellite dish. Monocrystalline solar cell is efficient one to use in this project.

### 1.2 Blocking Diode

Blocking Diode in a solar panel is used to prevent the batteries from draining or discharging back through the PV cells inside the solar panel as they act as load in night or in case of fully covered sky. In short, as diode only passes current in one direction, so the current from solar panels to the battery (Pass) and blocks the current from battery to the solar panel (reverse biased).

### 1.3 Buck boost converter

Buck boost converter takes supply from solar panel and boost it to rated value to run setup (either increase voltage or decrease voltage).

### 1.4 Solar charge controller

A solar charge controller is a voltage or current controller device which keep electric cells from overcharging and discharging with increasing life of battery.

### 1.5 Battery

A battery is a device which stores electrical energy and supply to T.V set when solar radiations are absent.



**TABLES**

- ❖ Assuming
- T.V set rating: - 60 watt ,12v, 5amp
- Set top box rating: - 18 watt ,12v, 1.5amp

**Components used and their ratings.**

Sr.No	Component Name	Quantity	Ratings
1.	Solar Panel	1	12v,100watt
2.	Blocking diode	1	20v,10amp
3.	Buck boost converter	1	Input (5v-30v), Output (0.5v-30V)
4.	Solar charge controller	2	12Volt
5.	Battery	2	T.V (12v,10ah) Set top box (12,3.3ah)
6.	Battery indicator	2	12volt
7.	DPDT Switch	2	16amp

**ADVANTAGE OF SOLAR ENERGY OVER CONVENTIONAL ENERGY SOURCES**

- [1] low maintenance cost of solar panels
- [2] 20-25 years solar panel life
- [3] satellite dish with solar panel installed anywhere in remote areas also
- [4] creating jobs
- [5] setup cost is normal where nuclear, thermal, hydropower plant set up cost and per unit cost is high

**RESULT**

The area of 0.23m<sup>2</sup> is required to receive tv signals properly on satellite dish.  
On day period constant 12v is found through the day to run T.V set efficiently.

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