

Green *e*

A Technical Over View of Our Revolutionary Products
Solar Photo Voltaic Lighting Systems

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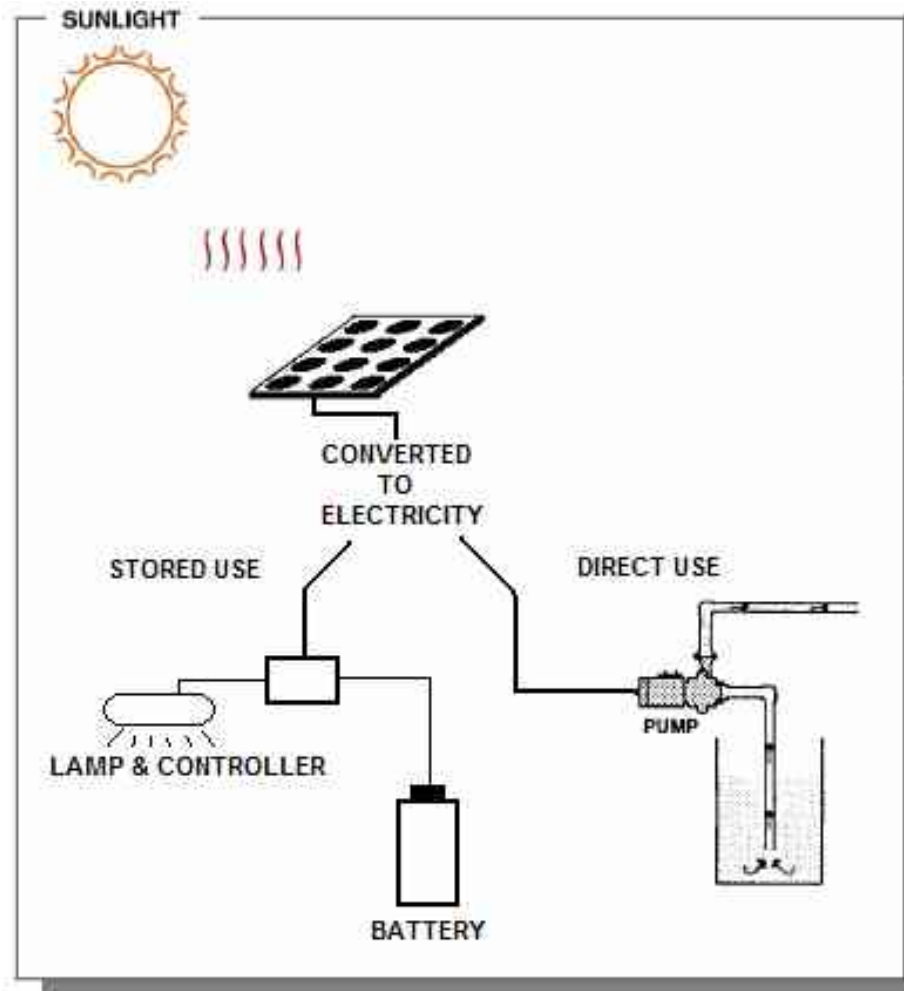
Enn Cee Enterprises - Bangalore



**Energy Solutions
for the Future**

Enn Cee Enterprises is an Indigenous Product Development and Manufacturing Company.

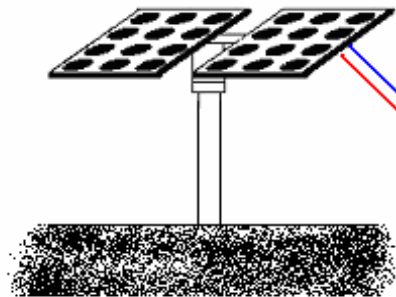
Fundamental Concepts



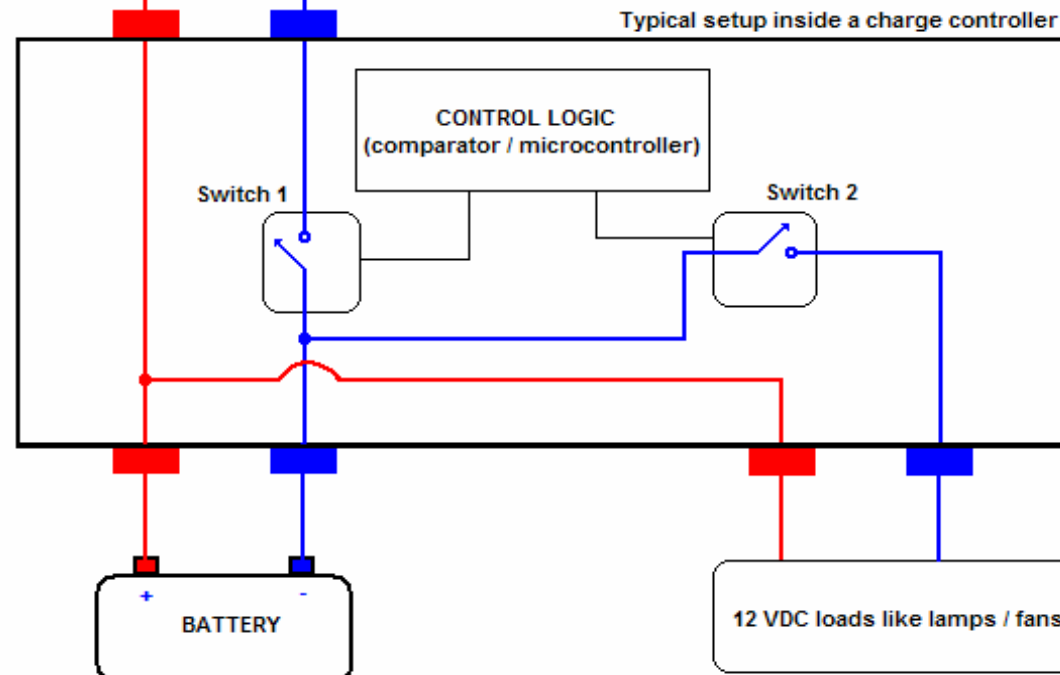
- These hi-tech systems, which work on photovoltaic cells, convert sun light into electricity.
- Virtually any electric power need, can be met by appropriately designed systems



The Controller and its Job....



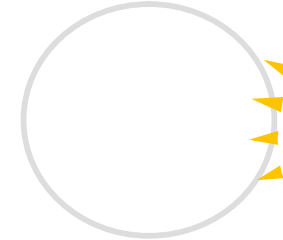
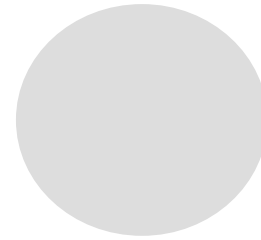
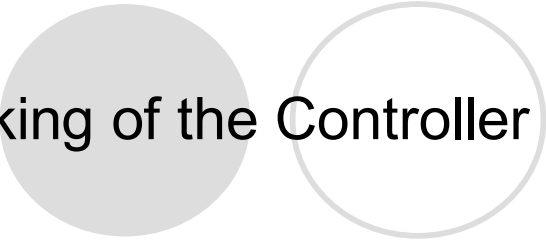
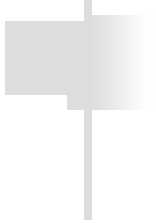
Series Type Charge Controller



- Simple ON OFF charge controllers are based on significantly cheaper control logic such as voltage comparators or even a microcontroller



Working of the Controller



- To charge a battery, the PV module must apply a voltage that is higher than that of the battery.
- If the PV module's Voltage at Peak Power (V_{pp}) is just slightly below the battery voltage, then the current drops nearly to zero (analogous to an engine turning slower than the wheels).
- To play it safe, typical PV modules are designed with a V_{pp} of *around 17 volts* (at a cell temperature of 25°C)

- In Solar Photo Voltaics, we have,

$$\text{Peak Voltage X Peak Current} = \text{Peak Power}$$

- For Example – for a 17Wp solar module,
 $17 V_{pp} \times 1 A_{pp} = 17 W_p$



Now comes the problem....

- As soon as the solar module were to be connected to the battery via a charge controller, The module voltage is dragged down to the vicinity of the battery voltage (11V to 14V) - a lower-than-ideal operating voltage.

$$\text{i.e. } 14\text{V} \times 1\text{A} = 14\text{W}$$

Ø *Traditional charge controllers* transfer the PV current directly to the battery, thus operating the SPV at a much lower power level than its maximum capacity.

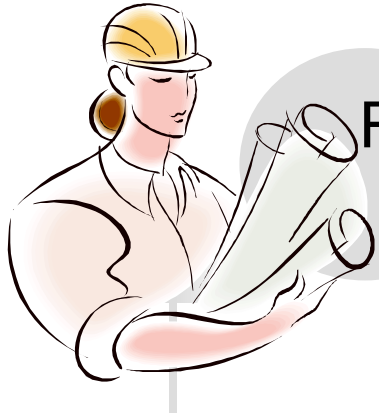


- Thus, available 17Wp module is operated only at 14W – *(expensive Loss of 3W)*



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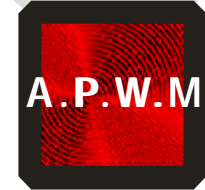




Revolutionary Solution:

Green 'e' Solar Charge Converters

Proprietary APWM Technology



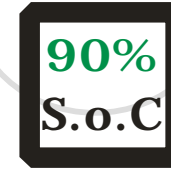
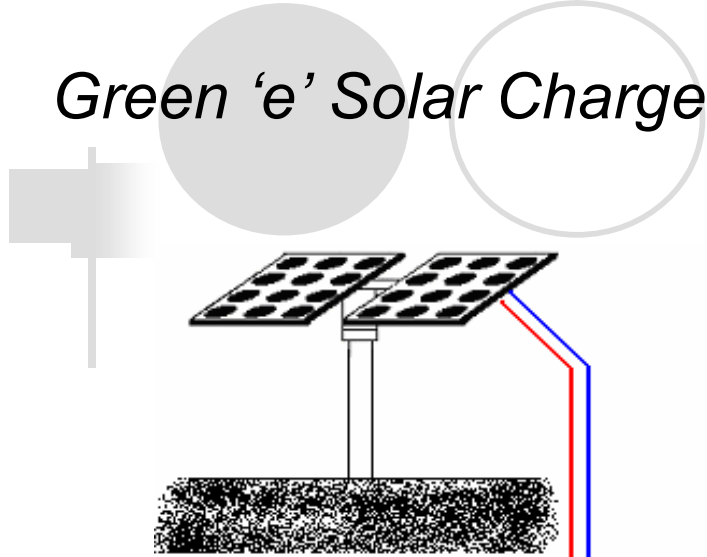
- I Our charge converters down convert the solar voltage to the vicinity of the battery voltage during regulation.
- I Thus increasing the pulsed currents to the battery and operating the module much cooler and at better operating points.
- I ***This cannot be done by any other controllers as they only control the power, but do not convert it.***
- I It also leads to lower sized solar batteries or modules thus saving overall system costs.



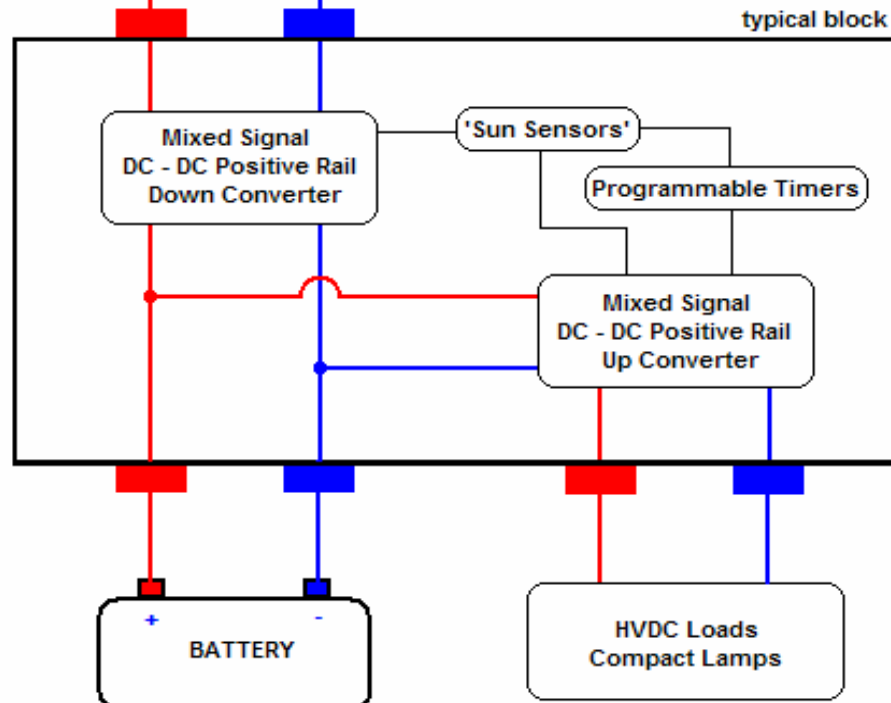
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Green 'e' Solar Charge Converters



Green 'e' Charge Converters



§Higher SOC levels.

§Reduce Battery Heating and Gassing.

§Smaller sized solar batteries or modules.

§Eliminate expensive transmission losses to lamps.

§Miniaturization of lamps.

§Lighting protection as per International Underwriters Laboratory (UL) safety specifications.

§ Active Environmental Corrosion Protection.

§Unique sealing for all electronic component to prevent degradations of performance over years of operation.



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Internal View of our Advanced Solar Charge Converters

Electronics happens to be the weakest link in solar powered systems...

WHY IS IT SO ?

The simple answer is dust , moisture, and most importantly battery corrosive gasses that will destroy delicate electronic circuitry – the heart of a Solar power system.

We at our design house have thus protected our unique products and designs by this proprietary formation that keeps the electronics smoothly running over years of unmatched operation - as long as the solar panel life span.

Essence of High Voltage DC Supply...

Basic Electric Rule1:

Low Voltage X High Current = Power

Basic Electric Rule2:

High Voltage X Low Current = Power

*World wide all solar powered installations use the **Rule 1** as the batteries can operate at low voltages. THUS...*

- Inherently to make high current flow, larger and expensive cross section of cabling need to be done to set up the system.
- Losses occurring at joints lead to lower power input at the lighting luminaries and thus poorer illumination levels.
- Bulky, non aesthetic metallic fittings are seen as typical solar lighting installation.
- Limited range from 40W to 75 W ~ incandescent lamp brightness



High Voltage DC Supply...

Mixed Signal



UP Converter

We at our Lighting Charge Converter Design House have long recognized this fact and have shifted over to Rule 2.

- | Eliminate expensive transmission losses to lamps.
- | Resonant based inverter topologies designed to virtually eliminate losses in fluorescent drives – rated world wide as the optimum mechanism for fluorescent tube operation.
- | Designed and used **only in our lighting products.**
- | Use Slim Line construction using **miniature and regular T5 tubes**
- | Allow miniaturization thus leading to Universal bulb holder sockets.
- | Push the obsolete brightness limits to a very wide range **and offer the industries longest system warranty.**
- | India's Brightest Ranges from 125 W to 300W in compact luminaire fittings.



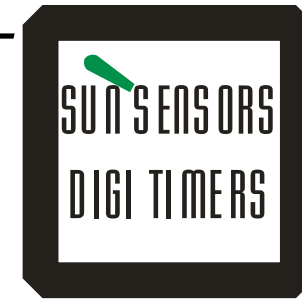
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The Green 'e' ADVANTAGE

AUTOMATION @ No EXTRA COST

- ü Inbuilt **Sun Sensors** help bring in the 'Sunlight after Sunset' to unattended areas of application.
- ü Factory preset timers allow complete unmanned system operation for virtually 365 days a year.



FUTURISTIC TECHNOLOGY @ No PREMIUM COST...

T5 Lamps – What Are they???

These are the worlds latest development in slim sized (16mm diameter) Fluorescent tubes. T5 tubes have a tri band phosphor coating that offers the highest lumen (or light power) per watt of energy supplied – upto 104Lumens/Watt as against CFL of only 60 to 80 lumens/watt.

Thus, our design house have developed special drives to harness this technology and more than ever efficiently use the expensive solar power that is processed by our Charge converters.



To harness more of the SUN using futuristic technologies, contact:



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