



Standalone Solar System

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Senior Design Project

"Da Vinci predicted a solar industrialization as far back as 1447."

"The earth receives more energy from the sun in just one hour than the world uses in a whole year."

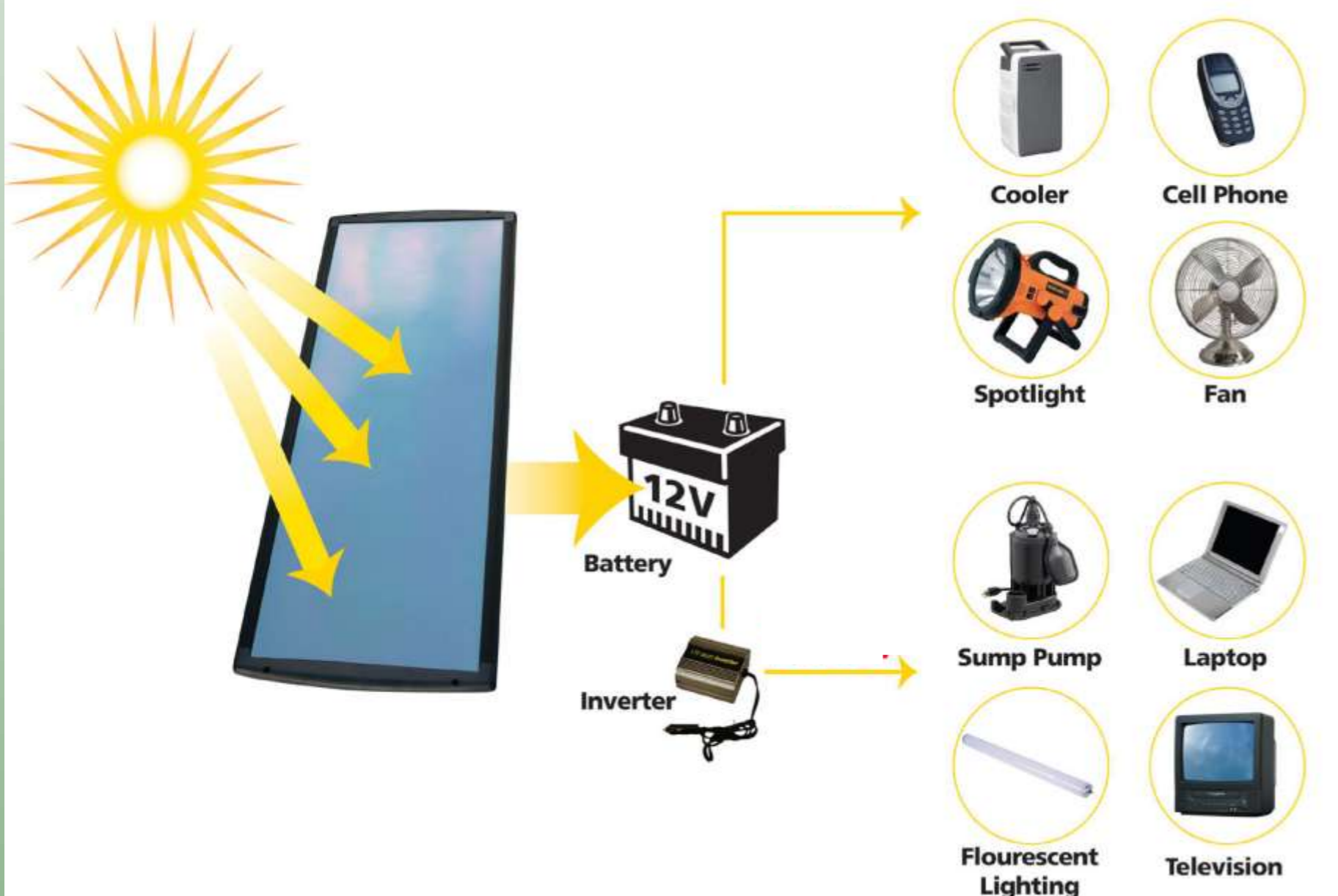
"About 2 billion people in the world are currently without electricity."

"In 5 billion years the sun will run out of fuel."

"Albert Einstein won the Nobel Prize in 1921 for his experiments with solar energy and photovoltaics."



How Solar Works



"A home solar system is typically made up of solar panels, an inverter, a battery, a charge controller, wiring and support structure."

"According to the US Department of Energy, an average American household used approximately 866-kilowatt hours per month in 1999 costing them \$70.68."

"To generate 20 - 50 megawatts of solar electricity requires about 1 square kilometre of land."

"Worldwide photovoltaic installations increased by 2,826 MW in 2007, up from 1,744 MW installed during the previous year. In 1985, annual solar installation demand was only 21 Megawatts."

"Solar panels have a payback time of approximately 7 to 9 years."

"At the end of 2005 total global peak power of installed solar panels was about 5,300 MW."

"The average solar energy falling on Australia is equivalent to about 15,000 (fifteen thousand!) times the nation's present total energy use. At 15% conversion rate that is still more than 2000 times the present need, providing we could capture it all."

"The energy output of a 1 KW solar energy unit is roughly equivalent to the burning of 170 pounds of coal and 300 pounds of carbon dioxide being released into the atmosphere."





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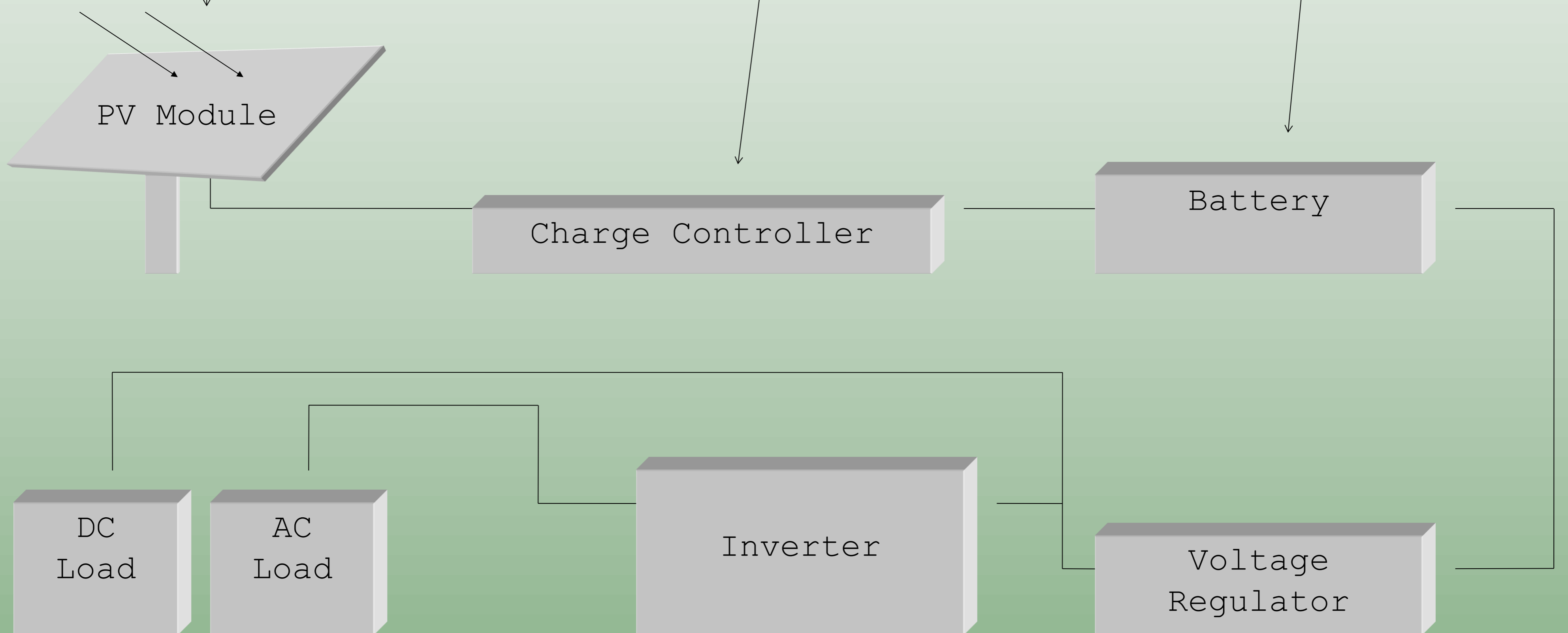
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The PV Module converts light energy to electrical energy in the form of DC power.

The charge controller makes sure the battery does not overcharge. It also makes sure that the current from the battery does not flow into the panels.

An electrochemical battery is used to store energy. At nighttime the battery provide power.



Loads vary from DC (such as DC lamps) to AC (such as washing machines). These can be powered using the Battery and Inverter outputs respectively

The inverter converts DC from the voltage regulator to AC at 50Hz

Since the voltage from the battery decreases steadily, the voltage regulator regulates the DC voltage from the battery at 12V.