

Team 6

Charging Batteries with Solar Cells

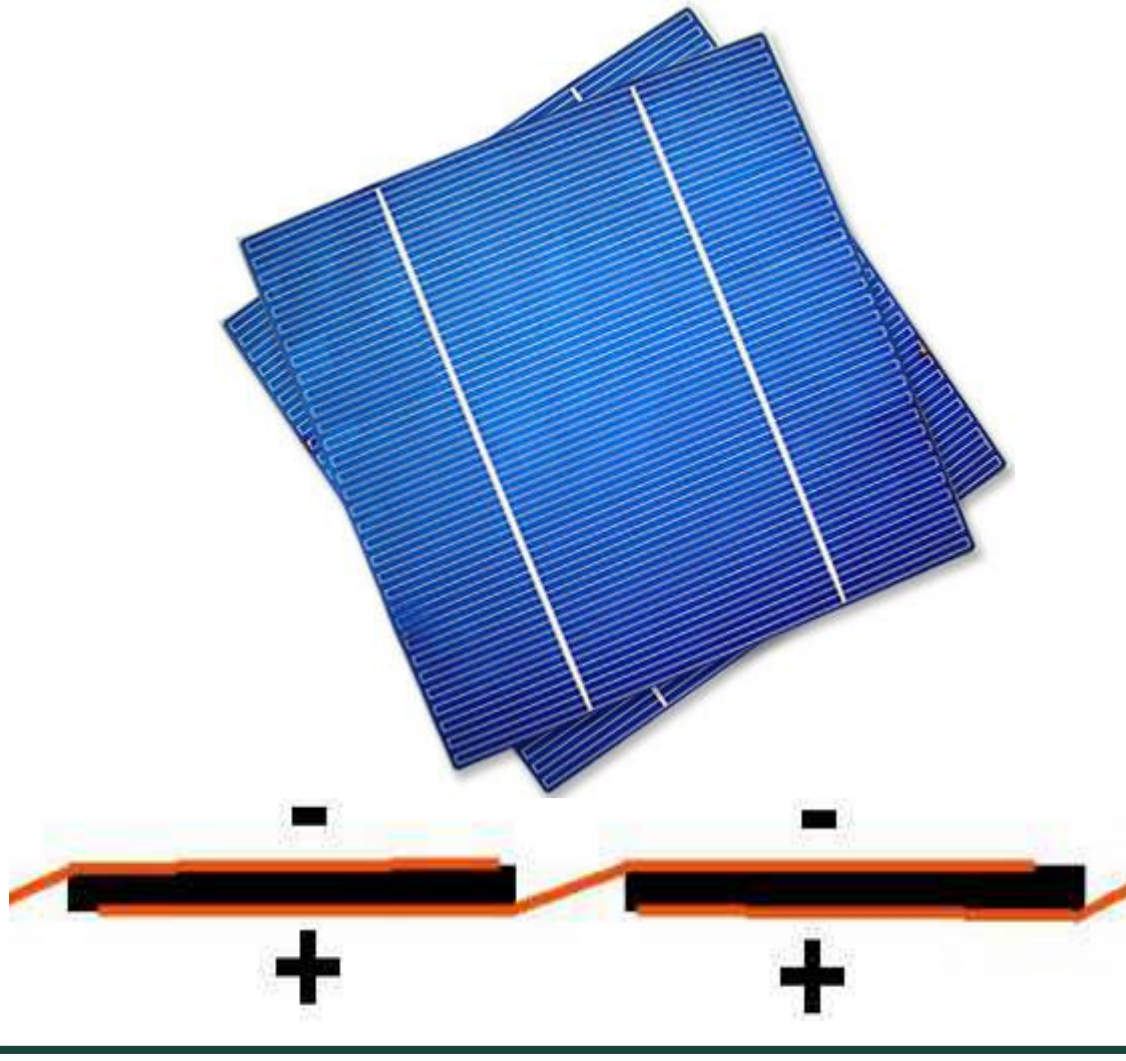
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MSU: Resource Center for Persons with Disabilities



Solar Cell Assembly



Pros and Cons

Pros

- It is a lot cheaper if you build a solar panel than buying one.
- The output voltage and current can be customized based on the needs.
- The size can also be designed based on the location the panel is needed.

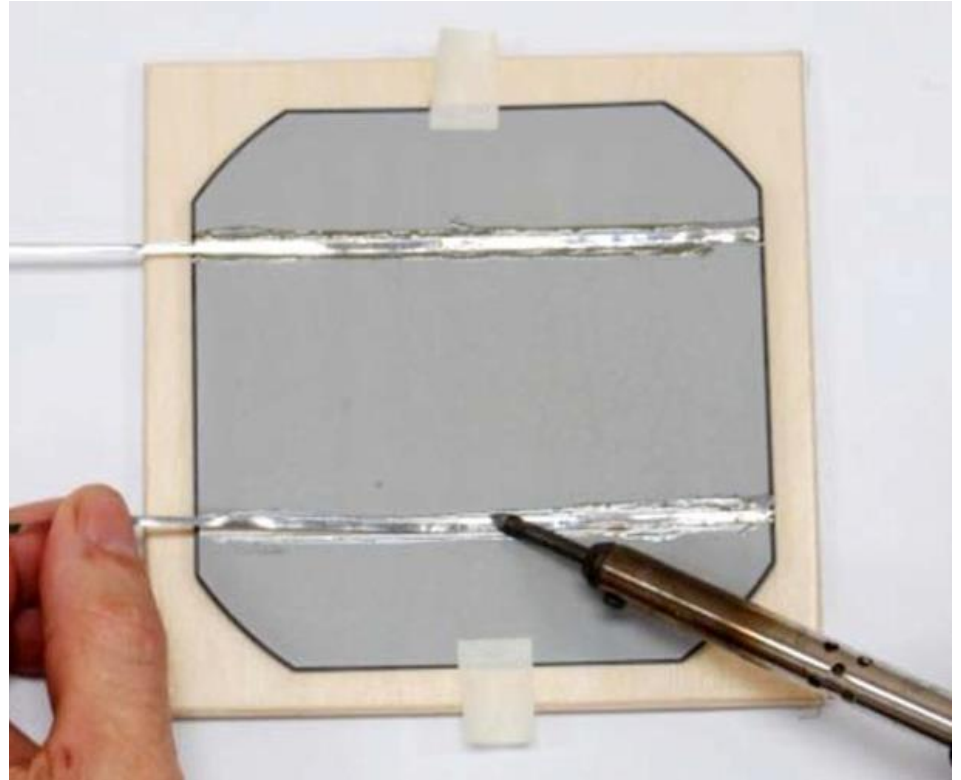
Cons

- The assembly is extremely time consuming and the solar cells are very fragile.
- If the solar cells are not correctly installed the efficiency of the solar panel can be much lower than expected.



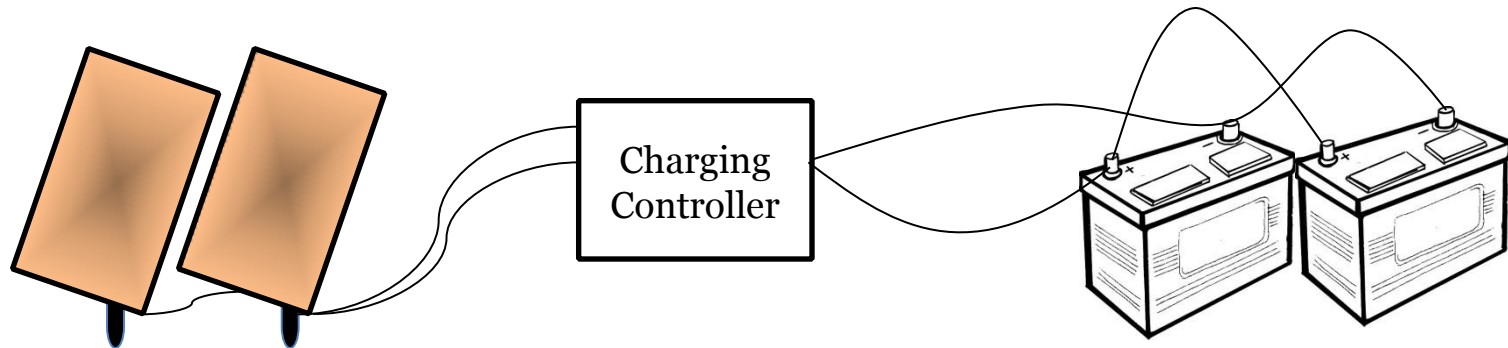
Parts and Tools

- Flux Pen
- Tab Wire (flux wire)
- Soldering Station
- Rubber Gloves





Overview



Solar Panel

- To use a charging controller, a solar panel of 5W or more is required.

Why?

- Prevent the overcharging of the battery.
- Increase the efficiency of the charging.
- Prevent current from flowing to the solar panels from the battery.



Charging Time

- Deep Cycle Battery rated 60AH ~ 120AH
 - Solar Panel rated at 90 W, 12 V, 7.5A
 - Charging Time = $60\text{AH} / 7.5\text{Amp} = 8 \text{ Hr}$
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- Doubled batteries = Doubled Charging Time
 - Doubled Solar Panel = Half Charging Time



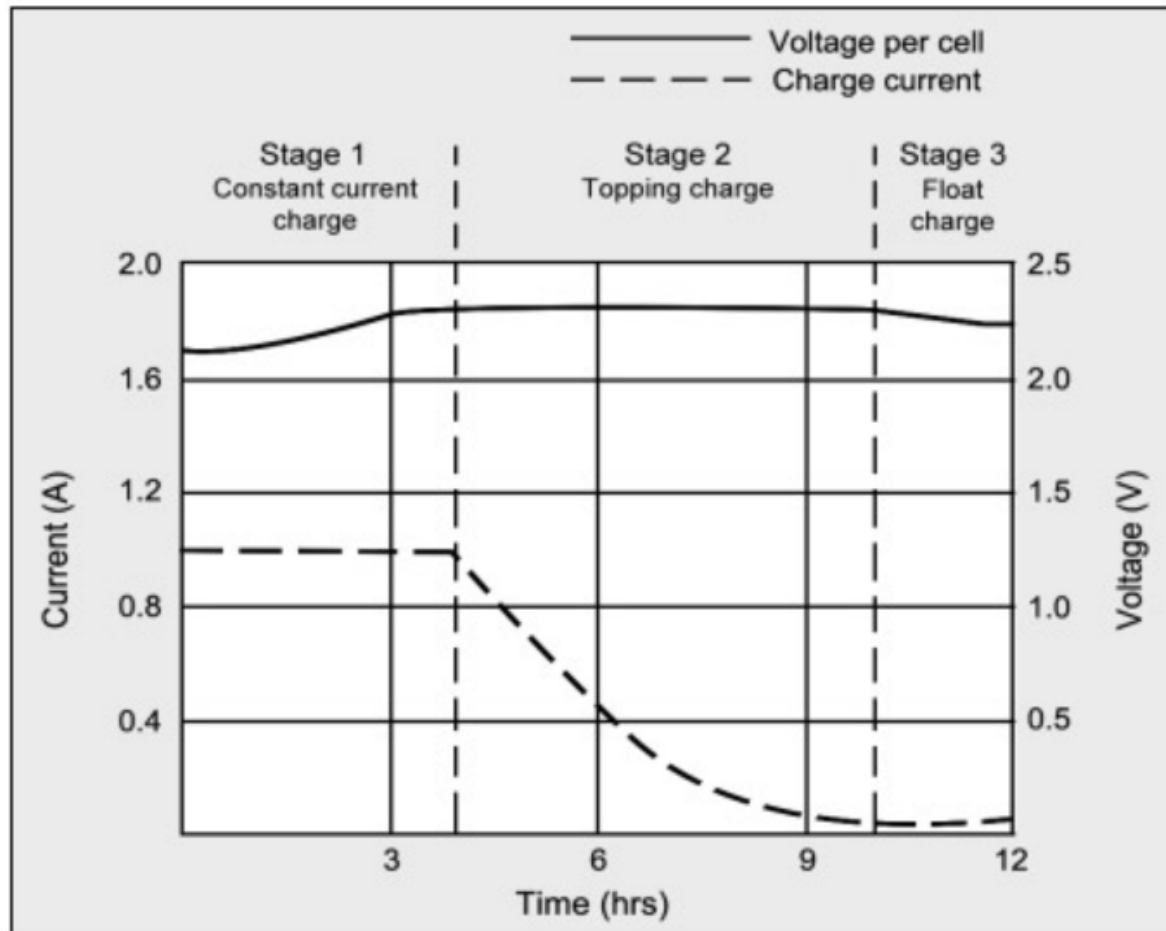
Storing Charge

The best choice to store charge are **Deep Cycle Batteries**

- Low Cost
- Easily Available
- Excellent Discharge Characteristics
- Simple to Expand Capacity



Charging a Battery

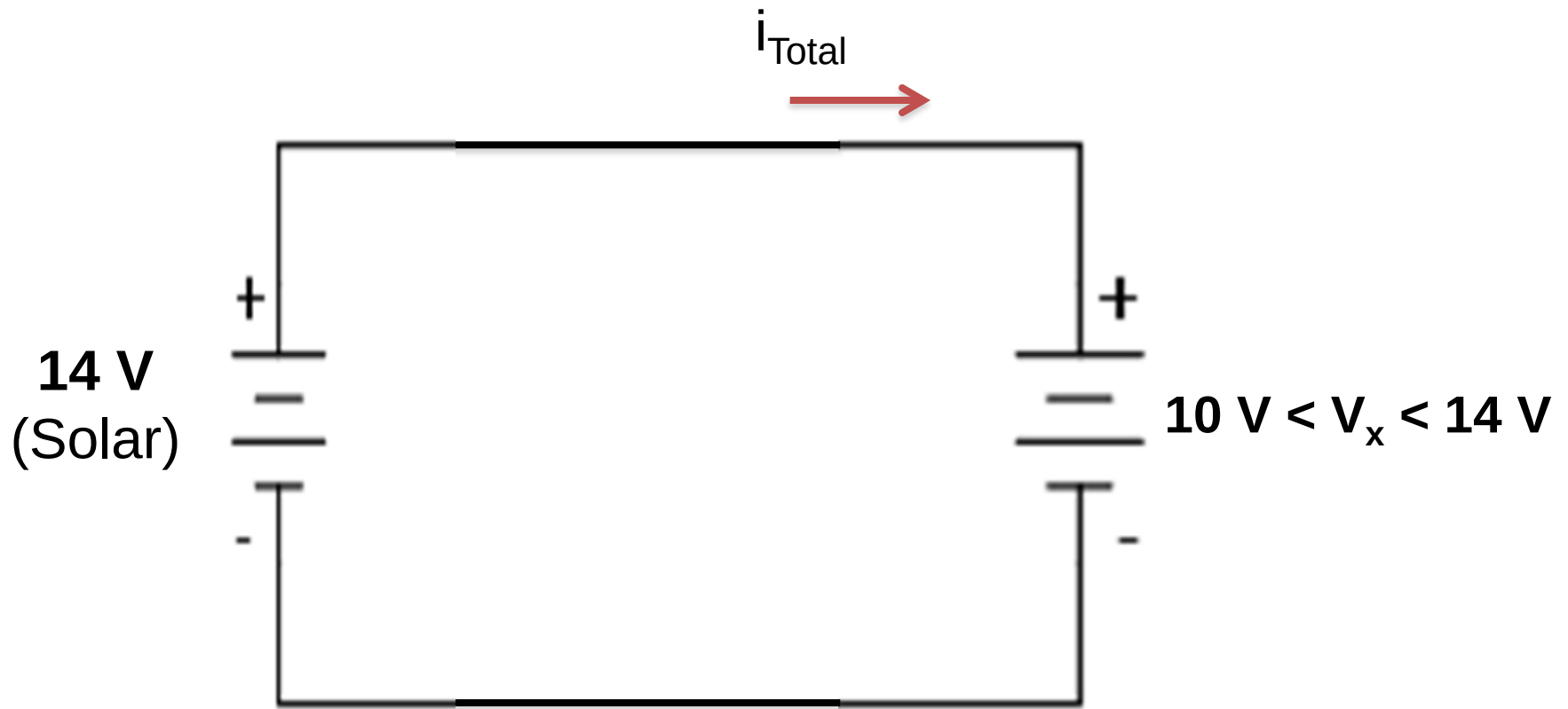


Increasing Charge Capacity

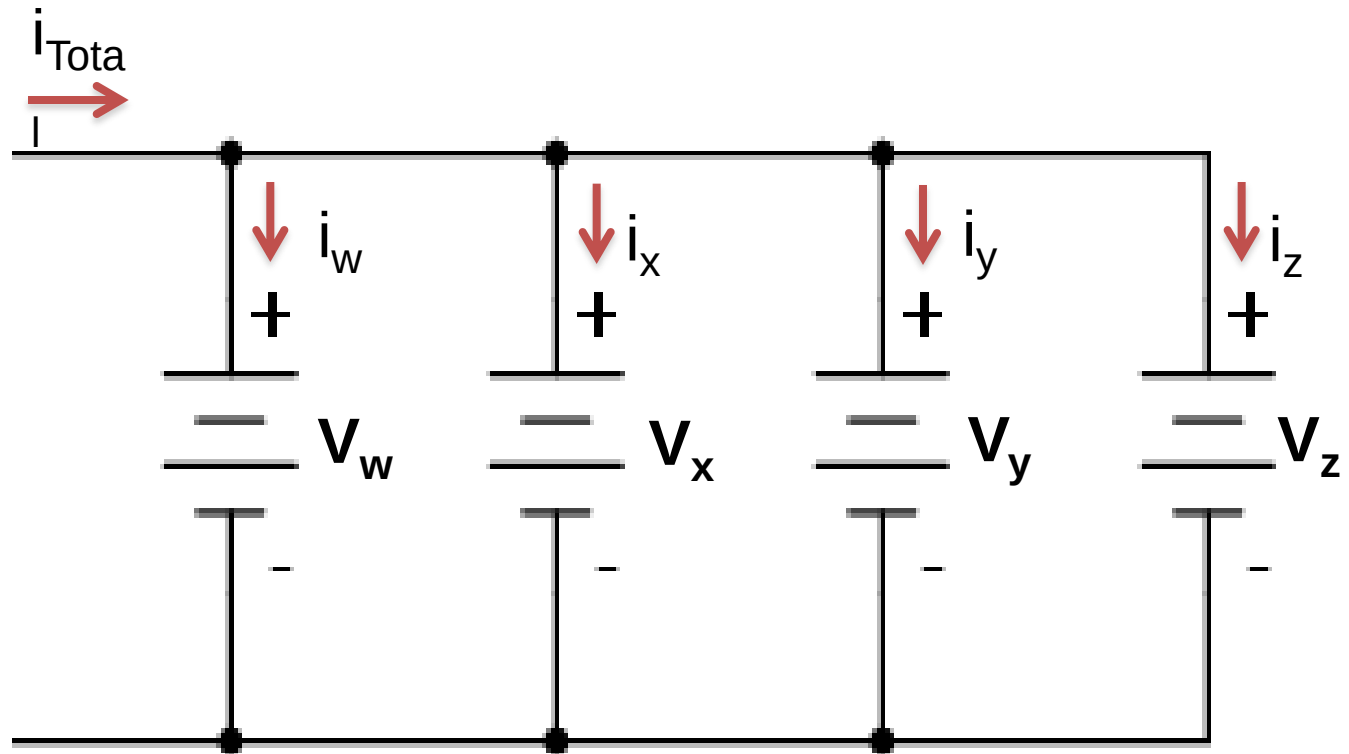
- Accomplished by adding cells in parallel
- All cells **must** be the same voltage
- Adding batteries does complicate charging



Simple Case : One Battery



Parallel Case



Limitations

- Mainly used for small scale solar projects
- Method feasible for larger scale projects despite better alternatives

