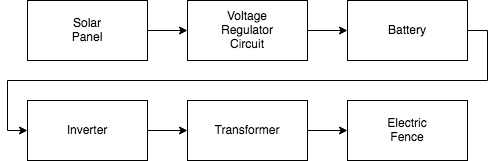
**Solar Powered Electric Fence Charger**

**Project Definition:** The aim of this class is to learn the basic methods of electric power analysis and design. To enforce this objective, I have chosen a project utilizing solar energy and a power switching mechanism — a solar powered electric fence charger. This project will be comprised of 2 major components:

1. Designing the solar panel voltage regulator circuit (solar to battery)
2. Designing the implementation of the electric fence (battery to fence)

The application of this project will be to provide protection for domestic animals such as chickens, from potential predators. The basic principle behind this project is using a solar panel to take in energy, which must be regulated before being directed to the input of the battery. The solar panel will be used to “top off” the charge in the battery. This battery, will then need to be attached to an inverter, which is then attached to a transformer to be bumped up to a few thousand volts (at low current levels) and modulated in pulses before transmission through the wire, thus creating an “electric fence.”

**Block Diagram:**



Upon further examination, the scope of this project definition appears to be too large. Consequently, I will be primarily focusing on the first 3 stages of this block diagram, using solar energy to maintain charge in a battery. If time permits, I will proceed to work on the last 3 blocks of the diagram, however, this remains an optional secondary goal.

A precise list of materials is yet to be determined as I develop a schematic for the voltage regulator circuit connecting the solar panel energy supply to the battery. However, a general list of parts with specifics to determine are:

* to what voltage will the energy from sunlight need to be regulated to in order to prevent damage to the battery? What minimum to charge it fully?
* What solar panel wattage/voltage will we be receiving?
* What size battery do we need to supply enough energy to the circuit/fence? 12V?
* What type of battery?
* What voltage do we need as an input to the transformer? 220V Ac?
* What voltage does our transformer need to output?
* Use of capacitors? Transistors? MOSFETS? Oscillators? Resistor Values?’ Transformer? Coils?

**Resources:**

<http://chemelec.com/Projects/Fencer-1/Fencer-1.htm>

<https://www.pocketmagic.net/electric-fence-20kv/>

<https://www.backwoodshome.com/solar-powered-electric-fencing/>

<https://www.homemade-circuits.com/make-this-solar-powered-fence-charger/>

<https://www.homemade-circuits.com/how-to-make-solar-battery-charger/>

<https://www.homemade-circuits.com/how-to-build-solar-panel-voltage/>

<https://www.homemade-circuits.com/how-to-calculate-and-match-solar-panel/>

<https://www.homemade-circuits.com/how-to-make-solar-inverter-circuit/>

<https://gitlab.com/dakriy/solar-charger/-/wikis/theory>

<https://www.slideshare.net/Shubhamshekhar29/charging-of-battery-from-solar-supply-using-buck-boost-converter>

<https://krakkus.com/mppt-buck-boost-controller/>

<http://iallpowers.com/index.php?c=product&id=362>

**Parts List:**

**Lipo Battery Protection**: [BQ29707DSER](https://www.digikey.com/product-detail/en/texas-instruments/BQ29707DSER/296-39948-1-ND/5177825)

DataSheet: <https://www.ti.com/lit/ds/symlink/bq2970.pdf>

Digikey Link: <https://www.digikey.com/product-detail/en/texas-instruments/BQ29707DSER/296-39948-1-ND/5177825>

Cost: $0.67

**MOSFET**: DMG6968UDM-7

Datasheet: https://www.diodes.com/assets/Datasheets/ds31758.pdf

Digikey Link: <https://www.digikey.com/product-detail/en/diodes-incorporated/DMG6968UDM-7/DMG6968UDMDICT-ND/2075462>

Cost: $0.44

**Boost Converter:** RT4812GJ8F

Datasheet: <https://www.richtek.com/assets/product_file/RT4812/DS4812-07.pdf>

Digikey: <https://www.digikey.com/product-detail/en/richtek-usa-inc/RT4812GJ8F/1028-1512-1-ND/5640521>

Cost: $1.62

**MPP**: LT3652

Datasheet: <https://www.analog.com/media/en/technical-documentation/data-sheets/3652fe.pdf>

Digikey: <https://www.digikey.com/product-detail/en/linear-technology-analog-devices/LT3652EMSE-PBF/LT3652EMSE-PBF-ND/2225686>

Cost: $7.61