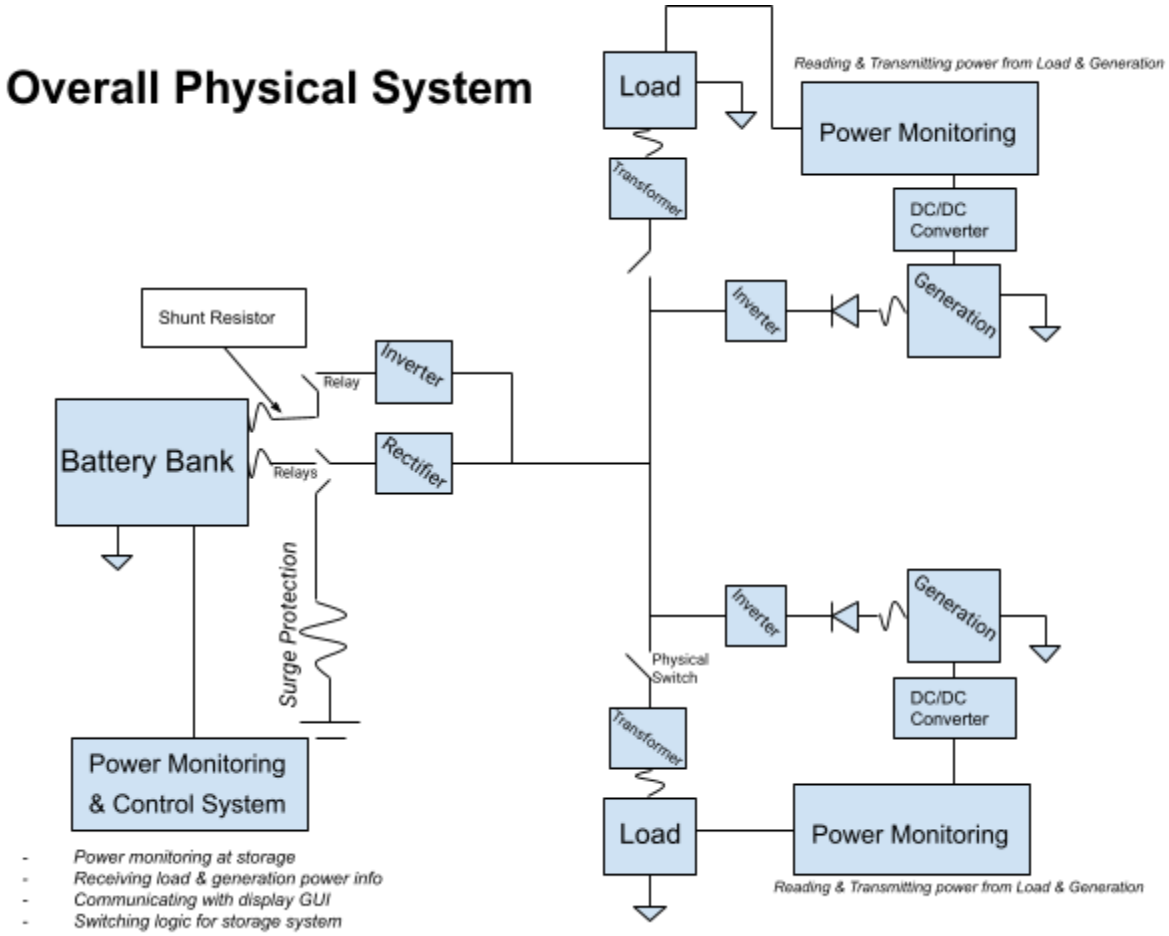
Senior Design Meeting Agenda — Microgrid Team

10:00AM Thursday, February 25th, 2021
205 Stinson Remick
Meeting Leader: *Dan*
Secretary: *Brian*



New System Schematic

New Parts

- Blocking diodes
    - Forward current is 400mA → 500mA diode
    - Reverse voltage is 12V → 15V diode
- Bypass Diodes

    - Can be either a PN-junction silicon diode or a Schottky barrier diode
    - Forward current is 400mA → 500mA diode
    - Forward voltage is 1.5V → 1.8V diode
- Relays - *Kelsey*
    - G3DZ SSR
      https://www.digikey.com/en/products/detail/omron-automation-and-safety/G3DZ-2R6PL-DC12/1789857
        - $ 26.24 each (plan to use 1)
        - Runs on 12V DC input voltage, have option to output either VDC or VAC
        - https://www.digikey.com/htmldatasheets/production/58441/0/0/1/g3dz.html
        - Plan to use this switch to invert power out of storage
    - KYOTTO KF0602D SSR
      https://www.jameco.com/z/KF0602D-Kyotto-Relay-Solid-State-32-Volt-DC-Input-2-Amp-60-Volt-DC-Output-4-Pin_172591.html
        - $8.25 each (plan to use 2)
        - Vin 12VDC and DC output between 5-60V (would choose 12VDC)
        - https://www.jameco.com/Jameco/Products/ProdDS/172591-Revised.pdf
        - Plan to use for the power into storage branch (after the rectifier) and for the grounding branch (large resistor to ground) into storage in the case of sudden high current volumes
- Rectifier
    - ~ $20
    - Example - there's lots of options
- Fuses
    - Need 5
        - One for each generation (2)
        - One for each load (2)
        - One for storage (1)
    - Sizing: a little more than (amp rating)x125%
        - Generation (400mA) needs 500mA or 630mA
        - Load needs two different fuses
            - Resistive load (150mA) needs 200mA or 250mA
            - Motor (<400mA) needs 500mA or 630mA
        - Storage (<600mA) needs 750mA
    - Packs are ~ $5

Meeting w/Dr. Sauer

Grounding & Neutral Line

- Ground the neutral line at each load
- Research whether or not we should just ground the negative of the solar panel output/what's electrical code for that sort of thing

Loads

- Load the motor to make it consume real power
- Potential for power factor correction

110VAC vs. 120VAC

- Bottom line: 110VAC is probably fine
    - Wire will be oversized which will result in less line loss

Connectors

- Use common connector with the inverter
- Just use bare-wire connections for everything on the 12VAC side

Power Monitoring Chip Voltage Supply

- Use a DC-DC converter at generation to power those chips
- Use a DC-DC converter at storage to power that chip
    - Covert down to 5v to boards, then surface-mount regulators to 3.3V or whatever the microcontroller + power monitoring systems need
    - These will be added to the the power monitoring subsystem

Lora Wireless Communication

Maia & Brian

- Module to implement
    - https://www.microchip.com/wwwproducts/en/RN2483#additional-features
- Manual that gives all necessary configuration instructions
    - http://ww1.microchip.com/downloads/en/DeviceDoc/40001864B.pdf
- Must ensure we have enough spare pins to facilitate this
    - 1 x SPI
    - 6 x GPIOs (three of the GPIOs must be interrupt-capable). If the PIC device has Peripheral Pin Select support, then an additional GPIO is required for the Chip Select of the SPI communication.
- Have to figure out how power monitoring chip factors into this

Next Week

- Deep dive into storage system/battery bank & corresponding PCBs
- Finalize parts
- Detailed block diagrams for each subsystem