

GRPU Microgrid

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Background

- The Pilot Program
- Denmark Exchange Program
- Capstone Project

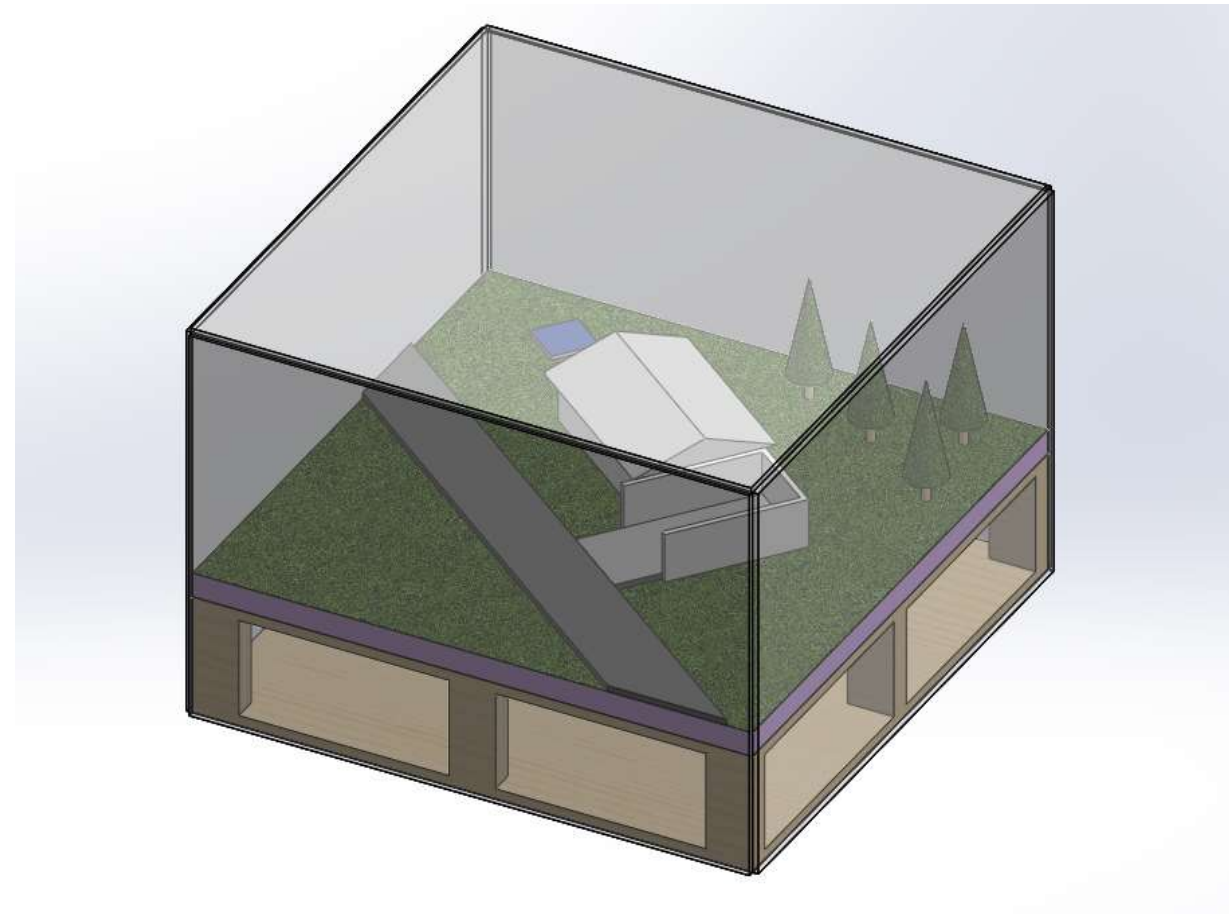
Objectives

- Create a Visual aid for the Pilot Program
- Research Microgrid components and propose a system
- Learn the innerworkings of real-world Engineering Design

Model

Specifications/Requirements

- Simple design
- Easy to understand
- Must show how a house can be powered by either the main grid, solar panels, or back charging by an EV via the microgrid



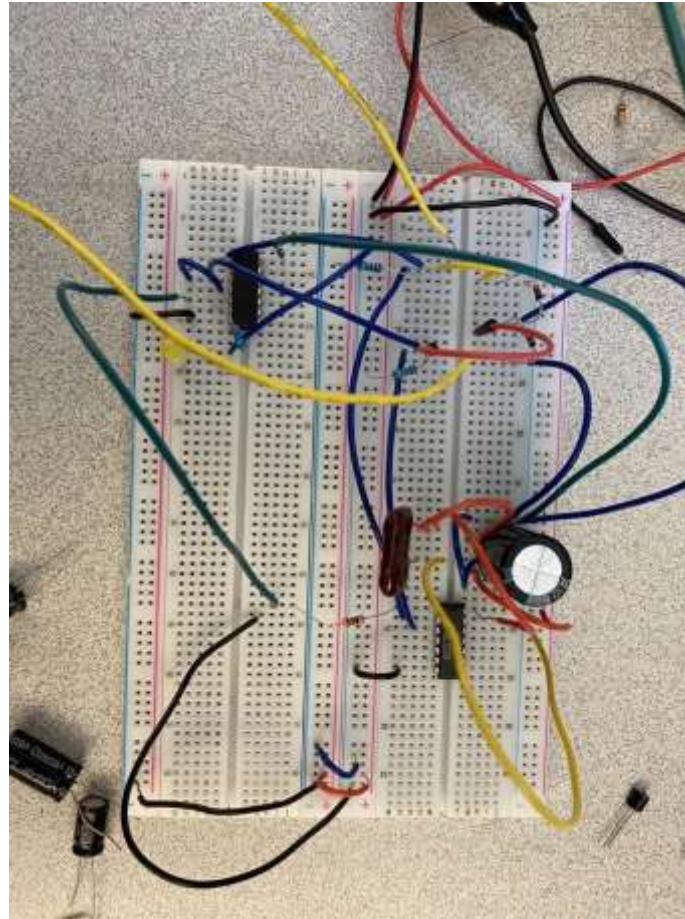
Construction

- 2 Week construction period
- Wood trimming
- Electrical components under model
- Door with switches attached



Electrical Components

- 2 Logic gates
 - NOR gate
 - OR gate
- Capacitor represents Microgrid
- Lights representing power sources



Back Charging

- Time of Use Rates, Peak Times, and Outages (Marohn) (*Minnesota Power, an Allete Company*)
- Vehicle to Building (V2B) vs. Vehicle to Grid (V2G)
- Benefits and Options: 8,000\$ Over two summers (*Unlock the value in your EV Batteries*)

Bidirectional Charging

- Bidirectional charging is not really available commercially in MN yet.
- Companies like Fermata Energy, Wallbox, Emporia, and Emphase are currently in the process of releasing Bidirectional chargers



Sources

Marohn, Kirsti. “Xcel Plan Would Charge More for Peak-Time Electricity.” *MPR News*, MPR News, 10 Apr. 2024, www.mprnews.org/story/2024/04/10/xcel-energy-charging-more-electricity-peak-hours-time-of-use-rates-utilities.

Minnesota Power, an Allete Company,

www.mnpower.com/CustomerService/TimeOfDay#:~:text=With%20a%20flat%20rate%2C%20you,this%20rate%20is%20%240.09403%2FkWh. Accessed 2 May 2024.

“Unlock the Value in Your EV Batteries.” *Fermata Energy*, fermataenergy.com/. Accessed 2 May 2024.