EE 491 Bi-Weekly Report 2

9/10/18 – 9/24/18

Group 11

High-Level Design of a Distribution Microgrid

Client: Alliant Energy

Advisor: James McCalley

Nick Stitzell – Communications Engineer

Minoru Fernando – Research Engineer

Joe Thurin – Power Engineer

Taylor Murphy – Power Engineer

Remo Panella – Data Engineer

Project Objective:

Create an excel document that estimates the cost of incorporating distributive generation and storage into a microgrid system at Nichols, IA.

Summary:

This report period we spend preparing a presentation for Alliant energy for our first meeting of the fall. This presentation was created as a refresher for where our prototype is currently at and where it will be going. We also individually researched different factors that will be affecting the accuracy of the microgrid simulation such as the operating frequency of the batteries and inverters, the continuous use of batteries, and a balance of real and reactive power in distribution.

Past Weeks Accomplishments:

The past few weeks we spent coordinating how we will execute the fall semester plan that was created in the spring, meeting with our advisor, and explored environmental factors that will be affecting our simulation's accuracy.

Pending Issues:

We came up with a handful of environmental factors that may affect the accuracy of our simulation, especially when it comes to geographic location. We will be able to, within a broad

tolerance, estimate the general effects of climate, however it changes so frequently that we will be unable to model the entire geological makeup of the US.

Individual Contributions:

Team Member	Contribution	Weekly Hours	Total Hours
Nick Stitzell	Researched the effect of the inverters that Alliant sent us on the simulation and how batteries introduce reactive power into the system. Bi-weekly status report	3	64
Minoru Fernando	Prepared presentation for Alliant	3	54
Joe Thurin	Minor excel improvements for user interface	2	67
Taylor Murphy	Financial and Yearly Simulation button	3	54
Remo Panella	Prepared Presentation for Alliant	3	56

Plans for the Coming Week (9/11 – 9/24/18):

- Look into Excel optimization tools and ways to simulate multiple scenarios similar to a MATLAB optimizer
- Use IEEE Explorer to find information on grid forming and grid following and how it will relate to the equipment used in the simulation

Summary of Client Meeting ():

Advisor Meeting on 9/13/18

- We need to nail down with Alliant EXACTLY what they will be using our end deliverable for and how they would like it packaged.
- Will they be wanting us to give Alliant a presentation?
- Are they wanting a simulation tool? A design tool? Both?
- How are the Vars (Reactive Power) created? What will give the microgrid a frequency of 60 Hz
  - Grid forming vs. grid following
  - Where will the balance between real and reactive power come from?

Client Meeting on 9/20/18

- Rescheduled for another date due to time conflict