

EE/CprE/SE 491 WEEKLY REPORT 6

11/18/2019-12/8/2019

Group number: 57

Project title: Impact of High Photo-Voltaic Penetration on Distribution Systems

Client &/Advisor: Dr. Venkataramana Ajarapu

Team Members/Role: Kenneth Prell – Team Leader

Andrew Chaney – Project Engineer

Daniel Riley – Assistant Project Engineer/Editor

Thomas Coleman – Assistant Project Engineer/Document Architect

Weekly Summary

During this week we gave our preliminary presentation to Dr. Ajarapu and Alok and continued work in simulating the 8400-node system

Past week accomplishments

- Finished 34-Bus system and injected PV into the system

Pending issues

- Simulate 8400-node system and inject PV into the system to test different types of control methods and distribution types
- Get network from Alliant Energy and start work on simulation and design
- 24-hour load profile
- Compare V-W to P-Q with PV

Individual contributions

| <u>Name</u> | <u>Individual Contributions</u> | <u>Hours this Session</u> | <u>Hours cumulative</u> |
|-------------|---|---------------------------|-------------------------|
| Daniel | NDA Progress, Attended EE 653 lectures, OpenDSS | 21 | 74.5 |
| Andrew | OpenDSS | 20 | 78 |
| Kenneth | OpenDSS | 20 | 76 |
| Thomas | Attended EE 653 lectures, OpenDSS, Weekly Reports | 24 | 75 |

Plans for the upcoming week

- Refine preliminary presentation with feedback from Dr. Ajarapu and Alok for final presentation on Dec. 9.

Summary of weekly advisor meeting

- Send Blank NDA PDF to Alliant for signing, because the signed one is no good apparently... づ)_(
- Check OpenDSS eventlog
- Try $V_{\min p.u.} = 0.85$ on loads
- Tighten band after doing load profile
- Long distribution line: Put PV in the middle of the line
- Low voltage at end of long line needs more compression
- Voltage vs Wattage control
 - Non-constant PF i.e. reducing Q for same P-load.
 - Do not exceed capacity of the inverter
 - Control P & Q $S < kVa$ rating
- 44% of kVa rating available for Q control (1547 standard)
- Should have NDA soon
- Min solar penetration to control all nodes
- Life of regulators vs inverter
- Storage