IOWA STATE UNIVERSITY
College of Engineering

4910 Lightning Talk: Detailed Design

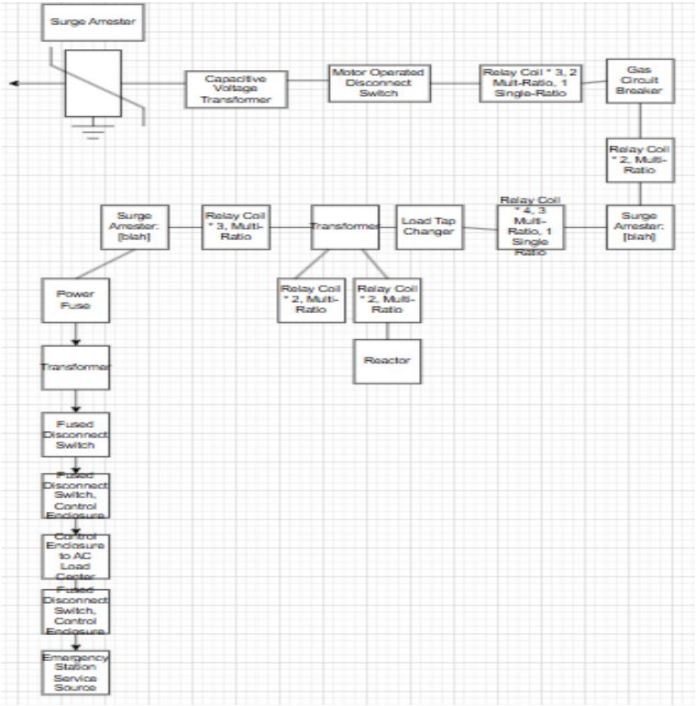
Sean Carver, Bethany Danley, Thomas Edwards, Nathan Kallal, Mina Khalil, MacKenzie Woods

Project Overview

- Client: Burns and McDonnell
- User: ISU Utilities and customers
- Goals:
  - Model and analyze the ISU Microgrid
  - Increase reliability for end users
  - Design upgrades for both transmission and distribution power systems
  - Create future plans for load growth and increase of renewable energy

Detailed Design Visual 1

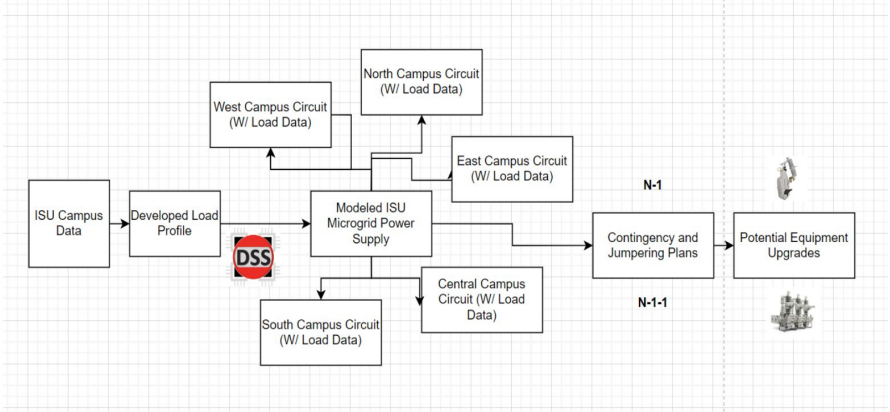
Substation Team:
- One-line diagram of substation and its key components.
- Detailed operation of electrical equipment.



Detailed Design Visual 2

Distribution Team:

- Energy consumption data using load profile.
- Visulas of n-1 and n-1-1 plans for power loss.



Functionality

- Ames city can benefit from stable power supply.
- The substation and the microgrid will respond to outages using contingency plans.
- The visuals show a timeline system option under normal condition and during power loss.

Technology Considerations

- Renewable energy integration
- Advanced control systems
- Trade-offs: High implementation costs vs. long-term savings and grid resilience.

Areas of Concern and Development

- Concerns
  - Managing load balance with renewable energy
  - Ensuring reliability during peak times
  - Cost
- Development
  - Model these visuals into OpenDSS and AutoCad.

Conclusion

- Progress
  - Completed designs for key systems
- Next Steps
  - Start modeling in OpenDSS and AutoCad
- Goal
  - Deliver a sustainable and reliable energy solution