

Overview

Background

The purpose of the Y9 Multiple LV SST System demonstration is intended to showcase FREEDM GEH hardware components as well as Distributed Grid Intelligence.

Figure 1 shows a multiple LV SST testbed.

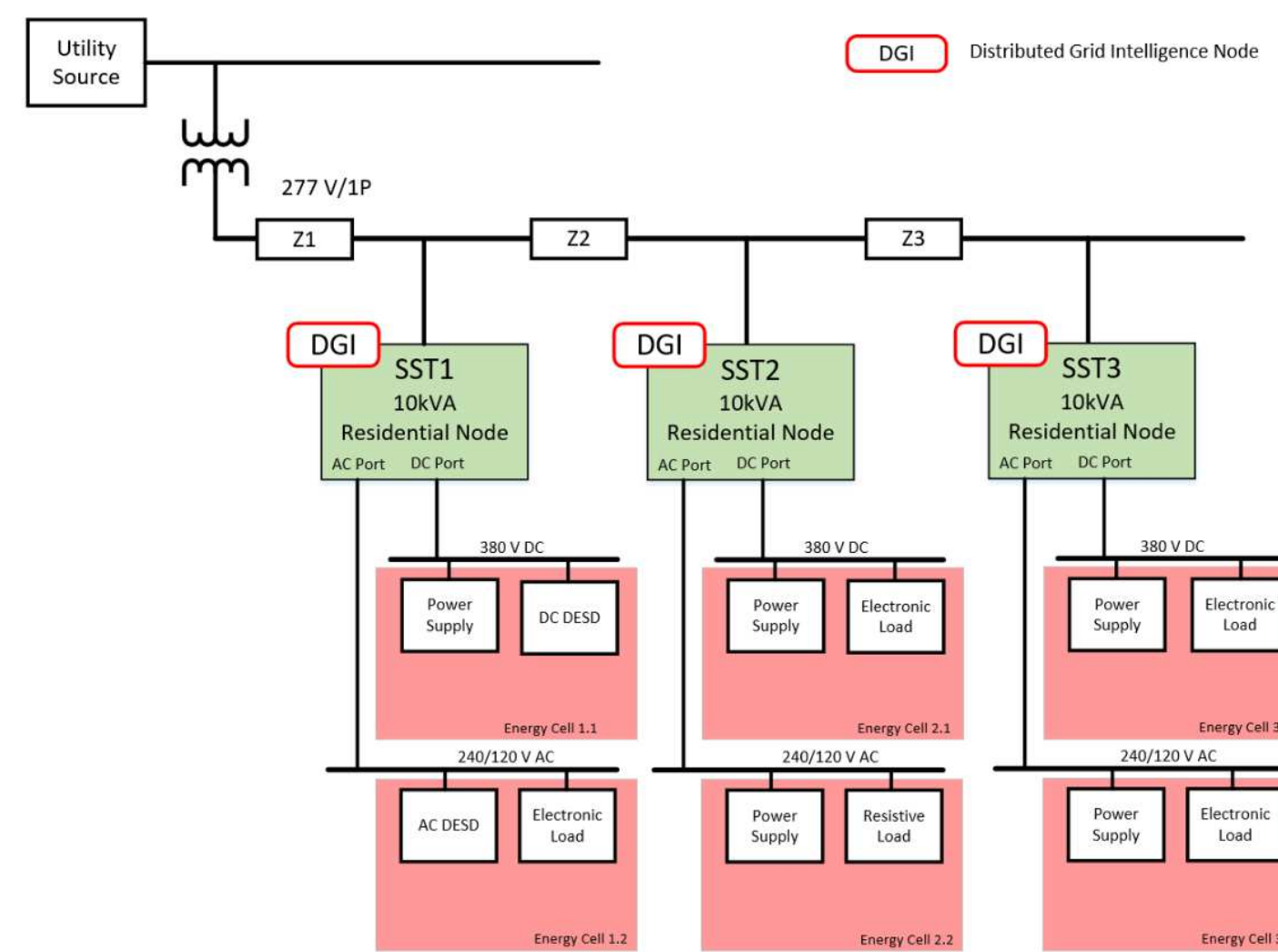


Figure 1: System Overview of Multiple LV SST Demonstration

Project Goals

- Integrate DGI Dispatch and DGI Volt/VAR control for LV SSTs and DESDs
- Monitor system demonstration in real-time with SCADA system
- Develop test cases to simulate various generation and loads

Method

Hardware Implementation

In this demonstration, there will be the following FREEDM components:

- Three LV SSTs
- AC DESD
- DC DESD
- Smart Home loads

In order to implement a Volt/VAR control, the line impedances Z1, Z2, and Z3 must be significant. A grid impedance emulator was designed to create a voltage drop across each LV SST. The enclosure of the grid impedance emulator is represented in Figure 2.



Figure 2: Grid Impedance Emulator

The FREEDM HEM system and external loads were used to create significant load profiles to test the multiple LV SST system.

Results

Software Implementation

The communication among all of the FREEDM components is essential to system operation. All of the GEH components are able to communicate via MQTT. In addition, A LabVIEW program was created to provide a visual display of the GEH testbed.

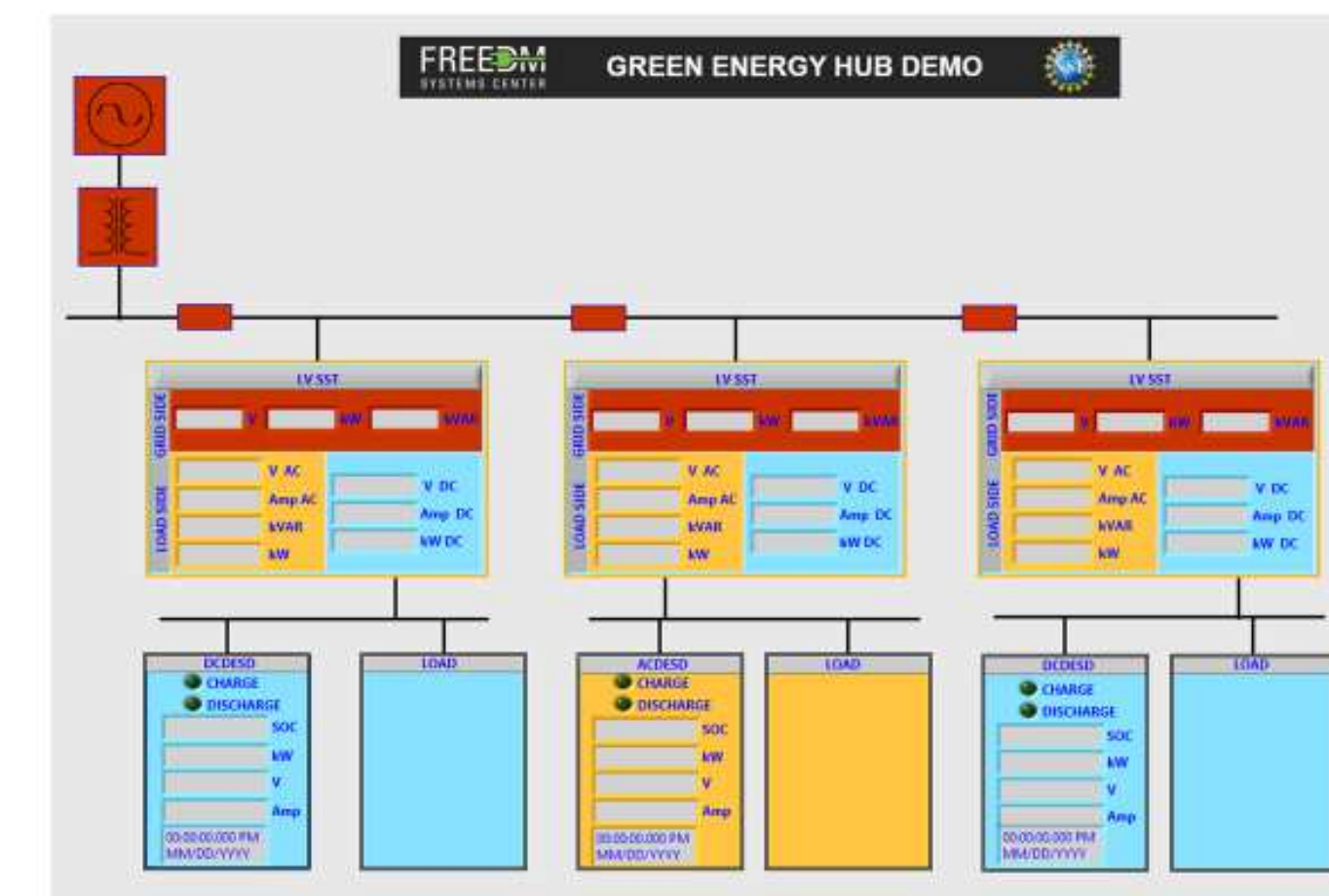


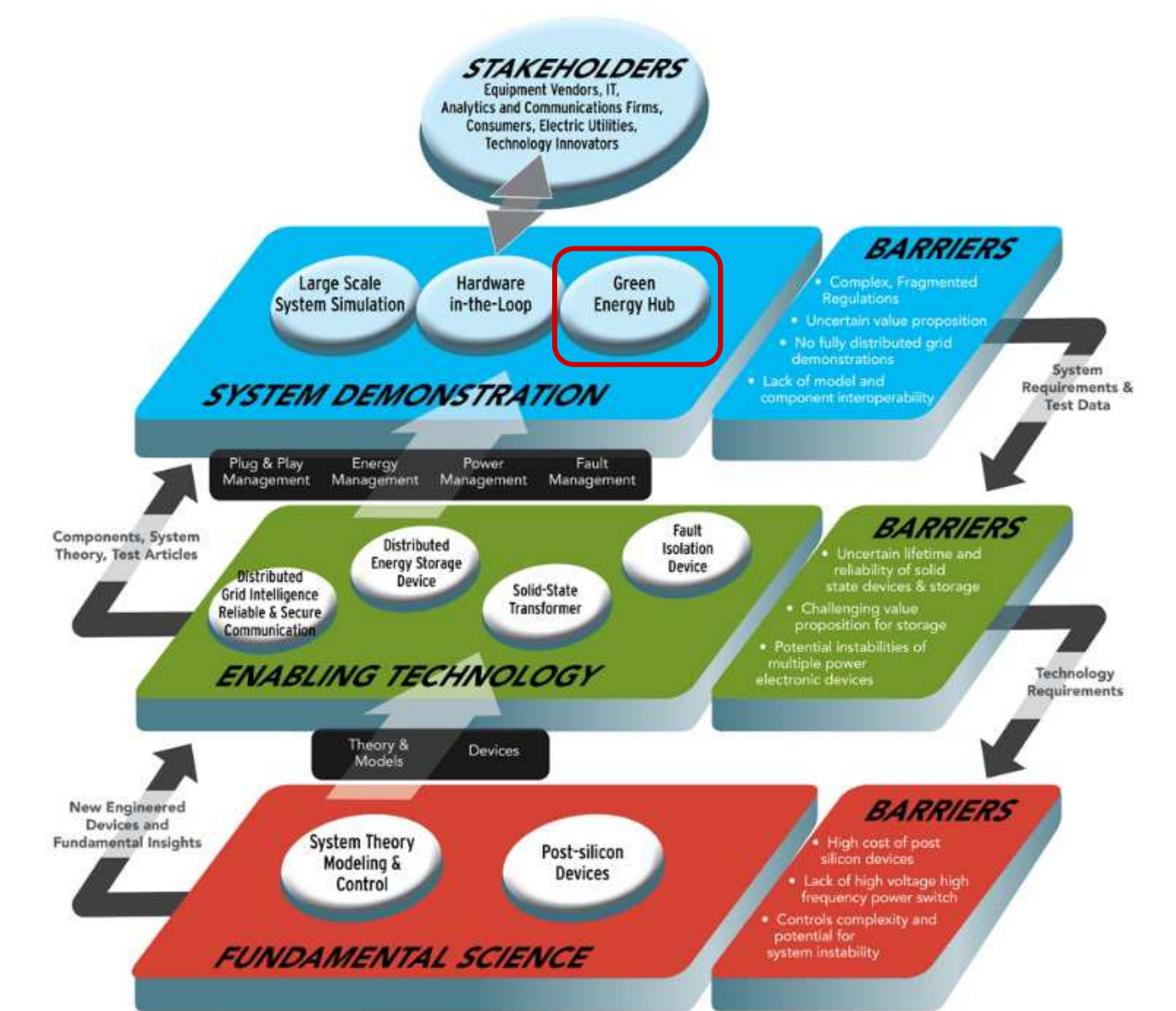
Figure 3: Multiple LV SST LabVIEW Interface

Conclusion and Future Work

The Y9 Multiple LV SST System Demonstration shows the integration of several enabling technology components in one testbed.

Future Work will include:

- Completion of three LV SSTs
- Integration of DGI Dispatch and DGI Volt/VAR Control
- All communication implemented via MQTT
- Complete System testing



Partners

