UNIVERSITY OF SOUTH FLORIDA
Energy Delivery Infrastructures

PI: Alex Domijan, USF; **Co-PI:** Arif Islam, USF
Students: Adedamola Omole (PhD), Mujahidul Islam (PhD), Bhavya Siddalingaiah, Nenad Damnjanovic

Description: The Power Center for Utility Explorations (PCUE) proposes to simulate the effects of a renewable energy generation system in a microgrid context to the distribution grid system. The proposed project is to simulate the combination of renewable distributed generation and a battery system to assess the effects during critical conditions such as power system peak. A research opportunity is to investigate how existing tools can be applied to properly represent dynamic and transient behaviors of microgrids. We use test beds to study integrated systems of revolutionary distributed green generation, improved grid and home efficiency, and automated energy conservation technologies for residential, substation, and distribution scale energy systems.

Budget: $485,184

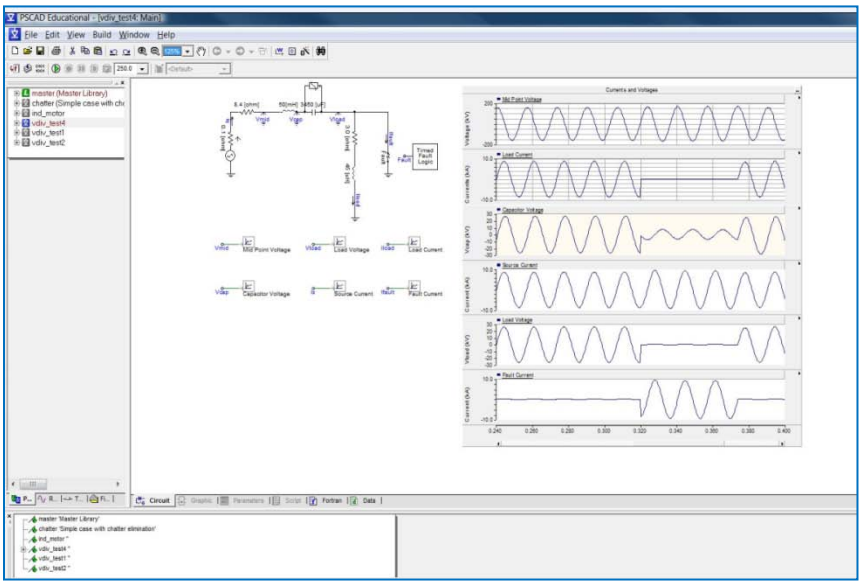
Universities: USF

External Collaborators: N/A

Progress Summary

An important aspect of a microgrid is to find a suitable control strategy that will take advantage of the inherent scalability and robustness benefits of distributed energy. This gives an opportunity to investigate how existing tools can be applied to properly represent dynamic and transient behaviors of microgrids. We have completed identifying simulation tools and different software's which will be useful for analysis of microgrids.

We have collected various parameters to the simulation tool.



We have performed testing and trail of various network models, generator models, transmission and cable models, load models. Implemented the EDSA and the Simulink software were used to analyze the system and have been validated. The control system for a micro grid embedded grid is modeled here. With the implementation of a controller, the microgrid system is able to switch between islanding and grid-connected modes without disturbing the critical loads connected to it.

One of the main challenges was obtaining a more detailed model network and components; this will be useful to investigate the dynamic response of renewable generation sources. As most of the renewable energy resources are intermittent in nature like the sun which is available to us during sunlight and wind only during strong currents; this gives a more challenging platform to analyze the behavior of renewable energy resources with the grid. The control system will be better observed in more detailed source and load models.