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CUSTOMER SUCCESS STORY

**NSF FREEDM Center**
***Raleigh, North Carolina***

# FREEDM Project — Energy Management and Communications Infrastructure

*The current topology of the national power grid will not effectively support the large-scale introduction of new technologies. The wide-scale deployment of distributed renewable generation and storage, as well as plug-in electric vehicles, presents a dynamic and unpredictable load profile which challenges the current infrastructure.*

## Challenge

The National Science Foundation-funded Future Renewable Electric Energy Delivery and Management (FREEDM) Center, in Raleigh, NC, created a project to mitigate these challenges through the creation of a new, intelligent distribution infrastructure. Green Energy Corp was chosen to lead and manage the project.

## Task

Build a demonstration project at the FREEDM Center on the campus of North Carolina State University (NCSU). The Project team set out to design, implement and integrate approximately 1MW of multiple Distributed Renewable Energy Resource (DRER) sites within the NCSU campus. Additional requirements included a secure communications infrastructure, a centralized Distributed Energy Control Center (DECC), end-user training and an educational certification program.

## Delivered

Green Energy Corp designed and implemented the communications infrastructure required to monitor and operate devices that have been and will be installed as part of FREEDM's evolving Smart Grid demonstration and test-bed lab. Implementation included:

- The design and implementation of the required, secure communication networks.
- A centralized Distributed Energy Control Center (DECC) based on Green Energy Corp's open-source GreenBus® platform.
- Integration of FREEDM's Real-Time Digital Simulator (RTDS) to support simulated and hardware-in-the-loop testing scenarios.
- An open-standards communication infrastructure and communication platform that will support the ongoing integration of new and enhanced Smart Grid applications and new devices as they are introduced.
- Design, development and integration of FREEDM's power electronic device interfaces
- Training and support for an educational certification program.

## *Results*

Green Energy Corp provided project management in accordance with PMBOK (Project Management Body of Knowledge) standards; Detailed design engineering, including DNP3 communications architecture between power electronic devices, development and integration of a microgrid SCADA system with web-based HMI, test plans & testing, and installation & operation manuals.

Green Energy Corp provided all software development including implementation of the standard communications protocol, as required, and FREEDM-defined control algorithms. The project was managed in collaboration with FREEDM Center personnel.

The FREEDM Lab will benefit from Green Energy Corp's GreenBus platform, the only open source, open API, open standard solution that supports interoperability of legacy and new applications for Smart Grid implementations. It enables grid applications to interoperate in a data-driven, secure and highly scalable open architecture.

This project demonstrates Green Energy Corp's ability to provide the project management and design engineering required to deliver customer accepted and approved deliverables in a timely manner. Additionally, the project showcases Green Energy Corp's software development and design engineering teams' ability to meet the design challenges of renewable power and Smart Grid integration.

## *About Green Energy Corp*

Green Energy Corp is a technology company that provides software engineering services to communications, utilities and energy companies and delivers software products to enable the Smart Grid of the future. Our team includes senior business leaders and top industry experts with deep experience managing technology companies and building energy and communications solutions.

Our offerings include the GreenBus® open source platform that enables utilities to move from legacy operations systems to the Smart Grid, and software engineering services for communications and utility companies.

The GreenBus forms the foundation for TotalGrid.org — a Green Energy Corp sponsored open source community dedicated to modernizing national power systems and microgrids while driving the development of the Smart Grid.
Visit **TotalGrid.org** for more information.

## *Contact Us*

For more information about our software engineering solutions, please visit
**greenenergycorp.com**
or call 303-453-8381 to speak to a Green Energy Corp representative.

If you are interested in developing applications for the GreenBus, or for more info on the **GreenBus Alliance Program**, contact us at 303-453-8381

### AFFILIATIONS

- NRECA Associate Member
- MultiSpeak® Initiative
- National Science Foundation (NSF) FREEDM Smart Grid Center
- KEMA Smart Grid Interop Lab
- Global Energy Model (GEM)
- IEEE
- IEC

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