

Future Renewable Energy Delivery and Management (FREEDM) Systems

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The mission of the FREEDM engineering research center is to develop the fundamental and enabling technology to demonstrate the FREEDM system and through such development and demonstration, foster a revolution in innovation and technology in the electric power and renewable energy industries, providing long-term energy security and environmental sustainability for the United States. The vision for the FREEDM system is an efficient electric power grid integrating highly distributed and scalable alternative generating sources and storage with existing power systems to facilitate a green-energy-based society, mitigate the growing energy crisis, and reduce the impact of carbon emissions on the environment. We believe the key to solving the energy crisis is not renewable energy alone, but the transformation of the infrastructure needed to deliver and manage large scale distributed renewable energy resources.

The proposed FREEDM system is a green energy grid infrastructure that will:

- Allow plug and play of any energy resource or storage device, anywhere and anytime;
- Manage distributed energy resources and storage devices through Distributed Intelligence;
- Pioneer a scalable and secure communication backbone;
- Be capable of being totally isolated from the central grid, if necessary, continuing to operate based on 100% renewable energy;
- Provide perfect power quality and guaranteed system stability; and
- Have improved efficiency, operating the alternating current system with a unity power factor