

Grid System Technologies Advanced Research Team

Vision

Be recognized worldwide as the leading renewable energy integration experts specializing in islanded power systems and advanced micro-grid solutions.

Mission

Research, develop, test and evaluate (RDT&E) advanced grid control architectures, enabling policies, and new technologies and methods for effective integration of renewable energy resources and power system optimization.

“Building on Established Pacific-Asian Regional Focus and Relationships”

Expertise & Focus

➤ Smart Grid Planning & Technologies

- Energy Control Systems & Architecture
 - ✓ Energy management system
 - ✓ Distribution management system
 - ✓ Hierarchical and distributed control systems
 - ✓ Virtual power plant aggregation and control
 - ✓ Hybrid power system controls
- Energy Storage Applications
 - ✓ Utility-scale grid support
 - ✓ Community-scale grid support
 - ✓ Customer sited distributed storage
 - ✓ Distributed storage aggregation and control
- Electric Vehicle Grid Applications
 - ✓ Integrated charge management and resource aggregation
 - ✓ V2H integration
 - ✓ V2B integration
 - ✓ V2G integration
- Microgrids
 - ✓ Resource planning
 - ✓ Microgrid controls strategies
- Smart grid control and energy use communication systems
- Grid operational performance data collection and analysis
- Customer energy use engagement
- Smart meters
- Load control
- Advanced inverters

➤ Power Systems Planning

- Generation Resources
 - ✓ Planning criteria
 - ✓ Production cost model development and analysis
 - ✓ Capacity planning analysis
 - ✓ Resource planning analysis
 - Transmission
 - ✓ Planning criteria
 - ✓ Transmission system model development
 - ✓ Steady-state power flow analysis
 - ✓ System dynamics analysis
 - ✓ Distributed and utility-scale renewable resource integration assessment
 - Distribution
 - ✓ Planning criteria
 - ✓ Distribution system model development
 - ✓ Distributed resource and load profile characterization
 - ✓ Steady-state power flow analysis
 - ✓ Transient analysis
 - ✓ Distributed and utility-scale renewable resource integration assessment
- **Power Systems Operation**
- Conventional generation commitment and dispatch
 - Generation resource operational constraints and issues
 - Power system operation with variable generation resources
 - ✓ Contingency planning
 - ✓ System inertia and transient response characteristics
 - ✓ Operating and contingency reserve requirements
 - Spinning and regulating reserves
 - Fast starting reserves
 - Alternative reserve resources
 - ✓ Mitigating impacts via forecast of RE resources and operating strategies
 - Transmission and distribution systems operations
 - Energy and distribution management systems
- **Energy Policy**
- Energy legislation and utility regulatory framework
 - ✓ Renewable resource and energy efficiency portfolio standards
 - ✓ Renewable resource policy incentives
 - ✓ Demand response programs
 - ✓ Utility rate structure, cost recovery and incentives
 - Operations reliability
 - ✓ Resource interconnection standards and requirements
 - ✓ Grid operations standards and practices
- **Power Systems Engineering and Standards**
- Transmission and distribution infrastructure
 - Overhead and underground equipment

- Energy system technologies performance testing
- **Project Management and Execution**
 - Generation and T&D infrastructure permitting
 - Environmental review and assessment processes
 - Project scope & budget development and execution
 - Project resource contracting and management