



U.S. Department of Energy

Office of Electricity Delivery and Energy Reliability

# North American SynchroPhasor Initiative

*DOE Update*

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# Advanced SynchroPhasor Research Projects

- The National Energy Technology Laboratory (NETL) Funding Opportunity Announcement (FOA) entitled “Advanced SynchroPhasor Research” closed May 27, 2009
- The FOA provides financial assistance for innovative applied research and development on the use of synchrophasor data for improving the reliability of electricity delivery
- Each project is a multi-year program using a phased approach –
  - Phase 1 - analytical (theoretical) studies,
  - Phase 2 - pilot or prototype studies
  - Phase 3 - large-scale demonstration with a utility partner
- Applications must propose analysis studies and demonstration of technologies that would improve electricity reliability and market efficiency using data exchange among utilities

# Advanced SynchroPhasor Research Projects

\$4.3 million awarded to four, 3-year projects

- **Regents of University of California**  
SynchroPhasor-based Adaptive Relaying
- **Virginia Polytechnic Institute and State University**  
Implement Synchrophasor-based Three-Phase Tracking State Estimator for Unbalanced Conditions and Adaptive Islanding
- **Georgia Tech Research Corporation**  
Real-Time Implementation of the Distributed Dynamic State Estimation for On-line Generator Parameter Identification and Wide-Area Transient Stability analysis
- **Electric Power Research Institute**  
Wide-area, Real-time Visualization of Frequency, Voltage and Current Contours for Security Monitoring, on-line Identification of Major Events and Event “instant” Replay





# Advanced SynchroPhasor Research Projects (cont')

- **Washington State University**

Power Grid Reliability and Security – Analysis and Simulation for a Secure Communication Network from PMU to Synchrophasor Applications





# Ongoing Advanced SynchroPhasor Research Projects

- Modal Analysis for Grid Operations
- New Security Tools for Real-Time Operations
- Adaptive Islanding Demonstration
- Mode Meter Development
- Characteristic Ellipsoid Method
- Reliability Compliance and Monitoring Tools
- PMU Test, Evaluation and Calibration





# Summary of SGIG Selections

Topic Area	Number of Applications Selected/ Conforming	Federal Funding (\$)	Applicant Funding (\$)	Applicant Cost Share (%)
Equipment Manufacturing	2/14	25,786,501	25,807,502	50.02
Customer Systems	5/27	32,402,210	34,933,413	51.88
Advanced Metering Infrastructure	31/138	818,245,749	1,194,272,137	59.34
Electric Distribution	13/39	254,260,753	254,738,977	50.05
Electric Transmission	10/28	147,990,985	150,454,793	50.41
Integrated and Crosscutting	39/143	2,150,505,323	3,082,366,420	59.09
Total	100/389	3,429,191,521	4,742,573,246	58.04

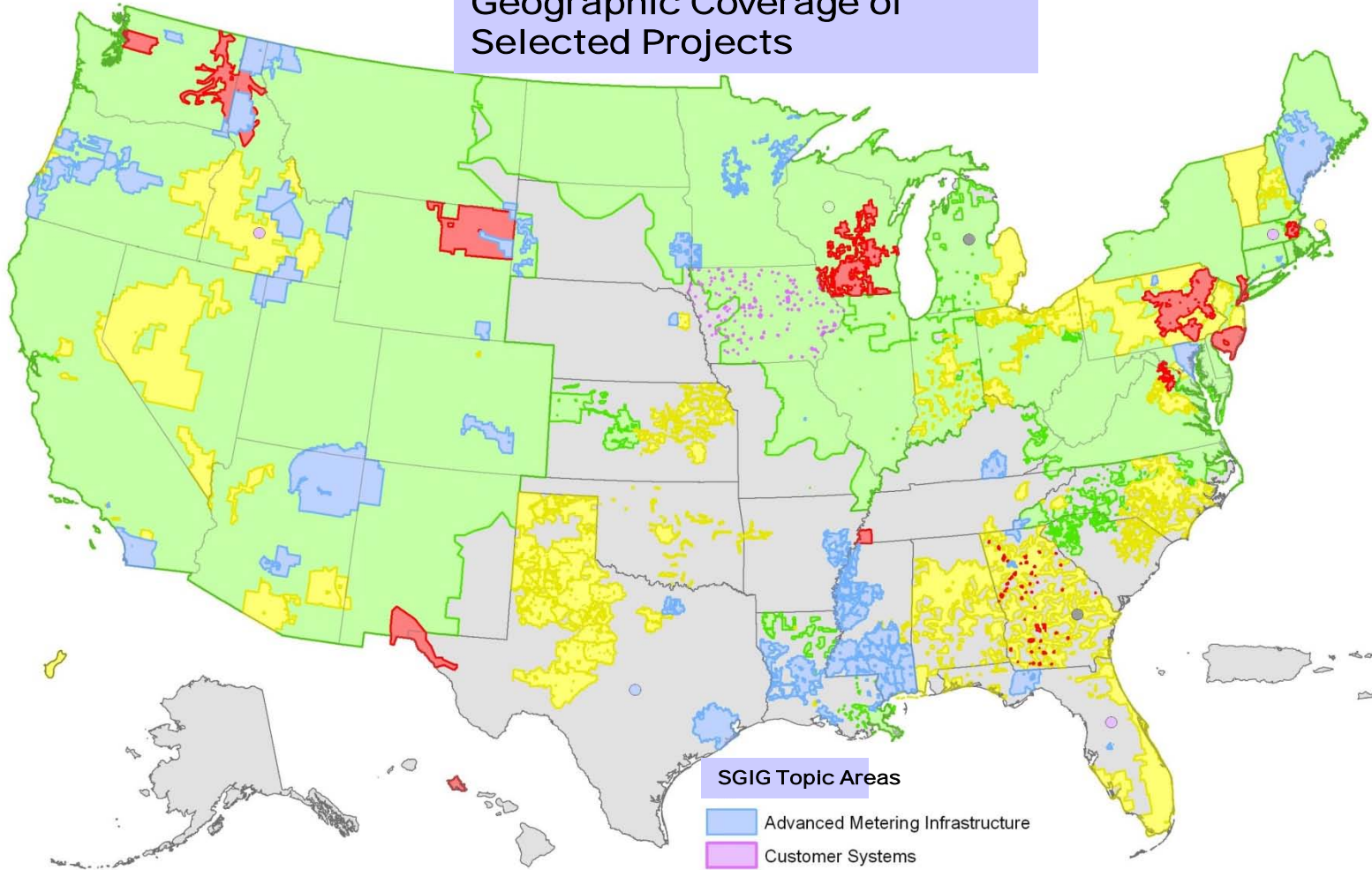


# SGIG Electric Transmission Systems Projects

- American Transmission Company, LLC (PMU)
- American Transmission Company, LLC (SCADA)
- Duke Energy Carolinas, LLC
- Entergy Services, Inc.
- Midwest Energy, Inc
- Midwest ISO, Inc
- ISO New England, Inc
- New York ISO, Inc
- PJM Interconnection, LLC
- Western Electricity Coordinating Council



# Geographic Coverage of Selected Projects



### SGIG Topic Areas

- Advanced Metering Infrastructure
- Customer Systems
- Electric Systems Distribution
- Electric Transmission Systems
- Equipment Manufacturing
- Integrated and/or Crosscutting Systems

**100 Projects**

Circle indicates project where specific utility/area is not known.

**SMART GRID INVESTMENT GRANTS**





# Synchrophasor Projects Applications - a Sample

- Wide-Area Visualization and Monitoring
- Angle and Frequency Monitoring
- Inter-area Oscillation Detection & Analysis
- Proximity to Voltage Collapse
- State Estimation
- Dynamic Model Validation
- Fast Frequency Regulation





# Contact Information

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