

**Electric Distribution R&D Peer Review 2006
Project Summary**

YOUR ORGANIZATION:	FirstEnergy
PROJECT TITLE:	Autonomous Storm Detector patent pending
PRESENTERS:	Karl Fickey
FY 2005 FUNDING:	\$150,000
FY 2006 FUNDING:	\$150,000
START/COMPLETION DATES:	May 2006 – April 2007

Overall Project Purpose and Objectives:

FirstEnergy is developing Autonomous Storm Detector (patent pending) technology which will allow the substation to determine there is a storm in the area and switch the relays to ‘storm mode’ without human intervention. This technology will also sense when the storm has left the area and switch the relays back to ‘normal mode’ also without human intervention. The Autonomous Storm Detector (patent pending) consists of a lightning detector, an anemometer or wind gauge, a programmable logic controller (PLC) and an uninterruptible power supply (UPS). The lightning detector senses both range and quantity of lightning relative to the substation’s position. Alarm points are set to detect if lightning occurs within a certain mile radius and/or at a certain frequency (strikes per minute). The alarm contacts provide one of the inputs to the PLC. The anemometer has similar alarm outputs based on sustained wind speed and maximum wind gust speed. These alarm outputs are also presented to the PLC as inputs. Based on the inputs from the lightning detector and the anemometer, the PLC is programmed to initiate the storm mode of the circuit breaker relaying at the substation. When the storm conditions have subsided, the PLC is also programmed to switch the relays back to normal mode after a predefined time delay.

FirstEnergy is proposing a proof of concept pilot project for 2006-07, which consists of installing a minimum of 15 Autonomous Storm Detectors (patent pending) at various sites throughout the service territory. The goal of the pilot project is to determine whether the concept of autonomous storm detection is practical, and also to determine what are the optimal alarm or storm activation set points for the lightning detector and anemometer. The initial pilot project will place the storm detectors at substations equipped with SCADA so that the operation of the units can be monitored and overridden as needed. However the ultimate goal is to develop a product that is capable of performing reliably and accurately at distribution class substations regardless of SCADA deployment. Successful operation of the Autonomous Storm Detector (patent pending) will provide improved reliability to the customer by reducing sustained outage time during storm conditions.

- Installation of a minimum of 15 ASD by end 2006
- Monitor operation and adjust settings by March 2007
- Assess and evaluate operation by end of March 2007
- Provide overview and on-site demonstration by March 2007

FY 2005 and FY 2006 Results and Accomplishments: FirstEnergy has deployed multiple Autonomous Storm Detector (patent pending) in the 2005 – 2006 timeframe with settings adjustments and 2 storm field operations.

FY 2007 Plans and Expectations: FirstEnergy will continue to deploy and assess and evaluate performance of Autonomous Storm Detectors (patent pending) determining settings for location and topography through the project period FY 2007.

Public/Private Partnerships:

Identify

FirstEnergy is engaging on this project with the Grid App Consortium as a Charter Member.