

Electric Distribution R&D Peer Review 2006 Project Summary

YOUR ORGANIZATION:	Detroit Edison
PROJECT TITLE:	Advanced Communication & Control of Distributed Energy Resources
PRESENTERS:	Hawk Asgeirsson & Richard Seguin
FY 2005 FUNDING:	\$300,000
FY 2006 FUNDING:	\$231,387
START/COMPLETION DATES:	09/30/2004 Thru 06/30/2006

Overall Project Purpose and Objectives: The primary objective of phase II is to develop the procedures for marketing the power of the phase I aggregated DERs in the energy market and to increase the number of DER units. The team is partnering with the Midwest Independent System Operator (MISO), the local ISO to address the energy market and demonstrate the economic dispatch of DER in response to market signals. Based on phase I demonstrated work, the next step is to demonstrate the prototype link to an ISO control area using standard protocols and to document the working prototype. The selection of standards-based communication technologies offers the ability of the system to be deployed and integrated with other utilities' resources. With the use of a data historian technology to facilitate the aggregation, the developed algorithms and procedures can be verified, audited, and modified. The team's commitment to standards, engineering practices, and post project analysis will yield DOE the most accurate results in the shortest time frame.

The team has demonstrated monitoring and control of multiple DERs as outlined in phase I report including procedures to perform these operations in a secure and safe manner. In this phase II additional DER units will be added, communication security enhanced and a market model developed for both customer and utility owned DER to participate in the energy market. We are proposing a DER energy market model--a utility need business model energy aggregator-business model. The approach of developing two market models of DER energy participation in the market is unique.

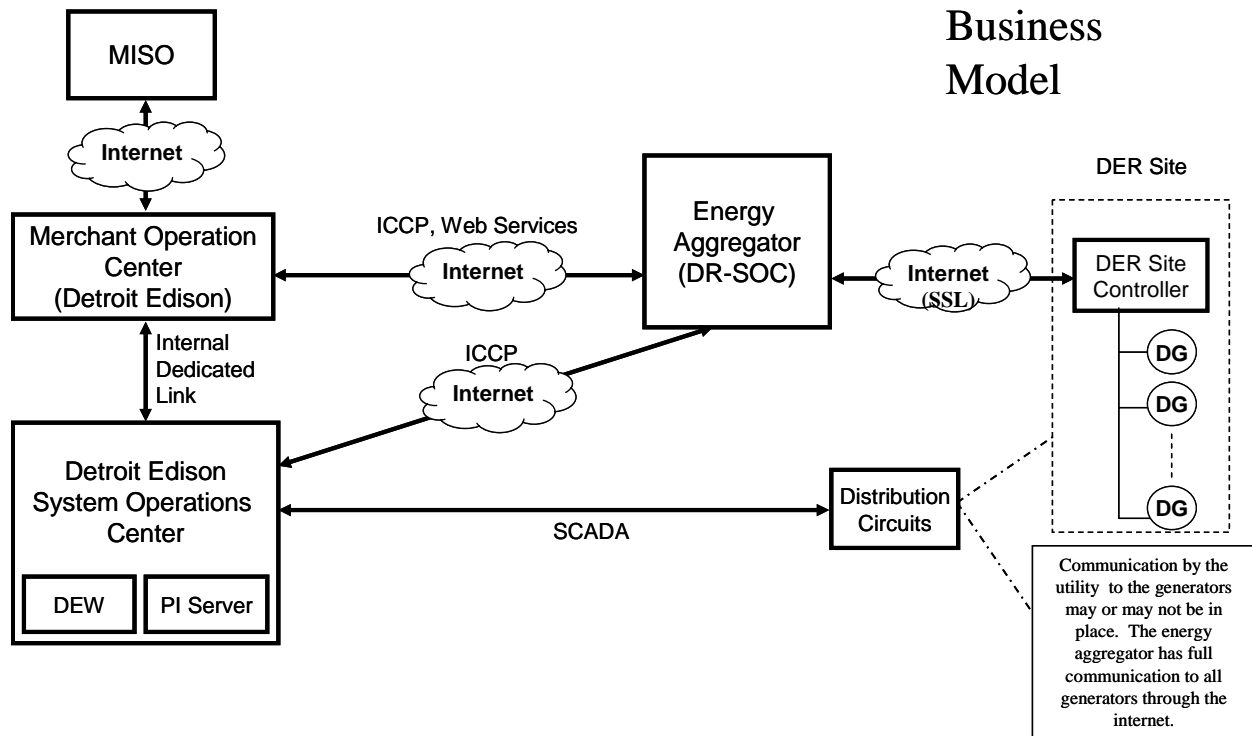
This project addresses DER integration that is part of the DOE Roadmap technical area titled Advanced Distribution Technologies and Operating Concepts. The integration and aggregation of multiple DERs by an electric utility lead team will demonstrate that it's feasible for utilities to accept and make use of utility and customer DER assets. This project benefits the electric utility, energy market and customer and the nation by demonstrating the interoperability of multiple DERs on an electric utility system and in the energy market place. The functionality developed for the Distribution Engineering Workstation (DEW) will be included in the DEW freeware at no cost as a result of this project.

FY 2005 and FY 2006 Results and Accomplishments:

The following is a partial list of major accomplishments since the April 2005 Peer review.

- Aggregate DER unit to system LMP nodes
- Register DERs in the MISO market as a Demand Response Resource
- Documented the market procedures with MISO
- Developed Economic Dispatch Algorithm for day-ahead forecast
- Developed a distribution system load forecast program based on weather dependent load research statistics
- Forecasted Real Time and day ahead loading by utilizing temperature sensitive load research statistics
- Build Inter-control room templates that are used for monitoring and control of aggregated DERs
- Bid into the day a head MISO market using a test environment
- Created a new DEW Contingency Analysis Program used to evaluate distribution systems containing Aggregated DERs
- Modify DEW's Reconfiguration for Restoration Program to make use of DERs in power restoration operations
- Hour-by-hour economic dispatch algorithm has been interfaced to a web based weather forecast at DTE
- Modify DEW's DG Control Application to interface to Economic Dispatch of Aggregated Units
- Develop standard work instructions for the operation of DER's in the energy market
- Established all data and communication infrastructure as shown in the diagram below

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FY 2007 Plans and Expectations: NA. This project will be completed in FY 2006.

Public/Private Partnerships:

In addition to many groups and personnel from DTE Energy, the following are the project's major partners:

Electrical Distribution and Design, Inc. - EDD is a Virginia Tech University spin-off company that specializes in computer analysis and design of electrical distribution systems. EDD, Inc. is the principal developer and sole distributor of the **Distribution Engineering Workstation (DEW)**. Current customers of EDD, Inc. are Ameren Services, Inc., DTE Energy (Detroit Edison), Orange & Rockland Utilities, Inc. (Con Ed), Tennessee Valley Authority (TVA), U.S. Navy, General Electric, Electric Power Research Institute, Inc. and EPRI Solutions, Inc.

DTE Energy Technologies, a subsidiary of DTE Energy, is a high-technology company specializing in providing distributed generation products and services. The DTEch System Operations Center (SOC) provides centralized, end-to-end management of all of the vital functions required to serve electric loads continuously and efficiently with various distributed generation technologies. The SOC is unique both in its ability to handle numerous generation units across many customers with various rate structures and in the scope of the services it offers.

OSIsoft provides the data historian technology (PI System) software that manages real-time information and monitoring for utility operations. OSIsoft provides the historian technology that is used by DTE to archive SCADA information. The PI system at DTE was expanded and enhanced to perform the information aggregation function.

Systems Integration Specialists Company Inc. (SISCO) specializes in integration technologies and is primarily focused on integration methodologies based upon standards. SISCO provides expertise in emerging economic scheduling protocols and real-time protocol knowledge.

Midwest Independent System Operator (MISO) is the fully integrated regional transmission organization serving DTE Energy. The non-profit Midwest ISO assures industry consumers of unbiased regional grid management and open access to the transmission facilities under Midwest ISO's functional supervision. MISO provides the vehicle for the DERs to participate in the energy market.