



Power Systems Engineering Research Center (PSERC)

Cornell University (lead institution)

Helping to design the future of high-performance electric power systems to meet emerging needs

A National Science Foundation Industry/University Cooperative Research Center since 1996

Partner Institutions:

- *Arizona State University*
- *University of California at Berkeley*
- *Carnegie-Mellon University*
- *Colorado School of Mines*
- *Georgia Institute of Technology*
- *Howard University*
- *University of Illinois at Urbana/Champaign*
- *Iowa State University*
- *Texas A&M University*
- *Washington State University*
- *Wichita State University*
- *University of Wisconsin at Madison*

Center Mission and Rationale

The Power Systems Engineering Research Center (PSERC) is a research consortium that includes 13 universities. The goals of PSERC are to create an environment in which universities and industry work together to promote and enable collaboration, to provide a forum for exchange of information and ideas, and to create solutions to complex and diverse problems facing the electric power industry. PSERC is especially interested in technical problems associated with the new institutional arrangements that are occurring under a restructured power industry. The Center is researching issues such as how to simulate power systems under bidding, how to quantify planning and operational limits, how to operate a power system reliably and securely while increasing competitive interplay, how to implement and operate needed information networks, and operation under an ISO and other possible scenarios. The goal of PSERC is to create the necessary tools and models to aid in the technical design of a future high-performance electric-power system, a system that will be more efficient, more responsive, and more environmentally acceptable than the one that is operating today.

The generation of electric energy is facing new challenges due to factors such as increasing demand, stringent requirements on power quality, uncertainty in load variation and growth, higher fuel prices, introduction of highly sensitive digitally controlled industrial equipment, increasing public concern and regulation regarding environmental issues, independent power producers, and the aging of existing



Electricity market trading floor.

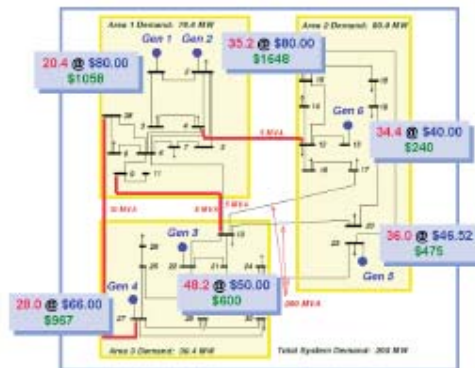
facilities. Thus, there is a real need for fundamental and integrated analysis of power generation using advances in the areas of electronics (especially higher-power solid state devices), automatic control, smart sensors and actuators, modeling simulation, computer control, the national information network, and artificial intelligence. Due to the nature and size of the problem, this fundamental study would not be successful unless carried out by an interdisciplinary research team in close collaboration with industry.

PSERC is managed by a Director and Executive Committee, and operates with funds provided by the partner universities, the National Science Foundation, and members of the electric power industry. Industrial members of this I/UCRC provide oversight and direction through an Industrial Advisory Board. The Center focuses on the problems facing

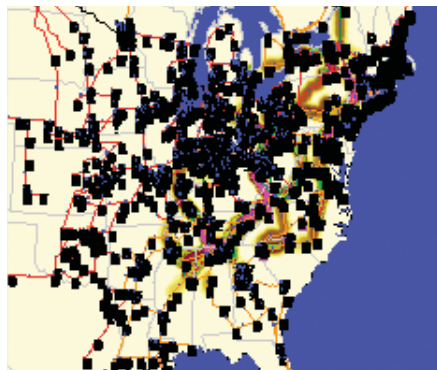


735 kV transmission lines.

the U.S. electric power industry and its users. The Center investigates development of feasible and innovative ideas necessary for these industries to meet the challenges of the next century. Center activities, such as seminars and workshops, are designed to foster rapid technology transfer; these activities take place on the participating university campuses, on the Internet, and at the sites of industrial affiliates. Thus, Center objectives are to serve its industrial members through delivery of tangible research results, continuing education, conferences, and short courses.



Auction-based nodal prices for a 30-bus system.



Eastern U.S. power transfer distribution factor flows.

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