Advanced Control Center program utilizes state-of-the-art grid management system
The PJM Interconnection, LLC. (PJM) Advanced Control Center (AC²) program integrates state-of-the-art, large-scale energy management systems and real-time market pricing systems using the Siemens/PJM Shared Architecture integration platform.

PJM has placed into production the world’s most advanced energy management system (EMS) – the PJM AC² program. PJM uses the system to manage North America’s largest transmission grid.

Groundbreaking dual, “hot” control centers promote flexibility and innovation
This program employs the Siemens Spectrum Power™ EMS as well as Siemens’ Multi-Site and multi-mode System Synchronization systems running at two different sites, with each site fully functional and capable of assuming control of the grid either independently or, combined, as a single virtual control center.

A Web-enabled user interface (UI) framework provides situational awareness, with capabilities for advanced visualization of data and system information. PJM is the only grid operator in North America, and one of the few worldwide, to have a “dual-primary” control center configuration. The AC² program, through these dual control centers, better ensures reliability and the uninterrupted operation of markets if functionality were lost at either center.

Smart Grid breakthrough promotes security and protection
This is a breakthrough for grid operators around the world, proving that innovative IT technology, such as a service oriented architecture (SOA), can be adapted to real-time, high-performance, mission-critical environments for the Smart Grid. Siemens delivered its Information Model Manager (IMM) as a common information model (CIM)-compliant and model-driven integration platform. PJM employs the IMM to manage its diverse set of EMS, market management systems (MMS) and legacy systems that consume the system model. This unifying approach allows for improved productivity, accuracy, flexibility and innovation while protecting PJM’s IT investment.

Shared Architecture platform adapts to new technologies
From the beginning of the system design, PJM sought to integrate embedded security controls, scalability and flexibility into a new
generation of control systems to enhance grid reliability and sustain wholesale power market innovations. That led PJM to the idea of a new Shared Architecture platform so their systems could easily grow with their members, adapt to new technologies and invite innovation.

Open architecture enables rapid integration
This open, modern architecture, built on an enterprise services bus (ESB), enables the rapid integration of traditional utility applications and emerging Smart Grid applications, providing flexibility and choices for utilities that had previously been unavailable due to their legacy control center application investments. Utilizing a Shared Architecture enabled PJM to deploy new EMS and MMS applications while leveraging existing legacy applications that will be replaced consistent with planned technology life cycles, thereby avoiding unnecessary reinvestment and risk. This proven, innovative approach also promises reduced application migration risk, investment protection and enables faster innovation cycles throughout the energy industry.

Siemens and PJM seek other interested industry participants to further advance modern Smart Grid integration platforms and contribute to the development of integration standards for Smart Grid architectures.

Shared architecture that fosters innovation

A pioneering project
- Supports shared architecture and long-term innovation
- Provides customer flexibility and choice in their technology plans and strategic roadmaps
- Allows complex EMS/MMS/DMS systems to be enhanced or replaced without disturbing the underlying standards-based system foundation
- Fosters flexibility, component competition and invites broader based innovation throughout the energy industry

Project scope
- Two fully redundant control centers (AC1/AC2)
- Data engineering via the information model manager (IMM)
- Complete Web-based UI
- Considerable number of software specials (>9,000)
- New, high-performance technologies

Architecture
- Spectrum Power 3 components, AIX-based system with ESB connectivity

SCADA
- Inter-Control Center Communications Protocol (ICCP), communication front end (CFE)
- Web-based alarming

Applications
- Network application (NA) Suite
- Automatic generation control (AGC)
- Real-time locational marginal pricing (RTLMP)
- Multi-Site and multi-mode system synchronization
- IMM-Model Maintenance for all enterprise components and sub-systems, including those supplied by other vendors
- Artificial intelligence (AI)-based technology

Key statistics*
- More than 750 PJM member companies
- More than 60 million people served
- 163,848 peak load in megawatts
- 185,600 MWs of generating capacity
- 65,441 miles of transmission lines
- 832,331 GWh of annual energy
- 1,365 generation sources
- 214,000 square miles of territory
- Area served includes 13 states plus DC
- 142 internal/external tie lines
- 26 percent of generation in Eastern Interconnection
- 28 percent of load in Eastern Interconnection
- 19 percent of transmission assets in Eastern Interconnection
- 21 percent of U.S. GDP produced in PJM
- 2011 Annual Billings – $35.9 Billion

*Numbers from January 2012

The Siemens Smart Grid division supplies products and solutions for intelligent and flexible electrical network infrastructures. To meet growing energy needs, the networks of today and tomorrow must integrate all forms of power generation and ensure bi-directional energy and communication flows. Intelligent networks help make it possible to generate and use power efficiently and on demand. They contribute to the electrification of railroads and also supply industrial enterprises, infrastructure elements and entire cities with electricity.

PJM Interconnection, founded in 1927, ensures the reliability of the high-voltage electric power system serving 60 million people in all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and the District of Columbia. PJM coordinates and directs the operation of the region’s transmission grid, which includes more than 65,000 miles of transmission lines; administers a competitive wholesale electricity market; and plans regional transmission expansion improvements to maintain grid reliability and relieve congestion.

www.pjm.com

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