



Hydro-Québec - LASER Project

Sector of activity :
Energy Control Systems

Client :
Hydro-Québec

Year of completion :
Ongoing

Financing :
Client

Mandate :

To design, supply, install, and commission a new Energy Management System (EMS) for Hydro-Québec, which operates and maintains the generation and transmission system in the province of Québec, Canada. The scope of work included the delivery of hardware, software, documentation, and training for the main control system and disaster recovery system.

Description :

Hydro-Québec is a leader in generation and transmission system design, operation and maintenance. It operates the most extensive transmission system in North America, with more than 500 transmission substations, 32,539 km of lines, and 18 interconnections allowing power interchange between Québec, Labrador, New Brunswick, Ontario and the U.S. Northeast. With a transfer capacity exceeding 7,300 MW, these AC and DC interconnections enable Hydro-Québec TransÉnergie to export surplus electricity in summer when demand in the U.S. Northeast rises, and to import electricity during winter peak periods.

The EMS system is installed in Montréal, Québec, and is the highest-level energy management system for the Hydro-Québec bulk power transmission grid. The new system is

configured with modern, state-of-the-art EMS functions to monitor and control the electrical network, and to validate future operating plans associated with power production. The system includes interfaces to existing business systems to acquire real-time and scheduling data. The external systems include the Siemens Spectrum SCADA, six Regional Control Centres (CERS), Limits Selection System, Short-term Generation Scheduling, Off-line Stability Limits Evaluation, and Off-line Support System.

The EMS system is based on a distributed client/server architecture designed to internationally recognized standards. Commercial off-the-shelf equipment is used throughout the system, and includes HP Alpha servers, HP Intel workstations, communication equipment, and peripheral equipment connected to a redundant local area network. Advanced security features have been implemented to ensure the system is guarded from cyber attacks. The EMS is fully redundant to ensure high availability, and provides automatic fail-over features.

The SCADA/EMS software is based on the GEN-4 product developed by SNC-Lavalin Energy Control Systems. The database is maintained in an Oracle RDBMS, and is complemented by a set

of memory-resident real-time databases that are replicated to all of the servers and workstations on the local area network for optimal performance. All database edits can be performed online without the need to failover any servers or workstations to bring the changes online.

The EMS applications are fully integrated with Nexant PCA Powersuite, and include the Network Topology Processor, Bus Load Scheduler, State Estimator, Dispatcher Power Flow, Transmission Loss Penalty Factor Calculation, Reserve Monitor, Contingency Analysis, Contingency Remedial Action, Optimal Power Flow, and Fault Level Calculation. A built-in Application Sequence Controller coordinates the execution of these applications. These applications provide the system operators with valuable tools to assist in operating the electric power system to high performance standards, in particular, network security.

Services provided :

A turnkey contract including project management, hardware, software, system integration, acceptance testing, documentation, customer training, and all necessary field installation and adaptation services.



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