Enterprise Solutions

A current of change:
Ontario Hydro empowers employees with a
new level of knowledge management

Solution Overview

Ontario Hydro

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Ontario Hydro, one of the world's largest and most reliable electricity systems with more than 23,000 employees, has radically updated its internal IT structure to empower employees to get the information they need, when they need it. Faced with deregulation of the energy industry, the Y2K compliant client/server system built on Microsoft Windows NT Server well-positions Ontario Power Generation (OPG), an Ontario Hydro successor company, as a front-runner in the new world of energy competition.

OPG now has its own data store that's easy to access, saves employees valuable time and requires very little training - valuable business benefits for entering the new era of competition.

Customer Profile
Founded in 1906, Ontario Hydro is one of the largest utilities in North America in terms of installed generating capacity and has more than 23,000 employees.

Business Situation
The Ontario Government introduced new legislation calling for the creation of a competitive energy market beginning in the year 2000. With an information system that was outdated and inaccessible, Ontario Hydro knew it needed an IT facelift in order to effectively compete in the millennium.

Solution
Benefits
The new system is user-friendly, accessible and has reduced training costs substantially. Ontario Hydro will see its technology investment fully recovered in three years.

Situation

Ontario Hydro had a lot on their plate back in mid '98. Not only had the Government of Ontario introduced the Energy Competition Act to break up market dominance of Ontario Hydro, North America's largest utility, but the crown corporation had an information technology infrastructure ill-prepared to face the realities of a competitive marketplace.
Now there's a feeling of confidence as Ontario Hydro stands on the threshold of a very different era in the electricity industry: an era of competition, innovation and growth. This confidence is due in no small part to the powerful enterprise system that will guide Ontario Hydro into the millennium as a leader in the electricity industry.

The Energy and Resources Information System, dubbed ERIS, empowers users of Ontario Power Generation (OPG), an Ontario Hydro successor company, to get the historical operation information they need, when they need it. The development of the system started in 1997, after management decided to overhaul Ontario Hydro's information systems to ensure Year 2000 compliance. Microsoft Canada consultants were brought in to work hand-in-hand with OPG's Information Systems team. The results? A robust three-tier client/server system built on Compaq and Microsoft Windows NT Server that is Y2K compliant, and adds substantial value by placing power back in the hands of employees.

Software and Services
Microsoft Transaction Server 2.0
Microsoft Windows NT@ Server 4.0
Microsoft Windows@ 95
Microsoft Visual Basic@ 5.0
Microsoft Internet Information Server 3.0 Microsoft Visual Source SafeTM 5.0 Microsoft ADO 1.5
Microsoft Excel 95 7.0
Microsoft Excel 97
Microsoft Internet Explorer 4.0
Microsoft RDS 1.5
Microsoft VisualInterdevTM 1.0

Scenario
Data tracking and analysis
Knowledge management

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"It's like night and day," says Ion Corbu, project manager for ERIS, when asked how different ERIS is from Ontario Hydro's old information system. Before ERIS, there were actually two systems running on an IBM mainframe computer. The first, the Hydrologic Data Management System (HDMS), stored historical water resources information on Ontario Hydro's 69 hydraulic generating stations. This information includes water data like water levels, plant flows, local inflows and spill. The information is used for the planning and utilization of water resources to get the maximum monetary benefit from hydroelectric generating facilities while meeting environmental and citizenship constraints. The challenge was actually getting to this data.

"People couldn't access the database directly, they had to call a data analyst who would extract the data, put it into Excel and then send it to the users. The whole process used to take anywhere from a couple of hours to a couple of days, sometimes even longer until the user got to the data. The system was anything but user-friendly," explains Corbu.

The second system, the Hydroelectric Outage System or HOS, calculated and archived hydroelectric unit reliability indicators and wasn't much more user-friendly. HOS generated reports for hydroelectric employees only once a month, which meant that data was always one month behind. To top it off, only a couple of people had access to the system at the head office in Toronto.

With these challenges in mind, work began on producing a robust system that meets the business needs of the newly created OPG.

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> Vice President, Hydroelectric

Solution

The Energy and Resources Information System (ERIS) replaced the old HDMS and added significant new capabilities such as interactive hydraulic calculations, statistics, automatic data validation, automatic generation of reports, view of river schematics, glossary of terms, help function, direct access to e-mail and security for accessing the information.

The old HOS product was replaced by the Reliability Information System (RIS) which is fully and seamlessly integrated within ERIS. RIS provides timely business performance measures on plant reliability and adds, as a new feature, the capability to perform root cause analysis. RIS is a powerful decision-making tool for equipment maintenance and capital projects and, on a midterm and long term basis, can reduce hydroelectric unit outages.

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> Bill Boyd
> Vice President,
> Ontario Power Generation

"It is great to have ERIS," says Emad Elsayed, Hydroelectric's Vice President. "For the first time in Hydroelectric, our production and water resources staff are provided with an efficient, user-friendly, intranet-based information system that benefits OPG and prepares our company for competition in the open electricity market. Making unit reliability and water information available to selected Plant Group staff across the province is a major accomplishment".

As a consequence of the Energy Competition Act, the OPG can no longer rely on receiving data from the Independent Market Operator; so it required an autonomous structure for all its information resources.

ERIS ensures the Generation and Resources Management Division (GRMD) has access to historical Bulk Electricity System information. This includes information on unit set-up, unit limitation, system marginal cost, market clearing price, hourly production data, unutilized base-load generation, maximum capacity rating and interconnection data. Such historical information is important in supporting the day-to-day operation, after-the-fact analysis and for auditing purposes.

"It is essential that the Generation and Resources Management Division doesn't have to depend on any other body for vital information with commercial value, since starting in the year 2000 we'll be competing with other electricity providers," explains Bill Boyd, OPG Vice President. "We cannot competitively operate our generating system without quick and reliable access to historical information. The Energy and Resources Information System is a critical system for us."

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Y2K compliant, with a fast and user-friendly design, ERIS features a three-tier application with a relational database management system on its backend. The middle tier includes a web cluster made up of two Compaq ProLiant 3000 servers with Windows NT Server Enterprise Edition, as well as Internet Information Server (IIS), and Common Object Model (COM) technologies such as Microsoft Transaction Server. On the front-end, Microsoft's Web browser, Internet Explorer, allows easy navigation and fast access to information.

Virtually everyone in OPG will soon be using a workstation with a Windows NT operating system; meaning that the NT project, all tolled, rolls out some 3000 workstations. "I'm convinced that NT is the platform of the future," says Corbu. "And we were also extremely confident in the rate at which Microsoft was improving Windows NT."

This translates into OPG employees getting direct and intuitive access to historical operation information via the enterprise intranet. ERIS users can view, print and save-to-file the desired information. Microsoft Windows NT Server's built in Web server, Internet Information Server (IIS) is a critical component to ensuring this ease of delivery, serving as the vehicle for displaying information on users' screens. IIS initially receives the request from users, and then it transmits the request down the pipeline to the database. Eventually the requested information comes back to IIS, at which point it sends the needed data to the user and displays it on the screen.

Microsoft's Common Object Model (COM) was used to build OPG's middle-tier business objects that access and manipulate enterprise-wide data. As a result of leveraging these business objects, development time for new applications has been cut from months to days. The ERIS team has also gained the flexibility to add new components and interfaces to its data when needed - as well as the ability to

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Project Manager, ERIS

Benefits

OPG couldn't be more pleased with the results. Now OPG isn't just storing all of that data; they're transforming the data into information, information which provides users with value. This has made for a whole new level of knowledge management. "COM takes raw data, like the precise water levels in a lake and manipulates it to present it in up-to-date statistical tables or graph form to meet users' needs," Corbu elaborates.
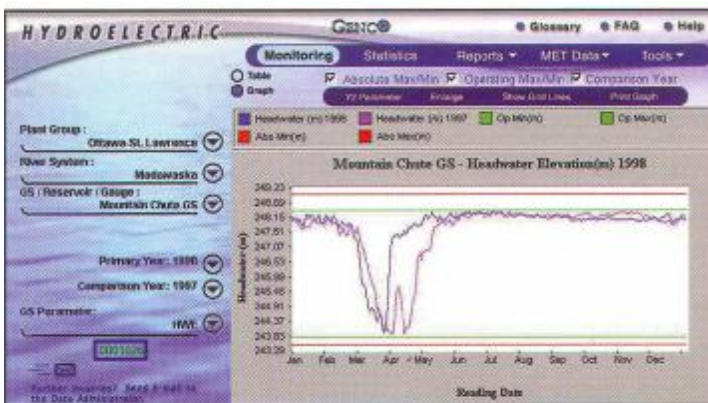
Water Resources Monitoring Menu - Display of Headwater Elevations
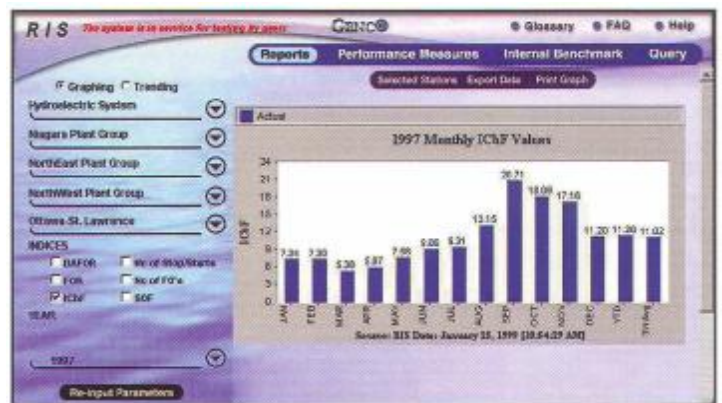
RIS Reports Menu - Display of Monthly ICbF Information

Users are oblivious to the processes running on the middle-tier, thanks to what they see on the front-end: an intuitive and user-friendly intranet screen. While the COM and Active Server Pages (ASP) are run on the Web, Internet Explorer and the ActiveX controls are located on the client Windows workstations. Corbu says that the Microsoft technology has enabled a thin client solution, with Microsoft NT Server, Terminal Server Edition eliminating much of the overhead by containing the majority of processing and storage at the server level. Windows Terminal Server improves performance and helps lower total cost of ownership by having the applications run on the server. The Hydroelectric Plant Group staff is the main beneficiary of this technology.

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ERIS has made lives easier, and saved money too, particularly in training costs. "There's no formal training, we just show them a little how to click here and there and in half an hour they're navigating themselves."

OPG's entry into the world of energy competition is accompanied by a solid return on their technology investment. The $5.5 million cost of the ERIS project will be recovered in three years. - Since OPG now has its own historical operation data store, it will avoid costs for obtaining such data and information from external companies now being formed as a result of Ontario Hydro's de-merger.

"But more than this," adds Syed Mir, Senior Manager of Application Services Department, "ERIS is part of a new set of integrated information systems that will enable OPG to become commercially successful in the open electricity market. In today's information age, management needs to take calculated risks and invest in leading age information technologies to ensure future success. ERIS is an example of applying this strategy."

So just how satisfied are users? In September 1998, ERIS was put to the test in a user satisfaction survey. On a scale of one to five, with five being "extremely satisfied", 72% of Hydroelectric users in the Toronto office said they fell in the four to five satisfaction range.

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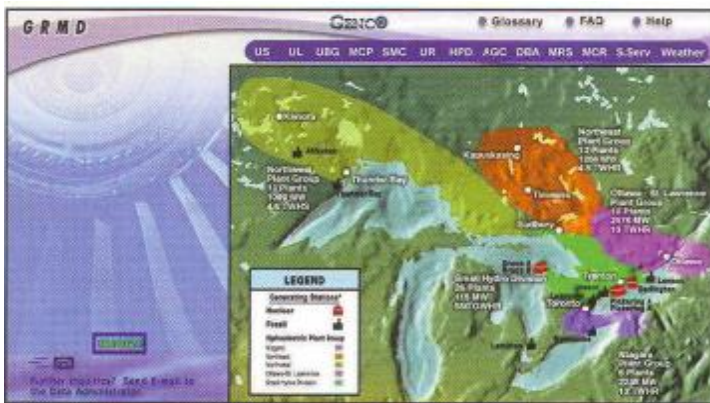
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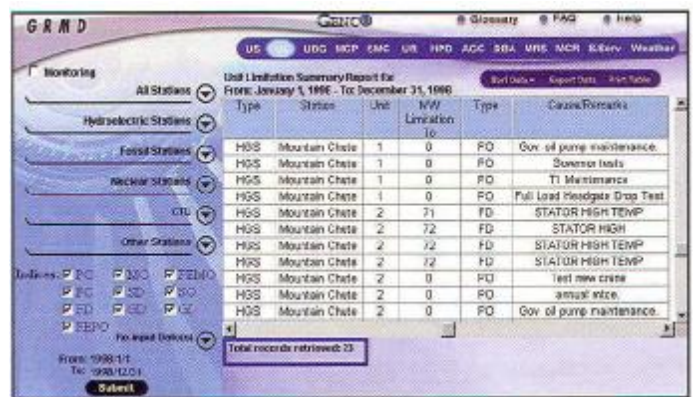
GRMD Unit Limitation (UL) Menu - Display of UL Information

The success ERIS enjoys could not have been possible without dedicated work by the IT Application Services developers and external contractors in the team, full cooperation and involvement of many users from Plant Groups, the Water Resources Division, the Reliability Planning and Maintenance Department, and the GRMD. Due to their efforts, ERIS is about two months ahead of schedule and on budget.

ERIS has well-positioned OPG to become a front-runner in the new world of competition. So much so that OPG not only welcomes the change in the electricity industry, but they're even looking forward to the challenge.

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