Rockwell Automation

Rockwell Helps Manufacturers Save Energy with the .NET Framework and Chart FX

Overview

US

Industrial Automation

Rockwell Automation (RA) is a leading industrial automation company with the mission to be the most valued global provider of power, control and information solutions.

RA's Power & Energy Management Solutions (PEMS) group was set up to help customers manage and optimize energy consumption, in the face of the rising cost of energy.

The PEMS group built a new application, RSEnergyMetrix, using C#, SQL Server 2000, the .NET Framework, and Chart FX for .NET. RSEnergyMetrix is a server application with both Web and Windows interfaces.
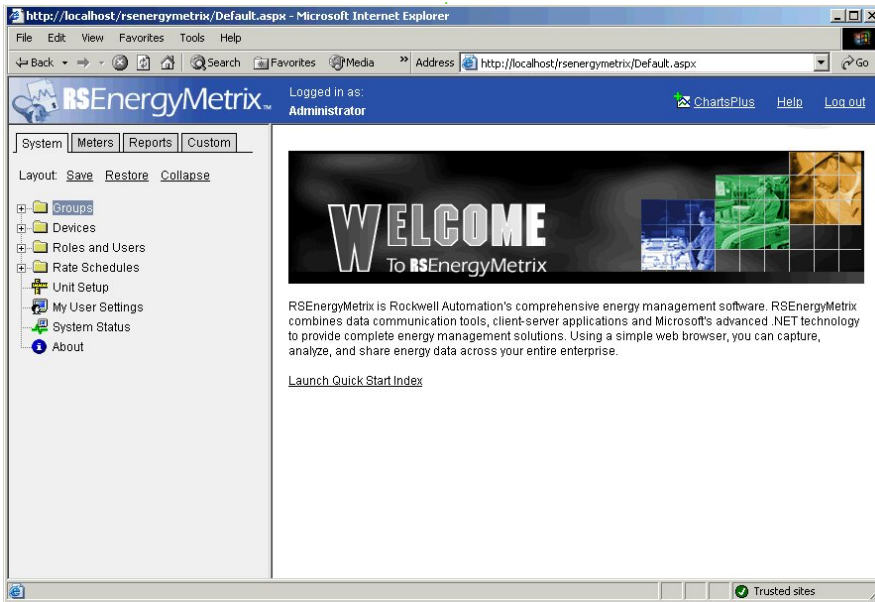
- Reduced time to market by 6 mo
- Saved >$100K in development
- Easy interface to meters
- Wide assortment of charts
- Web and Windows interfaces

Time to market was critical for us, and the .NET Framework helped us to get to market quicker. It improved our time to market by as much as 25%.

Al Hamdan, Product Marketing Manager, Rockwell Automation

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SoftwareFX
Any Chart, Anywhere!

Microsoft Visual Studio.net

RSEnergyMetrix

Logged in as:
Administrator

ChartsPlus   Help   Log out

System | Meters | Reports | Custom

Layout: Save Restore Collapse

- Groups
- Devices
- Roles and Users
- Rate Schedules
- Unit Setup
- My User Settings
- System Status
- About

WELCOME
To RSEnergyMetrix

RSEnergyMetrix is Rockwell Automation's comprehensive energy management software. RSEnergyMetrix combines data communication tools, client-server applications and Microsoft's advanced .NET technology to provide complete energy management solutions. Using a simple web browser, you can capture, analyze, and share energy data across your entire enterprise.

Launch Quick Start Index

Trusted sites

RSEnergyMetrix is a modular, scalable, web-enabled, client/server energy information and management application. It connects energy-related data sources to a Microsoft SQL database and presents energy information in ways that enable you to monitor and manage your energy use to maximize the value of your enterprise. RSEnergy-Metrix is built using Microsoft .NET technology, ensuring the highest level of quality, reliability, and compatibility now and in the future.

Fast Facts

Number of developers to build application	4
Number of months to build application	18
Lines of code	>250,000

Situation

The costs of oil and gas have almost doubled since their lows in the mid-1990s; the US Department of Energy projects that these costs may drop slightly from their recent highs, stay stable until 2011, and rise gradually after that until at least 2025. What this means for manufacturers is that energy costs have started to approach 1% of total manufacturing costs, with no relief in sight. The manufacturers now have every reason to increase the energy efficiency of their processes.

Rockwell Automation (RA) is a leading industrial automation company with the mission to be the most valued global provider of power, control and information solutions. With a focus on automation solutions that help customers meet productivity objectives, the company brings together leading brands in industrial automation, including Dodge mechanical power transmission products, Reliance Electric motors and drives, Allen-Bradley controls and engineered services and Rockwell Software factory management

software. Rockwell commands a leading market share for Programmable Logic Controllers (PLCs) in the US: roughly 50% of US manufacturers use Rockwell products.

That market situation put RA in a unique position to help manufacturers address their energy consumption problems. Rockwell already had these manufacturers as customers, and understood that their manufacturing processes can drive significant energy consumption.

The state of the art in energy management prior to this project was represented by two proprietary software approaches. One used a client to extract data from a meter to an Excel spreadsheet; the other extracted data through a network of serial links. Neither approach allowed the software to talk to other people's equipment.

In general, however, industry didn't measure its energy consumption in a way it could be managed: companies typically relied on their gas and electric bills. Rockwell had the opportunity to provide manufacturers with monitoring of all their energy sources, referred to in the industry by the acronym WAGES: water, air, gas, electric, and steam.

Solution

RA's Power & Energy Management Solutions (PEMS) group considered building its new energy monitoring application with Visual Basic 6 and Visual C++ 6, using a classic ASP Web site and ActiveX controls. When they evaluated Visual Studio .NET, they realized that developing in C# and the .NET Framework would shorten their time to market. "Time to market was critical for us, and the .NET Framework helped us to get to market quicker. It improved our time to market by as much as 25%," says Al Hamdan, Product Marketing Manager.

The .NET Framework does a lot of the heavy lifting for us. Managed code reduced memory leaks and debugging time.

Rich Morgan, Application Engineer, Rockwell Automation

"The .NET Framework does a lot of the heavy lifting for us," explains Rich Morgan, Application Engineer. "Managed code reduced memory leaks and debugging time."

Kevin Wright, Engineering Manager, adds: "We realized that using the .NET Framework would extend the life of the new product. We made a business decision to trust Microsoft and trust the plan for the .NET Framework, even though we made the decision before the technology was final. That seems to have worked out."

"We chose the .NET Framework for productivity enhancements," says David Adair, Lead Development Engineer. "We wanted both a Web application and smart clients. The .NET Framework helped us do it a lot faster."

Once they'd settled on using the .NET Framework, they needed a compatible charting component. At the time, few charting components were designed to work with the .NET Framework, although more have since become available. "We searched for a chart control for the .NET Framework on the Internet," says Hamdan. "Chart FX was the first one to support .NET that met all our requirements at the time.

"Charting is a critical component for this application. Chart FX for .NET gave us the ability to implement all of the charting we needed, from simple Web-based charts to 'no-touch deployment' Windows Forms-based charts."

The PEMS group built RSEnergyMetrix as a server application with Web and Windows interfaces. A data logger, built as a Windows service, periodically gathers data from RA's RSLinx application, from OPC Servers, and from other Web applications by "screen-scraping."

RSLinx is a complete communication server providing plant-floor device connectivity for a wide variety of Rockwell Software applications. Manufacturers that use any RA software already have RSLinx in place. The RSEnergyMetrix data logging service communicates with RSLinx using P/Invoke to call the RSLinx C API. RSLinx, in turn, collects data from Allen-Bradley Powermonitors and from other Allen-Bradley controllers connected to devices like steam meters, flow meters, and temperature sensors.

OPC (OLE for Process Control) is an open, multi-vendor standard for industrial automation built on the Microsoft OLE/DCOM architecture, and administered by the OPC Foundation (http://www.opcfoundation.org/). OPC technology can eliminate the need for expensive custom interfaces and drivers for moving information easily around the all parts of the enterprise between different computing solutions and platforms both horizontally and vertically in the enterprise. OPC specifications support interoperability amongst different computing platforms and

RSEnergyMetrix Block Diagram

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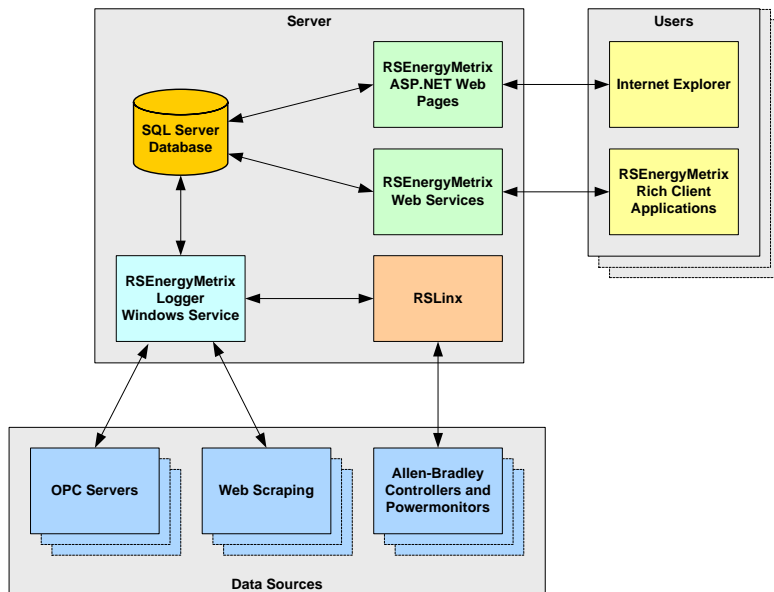
the technology is proven in hundreds of plants and thousands of applications. The OPC Foundation currently has over 300 members.

RSEnergyMetrix can call OPC servers via COM Interop to gather data from any device or controller compatible with the OPC standard. As a matter of efficiency, it only uses OPC to talk to non-Allen-Bradley devices. For devices that aren't even OPC-compatible, RSEnergyMetrix can extract data from Web pages, and for devices that aren't online at all, RSEnergyMetrix can accept manual data entry.

By preference, RSEnergyMetrix collects energy consumption data live, in real time. When gaps occur in the collection stream because of server downtime or network problems, the product uses automatic data repopulation to fill in the gaps from historical data collected on the network.

The logger service stores its data in a SQL Server 2000 database. RSEnergyMetrix has

Web services and ASP.NET Web pages that utilize the stored data. Windows Forms smart client applications access the data through the Web services. Both the Web and Windows interfaces can generate and display charts and reports to help analyze energy demand, energy consumption, billings, costs, and power quality.

While the RSEnergyMetrix product was developed in C#, customers can create their own custom scripts using Visual Basic .NET. This choice is a matter of familiarity: Rockwell customers have historically been able to write custom scripts in Visual Basic for Applications.
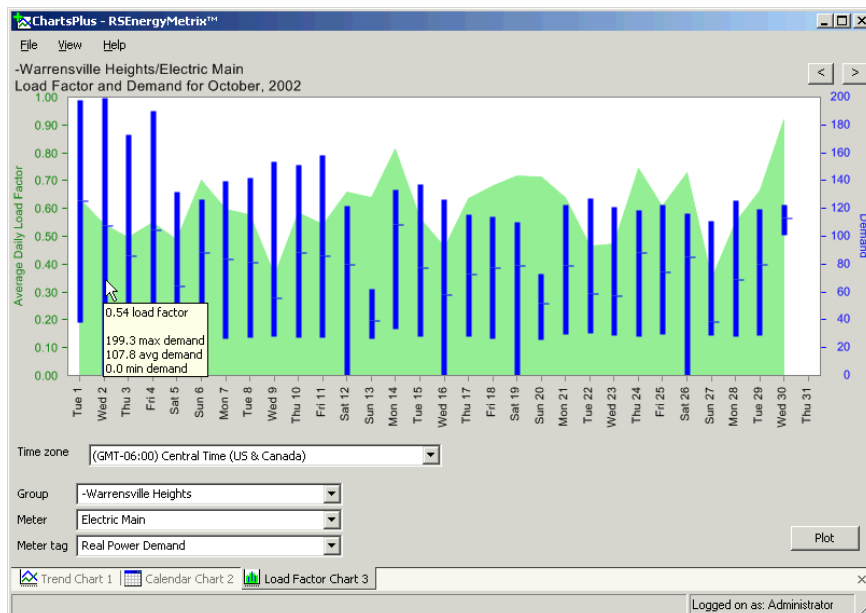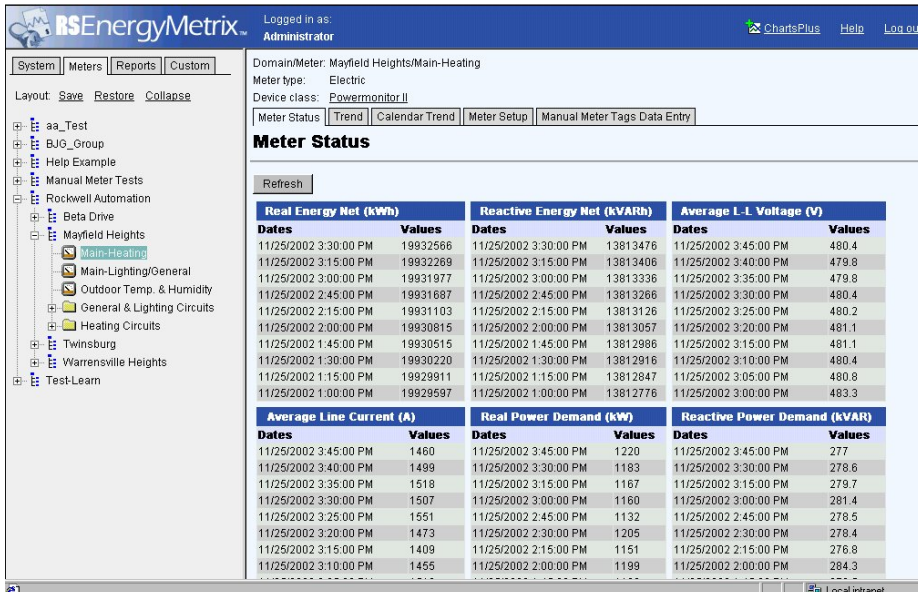
Benefits

The typical target customer for RSEnergyMetrix spends $1,000,000 per year on energy, and can save 3-10% of that by applying the results of the software analysis, amounting to some $30K-100K per year in savings.

RSEnergyMetrix had about 60 customers in its first year. They range from small to global enterprises; about two-thirds are Fortune 500 manufacturers. The largest industry application areas for RSEnergyMetrix are Food and Beverage, Educational, and Wastewater Treatment.

For example, the Hyperion Wastewater Treatment plant in Los Angeles is one of the three largest wastewater treatment facilities in the United States. Rockwell recently upgraded the plant's facilities to help improve its automation and help it conserve energy. RSEnergyMetrix was part of the solution.

A number of energy cost savings were realized quickly after installing the system: for instance, energy logging data showed that one clarifier in the system was using almost twice the energy that other clarifiers used.

The RSEnergyMetrix ChartsPlus module can display a variety of analyses, trends, and charts, with the help of Chart FX for .NET.

RSEnergyMetrix can display a variety of reports both locally and on the Web.

Using Chart FX rather than building our own chart components was a no-brainer.

RSEnergyMetrix ," says Adair. "The managed nature of C# gave us a much more solid product, faster than we could have done in unmanaged C++."

Wright, Morgan and Hamdan attribute at least six months reduction in their time to market, and at least $100,000 in development cost savings, to the use of Chart FX for .NET. "Using Chart FX rather than building our own chart components was a no-brainer," says Hamdan.

When comparing the speed of the clarifiers, engineers found that the abnormal clarifier was set at a higher speed than others. The speed was adjusted, saving the plant $33,000 annually.

Rockwell itself realized significant productivity improvements and development cost savings by choosing to use the .NET Framework and Chart FX for .NET to develop RSEnergyMetrix.

According to Wright, it took three developers 18 months total to develop the current version of RSEnergyMetrix. He attributes six man-months of saved development effort to the use of Visual C# .NET and the .NET Framework. "The object-oriented tools were structured well to fit our program," says Wright. "On the other hand, we have to balance that against the learning curve we incurred. In the future, we expect more cost savings, since we're already up to speed on the Framework and tools."

"Garbage collection and array bounds checking improved the reliability of

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For more information about Software FX products and services, call (800) 392-4278 or visit the Web site at: www.chartfx.com

For more information about Rockwell Automation products and services, visit the Web site at: www.ab.com

Microsoft Visual Studio .NET

The Microsoft .NET Framework is an integral Windows® component that supports building and running the next generation of applications and Web services.

For more information about the .NET Framework, go to: http://msdn.microsoft.com/netframework/

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For more information about Visual Studio .NET, go to: http://msdn.microsoft.com/vstudio/

To acquire Visual Studio .NET, please see your reseller or go to: http://shop.microsoft.com/devtools/

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