Rockwell Software® Enterprise Energy Management

A continuous improvement and commissioning solution that provides real-time visibility into ongoing operations and drives energy efficiency.

Rockwell Software® EEM is a holistic approach to energy management for centrally managed buildings—such as schools, government buildings, hospitals, and airports—with a sustainable savings of more than 20% of the total energy bill in the first year. Its low capital cost produces a rapid return on investment, saving money through smarter central plant management, detection of abnormal building demand, and improved operational planning. All of this helps allow better maintenance decisions and provides detailed management insight that simply has not been possible until now.

Overview

Enterprise Energy Management (EEM) is nothing new, yet it has never been more relevant than it is today. The impact of the accelerating cost of energy, the fact that peak demand for electricity frequently exceeds supply and a heightened awareness of the issues of global warming have combined to place pressure on campus facilities managers as never before. The tried-and-true solutions of the past only address a part of the problem.

Conservation is the only approach with promise in the short term. Operating campus utilities smarter and addressing energy demand holistically is not a control problem but an information problem that requires an intelligent, scalable solution with the potential to drive a significant, sustained reduction in the cost of campus energy.

Rockwell Software® EEM is a bundled solution based on the industry-leading FactoryTalk VantagePoint EMI, a Business Intelligence package for discrete manufacturing, process control and batch operations. Rockwell Software EEM monitors all supply and consumption of electricity, fuels, chilled water and steam – at the central plant and at each building under management. It also monitors external variables, such as energy costs, calendar and weather conditions and forecasts. With Rockwell Software EEM, you create a model of your campus as you see it, such as location, type of building, space, lab, classroom or other resource. Data representing the supply and consumption of energy can be retrieved from the relevant building management systems, control systems and meters and...
stored in a historian, where the Rockwell Software EEM model uses it to publish reports and key performance indicators (KPIs) as Web pages on the internal campus Web site.

With Rockwell Software EEM, users can track actual consumption of energy by unit and by cost per building on an hourly basis and can predict what consumption should be for various weather, calendar and occupancy conditions.

The self-configuring server, pre-configured reports and zero-install client software get you up and running quickly, providing immediate insight into the business of managing your campus’ energy utilization. Power users gain even more insight using Rockwell Software’s analytic applications and Microsoft Excel. They can easily publish these insights to the Web as new reports, views and dynamic dashboards that provide users across the campus with timely and clear usage information via the Rockwell Software or SharePoint Portal. With this readily-available, highly-contextual information, they can drill down to expose bottlenecks, potential consumption problems and abnormal system behavior, all of which drive better decisions that directly impact campus conservation.

Unified Production Model
The Unified Production Model (UPM) is the heart of Rockwell Software EEM. The UPM models central plant supply of steam, chilled water and electricity and individual building demand at configurable intervals, all in the context of current and forecast weather conditions, activity calendar and previous behavior. The model is unified because it abstracts the complexities of the individual data sources and creates a coherent, unified view of all available data – historical, current and future forecast.

Rockwell Software’s EEM solution allows energy managers to turn disparate energy data sources and systems into actionable intelligence.
Model of Campus Energy

Every campus has important differences and priorities. The power of the UPM is that it can easily accommodate these differences into the standard model of campus energy consumption. Implementation is generally done in three phases, each quickly generating a return on the software and services invested. Each phase produces a significant monetary benefit for the facilities manager in the battle to conserve energy and contain cost.

- With the Rockwell Software EEM model in place, facilities managers can get control of the central plant – monitoring purchases of fuels and electricity and the production of electricity, steam and chilled water. Using concurrent external data, such as the cost of energy and fuels and weather forecasts, users have a predictive model that allows them to negotiate contracts that more accurately reflect predicted consumption. Therefore, they are empowered to buy more energy when prices are low and less energy when prices are high.
- Once building consumption is integrated into the model, a weather enthalpy factor is calculated that allows facilities managers to predict optimum building performance. By incorporating weather forecast and calendar changes and comparing forecast behavior against the predictions, facilities managers can avert problems before they happen. And when the unexpected does occur, a comparison of actual building consumption vs. predicted consumption can alert facilities managers to take corrective action.
- Comparative analyses of various building models empower the facilities manager with another benefit – refined, cost-effective management and maintenance of the buildings. Decisions ranging from simple building maintenance and repairs to load balancing, intelligent retrofitting of building attributes such as doors, windows, insulation, roofing, and more, combine to produce further incremental savings. Most importantly, the facilities manager can utilize the model to aid in making decisions about what projects could produce the best results in the shortest time and at the lowest cost.
- Finally, because Rockwell Software EEM is based on the powerful FactoryTalk VantagePoint EMI tools, the campus staff can draw on any combination of Microsoft Excel add-ins, trends, XY plots, dashboards and the Rockwell Software EEM Portal – coupled with their own experience and creativity to extract further incremental value from Rockwell Software EEM.

Analysis Services

The Rockwell Software EEM Analysis Services manage the integrated information based on an individual user's needs. Rockwell Software EEM leverages these powerful analysis services to create a predictive model.

Analysis services include:

- Demand prediction – weather, campus events and calendar
- Cost prediction – real-time utilities markets and campus contracts
- Capabilities prediction – control and maintenance systems
- Buildings – building automation and metering systems
- Alarms – notification of users when monitored values exceed limits

Analysis services can correlate these predicted values with actual data derived in periodic readings from the same sources, highlighting any potential anomalies as they appear. They perform calculations (predefined limits and alarms, operating regions, etc.) and transform, summarize and aggregate data for analysis in Microsoft Excel to produce calculated variables, KPIs, aggregations and more.

The Excel Add-In makes it easy to bring historical, campus control system and business application data through the UPM into the familiar but powerful Excel environment. Here users can leverage Excel's analysis capabilities or use FactoryTalk VantagePoint wizards designed to manipulate and present campus energy information. Users can also publish Excel content directly to the Web and collaborate by fetching and building upon existing published reports.
The FactoryTalk VantagePoint Trend tool graphs real-time and historical plant and building data on a time axis and features – such as plotting the aggregated steam consumption for a subset of buildings over a period of time, as is depicted in the example.

The XY Plotter is a client application that runs in an Internet browser to plot relationships between conditions, create shapes to define expected behavior, and plot them all against a scaled background image. For example, users can trace the relationship between a pair of values such as weather enthalpy versus steam consumption for a building in real time or historically.

The FactoryTalk VantagePoint dashboard is used to create a variety of dynamic KPI charts and graphs, easily recognizable by users and management as indicators of campus facilities’ performance. Dynamic dials, sliders, progress bars, gauges, numeric values, spinners and play buttons are configurable through the FactoryTalk VantagePoint dashboard wizards.

**Rockwell Software EEM Portal**
The Rockwell Software EEM Portal provides role-based access to published views, trends, reports and dashboards via an Internet browser. It can be deployed as a standalone portal or integrated with an existing Microsoft Sharepoint or other portal.

End users can customize and personalize the portal to ensure they are receiving the content they need and displaying it in a form that they prefer.

**Extensibility**
Even though Rockwell Software EEM was designed to be highly configurable, it is also eminently extensible. The entire model may be exposed and leveraged in any of three powerful ways:

1. The UPM is accessible entirely through Web Services, making it a true Service-Oriented Architecture application.
2. The UPM object model is accessible from any .NET programming environment on the server or a client.
3. The model and data are accessible through SQL Queries.