



Let's build a smarter planet

IBM Rochester, MN implements smarter buildings solution

Gains economic, operational and environmental benefits

Smart is...

Integrating building, infrastructure and enterprise systems to promote sustainable and cost-effective operations.

Through a joint effort of IBM Global Business Services, IBM Software Group and IBM Alliance Partner Johnson Controls, IBM's smarter buildings solution delivers new economic, operational and environmental benefits to IBM facilities. The integration of asset and service work-order management with energy and sustainability management analytics is a key enabler for reducing energy use and carbon emissions, and for sustaining these reductions. A five percent year-over-year incremental energy savings is expected for a facility that has undergone years of energy efficiency improvements, and observations in the pilot indicate an eight percent annual savings from the equipment's operating costs.

With rising energy costs and the overall economic environment, commercial property owners are faced with a significant challenge: maintaining reliability and efficiency of their facilities while demonstrating environmental responsibility.

It's a challenge that IBM is all too familiar with. IBM operates hundreds of facilities in support of its global operations. Over the years, the company has taken a leadership role in implementing energy conservation and building management practices that promote sustainable and cost-effective operations. Today, using its smarter buildings solution, IBM is gaining a new level of economic, operational and environmental benefit.

"We've been focused on energy management for many years," says John DeMarco, director, Real Estate Operations for IBM. "From an operational perspective, we've made many targeted investments in energy efficiency. We have installed high-efficiency instrumentation as well as advanced sensor and metering technology along with undertaking a long list of other conservation actions. We've also educated employees on how changes in the way they work could have a big impact on reducing the demand for energy. To continue to achieve year-over-year improvement in conservation, you have to develop new and innovative approaches. We need to capture data and effectively communicate new insights that change behaviors and that is what the smarter buildings solution delivers."





Business benefits

- Reduces energy consumption and carbon emissions with an estimated five percent year-over-year incremental energy savings for a facility that has undergone years of continuous energy efficiency improvements
 - Delivers an eight percent annual savings from the equipment's operating costs based on pilot program observations
 - Improves asset reliability and longer asset lifespan
 - Decreases operational costs by streamlining problem diagnosis and resolution and improving staff productivity
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The smarter buildings solution—which combines the company's software, research and services expertise together with industry-leading business partners—enables IBM to better achieve the following:

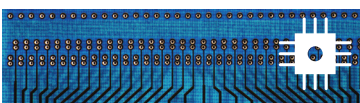
- Manage energy use, lower costs and decrease emissions by monitoring and analyzing heat, air conditioning and power consumption
- Maintain equipment proactively, identifying emerging problems and trends to prevent breakdowns and confirm that critical assets will work as needed
- Lower maintenance and building management costs and extend asset life through preventive maintenance, greater insight into asset conditions and automated notification when assets are performing outside of specifications

IBM's Rochester, Minnesota campus is one of the first IBM campuses to benefit from this new capability.

The Rochester campus consists of 3.2 million square feet of space and has over 35 interconnected buildings, including manufacturing facilities, testing labs, office buildings and a worldwide data center. It is the sixth-highest energy user in IBM's global facilities portfolio, making it an ideal location to launch this program.

Smarter Buildings:

New insight, analytics drives sustainability and savings



Instrumented

Sensors, meters and instruments monitor operations of facility assets, energy use, equipment conditions, systems performance and environmental conditions



Interconnected

The integration of instrumentation, metering, control systems and asset management systems gives a top-down and bottom-up view of facility performance, energy use and costs, and carbon footprint



Intelligent

Advanced analytics detect and diagnose faults, deliver insight into how to save money, and help staff predict problems before building performance and occupants are affected



Solution components:

Software

- IBM® Cognos® Business Intelligence
- IBM Mashup Center
- IBM Maximo® Asset Management solutions
- IBM Tivoli® Access Manager
- IBM Tivoli Data Warehouse
- IBM Tivoli Monitoring
- IBM Tivoli Netcool®/OMNIBus
- Johnson Controls® E2MS
- Johnson Controls EnNet
- Johnson Controls Metasys®
- Johnson Controls Sustainability Manager
- Johnson Controls Dashboard & Mash-Up Widgets

Services

- IBM Global Business Services—Smart Buildings Solution Implementation
- IBM Software Group
- Johnson Controls Systems & Integration Services
- Johnson Controls Energy & Sustainability Solution Services

IBM Business Partner

- Johnson Controls

“The smarter buildings solution will help us find and address opportunities that were previously invisible to us.”

—John DeMarco, Director, Real Estate Operations, IBM

“The driving force behind Rochester’s installation of the smarter buildings solution was to reduce energy and maintenance costs,” says Bob Maroo, manager, Global Process Optimization, Real Estate Site Operations (RESO), IBM. “The smarter buildings solution enables us to see cost reduction opportunities faster and helps us to improve the overall efficiency and reliability of our assets.”

Integrating information leads to new insight

The solution, implemented by IBM Global Business Services, IBM Software Group and IBM Alliance Partner Johnson Controls®, integrates an enormous amount of data from the Johnson Controls Metasys® building management system, electrical meters, IBM® Maximo® Asset Management software and outdoor temperature and humidity gauges. The data is consolidated into a common repository for effective, intelligent analytics and decision making.

The initial phase of the project integrates information from 87 of the site’s largest and most heavily used air handling units as well as lighting and perimeter heating in three buildings. It provides insight into valve and damper positions (e.g., open or closed), motor operations, temperature and speed, and other equipment and environmental parameters.

During the second phase of the project, staff will expand this implementation to include operational data from a total of 254 air handling units. Future phases will incorporate data from hundreds of other facility assets, including boilers, compressors, chillers, pumps, steam traps and air cooling towers.



“The only thing we’re going to be limited by is our imagination. The smarter buildings solution has a lot of power, and the more rules we develop the more productivity we can drive.”

—Bob Maroo, Manager, Global Process Optimization, Real Estate Site Operations, IBM

Data analytics and optimization software measure and record operational performance against standards (rules), highlighting variances as they occur. If a variance is detected, a service request is automatically generated and the appropriate personnel are notified. For example, if the outside air temperature is above 70 degrees and a heat valve is open on one of the air handlers, thus heating a building unnecessarily, maintenance staff can be quickly alerted and dispatched to resolve the issue. Previously, maintenance staff would only become aware of this issue when a building tenant called to complain about the temperature.

Comprehensive dashboards provide corporate and site managers, engineers and maintenance staff with real-time visibility into operations. Integrated security and single sign-on capabilities help confirm that staff members can only access the information pertinent to their area of responsibility.

“We have excellent instrumentation at our location,” says Maroo. “With the smarter buildings solution, we can now interconnect our data and add intelligence to better manage our resources, improve the reliability of the building and optimize the use of energy.”

Improving operational productivity

The integration of asset and service work-order management with energy and sustainability management analytics is a key enabler for reducing energy consumption and carbon emissions, and for sustaining these reductions over time. In fact, the organization estimates a five percent year-over-year incremental energy savings for a facility that has undergone years of continuous energy efficiency improvements.



“It has been a tremendous team effort. Each team member from IBM and Johnson Controls brings something to the table. It’s a great example of how bringing together the right expertise can enable innovation.”

—Bob Maroo

Additionally, initial observations of the equipment in the pilot have indicated an eight percent annual savings from the equipment’s yearly operating costs. However, it is important to note that IBM has very mature energy and equipment management processes. A company with less mature processes could experience higher savings.

Maintenance productivity will also be realized as the quality of the overall infrastructure improves. The organization is now able to systematically monitor and benchmark asset performance in ways that will add new insight into how to enhance maintenance productivity. As a result, facility personnel can identify opportunities sooner than they would normally find them, and in many cases, they are finding opportunities that may have never been detected.

“The smarter buildings solution will help us find and address opportunities that were previously invisible to us,” says DeMarco. “Over time, we expect to enhance our energy management system, as well as gain maintenance productivity through better information and less diagnostics.”

Improving asset reliability and lifespan

While energy savings is a key goal, the solution’s ability to prevent asset failures is also a top priority.

“There are a number of critical spaces in our buildings, including data centers and manufacturing lines,” says DeMarco. “Energy savings is important, but maintaining high reliability and uptime of our critical spaces is our first priority. Our business requires uninterrupted services from our building management process.”



Through the smarter buildings solution, maintenance staff is automatically alerted of any emerging problems so they can take action before operations are impacted. For example, if a motor on one of the data center's air handlers is running hot, the system immediately issues a work order so maintenance staff can check the system and resolve the problem before the motor stops running. Work orders include detailed information for faster problem resolution and identify the severity of problems based on the type of space and potential impact on IBM operations.

"We have a better understanding of how our equipment is operating, which helps us extend the life and improve the reliability of these assets in a very efficient and cost-effective way," says Maroo.

Identifying trends across geographies

The solution also provides IBM management with the information needed to spot opportunities to reduce costs and optimize productivity across facilities worldwide.

"The management team will be able to take periodic snapshots of facility activity and do benchmarking across facilities," says DeMarco. "If we see a particular alarm in Rochester all the time but we don't see it anywhere else, we'll be able to debug and correct that condition faster."



► The inside story: Getting there

A strategic vision. In April 2010, the Real Estate Site Operations team met in Somers, New York with IBM's management team to discuss how IBM could expand its work to create sustainable and smarter infrastructures—both internally and for its customers. The result of that meeting was a commitment to install its first customer-ready smarter buildings solution at IBM's headquarters in Armonk, New York and its manufacturing and development facility in Rochester, Minnesota. “Our view is that this is an area where we can continuously improve,” says DeMarco. “While we've done a lot in terms of facilities management and we are competitively positioned in this area, we are constantly trying to advance our capabilities to the next level.”

Teamwork drives success. Software architects, developers and engineers from IBM Global Business Services, IBM Software Group and IBM Alliance Partner Johnson Controls worked collaboratively from initial planning to integration and implementation of the software components.

“It has been a tremendous team effort,” says Bob Maroo. “Each team member from IBM and Johnson Controls brings something to the table. It's a great example of how bringing together the right expertise can enable innovation.”

Start small. Think big. According to Maroo, the initial phase of the project was limited in scope to prove the value and gain local working knowledge of the solution. The organization's long-term goal is to significantly expand the installation in both the amount of equipment managed as well as the number of analytic rules to fully leverage the solution's capabilities.

“The only thing we're going to be limited by is our imagination,” says Maroo. “The smarter buildings solution has a lot of power, and the more rules we develop the more productivity we can drive. We see many new opportunities emerging from the smarter buildings solution.”

For more information

To learn more about the combined solution for smarter buildings offered by IBM and Johnson Controls, contact your IBM or Johnson Controls representative or your IBM Business Partner, or visit:

ibm.com/tivoli/solutions/facilities-management or

www.johnsoncontrols.com/publish/us/en/products/building_efficiency.htm



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