



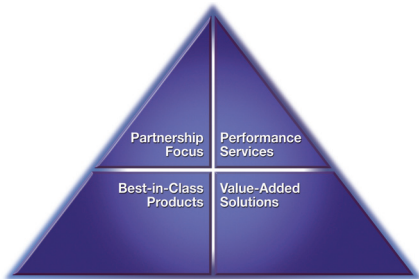
Industrial Energy Efficiency Case Studies

Submitted by Kevin Kosisko, ABB, on behalf of the
Industrial Energy Efficiency Coalition

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Administered by





Results-Driven Automation



Partnership Focus

Success Stories

Plastics & Rubber

Drive retrofits of extruding lines at Cantex Plastics are optimizing production of Poly Vinyl Chloride (PVC) pipes

Upgrading PVC extruding lines with ABB ACS800 DTC/ Direct Torque Control drives is helping Cantex Plant Manager Ron Berry wring the maximum production from his plant's existing machinery as cheaply as possible.

Benefits

- Immediate Production Increase
- Upgrade Cost is 1/8 of New Installation Cost
- No Need for Encoders
- Reduced Downtime
- Minimized Scrap
- Blower (& Noise) Eliminated

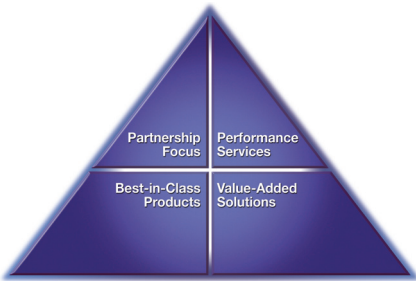
Cantex is a leading producer of PVC (Poly Vinyl Chloride) pipes in the U.S., with plants in Texas, Ohio, Florida, Mississippi and Nevada. The Reno, Nevada plant turns out PVC pipes of varying diameters and lengths for customers that include utilities, municipalities and construction markets/applications. Cantex, to date, has upgraded two of 18 extrusion lines

at the plant with ABB's ACS800 adjustable-speed, direct torque control (DTC) drives, and is working on upgrading a third line.

Production Increase is Immediate

A 100 HP ABB ACS800 drive retrofit of the motor powering the mixing screws on one of the extrusion lines was started up this past Christmas Eve. It has already increased production by 30 percent. The AC ABB drive and motor replaced the ageing DC technology on these augers, which move the plastic pellets from the hopper tanks into the pipe extruder. Cantex uses the line to produce electrical PVC up to four inches in diameter for customers such as Home Depot and Lowes.

Intec also has started up a 150 HP ACS800 drive on a line used to extrude up to six-inch PVC. Following that, a number of puller motors will be retrofitted with ABB drives and motors. And just like the puller motors with the printer motors, the hopper motors and the mixing screw motors will be integrated, to optimize production and throughput.



Results-Driven Automation

Success Stories



**Very Smart Investment:
New Line Capacity for 1/8th
the Cost**

Berry says upgrading an existing extrusion line with ABB drives is one-eighth the cost of building a new one, and production in the upgraded lines has “increased by hundreds of pounds of PVC per day. We’ve basically added the capacity of one more extruder, without having to put a new line in.” ABB’s ACS800 drives provide precise, unmatched motor control for injection molding machines, extruders (single-, double- and multi-machines), melt pumps and pelletizers.

The ACS800’s proprietary, open-loop, DTC technology eliminates the need for encoders (electrical disks placed at the motor/load end that provide specific information about load changes and motor speeds), and enables drives to calculate motor torque and flux 40,000 times per second. The open-loop speed and torque control is so precise, the drives can adapt to and handle changes in load immediately. That means full torque (twisting power) at zero motor speed, and high-operating torque at low speeds. Such speed control has eliminated all the previous speed variation of the DC equipment, which has reduced downtime and minimized scrap. Such new drive and motor combinations have eliminated any need for replacing DC motor brushes and maintaining them; the blower (and noise) that kept the DC motor cool has been eliminated, too.

**Technology Becomes New
Standard**

In addition, the ACS800 drives are quieter, which is important for a plant in a residential area. Cantex has standardized on ABB drives, and Reno is one of a number of plants the company owns and operates.

“This plant operates 24/7,” Berry notes, and adds, “ABB’s system is the difference between noon and midnight.” The upgrades mean the Cantex Reno plant can produce more product from existing equipment, rather than building an expensive new extruding line.



Improve Your Bottom Line and Environmental Stewardship with Energy Management Solutions from Eaton

Energy Management is a continual improvement process involving measurement, analysis and implementation of programs to reduce usage and costs. No longer is energy considered a fixed cost of doing business; today's technology and energy market dynamics make this one of the most promising opportunities for cost reduction and environmental stewardship.

The Environmental Protection Agency (EPA), in collaboration with a financial services firm, researched the impact of Energy Management on a company's bottom line. The results are encouraging: companies that have implemented effective Energy Management programs are not only strong environmental performers, but they are also strong financial performers, outpacing the competition by 20 to 30 percent.*

Many companies, however, require additional expertise and resources to develop an effective Energy Management program that identifies and fully capitalizes on every opportunity to conserve energy and save money. By outsourcing this critical cost-out responsibility to Eaton - Electrical Services & Systems (E-ESS), you can be confident that every conceivable option will be explored. Our experts will perform a complete Energy Management needs assessment and submit a comprehensive report of the findings and recommendations. In most cases, implementation of the measures recommended by E-ESS results in a payback period of two years or less.

Getting Started

An E-ESS Energy Reduction Review team will become familiar with your facility, your staff and your business objectives. They will analyze historical reports and energy bills and do a physical analysis of the facility and equipment. The following will be included in the needs assessment and report as applicable:

- HVAC Systems
- Lighting Systems and Controls
- Compressed Air Systems and Controls
- Paint Processes
- Motor Applications
- Utility Bills, Rates and Riders
 - ▲ Power Factor
 - ▲ Demand Control and Peak Shaving
- Building Automation Control Systems
- Plant and Office Operations

The final report will contain recommendations that can be implemented by E-ESS, resulting in improved energy efficiency and a healthier bottom line.

A full Power Quality Assessment can be added at the time of the Energy Reduction Review.

A Look at the Numbers

Example 1

A partial needs assessment was conducted at a facility that manufactures heavy-duty, on- and off-road Class 8 trucks. The results indicated potential cost savings surrounding compressed air usage, so the compressed air connectors, hoses and other associated parts were upgraded. The plant realized an eight-month payback. The following is a single measure of this program:

■ Material cost	\$23,000
■ Labor cost	\$10,000
■ Total investment	\$33,000
■ Annual savings	\$48,000

Simple payback period = 8.25 months

Example 2

A commercial building in Pittsburgh, PA had a low Power Factor (PF) and was penalized \$1,932 per month by the utility. A \$12,000 Power Factor Correction Capacitor Bank, expertly installed by E-ESS, corrected the PF to 0.95 and eliminated the penalty, resulting in a payback period of approximately six months.

Facility Profile

- 1500 kVA transformer
- 1146 kW demand
- PF range = 0.86 to 0.88

Utility Charges

- \$12/kW demand charge (kWD)
- Penalty below 0.95 PF
- PF penalty multiplier = 1.14 (PFM)
- 1307 kW (billed) — 1146 kW (actual) = 161 kW (penalty)

ROI Calculations

- Billing kW based on PFM x kWD = 1.14 x 1146 kW = 1307 kW
- Penalty based on cost of 161 kWD = \$12 x 161 kW = \$1932/month

Simple payback period = \$12,000/\$1932 = 6.2 months

A Case Study in Savings

E-ESS engineers applied their knowledge to Eaton facilities to identify cost-saving measures via effective Energy Management practices. Listed below are just some of the savings identified in this ongoing project:

- **Transmission Plant** — Process change. Annual savings: \$75,000.
- **Fluid Power Plant** — Water, lighting, compressed air and process change. Annual savings: \$150,000.

- **Automotive Plant** — Lighting and compressed air improvements. Annual savings: \$126,000.
- **Aerospace Plant** — Lighting, compressed air, cooling tower operation and meter consolidation. Annual savings: \$177,000.

To date, annual savings in excess of \$500,000 have been identified, and there's much more to come. Contact your local E-ESS office today to learn how you can benefit from the Energy Management expertise of E-ESS engineers.

ENERGY STAR®

Eaton is an ENERGY STAR partner, solidifying our commitment to providing energy-efficient products and services. To earn the ENERGY STAR, we must meet strict energy efficiency criteria set by the US Environmental Protection Agency and the US Department of Energy.

A strategic approach to Energy Management can produce dual benefits — for the bottom line and the environment. EPA's ENERGY STAR partnership offers a proven Energy Management strategy that helps in measuring current energy performance, setting goals, tracking savings and rewarding improvements.

As an ENERGY STAR partner, Eaton has access to tools and resources that help identify the value of improved energy performance and its impact on profitability.

- Uncover opportunities for improvements and set performance goals
- Justify projects in powerful financial terms
- Set energy performance goals for new buildings
- Demonstrate project success
- Gain recognition

Integration Solution Summary

Highly trained E-ESS engineers can implement improvements identified via the Energy Management needs assessment. Services include procurement, installation and commissioning of all power systems products in support of the recommendations.

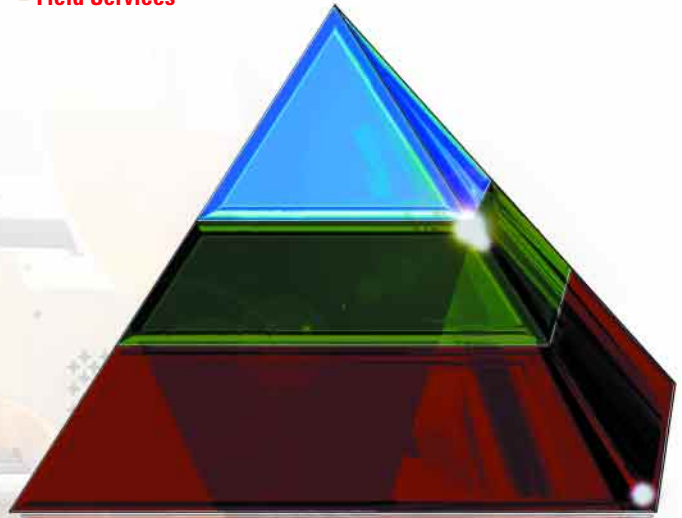
Examples of efficiency and cost reduction measures include, but are not limited to, the following:

- **Power Factor Correction Capacitor Banks** — Correct low power factor to reduce or eliminate utility penalties and typically provides a two-year or less payback period.
- **Energy Information Services** — Internet-based, real-time tools to help you better understand and reduce your energy costs on an ongoing basis.
- **The Instant Response CenterSM** — Integrates existing power management assets with the latest predictive diagnostic technologies, and then provides this information in real-time to our knowledge experts via a secure Internet connection, mitigating or avoiding unplanned outages.

- **Variable Frequency Drives** — Conserve energy by reducing the horsepower for applications when excess horsepower is not needed.
- **Reduced Voltage Soft Starters** — Eliminate the inrush of electricity when starting motors, impact demand and extend the equipment life.
- **Lighting and Load Control Solutions** — State-of-the-art lighting technologies to reduce energy costs and improve the overall lighting systems.
- **Power Management Systems** — Manage energy costs, troubleshoot power quality problems, and ensure the reliability and integrity of your electrical distribution system from the convenience of your PC.
- **Compressed Air Systems** — Reduce energy by optimizing the demand and supply sides of the compressed air system.
- **HVAC Control Systems** — Reduce energy and improve the plant and office environment.

Integrated Solution Summary

- **Asset Optimization**
- **Knowledge Management**
- **Integrated Project Solutions**
- **Power Systems Engineering Solutions**
- **Power Systems Modernization**
- **New Equipment Services**
- **Field Services**



For further information, please visit our Web site at: www.EatonElectrical.com and click on Support, then Services & Systems, or contact your nearest Eaton - Electrical Services & Systems office.

For emergency service, call 1-800-498-2678 and ask for the office nearest you.

* ENERGY STAR — The Power to Protect the Environment through Energy Efficiency, EPA 430-R-03-008, July 2003.

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Aluminum Manufacturer Productivity Increase

Process improvements and controls upgrades improve reliability and profitability at one of the industry's largest North American facilities

Results

Improved profitability

- Estimated profit increase of nearly \$1.5 million annually
- Customer payback on \$750K investment in six months

Upgraded controls and improved diagnostics

- Upgraded DC power bridges to digital drive control
- Upgraded analog control to digital controller platform
- Reduced the electrical maintenance
- Improved operator set-up and line diagnostics

Increased tension level line productivity

- Increased line speed by 50%
- Increased electrical reliability
- Decreased scrap from off-flat material
- Reduced material requirements by 129 feet per coil

Greater Productivity with Lower Material Cost

The original need to increase tension level line productivity results in wide-ranging process improvements for higher profitability

A leading manufacturer of common-alloy aluminum sheet from recycled metal, with advanced technology mills operating across the U.S., provides a variety of alloys and products for diverse industries—including metal distribution, transportation, building and construction, and consumer durables. As an industry leader in manufacturing superior quality coated aluminum products, the company operates coating lines at some of its plants—including its showcase plant, which is one of the largest such facilities in the U.S.

It was at this U.S. facility that the company began experiencing a number of product returns due to off-flat material. The aluminum manufacturer identified a need to increase their tension level line productivity—and to reduce the number of off-flat returns from their customers.



case study

Responding to the query from the aluminum plant's Finishing Electrical Engineer, the GE Drives and Controls Field Engineering team was able to conduct a productivity study that determined a range of process improvements GE could provide to the plant.

Working closely with the customer's engineering and production teams, GE proposed a controls upgrade that could increase line speed, improve reliability, reduce scrap, and improve the drive system's limited diagnostics.

Installation in Just Ten Days

By implementing the project in stages—a pre-work phase and a system-conversion phase, GE's Drives and Controls field engineers were able to complete the upgrade within a ten-day outage time.

GE's team of specialists upgraded the aluminum sheet manufacturer's existing Siltrol+ power bridges to DC-2000 controls and upgraded the GE Directomatic II analog control to a GE Innovation controller. These upgrades resulted in dramatic improvements, including:

- **Increased yields.** Tension level line speed was increased by 50%, allowing the number of aluminum coils produced to rise from 17 to 20 coils per shift. This resulted in a total increase of 3000 coils per year for a profit of \$1.3M.
- **Increased productivity.** GE's new strip transport technology included auto payoff reel stop and digital elongation control—yielding material savings of 120 feet per coil for additional savings of \$200K.
- **Increased quality.** The new process greatly improved the quality of the end product—resulting in fewer customer complaints, returns, and business that otherwise might have been lost due to off-flat material.



Extending the Life Cycle and Reducing Maintenance

In addition to extending the life cycle of the Siltrol+ drives, the upgraded equipment eliminated the need for difficult-to-obtain spare parts—such as analog drive/control printed circuit cards, field terminal board assemblies and field exciters.

Payback in Six Months

Within six months of GE's project completion at this mill, the plant was able to achieve payback of their \$750K investment. Since completion of the project, the tension level line is continuing to operate with the high reliability required by the customer, and occasional routine service is provided by GE.

Along with this successful installation, GE has worked closely with the customer to complete several additional projects in the same area of this plant.



For more information about GE Industrial Services and our Drives and Controls offerings, contact your GE representative.

Ann Arbor Municipal Water Treatment Plant Develops Strategy, Adopts Technology to Reduce Electricity Costs

Rockwell Automation power monitoring equipment helps facility reduce energy consumption by up to 10 percent.

Solutions

Energy Management

- Allen-Bradley® PowerMonitor™ 3000 and Rockwell Software® RSPower™ Plus software obtains real-time energy usage via Ethernet to reduce peak demand charges

Results

Reduced Costs

- Saved up to an estimated \$40,000 per year by precisely tracking and controlling energy usage
- Reduced energy consumption by up to 10 percent

Improved Sustainability

- Reduced energy consumption has resulted in a more sustainable operation



“Our plant is one of the most complex in the state because of the quality of our source water, which primarily comes from the Huron River.” – Brian Steglitz

Background

With state and local budgets shrinking, and the cost of electricity rising, municipalities need to shave utility costs wherever they can. As major energy consumers, water treatment plants are a natural place to start.

Operators at the water treatment plant in Ann Arbor, Mich., developed a strategy to help significantly lower the electric bill with a simple solution – monitoring and controlling power use to avoid the high charges that come with operation during peak demand times.

Every day, the Ann Arbor plant processes an average of 14 to 15 million gallons of water, and distributes it to 25,000 homes and businesses in the city and beyond. The treatment process is highly complicated because of the water’s source.

“Our plant is one of the most complex in the state because of the quality of our source water, which primarily comes from the Huron River,” said Brian Steglitz, the plant’s senior utilities engineer.

While flow through the plant is primarily by gravity, there are two locations where low head pumps are required to drive the flow through the remainder of the plant’s treatment processes. In addition, the plant uses two large pumps to backwash the 26 multimedia filters that are used to polish the water. These pumps, along with the high service pumps that deliver water to several portions of the city, consume the largest quantity of energy at the treatment plant. The next largest energy demand is exhibited by the plant’s ozone system which uses energy to convert liquid oxygen to ozone for disinfection.

LISTEN.
THINK.
SOLVE.™



Ann Arbor invested in Rockwell Software RSPower Plus software and four Allen-Bradley PowerMonitor devices with Ethernet, which connect the devices to the process control network.

Solutions

The Ann Arbor plant invested in four power monitors to keep a watchful eye on its four substations and transfer energy-use data to the operator's computers. Unfortunately, the original power monitors were "rudimentary" Steglitz said, and the components were failing. The situation prompted plant managers to turn to Rockwell Automation, the provider of their existing control platform.

"Our history with Rockwell Automation products has shown they are extremely reliable," Steglitz said. "And when it comes to delivering clean and safe water, reliability is critical."

Ann Arbor invested in Rockwell Software® RSPower™ Plus software and four Allen-Bradley® PowerMonitor™ devices with Ethernet, which connect the devices to the process control network. Data on electrical usage is then communicated to the SCADA

system, which displays real-time electrical usage information, allowing operators to make decisions that optimize energy usage. For instance, operators can postpone noncritical pumping and delay backwashing the filter until nonpeak hours.

The system also alerts operators when the plant is approaching peak limits, allowing them to quickly react and ramp down electrical usage wherever possible.

Results

The investment in the PowerMonitor devices quickly paid off. Steglitz estimates the Ann Arbor treatment plant saves between \$30,000 and \$40,000 per year by precisely tracking and controlling its energy consumption.

Challenge

Like managers at most water treatment facilities, those at the Ann Arbor plant routinely paid the electric bill without scrutinizing the individual charges included. When looking to cut costs, they took a closer look at the plant's monthly bills and realized that they were paying thousands of dollars in peak energy charges that could potentially be avoided.

"The plant was being hit with high electrical-demand charges – accounting for more than half of its energy bill," Steglitz said. "Our team knew we needed to find ways to stop throwing money down the drain."

To manage costs, managers needed to know exactly how much energy they were using – and when – to avoid peak-demand charges. The first step was to understand the rate structure of the plant's electricity supplier.

Like many energy providers, the local provider for the Ann Arbor plant has different rate structures for different customers. Major energy users, like the water treatment plant, pay more for electricity during peak hours of 11 a.m. to 7 p.m. If they exceed their predetermined allotment for peak-demand energy use, they must pay additional "demand" charges.

Those charges can add up quickly. For example, if operators run the backwash pump for just 30 minutes during peak hours, the demand charges could total as much as \$4,000.

"Operators needed real-time data to show them when they were approaching electrical peaks, so they could avoid nonessential tasks that would impact our demand charges," Steglitz said.



"Our history with Rockwell Automation products has shown they are extremely reliable... and when it comes to delivering clean and safe water, reliability is critical."

Steglitz expects these types of savings to increase as energy intensive water treatment technologies become more commonplace.

“Water treatment processes are becoming more energy intensive,” Steglitz said, referring to the advent of disinfection methods using ozone and ultra-violet light, as well as the expanding use of reverse osmosis and other membrane technologies.

Steglitz suggested that many other municipalities could save on energy expenses – and become more sustainable – by adopting the monitoring solution that the city of Ann Arbor implemented. “Saving money is not the only benefit. Conserving energy is simply the right thing to do.”

The results mentioned above are specific to Ann Arbor Municipal Water Treatment Plant's use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

Allen-Bradley, PowerMonitor, Rockwell Software and RSPower are trademarks of Rockwell Automation, Inc.

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Energy management solutions



Challenges

In today's industrial landscape, many businesses are facing fundamental energy management challenges including:

- Enhancing business performance by meeting production schedules, emissions targets, and quality requirements, while also lowering costs
- Solve the total equation of human behaviour, processes, and technologies
- Optimize energy consumption while maximizing productivity



Benefits

Efficient



Save up to 30% energy consumption

Solution in brief

With Schneider Electric, the global specialist in energy management, you can achieve a whole new level of energy optimization, from the device level right to the enterprise level.

Our solutions provide real insight into your energy consumption, in content with your process, **helping you identify energy savings while also meeting your production goals.**

Optimizing energy means much more than just reducing costs, it is about improving the overall efficiency of your enterprise.

Value proposition

Proven approach

Energy Consulting Services help you to deliver energy savings through site energy audits and detailed analysis, as well as long-term recommendations and action planning.

Optimized architecture

EcoStruxure architectures are designed to optimize your plant with Schneider Electric and/or third party equipment. PlantStruxure, Schneider Electric's process automation system, connects automation and control to energy monitoring to enable production and process energy optimization.

Based on business KPIs

Our system turns energy information into key performance indicators and helps you make decisions about energy use, supplier allocation and load shedding or shifting opportunities from a single point based on business KPIs.

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Differentiation factors

- PlantStruxure, Schneider Electric's architecture, is a key building block of our comprehensive energy management portfolio, EcoStruxure, which gives us the **unique capability to deliver an integrated architecture for both process management and energy management.**
- PlantStruxure's automated Energy Management Libraries actively **reduce energy consumption by removing energy waste** at the source of overconsumption, **making processes and energy more efficient.**
- While the first step to reducing energy consumption per unit of production is diagnosis, it is not enough. To get results, industry customers need to invest in a long-term energy efficiency strategy to realize quantifiable gains year-on-year.

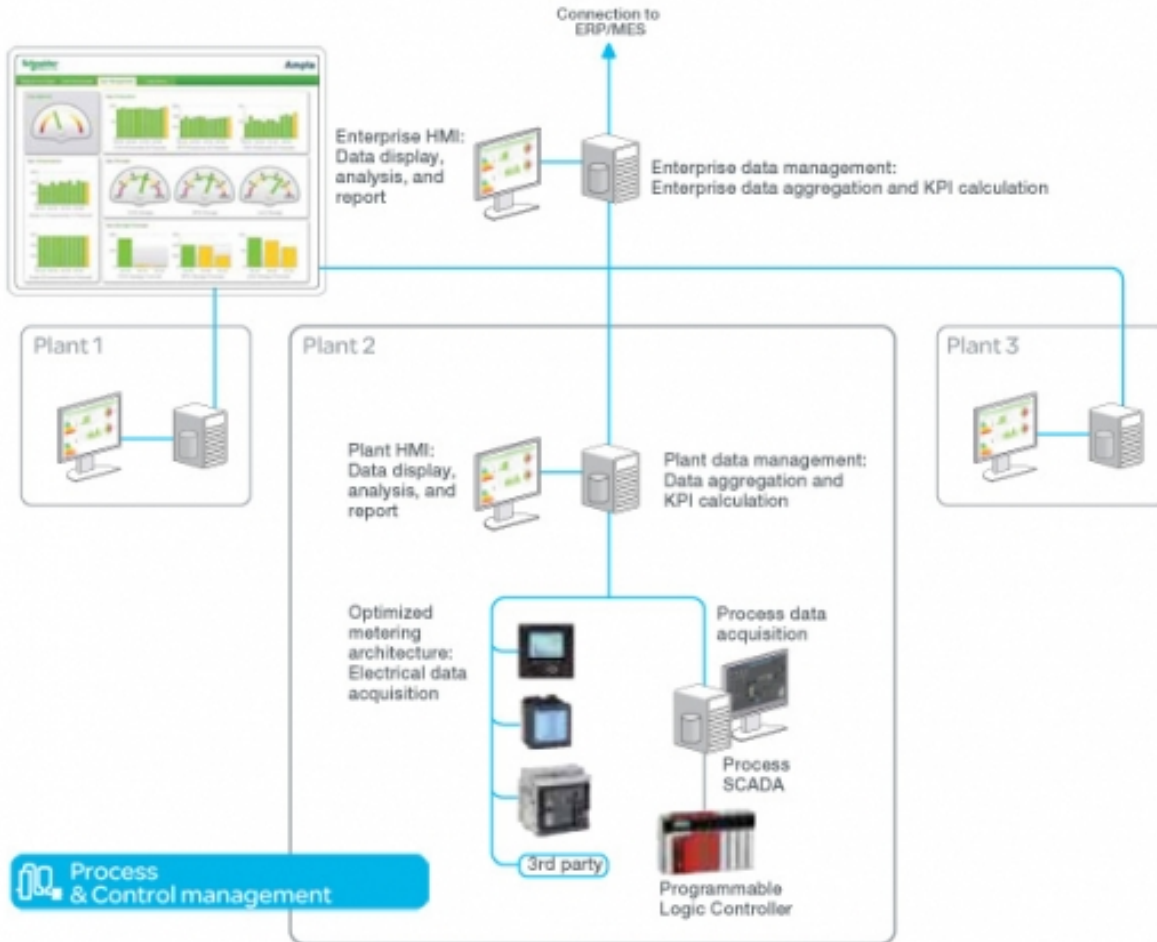
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Architecture



Main characteristics

A structured and continuous approach

- Discover energy waste throughout your process and create an action plan to deliver results.
- Connect automation and control with energy monitoring systems to create an intelligent, energy aware infrastructure.
- Automate active energy management, gain insight into energy consumption in context with production output and identify more opportunities for savings.
- Manage energy as a production variable and reduce waste within the process with continuous improvement initiatives.

Special Treatment

The residents of Orlando and nearby communities are more likely to see lightning strike than to have their toilets run dry. Extensive high-tech upgrades, including new Siemens automation and control systems, at Orlando's three advanced wastewater treatment plants have assisted city staff in its quest to process more sewage and gray water more effectively and reliably than ever before.

As growth continues to put more demand on Florida's fresh water supplies, more communities in and around Orlando are counting on reclaimed water to meet many of their residential and business needs. Water shortages, stringent environmental protection laws, surging sewer service demand, fewer

qualified workers, and a virtual rate freeze are the big challenges being tackled by a smaller but smarter wastewater management team.

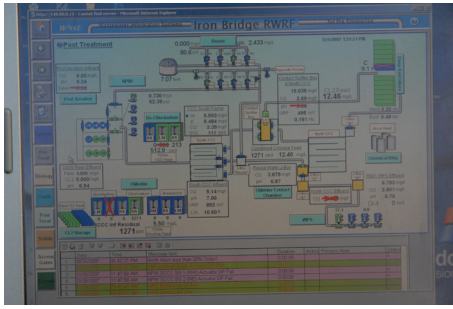
"It's expensive and tough to find experienced and qualified people in this business. Automation has solved that issue for us," explained industrial automation manager, Bill Wood, as he walked the southern end of the city's Iron Bridge Regional Water Reclamation Facility. "It used to take a dozen or more operators to run this plant alone. Even though the operation has grown significantly in scope, running the plant is now more manageable and precise thanks to the vision of Orlando's public works and environmental leadership." The Iron Bridge plant was originally built in the 1980s to treat about 5 million gallons of wastewater per day. After several modifications and upgrades, it can now treat and reclaim up to 40 million gallons in that same 24 hours.

"The automation simplifies operators' decision making. All the information they need to run the plant is at their fingertips no matter where they are," said Wood, whose team has installed a totally integrated Siemens automation and energy system to assist in the operations and power distribution throughout the plant.



Orlando works with Siemens automation to achieve reliable, cost-effective wastewater treatment and recycling.

Reliable, cost-effective wastewater treatment and recycling.



Standardized on the Siemens S7-300 programmable logic controller (PLC) and Siemens PROFIBUS and Industrial Ethernet networks, the automation platform controls everything from the flow of electricity to the amount of reclaimed water being safely discharged from the plant. Treated water is sent to the Little Econ River and the Orlando Wetlands Park, while pipelines also deliver purchased reclaimed water to residential neighborhoods, golf courses, citrus groves and other customers as far as twenty miles away.



"Our daily objectives focus on keeping the toilets flushing and meeting the growing demand for wastewater treatment and reclaimed water across the region," Wood noted. "We can't reach those goals without the reliability and flexibility provided by Siemens automation and communication systems."

The Eyes and Ears of the Plant

Iron Bridge is a 320-acre operation – a series of treatment processes that must be closely monitored and managed. A Siemens PLC at the master pumping station reads real-time intake levels and signals variable frequency drives (VFD) when to speed up or slow down the eight

400-horsepower pumps designed to handle peak loads of wastewater rushing into the facility through an 84-inch pipe.

Halfway across the plant, Siemens flow meters are measuring the air being pumped into aeration tanks where organic waste is consumed by bacteria. A PLC controls the air flow, records and stores data produced during the intricate, five-stage biological process known as Bardenpho.



Siemens human machine interface (HMI) touch screens located inside every process station and linked to the facility-wide Industrial Ethernet network offer operators a real-time view into every layer of the plant. Siemens' WinCC supervisory control and data acquisition (SCADA) software offers that same vantage on the laptops, desktops and kitchen countertops of authorized plant and city personnel.



"It used to be a real juggling act for an operator to ensure that water leaving the plant through three separate exits met a variety of strict environmental standards for the river, wetlands and irrigation," explained Wood, as he clicked on the latest plant discharge readings on his office computer. "Now we trust Siemens automation to handle this once intimidating task with web-based WinCC SCADA software integrated over our S7 platform that provides reliable snapshots of our operation status and water

conditions anytime, anywhere. Coupled with the operator's expertise, the PLCs have become the eyes and ears of the plant and they have changed the way we do business," Wood noted.

Lowering Operating Costs

Orlando has three advanced wastewater treatment facilities and 210 lift stations, which pump sewage away from the homes and neighborhoods to Iron Bridge or one of two other plants, Water Conserv I and Water Conserv II. Orlando, like most municipalities, treated and operated each facility autonomously for decades. To reduce costs and increase efficiency, the plants were integrated using Siemens automation, WinCC and PROFIBUS and Industrial Ethernet networks.

"Rate freezes and infrastructure, inventory, and labor requirements put a real squeeze on productivity, so we had to find a solution that would benefit all of our facilities," Wood explained. "Instead of having staff dedicated to a single plant, we now share our resources across the entire enterprise using Siemens automation."

"As the treatment plant grows with the city, we simply can't continue to staff up. It's too costly," noted Guy Mecabe, wastewater systems manager, who has been instrumental in the deployment of the Siemens automation system and the PROFIBUS and Industrial Ethernet networks. "The reach of our networks has grown ten times over in the last two years, as we've expanded our ability to monitor and manage the whole system 24/7 from just about anywhere using WinCC SCADA software."



Authorized managers, operators and technicians can view the Iron Bridge plant

Reliable, cost-effective wastewater treatment and recycling.

from any one of ten onsite Siemens HMIs or a remote computer. They can also monitor and control operations at Water Conserv I, Water Conserv II or the lift stations throughout the city without leaving the Iron Bridge plant. "Secure remote monitoring means I can respond to a trouble call in the middle of the night by simply tapping into any of the treatment facilities from home or wherever I am. It's amazing," said Mecabe. "And we couldn't do any of it without the reliability of Siemens."



"Because we can't physically push the buttons that start, stop and reset processes, we've called on the best technology to do it automatically and reliably. It's just one of many new cost-cutting practices we've initiated that are really making a difference on the bottom line," said Wood.

Powerful Savings

"A lightning strike could instantly cut power to this plant, but all the Siemens PLCs and networks feature UPS (uninterruptible power supply) redundancy. The controllers signal an outage, the generators come online and the plant never misses a beat," explained Wood, noting that Iron Bridge has been struck before because of its location in a central Florida region known as the "lightning capital of the U.S."

While Siemens automation is assisting in the operation of Orlando's wastewater treatment system, a full suite of Siemens generator switchgear, including breakers and protective relays, is standing by to make sure three 2800 megawatt generators never fail during emergency operation.

The Iron Bridge plant is a big consumer of power with a monthly Progress Energy bill that averages \$180,000. But the question of the bill's accuracy long nagged Wood and his counterparts. As part of a re-rating plant upgrade, Siemens 9600 and 9330 utility-grade power meters were installed at the plant's power intake and at each of the facility's switchboards and MCCs (motor control centers).



"Until now, we had no way to verify the accuracy of the electric bill. The Siemens metering, linked to our networks, offers real-time consumption data and monthly peace of mind, as well as an effective way to identify the equipment power hogs in the treatment process," noted Wood, referring to the PLC-based system's ability to monitor and enhance power consumption at the device level. "That's a powerful capability that we fully plan to leverage in the months and years to come."



Code to Success

There's no secret to the successful control evolution at the Iron Bridge plant. There's no hidden blueprint. It's more like an open book. Bill Wood, Guy Mecabe and the team are more

than happy to share their experience with other industry professionals like Pat Brechbill, a wastewater treatment specialist with the Cobb County system near Atlanta who recently toured Iron Bridge.

"I'm most impressed with the amount of system information and feedback reports available and how it's easily and quickly displayed using Siemens HMIs and WinCC," said Brechbill. "A single purple PROFIBUS network cable has made wiring, maintaining and troubleshooting the plant easier and faster than a conventional facility. All in all, Orlando has one of the most innovative and efficient systems I've ever encountered."

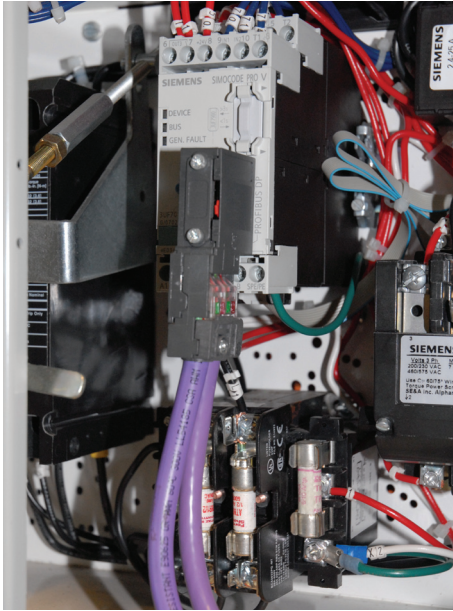
"I've seen too many treatment facilities spend lots of money on upgrades only to end up with outdated and patchwork solutions," explained Wood. "So if we can help steer a community in the right direction, why not offer them a good look at what we're doing here with automation using Siemens equipment."

What Wood and Orlando have done is design an upgraded treatment system with the future in mind. Every piece of Siemens automation and control equipment and software – from the PLCs and HMI touch screens to the WinCC that provides the graphical, insightful views into the plant – is modular in design so we can keep adding new functionality and applications along the way," explained Wood. "We could run this entire plant on two Siemens PLCs. But we've put a PLC in every process station to minimize our risk through a distributed architecture that's given us the ability to do whatever we need to do when demands change in the future."

Even the minimal hardwired functionality in the plant is future-proofed with a recent addition to the plant's automation platform – a multipurpose workhorse from Siemens called SIMOCODE. "SIMOCODE is a very flexible product," said Wood, opening a VFD cabinet in the Bardenpho process station. "We've actually changed our specifications to include a SIMOCODE in

Reliable, cost-effective wastewater treatment and recycling.

every starter bucket, so we can remotely check the status of smaller feeder breakers, as well as detect and reset faults over PROFIBUS.”



Siemens SIMOCODE has dramatically reduced the wiring required in the motor control centers at Iron Bridge. “You can see how clean this cabinet is compared to the elaborate conduit chases with cables running back and forth in control rooms like this,” explained Hester. “Instead a SIMOCODE has been placed in each bucket

as a piece of I/O that can easily be added and viewed on the network. It’s all part of a totally integrated automation solution that works seamlessly.”

“With SIMOCODE, I have very smart switchgear,” said Wood, who is just beginning to see the power savings and preventative maintenance benefits that SIMOCODE can deliver each month. “SIMOCODE enables us to make better informed, accurate operational decisions that will help us dramatically reduce operational costs across the board. That’s powerful.”

Community-Minded Rewards

For Bill Wood, Guy Mecabe and the Orlando team, wastewater treatment is all about protecting the community and the environment. “Most people aren’t



thinking about everything that goes into safely returning treated water back into the environment,” said Mecabe. “It includes state-of-the-art automation that runs reliably for weeks, months and years enabling us to put clear, clean water back into the aquifer with confidence.”



“This is the product of our treatment plant,” Wood said, holding up a beaker full of clean water bound for the Little Econ River. “Siemens automation helps give us the confidence and information we need to secure the most important ROI of all – the return of clean water to our rivers, streams and irrigation systems across the region.

That’s special treatment.”



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