The Green Scene
How businesses are saving big bucks with natural gas

- Strategies for energy efficiency
- The latest natural gas technology
- Tools for building automation

presented to you by

Energy Solutions Center
for Commercial Buildings

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Natural Gas
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Fueling the Green Movement

How a simple product can boost the efficiency of natural gas even higher.

Today’s high-efficiency products and technologies are helping building owners save money and resources. The cleanest-burning fossil fuel available, natural gas helps improve air and water quality, especially when used in place of more polluting energy sources. When natural gas burns, virtually no harmful pollutants are produced — which means that when building owners cut costs and use less gas, they’re greening their bottom line and the environment.

Natural Gas Savings

Heated air in an enclosed space has a natural tendency to stratify, creating a floor-to-ceiling temperature gradient, or difference. For commercial facilities with high ceilings, this can mean energy loss that significantly increases a building’s operating costs.

Heat stratification at the Hudson’s Bay Company (Hbc) distribution facility, the Brampton Logistics Centre, in Ontario, Canada, was causing discomfort for operations associates and driving up energy bills. Attempts had been made to improve the complex’s heating and air circulation, but these measures had limited impact. On cold days, heat wasn’t getting down to the floor where it was needed, leaving associates chilled or encumbered with winter coats.

In operation since 1975, the Brampton Logistics Centre was experiencing discomfort and increased energy costs due to heat stratification. Today, high-volume, low-speed fans, which have aerodynamically designed airfoil blades to help destratify air, can improve working conditions and save on energy costs. Photo courtesy of Enbridge Gas Distribution.

High-volume, low-speed fans, which have aerodynamically designed airfoil blades to help destratify air, can improve working conditions and save on energy costs. Photo courtesy of Enbridge Gas Distribution.
High-volume, low-speed (HVLS) fans significantly reduce stratification, cutting the difference between floor and ceiling temperatures by as much as 15°F.

Destratification yields natural gas savings because the heating system does not need to cycle as often.

HVLS fans can reduce summer floor temperatures by as much as 6° to 8°F.

One HVLS fan moves 12 times the amount of air a large high-speed fan does, while costing less to operate.

Specifically designed for commercial spaces, the Element fan from Big Ass Fans uses a gearless motor to maximize energy efficiency and an airfoil and winglet system that optimizes airflow.

In recent years, Hbc has been looking for new solutions to improve building performance and comfort at its 33-year-old distribution facility. Their challenges included outdoor air ingress (27 receiving docks and 30 shipping doors) and stratification (14°F difference between floor and ceiling temperatures in the winter).

The solution: seven high-volume, low-speed (HVLS) ceiling fans installed near shipping and receiving docks. These fans dramatically improved working conditions and are set to trim an estimated $30,000 per year from the facility’s natural gas bill. “This is a great, simple technology that should be integrated in all buildings with high ceilings,” says Bill Chihata, program manager for Enbridge Gas Distribution. “Many of the warehouses that I talked to have installed these large diameter fans, and the payback is really quick.”

HVLS fans are aerodynamically designed airfoil blades that help to de-stratify air, directing it more efficiently, with less turbulence and with a greater airflow volume. The fans can be operated at very low speeds (10 to 15 Hz) in winter to move warm air downward without creating an uncomfortable draft, and sped up (30 to 60 Hz) during the summer to provide a cooling effect. Properly deployed, HVLS fans can virtually eliminate stratification while using substantially less energy than high-speed fans.

Brian Benson, director of Hbc facilities and energy management, says the project delivers several wins: energy savings, environmental benefits and employee comfort. “Enbridge incentives have been very important in making the business case and are a strong driver for replication at other locations,” he says.

Fans of HVLS
In 2007, Benson and Hbc portfolio manager Rudy Stewart decided to proceed on a pilot project basis to install a limited number of HVLS fans at the Brampton Logistics Centre to assess whether they could be used more widely throughout Hbc facilities. Stewart put together a business case and call for proposals.

Ventilation specialists Envira-North Systems Ltd. won the bid with a proposal to install their Altra-Air HVLS fans selectively where climate control problems were the most challenging, at the receiving and shipping doors. Enbridge Gas Distribution worked with Hbc and the supplier to provide the strongest business case by establishing energy savings projections and determining the project’s eligibility for Enbridge energy-efficiency incentives.

The result was seven new overhead fans that achieve 100 percent coverage of the areas in front of the loading and receiving doors. During an unusually long, cold winter in 2007–08, Stewart received favorable feedback from associates about the warmer, more comfortable work environment. The fans are expected to drop “real feel” floor temperatures during the summer months by as much as 8°F.

Enbridge uses a proprietary spreadsheet application to calculate the natural gas savings from installation of HVLS fans. Based on the area covered and the efficiency of the fans in de-stratifying heated air, Enbridge estimates that Hbc will save 61,407 cubic meters (approximately 22,336 therms) of natural gas annually.

Based on these energy savings, Hbc received an Enbridge energy-efficiency incentive of $3,070. With this incentive, Hbc will recover their investment in less than two years. The increased efficiency is expected to save Hbc $30,000 per year at this site. “This project is a logical fit with Hbc’s commitments to a safe, comfortable workplace and to environmental responsibility,” Stewart says.
Keeping Facilities in Top Shape

Cx and RCx processes help ensure successful systems and energy savings.

People regularly get check-ups to make sure they’re in good physical condition. Likewise, vehicles get annual inspections to ensure that everything’s operating properly. But how does one make sure that buildings and their equipment are working as precisely as they should?

The answer is commissioning, or Cx — the systematic, quality-focused process of ensuring facilities, systems and equipment perform according to design intent. Commissioning is a quality assurance–based process that delivers preventive and predictive maintenance plans, tailored operating manuals and training procedures.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) defines commissioning as a “quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria.” In other words, the process assures owners and occupants that the building will meet their needs and expectations.

Commissioning for existing buildings (also called retrocommissioning, or RCx) may require developing new functional criteria to address the owner’s current requirements for system performance. Retrocommissioning is a systematic process of investigating, analyzing and optimizing the performance of building systems by improving their operation and maintenance to ensure continued performance over time. This process helps building systems perform interactively to meet the owner’s requirements.

Why It Matters
Making sure building owners get what they pay for — that’s really where commissioning is important, says Stephen Bareuther, major account representative for UGI Utilities, a natural gas and electric utility headquartered in Reading, Pa. “Considering today’s high-tech equipment, the commissioning process is especially important,” he says. “It ensures that everything is installed and operates correctly.”

New equipment interfaces with complex systems that handle a great deal of input, Bareuther explains, and the equipment and systems all need to communicate. For instance, UGI was working with a local retirement community that installed Capstone MicroTurbines — compact, turbine generators that deliver electricity on-site or close to where it’s needed. “It took them some time and effort to get the system working correctly,” he says. “Now they’re happy with their successful system and are expanding it.”

In recent years, commissioning and retrocommissioning have become a part of the commercial building mainstream.
and were added to the prerequisite for LEED certification, which is perhaps the most recognized green building certification process in North America. Benefits of commissioning include:

- Energy efficiency
- Improved building performance
- Improved operator and maintenance knowledge and training
- Reduced costs — first and life-cycle costs — related to construction, energy efficiency and maintenance
- Reduced warranty callbacks
- Improved documentation
- Fewer occupant interruptions
- Improved indoor air quality
- Smoother building turnover and occupancy
- More useful operation and maintenance (O&M) manuals

But it’s the energy savings that first attracts many building owners. Some estimates show that a commissioned building saves 10 percent to 20 percent of the total utility cost compared with a noncommissioned building. All forms of energy are expensive right now, Bareuther says, highlighting the importance of commissioning even more, especially its role in energy savings. “Commissioning ensures you get what you pay for and that your system is highly efficient. The result is a significant cost savings, which can help offset the price of energy.”

Commissioning research organizations report that as a direct result of every $1 invested in commissioning, owners can save $4 in operation over the first five years of occupancy — an excellent return on investment.

Case in Point

In 1998, Armstrong World Industries built their new corporate headquarters in Lancaster, Pa. The 126,000-sq.-ft. commercial office space was constructed with the newest technologies in green building design and innovation. Commissioning was included in the process.

At that time, LEED-NC was still in its pilot phase, and the corporate headquarters wasn’t seeking early certification. Nearly 10 years later, thanks to stringent documentation, design specs and building systems documentation, the building applied for and received a LEED-EB Platinum certification in 2007. The building was so energy efficient and sustainable, and the documentation so comprehensive, that short of a few upgrades to water efficiency, only minor physical changes were required for certification. The building also received the Energy Star label for energy savings.

During the LEED certification process, the building underwent a performance review and was recommissioned. The recommissioning process included a review of the operating protocol to verify that all systems were still operating and functioning as they were designed and intended.

“During the recommissioning project, we were able to verify that the building was working as designed and that we are in fact achieving the energy savings we had hoped. I estimate that we are saving about $20,000 annually on energy,” says James Baker, director of facilities management for Armstrong World Industries. “It was reassuring to discover during the recommissioning process that we weren’t going to have to undergo any major changes or upgrades to the building — it was operating as intended.

“We closely monitor our systems and we meter our electricity, steam and chilled water. With commercial buildings, regardless of age, it is crucial that you and your facilities staff really familiarize yourselves with the building. If you want to run a more efficient and comfortable building, know your operating systems and meter them.”

As a direct result of every $1 invested in commissioning, owners can save $4 in operation over the first five years of occupancy — an excellent return on investment.”

Natural Gas and CX

The Armstrong World Industries corporate headquarters building uses natural gas to produce steam for building environmental control. Natural gas is used for boiler operations to produce steam at 100 pounds of pressure. Steam is directly injected into the air stream for building humidity control. Additionally, the steam pressure is reduced in two stages: The first pressure reduction to 55 pounds is to reheat water for various HVAC systems’ operations, one of which is fin-tube radiation along window baseboards. The second pressure reduction is to 15 pounds and is used for air discharge preheating to temper the air being discharged into the interior workspaces.

UGI Utilities worked to support Armstrong World Industries with their capital project by providing them with information on the latest energy-efficient natural gas technology.

“Commissioning and the obvious energy savings ultimately affect the health of the business and the region. For UGI’s commercial gas customers like Armstrong, buildings that are achieving maximum energy efficiency decrease their overall utility costs,” Bareuther says. “This in turn improves the long-term health of the corporation. In addition to their corporate headquarters, Armstrong has two large manufacturing plants in our region, and the savings they achieve provides growth opportunity and ultimately job security for our region.”

FOR MORE INFORMATION

American Society of Heating, Refrigerating and Air-Conditioning Engineers
U.S. Green Building Council-LEED Rating System
The Building Commissioning Association
AABC Commissioning Group

www.ashrae.org
www.usgbc.org
www.bcxa.org
www.commissioning.org
Serving Up a Popular Dish

Restaurants use natural gas to decrease energy costs and meet the public’s growing demand for eco-friendly businesses.

Today’s restaurant industry makes up 10 percent of the U.S. economy and employs 13.1 million people, so when restaurants choose high-efficiency equipment for their facilities, they make a significant impact. And more of them are doing just that.

The National Restaurant Association reports that nearly a third of restaurants plan to allocate a larger part of their budget to greening their kitchens in 2008. A recent association survey shows that kitchen equipment that saves water and energy is the second-hottest equipment trend, following multi-purpose equipment.

High-efficiency gas products also help restaurants meet the growing consumer demand for businesses that are eco-friendly: 62 percent of consumers say they are likely to choose a restaurant based on its environmental friendliness.

Thinking Outside the Pizza Box

One national restaurant chain heeding the call to green action is Pizza Hut. Joe Tatsch, Dallas-based engineering manager for Pizza Hut, leads a team accountable for energy programs. When they began experiencing pressure issues that hindered fryer efficiency at a few locations, their team began working on a solution. "We worked with [manufacturer Pitco Frialator] to address our energy conservation goals," Tatsch says. "We had a great partnership with Atmos, which enabled us to demonstrate the benefits of these solutions to save energy."

Greg Anderson, commercial marketing manager for Atmos Energy — the largest natural-gas-only utility in the United States — serves as account manager for the utility’s MidTex Division and has been working with Pizza Hut to fulfill their gas service needs. "They were having pressure problems at some of their stores that were affecting how their fryers worked," he says. "I talked with them about replacing their existing fryers with high-efficiency natural gas units or installing retrofit burner kits to save energy, if they preferred not to replace fryers."

Tatsch and his team of engineers worked with manufacturer Pitco on installing high-efficiency fryers and SSH55R upgrades. The new fryers are low-maintenance and reach up to 70 percent thermal efficiency while delivering low flue temperatures and running a daily 30-second cleaning cycle to keep burners operating at optimal efficiency.

Pitco, which won the 2007 Kitchen Innovations Award from the National Restaurant Industry, has seen an upward trend in the green restaurant movement. "Restaurant operators stand to gain bet-
ter efficiency by upgrading their facilities, and utilities offer rebates to make that easier," says Skip Lawrence, technical sales trainer for Pitco. "The rebates really do make a difference."

Mark McCabe, product development manager for Pitco, says upgrades and purchases of high-efficiency equipment give restaurants opportunities to gain better efficiency in the long run. "The money they save far outweighs the up-front costs," he says.

An Eye on Savings
Analyzing for efficiency, Pizza Hut monitored the new high-efficiency gas fryers in three locations and retrofitted fryers in three locations for a six-week period. The team installed gas meters at the fryers themselves, comparing gas usage before and after installation. The bottom line, Anderson says, was a 30 percent energy savings with the new fryers, and a 28 percent savings with the retrofitted ones. They estimate annual gas savings of about $500 dollars per store where new high-efficiency fryers were installed and more than $400 per store where upgrades were made.

“We have some energy goals we’re trying to reach,” Tatsch says. “We’re looking at the full gamut of opportunities to reduce Pizza Hut’s energy carbon footprint.” To that end, since October 2007, Pizza Hut has been installing the Energy Star-certified, high-efficiency Pitco fryers in their stores nationwide.

In addition, Pizza Hut engineering director Homero Ortegon says, the company last year completed development and approval of a new oven that incorporates an Energy Management System. “It reduces idle gas consumption during periods when business is slower,” he explains. “The system has shown a 15 percent energy savings compared to our older ovens.”

Their energy programs, Ortegon says, are part of an overall Yum! effort to reduce their consumption 20 percent by 2010. Yum! Brands, based in Louisville, Ky., is the world’s largest restaurant company in terms of system restaurants, with more than 35,000 locations in more than 110 countries and territories.

### Annual Savings: Gas vs. Electric

#### FOR FRYERS IN USE 12 HOURS A DAY

<table>
<thead>
<tr>
<th>Number of Fryers</th>
<th>Gas Savings</th>
<th>Electric Savings</th>
<th>Annual Savings Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 fryers</td>
<td>$1,728</td>
<td>$4,416</td>
<td>$2,688</td>
</tr>
<tr>
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#### FOR COMBINATION OVENS IN USE 12 HOURS A DAY

<table>
<thead>
<tr>
<th>Number of Combination Ovens</th>
<th>Gas Savings</th>
<th>Electric Savings</th>
<th>Annual Savings Gas</th>
</tr>
</thead>
<tbody>
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<td>$620</td>
<td>$1,300</td>
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<tr>
<td>2 combination ovens</td>
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<td>$2,600</td>
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<tr>
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### Fast Facts

- In the past two years, more than 60 percent of restaurants nationwide have invested in energy-saving equipment.
- Conserving 20 percent on energy operating costs can increase profits by up to 33 percent.
- Half of what the average American spends on food goes toward dining at the country’s 945,000 restaurants.
- Restaurants use five times more energy per square foot than other commercial buildings.
- Restaurants use five times more energy in the kitchen than in the rest of the building.
- Spending on utilities consumes approximately 2.5 to 3.4 percent of total restaurant sales.
Small Businesses, Big Strides
Companies looking to go green have an easier job ahead of them than they may think.

Although large companies tend to make the headlines and work to pave the way for other businesses to follow suit, small businesses can have a significant impact on environmental change as well. Energy-saving measures and green business strategies such as carbon reduction, recycling and eco-friendly products can help small businesses go a long way toward reducing environmental impact and saving money.

Small businesses employ half of the private sector work force and use half of the electricity and natural gas consumed by the commercial and industrial sectors. In 2006, small businesses accounted for the majority of the 26.8 million businesses in the country, according to the Business Alliance for Local Living Economies (BALLE), an affiliation of 52 business networks spread across 22 states, Washington, D.C., and Canada.

The following two 2007 Energy Star Small Business Award winners illustrate the dramatic impact that small businesses can make.

Improving Energy Efficiency
In 2003, Tom and Linda Bullington purchased an old building and began operating three small businesses on the first floor and leasing six apartments on the second floor. The three businesses were a real estate company, mortgage lender and settlement service agency. They quickly realized their building needed to be more energy efficient.

The Bullingtons began by replacing all 70 windows with Low-E energy-efficient windows and increasing insulation in the attic to R38. The next hurdle to overcome was an old boiler that was only 50 to 55 percent efficient. The excessive heat loss resulted in the need to run the first-floor air-conditioning nearly year-round to compensate. Confronted with a confusing array of estimates and recommendations, the Bullingtons turned to the Pennsylvania Small Business Development Center (SBDC) at St. Francis University and its Environmental Management Assistance Program (EMAP) for guidance, one of many programs of its kind throughout North America.

The Bullingtons worked with Heather Fennessey, PE, a regional environmental specialist who works with businesses in the areas of on-site pollution prevention, energy-efficiency assessments and regulatory compliance issues. Since 2001, Fennessey has helped more than 200 small businesses.

Fennessey assisted the Bullingtons in reviewing contractor estimates and making equipment selections for a new boiler with an efficiency rating of 87 percent. She also helped the Bullingtons obtain state assistance through the Small Business Advantage Grant.
This enabled them to recuperate 50 percent of the boiler upgrade. [Editor’s note: Check with your state or province to see if any rebates or grants are available to you.]

As a result of their new boiler, the Bullingtons are saving approximately $6,200 from their gas bill, a reduction of more than two-thirds and a savings of 4100 therms. Plus, they’re saving by not running the air conditioner so frequently. Because of the state’s grant, the Bullingtons began seeing a return on their investment in just eight months. Their more efficient boiler is also preventing about 61,000 pounds of CO2 emissions from being released into the atmosphere each year.

Left to right: Eric Zembower, Tom Bullington, Heather Fennessey and Greg Knisley with the 2007 Energy Star Small Business Award.

**Serious Savings with Natural Gas**

Sonoma Wine Co. of Graton, Calif., is realizing nearly a quarter million dollars in annual energy savings as a result of an integrated design process coordinated with their local utility, Pacific Gas & Electric (PG&E). The firm, founded in 2003, offers crush-bottle custom winemaking services to the wine industry. Back then, Sonoma Wine had an annual bottling production of 1.5 million cases serving more than 30 wineries, in addition to the production of their own wine brands.

Recently, Sonoma wanted to double their capacity to 3 million cases a year and knew that achieving the goal required reducing energy and water use without increasing the footprint of their winery or wastewater treatment pond. PG&E helped Sonoma Wine apply for various energy-efficiency programs to upgrade equipment, lighting and reduce energy and water use. The incentives allowed return on investments from six months to five years.

Overall, Sonoma Wine Co. is saving more than 54,400 therms of natural gas each year and 1,288,000 kWh of electricity. That’s about $246,600 in annual savings and 2.8 million pounds of CO2 emissions prevented from being released into the atmosphere.

The first step in the upgrade and expansion process was to perform energy, water and wastewater audits. Sonoma Wine contracted with PG&E’s food and agriculture incentive program, which offers design assistance for upgrades or new construction. The program provided a consulting engineer who analyzed all winery processes and practices to identify energy and water use and devise a reduction plan that was implemented over two years.

**Help for Small Businesses**

There are numerous resources for small businesses looking to make environmental and energy-saving upgrades, like these two Energy Star Award winners made. Businesses can access associations, compliance information, advocacy for government policy, utility rebates, networks, resource contacts and free online business rating systems.

>> **Energy Star for Small Business**, run by the EPA and Department of Energy, provides useful information and technical support to help business owners improve their respective company’s financial performance by reducing energy waste and energy costs, while at the same time protecting the environment. In partnership with the voluntary Energy Star Small Business program, which is providing technical support, the National Small Business Association (NSBA) is challenging the 150,000 small businesses it reaches to reduce their energy consumption by 10 percent or more through improved energy efficiency.

>> **The Small Business Environmental Home Page** is a government resource that provides information on environmental compliance and pollution prevention for state Small Business Environmental Assistance Programs, which then work directly with businesses.

>> **GreenBiz.com** has compiled a useful list of contacts to help small businesses move in a sustainable direction. The site includes information on the Business Alliance for Local Living Economies (BALLE), Co-Op America’s Green Business Network and the Green Chamber of Commerce.

Follow the LEEDers

Commercial green buildings reap huge energy savings.

One of the most active figures in the commercial green building industry is the U.S. Green Building Council (USGBC). Currently, the USGBC has 91,000 individuals and 15,700 member organizations, including corporations, governmental agencies, nonprofits and others. Since 2000, membership has increased tenfold.

The USGBC’s well-known Leadership in Energy and Environmental Design (LEED) Green Building Rating System may be a mouthful, but the program’s impact and influence on the commercial green building industry is indisputable. Their certified project case studies show innovative building design, technology, sustainability practices and, perhaps most importantly, dramatic energy savings.

Westwood Elementary School

Westwood Elementary is a 75,000-sq.-ft. school serving 500 students in grades 3 through 5. The facility incorporates energy-saving features such as daylighting, extra insulation, occupancy sensors that conserve on lighting and ventilation, and high-efficiency window glass and energy-saving ventilation.

The school is heated with natural gas by way of high-efficiency boilers. Natural-gas-fired water heaters and kitchen equipment play key roles in meeting the school’s energy-efficiency goals. According to the district, the school has surpassed its expected energy savings and is realizing about $50,000 a year in energy savings.

Even on days when it’s 30 degrees outside, the heating system isn’t needed to warm up the cold ventilation air required for the building occupants.

“A big part of the LEED program is putting in energy-efficient natural gas equipment,” says Todd Berreman, key accounts manager for CenterPoint Energy in Minneapolis, which helped fund the school’s application for certification. “This translates to reduced operating costs for heating, through the life of the equipment.”

AstraZeneca Hope Lodge Center

Set to open in the fall of 2008, the AstraZeneca Hope Lodge Center in Boston is a 50,000-sq.-ft. building and a program of the American Cancer Society. The existing building has undergone an extensive remodel and energy-efficient upgrades with the goal of achieving and LEED-EB Gold Certification.

“For our donors, the energy savings and building efficiency means greater cost savings,” says David Rosenthal, MD, co-chair of the Hope Lodge campaign.

With educational and incentive support from National Grid, an international natural gas and electric utility serving the northeastern United States, Hope Lodge was able to take advantage of incentives and qualified for their Economic Redevelopment Program. Upgrades include:

- A chilled water and hot water piping distribution system, provided from the central refrigeration and boiler plants to local fan coil units. All rooms have vertical- or ceiling-mounted four-pipe fan coil units.
- A VAV air-handling system, used for the common dining room and basement areas.
- Conditioned outdoor air, supplied to the individual rooms and corridors through two roof-mounted energy recovery units.
- The heating plant, which consists of two 765 MBH, gas-fired flexible water-tube-type hot water boilers; two hot water pumps; VFDs; and an insulated piping distribution system serving all fan coil units, air-handling units, energy recovery units, VAV boxes, heating coils, perimeter radiation, cabinet heaters and unit heaters.
- The refrigeration plant, which includes a single, 112-ton water-cooled scroll chiller; a chilled water pump with VFD; and a single induced draft cooling tower with VFD.
- Support systems for the emergency generator, which include vent and fill piping for the indoor fuel oil tank, an insulated exhaust pipe extended to the roof, inlet and discharge louvers, dampers and leak detection, and tank level alarms.
- A complete DDC control system for all central cooling and heating plant equipment, air-handling units, energy recovery units, VAV boxes, fans, fan coil units and building alarms.

Hope Lodge’s high-efficiency heating and solar hot water thermal systems are estimated to provide a savings of 15,899.4 therms a year.
Automatic Efficiency

Building Automation Systems provide an array of benefits to building owners.

Computer-controlled automated building systems can help meet today’s ever-increasing economic and environmental need for energy management. Building Automation Systems (BAS) are a highly functional tool to achieve better control over the total building envelope while meeting operational and occupant needs.

The evolution of control systems is nothing short of remarkable. Older systems are robust in service but often limit what the end user can easily reference without learning the programming language. The amount of data input and use history that older systems can handle is also limited. Newer systems have improved processors and better data storage, and tools such as detailed graphic front ends allow users to quickly look for building problems at macro and micro levels and address them — often before the occupants know there’s an issue.

Drexel University in Philadelphia has been using campus-wide BAS for years to control basic functions such as lighting and HVAC scheduling, equipment operation such as on/off or start/stop functions, temperature set points, adjustable electric motor speeds and more. Drexel recently began using computer systems to control more complex functions such as managing a cooling system in its cutting-edge science and research building, the Bossone Research Center.

One of the BAS systems serving many of the newer buildings is also linked via the Internet to provide regional weather data — namely outdoor air temperatures, so these linked building systems perform in a more uniform fashion in terms of energy consumption. Local equipment sensors are often affected by direct sun or other factors that trick the equipment into running less efficiently. The local temperature sensing equipment is that already in place acts as a backup if problems arise or the Web connection fails.

Since the system is Web-based, any authorized user can access it to monitor and adjust any of the building systems settings from virtually any computer in the world. The BAS can automatically contact individuals by phone or e-mail if equipment or alarms are detected. It can also notify security departments in case of fire or smoke detection.

Drexel worked closely with its Automated Logic Controls vendor, DVL, to develop the weather link function. In addition, faculty have been given read-only access to the BAS information for their academic curricula, thus offering students valuable exposure to cutting-edge technology. Individual building sub-metering and campus-wide power monitoring are being developed to provide additional environmental and financial benefit.

“The systems in use today allow worldwide access to building equipment by mechanics, occupants, manufacturers and contractors,” says Bill Taylor, director of plant maintenance at Drexel University. “Set points, equipment selection, scheduling, control programs, data collection, troubleshooting and economic performance are monitored and managed through building automation.”

Hans Greene, director of business development for Philadelphia Gas Works, says that while natural gas is the affordable clean-energy solution in comparison with other energy sources, conservation is something everyone can practice right now to cope with energy costs. “Today, we face unprecedented energy costs and associated environmental issues across the entire planet. Conservation is one immediate means available to begin to mitigate some of the impacts,” he says. “Building automation is an excellent tool to achieve conservation since it is in operation 24/7 and can be applied at such basic levels as the programmable thermostat or much more comprehensive for complete commercial building systems control.”

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a sequencing system that allows your ultra-high efficiency boilers to condense.