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Steam Systems: Save Energy Now

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Steam systems account for about 30% of the total energy used in industrial applications for product output. These systems can be indispensable in delivering the energy needed for process heating, pressure control, mechanical drives, separation of components, and production of hot water for process reactions.

As energy costs continue to rise, industrial plants need effective ways to reduce the amount of energy consumed by their steam systems. Industrial steam systems can include generation, distribution, end use, and recovery components. End-use equipment includes heat exchangers, turbines, fractionating towers, strippers, and chemical reaction vessels. Steam systems can also feature superheaters, combustion air preheaters, feedwater economizers, and blowdown heat exchangers to boost system efficiency.

Potential for Savings

Making steam systems more efficient throughout industry could reduce annual plant energy costs by several billion dollars and environmental emissions by millions of metric tons. About 80% of the energy used in the pulp and paper industry goes to generate steam, and steam systems consume about half of the energy used in the chemicals and petroleum refining industries. Typically, plants that assess their steam systems in these industries and others uncover potential steam system energy use and cost savings that range from 10% to 15% per year.

A helpful resource for facilities of all sizes is the U.S. Department Energy's [Steam System Assessment Tool \(SSAT\)](#). The SSAT allows users to quantify the magnitude—energy, cost, and emissions-savings—of key potential steam improvement. Plants of all sizes have used this tool to generate significant energy savings. For example, following an evaluation conducted using DOE's Steam System Assessment Tool, the J.R. Simplot Company improved the steam system in its food processing plant in Caldwell, Idaho. Improvements included upgrading burners and controls, installing flue gas oxygen trim systems on boilers, and recovering more condensate to reduce the number of boilers needed to meet the steam load. These save the plant 52,000 MMBtu of natural gas and 526,000 kWh of electricity annually. In summer 2005, the plant's energy costs were lower by nearly \$300,000 per year.

Start Saving Today

Some typical opportunities for increasing the efficiency of most industrial steam systems are shown in the table. Use this as a guide to begin assessing and improve your steam systems today.

Opportunities for Increasing Steam System Efficiency	
Generation	<ul style="list-style-type: none"> Minimize excess combustion air Clean boiler heat transfer surfaces Consider high-pressure boilers with backpressure turbine generators Improve water treatment to minimize boiler blowdown Add or restore boiler refractory Optimize the deaerator vent
Distribution	<ul style="list-style-type: none"> Repair steam leaks Minimize vented steam Ensure that piping, valves, fittings, and vessels are well insulated Implement a steam-trap maintenance program Isolate steam from unused lines Use backpressure turbines instead of pressure-reducing valves
Recovery	<ul style="list-style-type: none"> Optimize condensate recovery Use high-pressure condensate to make low-pressure steam Install heat recovery equipment such as feedwater and condensing economizers Recover energy from boiler blowdown Recover thermal energy from wastewater streams

Potential Benefits

Fast Facts

- Manufacturing accounts for about 1/3 of the nation's total energy consumption.
- Steam systems use about 1/9 of that total energy consumption.
- Steam system improvements can reduce your energy costs by 10-15%.

You Might Also Be Interested In...

- [How to Maintain Proper, Slightly Positive Furnace Pressure](#)
- [Waste Oil: A Valuable Source of Energy](#)
- [The Big Picture on Process Heating](#)

- Energy efficiency improvements can reduce utility bills and improve your plant's bottom line.
- Many improvements require little or no extra investment, are easy to implement, and have payback times of less than a year.
- Strategies that increase energy efficiency often reduce operating and maintenance costs, minimize waste, and enhance production.
- Energy efficiency helps to reduce negative impacts on the environment and can enhance corporate community relations programs.

Note: Adapted from a U.S. Department of Energy Industrial Technologies Program fact sheet.

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**Nicor's Energy News – Municipal Version
Supplemental Story – FINAL 9/12/07**

Help For Your Residents in Managing Gas Bills

Natural gas prices are moderately higher than last year at this time, so Nicor Gas wants to make sure your residents are aware of several options that will help them manage their gas bills, stay current on their accounts and most importantly, stay warm this winter heating season.

Payment Plans

Our **Budget Plan** is a payment option that reduces the seasonal highs and lows of our bills. Additionally, those who are currently behind on payments may be eligible for a **Payment Arrangement**. Find out more about these options at the "My Account" section of our Web site.

(LINK TO: <https://www3.nicor.com/MyAccount/loginmain.aspx>)

Your residents also have the option to purchase their natural gas from an alternative supplier. The Nicor Gas **Customer Select Program** provides a list of suppliers offering a choice in pricing options and payment plans. Depending on the supplier, they will find some offers that lock in their gas price and others that compete with Nicor Gas' monthly gas supply charge. By comparing offers and making the choice that's best for them, they may be able to save money on the cost of their natural gas. More details can be found at the "Choosing Your Supplier" section of our Web site.

(LINK TO: http://www.nicor.com/en_us/residential/choosing_your_supplier/default.htm)

Online Gas Costs Tools

Our online tools can assist your residents in managing their natural gas bills. Tools include our **Bill Planning Guide** to get an idea of what they might expect to pay based on the amount of gas they use, our **Energy Depot** home energy audit tool, that will provide them with a comprehensive energy-use profile for their home and our **energy efficiency tips** that we hope will encourage them to create small changes to their energy use habits that could help them spend less money on their natural gas bills.

Financial Assistance

Depending on several factors, including income, household size and location, your residents may be eligible for the **Low Income Home Energy Assistance Program (LIHEAP)**. LIHEAP is administered by the Illinois Department of Healthcare and Family Services and helps low-income households pay for energy services. Qualifying households can receive grants to pay their energy bills. **Seniors and the disabled can apply for LIHEAP assistance now. Enrollment for the general public begins November 1.** For more information or to apply, your residents can call 1 877 411-9276 (1 877 411-WARM) or visit the "Financial Assistance" section of our Web site.

(LINK TO: http://www.nicor.com/en_us/residential/financial_assistance/default.htm)

If they don't qualify for LIHEAP assistance, residents may qualify for the **Nicor Gas Sharing Program**. The program is administered by the Salvation Army and funded by Nicor Gas employees and customers. For Salvation Army office listings and information on how to apply, visit the "[Financial Assistance](#)" section of our Web site.

(LINK TO: http://www.nicor.com/en_us/residential/financial_assistance/default.htm)

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High Energy Bills? Conduct An Energy Investigation of Your Facility

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Instituting energy conservation measures is an excellent way for a business to lower energy costs and save money. The problem is that it is often difficult to find out exactly where you are using the most energy and what energy efficiency measures will prove most effective. Professional energy consultants can perform a detailed energy analysis of your facility that can provide you with an in-depth view of your energy usage. These types of assessments, however, are often time consuming and costly.

As an alternative, you may be able to identify some areas for energy efficiency gains yourself, giving you the chance to deliver some immediate savings. You and your staff know your facility better than anyone else. Just working on your premises on a daily basis will give you a strong sense of where the biggest energy losses are occurring and which parts of your operation are large energy users. You can conduct your own walk-through energy audit that will help you to systematically identify energy losses that can be corrected through regular maintenance or simple, cost-effective building retrofits.

Many facilities have found that conducting their own energy audits has resulted in significant benefits. While every situation is different, an energy audit will reveal energy inefficiencies that, if fixed, can result in energy savings of ten to thirty percent. If, after evaluating the results of your audit, you determine that a more detailed analysis is necessary, you can then contact a professional energy management consultant. The information from your self-assessment will provide important background information for conducting the more in-depth examination.



Steps to Conducting An Energy Audit

Once you have determined to conduct an energy audit, you should proceed through the following steps.

Assign Responsibility: In smaller operations, the business owner or facility manager may conduct the audit. For larger operations, an energy management committee may be necessary to perform the required work.

Gather Energy Data: Review your utility bills over the past year or from a typical twelve-month period. Also, look at data from your accounting and production records to find out which areas of your facility or operations may be using the most energy. Record the current rate structure, demand and consumption figures, and any other fees for natural gas, electric, and other fuels.

Look at Your Building Systems: Review manuals and drawings of building equipment and mechanical systems, motors, etc. to determine their type, size, and age. Examine production reports and interview relevant staff to determine usage patterns, general condition, recent maintenance, etc.

In addition, you should gather the following information to help you complete the energy audit:

- Building design- square footage, location of doors and windows, type of insulation, operating hours, etc.,
- Lighting- types of lights used, total wattage and operating hours,
- Ventilation- the volume of air and size of motors relative to air make-up and exhaust systems,
- Process Equipment- size and efficiency ratings of motors, refrigeration equipment, compressors and heat recovery systems,
- Drawings of building architecture, electrical and mechanical systems,
- Operation and production schedules, and
- Operating manuals and equipment specifications.

Now you are ready to begin your audit. Use the checklist below as a guide of what to look for.

Energy Audit Checklist

Lighting

- Is your facility using the most energy efficient lighting options (fluorescent, mercury vapor, etc.)?
- Are there areas that have excessive or unneeded lighting?
- Are you making effective use of available lighting, such as natural sunlight?
- Have you installed lighting management equipment such as dimmers, timers, and sensors?

Weather Stripping

- Does weather stripping around doors and windows need to be replaced?
- Are cracks around doors, windows, and foundations properly sealed?
- Are there open doors around loading docks or other frequently accessed areas?

Heating and Cooling

- Are furnaces, boilers, and air conditioning systems operating efficiently?
- Is there a regular maintenance and update schedule for these systems?
- Are filters replaced regularly?
- Is the building properly ventilated?

Motors and Equipment

- Is your equipment maintained so that it is operating at maximum efficiency?
- Is equipment load compatible with manufacturer specifications?
- Are machines shut down when not in use?
- Are fan belts at the proper tension and in good condition?

Energy Behavior

- Are lights, fans, and equipment (computer, printers, etc.) turned off when not in use?
- Are building temperatures set back when not in use?
- Are thermostats set to higher or lower than necessary in summer and winter?

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Your Building Can Become An ENERGY STAR®

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As we all become more environmentally aware, the green building movement continues to grow. Energy efficiency is a key element and helps to lower emissions and reduces our dependence on fossil fuels. By earning the ENERGY STAR®, your organization can join an elite group of top energy performers nationwide. To date, more than 3,200 facilities in all fifty states have become ENERGY STAR®-qualified. Earning the ENERGY STAR® also makes good business sense. According to the U.S. EPA, ENERGY STAR® buildings use 35% less energy than average buildings.



You Might Also Be Interested In...

[Designing Schools for Energy Efficiency](#)

[A CFO's Guide to Energy Performance Contracts](#)

[Cool Tips During the Summer](#)

ENERGY STAR® is a joint program of the U.S. EPA and the U.S.

Department of Energy that promotes energy efficient products and practices. The ENERGY STAR® for Buildings Program provides energy efficiency guidelines for buildings and allows building owners to show their commitment to energy conservation. To qualify as ENERGY STAR®, a building must meet a set of [eligibility requirements](#). See below for more information about applying for ENERGY STAR® certification and how displaying the ENERGY STAR® label will benefit your organization.

What buildings are eligible to earn the ENERGY STAR®?

Buildings that rate in the top 25% of energy-efficient buildings in the nation may qualify for the ENERGY STAR®. Many types of commercial and industrial buildings can be rated, based on a comparison of energy use with other, similar buildings. Currently, buildings that can earn the ENERGY STAR® include offices, bank branches and financial centers, courthouses, hospitals, hotels and motels, K-12 schools, medical offices, supermarkets, dormitories, and warehouses. [Industrial Buildings that can earn ENERGY STAR®](#) include some manufacturing facilities and plants. Architecture firms can also display the [Designed to Earn the ENERGY STAR®](#) graphic to distinguish their projects as among the nation's best in energy performance.

How do I find out how much energy my building is really using?

Understanding the energy use of a building is important just as it's useful to know the estimated miles per gallon (mpg) for your automobile. ENERGY STAR® provides free tools and resources based on proven standards that compare buildings with other, similar buildings to help you measure the energy use of your building. For many types of existing buildings, you can enter energy information into EPA's energy performance tool, called [Portfolio Manager](#), and it will help you understand how efficient your building is by calculating a rating for your building on a scale of 1-100, relative to similar buildings. Buildings rating 75 or greater may qualify for the ENERGY STAR®.

How do I get started making my building more energy efficient?

ENERGY STAR® provides free Web-based tools, calculators, resources, and training to measure, track, and benchmark energy performance. These assessment and guidance tools help organizations make technological improvements to their buildings that can dramatically reduce both energy consumption and business expenditures.

EPA offers a proven strategy for superior energy management based on the successful practices of ENERGY STAR® partners. The [Guidelines for Energy Management](#) can assist you with step-by-step improvements to energy and financial performance by helping your organization make a commitment, assess your building's energy performance, set goals, create and implement an action plan, evaluate your progress, and recognize your achievements.

How will earning the ENERGY STAR® distinguish my organization?

Earning the ENERGY STAR® is evidence of your social responsibility to the community and your organization's commitment to reducing its impact on the environment. By displaying the ENERGY STAR®, you show that your building is one of the top performers for energy efficiency nationwide. In fact, more than 3,200 buildings have earned the ENERGY STAR® and use about 35% less energy than average buildings. Some ENERGY STAR® buildings even use 50% less energy than average buildings—now that's superior energy management!

EPA helps highlight your achievements within your organization and to the public. Each year in January or early February, EPA releases information about buildings that have earned the prestigious ENERGY STAR® to the press and involves organizations with buildings that have earned the ENERGY STAR® in its media activities. Within the ENERGY STAR® buildings program, it is also possible to earn public recognition as an ENERGY STAR® Partner or Leader, or to earn a nationally recognized [Partner of the Year Award](#).

Commercial buildings account for almost 18% of our nation's greenhouse gas emissions. Improved energy efficiency reduces pressure on our nation's power systems; helps businesses, governments, and other organizations save money; and helps protect our environment today and preserve it for the future.

How do I apply to earn the ENERGY STAR® ? Buildings achieving a rating of 75 or higher and professionally verified to meet current indoor environment standards are eligible to apply for the ENERGY STAR®. Find out how to [qualify your building as ENERGY STAR®](#).

[ENERGY STAR® Success Stories](#)

Colorado Springs School District #11 became ENERGY STAR® certified in 2003. Energy projects for preventive maintenance, holiday shutdowns, and retro-commissioning, and have resulted in [more](#)

Columbus Hospitality, a hotel group based in Columbus, Ohio, recently earned an ENERGY STAR® rating for one of its buildings. Recent building improvements have increased energy performance and resulted in annual savings of more than \$30,000. [more](#)

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Cold Weather Is Coming: Are You Prepared?

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For commercial buildings nationwide, space heating accounts for 35% of overall energy consumption. With the approach of cold weather, it is important to ensure that all your heating equipment is working properly and that your building is sealed up tightly. After an initial check-up, monthly maintenance and energy conservation measures are necessary to keep your building heating system running efficiently. This will help to maximize indoor comfort and lower winter energy bills.



You Might Also Be Interested In...

[Why You Should Be Concerned About Burner Excess Air](#)

[Lower Your Natural Gas Use Now: Quick Tips for Retail](#)

[Insulate Steam Distribution and Condensate Return Lines](#)

Heating System - General

- A full system checkup will ensure that all parts (fan belts, air dampers, etc.) are in working condition and operating properly. This ensures more efficient operations and helps avoid equipment failure disrupting employees and tenants.
- Inspect heating ducts and seal any leaks. Direct leaks in duct systems can result in large heat losses.
- Check air filters throughout the building. Dirty or clogged air filters reduce air flow, thereby increasing the energy required for heating.
- Make sure all hot water tanks and piping are well insulated, even inside the heated space. This can be a major source of heat loss and an inexpensive fix.
- Make sure outside air dampers are closed during unoccupied hours, including during morning warm-up periods. Also, make sure motorized dampers are operating properly.
- Ensure that hot water or steam valves are in their proper positions to allow full flow with minimal pressure drop within the piping system.
- The operation of your heating system is regulated by thermostats. Calibrate these thermostats to ensure that they are functioning properly. Otherwise the heating system will be receiving the wrong signals of when to start and stop.

Boiler Cleaning and Inspection

While a regular maintenance program is very important, an annual cleaning is often the best method of deterring system failure and increasing fuel savings. While an annual cleaning and inspection should follow manufacturer recommendations, there are some basic elements that should be part of any annual cleaning program. *(Annual cleanings should be performed by a technician certified and experienced in boiler maintenance and repair.)*



- Inspect and clean the fireside. A dirty fireside (such as one with deposits of soot and non-combustible material) will lead to loss of efficiency.
- Inspect and clean the waterside. This inspection should not begin until the boiler has cooled to 120°F. Allowing the water to cool will limit the possibility of scalding.
- Check the refractory. Boiler failures are often caused by cracking or erosion in the refractory. Patch as necessary following manufacturer recommendations.
- Burner inspection. Open the burner and inspect the components. All parts should move freely without making contact with other parts. Clean all components to like-new condition.
- Detach controls and inspect them for both mechanical and electrical operation. Reinstall and double check them before restarting boiler.
- Check the fluid levels on hydraulic valves and repair any signs of leakage.
- Check filters, and clean or replace them as needed.
- Check boiler feed pumps, and replace or recondition if necessary.
- Empty and wash out condensate receivers, and make an internal inspection. If necessary, overhaul and check for proper operation.
- Check electrical connections on starters and relays for tightness.

Building Envelope

A properly sealed and maintained building envelope is critical to maintaining building comfort and maximizing heating system efficiency. Look for air leaks, especially around windows, doors, and places where plumbing or ductwork penetrates the building envelope. For an in-depth analysis of leaks, consider hiring a professional to conduct blower door tests or an energy audit, focusing on all areas of the envelope:



Windows and Skylights

- Replace broken or cracked window panes.
- Replace worn weatherstripping and caulking.
- Replace defective sealing gaskets and cam latches.

Doors

- Replace worn weatherstripping and caulking.
- Check automatic door closers for proper operation.
- Replace defective gaskets on garage doors and other overhead doors.

Exterior Surfaces

- Replace worn weatherstripping, caulking, and gaskets at exterior joints and at openings for electrical conduits, piping, through-the-wall units, and outside air louvers.

Stairwells and Shafts

- Replace worn seals and weatherstripping in stairwells, on penthouse machine-room doors, in elevator shafts, in vertical service shafts, and on basement and roof equipment-room doors when they are connected by a vertical shaft that serves the building.

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Nicor's Energy News (Municipal Version) - October 2007
"Heating Season Safety Tips" – Supplemental Story
FINAL 10/10/07

During the holiday season don't forget the start of the *heating* season

Once October has gone, your residents will be busy planning for the upcoming holiday season - shopping, decorating, party planning - the list of tasks seems endless. During this hectic time of year, heating season also begins. With 98% of homes in our service area using natural gas for heating, this means many furnaces will ignite for the first time, as well as supplemental electric space heaters being plugged in for the first time. It also means there is a potential for hazardous conditions, so we'd like to pass along some heating season tips to keep your residents safe and warm all winter long.

Install Carbon Monoxide Detectors

- Each year around 500 Americans lose their lives due to carbon monoxide (CO) poisoning. CO is a colorless, odorless gas that can build up to high levels in homes where fossil fuels are burned with poor combustion or improper ventilation. The most common cause is a poorly maintained furnace. We highly recommend that you have an annual "clean-and-check" performed on your furnace by a qualified HVAC contractor to assure your furnace is properly maintained, so that the probability of CO issues can be minimized.

CO detectors come in three varieties – plug-in, battery-operated and hardwired – all of which can be purchased at your local hardware store.

Once you get your CO detector home, be sure to follow these precautions:

- Place a CO detector near each bedroom or other sleeping area
- Do not install CO detectors near the kitchen or garage, or in a room with a furnace, as this may cause false alarms
- Test the CO detector at least twice a year to assure it is still operating properly

Additionally:

- Never burn charcoal inside your home or garage
- Never heat your home with your gas range
- Never use combustion engines (car, snow blower) in enclosed areas

Exposure to high amounts of CO can result in serious illness or even death. Even if you have CO detectors in your home, it is important to know the symptoms of CO poisoning that can be mistaken for flu-like symptoms including: dizziness, nausea, headaches, and coughing. Other symptoms include irregular heartbeat, pale skin with cherry-red lips and ear tips. Be especially aware of these symptoms if you experience them while family pets seem to be lethargic or ill.

If your CO detector alarm goes off and you feel ill, leave the house and call 911 or the local fire department. If your detector goes off and you don't feel ill, press the reset button. If the alarm sounds again after five minutes, open the windows, leave the house and call 911 or the local fire department.

CALL OUT BOX

REMINDER:

As of January 1, 2007 the Illinois Carbon Monoxide Detector Installation Law made it a requirement that all single and multi-family dwellings with CO-generating sources have CO detectors installed.

Keep your gas meter clean and accessible

During the winter, snow and ice may accumulate on your outside gas meter, possibly blocking the regulator vent. This could cause the regulator to operate improperly, creating a pressure build up in your home that may lead to a dangerous situation. To prevent this from happening, follow these tips:

- Use a broom (not a shovel) to clear snow from your meter and regulator
- Remove any icicles hanging above your meter
- Sweep snow away from natural gas appliance openings outside your home (such as clothes dryer vents)
- If your meter is near a sidewalk or driveway, use extra caution when shoveling snow
- If your meter becomes encased in ice, call 1 888 Nicor4u (1 888 642-6748) immediately

Use space heaters carefully

A space heater can help warm chilly spots in your home, but it can also be a fire hazard if not operated properly.

- Never leave an operating space heater unattended
- Make sure the space heater includes an automatic shutoff feature should the unit accidentally tip over
- Keep space heaters off carpeting and at least three feet from draperies, blankets and sofas

For more safety information, visit the "[Safety](#)" section of [nicorgas.com](#).

NOTE:

"Safety" should link to: http://www.nicor.com/en_us/residential/safety/default.htm

nicorgas.com should link to: http://www.nicor.com/en_us/residential/

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Measuring Your Company's Carbon Footprint

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Footprints are unique impressions that people leave behind that provide information, such as your weight, size, speed, where you have been, and where you are going. Similarly, every individual and company has a carbon footprint that measures the amount of greenhouse gases emitted into the atmosphere and leaves an impression on the world. Assessing your carbon footprint can indicate opportunities for energy reductions, cost savings, and improvements in your environmental impact.

Calculating your company's carbon footprint may seem somewhat complex, but maintaining a focus on the end goal of reducing greenhouse gas emissions (GHG) and choosing an assessment strategy to follow can simplify the process. [Greenhouse gases](#) include (in order of relative abundance) water vapor, carbon dioxide, methane, nitrous oxide, and some fluorocarbons. The major sources of carbon dioxide include the combustion of coal for electric power generation, vehicle exhaust, natural gas production, distillate fuel oil production, and a variety of industrial, commercial, and residential practices.

Company Direct and Indirect Emissions

Companies will need to decide how they will account for direct and indirect greenhouse gas (GHG) emissions. Direct emissions are those from sources that are company owned or controlled, such as equipment stacks, vents, on-site generation, and company owned vehicles. Indirect emissions are those from sources that are not owned or controlled by the company, such as employee commuting, business travel, and suppliers. Measuring your carbon footprint has four important steps:



- Determine what direct and indirect emissions will be included in your carbon footprint.
- Determine the baseline year and begin to compile the data.
- From the data, calculate and analyze your GHG emissions. The contributing entities can be broken down into groups, allowing you to start with the basics first, such as the company's office building(s), then continuing with process operations.
- Report the results and determine appropriate action plans.

Carbon Footprint Calculator

Estimate how much your company's carbon footprint can be reduced based on certain proactive steps you can choose to lower your energy use.

Online calculators are available to help companies calculate their direct and indirect GHG emissions. The World Resources Institute and the World Business Council for Sustainable Development began a [GHG protocol initiative](#) that provides general, as well as [sector specific worksheets](#). The [Carbon Consultant conversion factor sheet](#) can be used to convert units of fuel into kilograms of CO2 emissions per unit. [Carbon Counter](#) offers tracking tools for businesses and individuals, and The Climate Trust provides a

[Business & Organization Carbon Calculator](#) that can measure the direct carbon footprint from travel information and utility-provided energy consumption. (Multiply your results by 1.1 to convert from the Metric Tons of carbon emissions reported by the calculator into U.S. tons.)

Lifecycle Assessment

Another approach is the "lifecycle assessment" (LCA) that determines the amount of carbon emitted at each stage of a product's life. The assessment includes the carbon emitted to develop the raw materials, the production process, distribution, consumer usage, and disposal of the product. This approach is part of the [ISO 14000 Environmental Standards](#) and can be used to optimize the environmental impact of a particular product, compare that product to similar products, and increase a brand's reputation as an environmental steward. ISO 14000 maps [the life cycle assessment in four stages](#) (goal and scope definition, inventory of extractions and emissions, impact assessment, and interpretation).

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[Have An Energy Efficient New Year!](#)

[Managing Energy Costs in the Hospital/Healthcare Sector](#)

[Energy Star Buildings and Plants](#)

Generic LCA Model

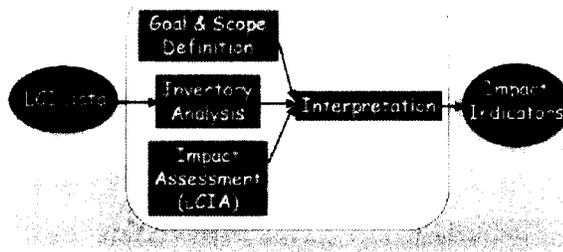


Photo from [NREL](#)

The National Renewable Energy Laboratory (NREL) provides tools to assist the process of "inventory of extractions and emissions." The [NREL Life Cycle Inventory Database](#) shows the energy usage of particular materials in common unit processes. This data is available to help companies with similar processes complete an LCA assessment and ensure consistency in the evaluation. In addition, [LCA software and calculators](#) may be downloaded from the NREL website.

Climate Leaders

The U.S. Environmental Protection Agency has developed an industry/government partnership, called Climate Leaders, with companies committed to reducing their greenhouse gas emissions. According to the EPA,

"Partners set a corporate-wide greenhouse gas (GHG) reduction goal and inventory their emissions to measure progress. By reporting inventory data to EPA, Partners create a lasting record of their accomplishments. Partners also identify themselves as corporate environmental leaders and strategically position themselves as climate change policy continues to unfold."

As Climate Leader Partners, companies have access to eighty hours of free technical assistance provided by EPA experts to help them complete the GHG inventory, accounting methods, tracking, and reporting.

Consulting Professionals

Although compiling the amount of greenhouse gases emitted from your direct operations (gas and electricity use) can be a quick calculation from your utility statements, defining your carbon footprint from indirect operations may be more difficult. Professional consultants provide services that will help you analyze your operations, compile the necessary data, and assess your GHG emissions. The [Thomas Publishing Company](#) supplies a list of Environmental Consultants that can be sorted by state to find a company near your location.

Case Studies

According to a report released by [The Conference Board](#) titled, Going Green: Corporate Commitment to Citizenship and Sustainability Issues Takes on a Greater Role, approximately 75% of companies are actively measuring their carbon footprint. Understanding the strategies other companies have used to manage GHG emissions can help others to become successful as well.

In 1996, Stonyfield Farm, a yogurt producer in Portland, Oregon, became committed to offsetting 100% of the carbon emissions from its production facility. The company achieved this goal one year later, and created a carbon fund to enable companies to invest in carbon-offset projects. Stonyfield has published an "[Environmental Cookbook](#)" describing the successful project.

In 2003, Starbucks hired CH2M Hill to calculate the carbon footprint of approximately 3,700 stores across the country. Since then, Starbucks has been implementing energy efficiency measures in their stores. In 2005, Starbucks joined the World Research Institute's Green Power Market Development Group that helps members purchase renewable energy. By 2006, the company increased its wind power to 20% of the total energy consumed by its North American stores. In order to further reduce energy consumption, stores are installing individual meters on specific equipment to monitor and track energy usage.

In April 2007, Yahoo! announced its commitment to going "carbon neutral," meaning the company will invest in greenhouse gas projects to neutralize its impact on the environment. Although much controversy surrounds the idea of carbon neutrality, Yahoo! contends that they will remain committed to reducing energy consumption by powering facilities with renewable energy, encouraging employees to reduce vehicle emissions, and promoting energy conservation to its customers.

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Nicor Gas Economic Development Resources

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New businesses, expanding businesses and Economic Development Organizations (EDOs) can count on Nicor Gas to assist with planning the natural gas requirements at new and existing commercial or industrial facilities. Our free services include, but are not limited to:

- Customized rate analysis
- Infrastructure verification/coordination
- Technical assistance with energy-related issues
- Site visit support and analysis

The [Economic Development](#) section at nicor.com is an excellent resource for anyone considering specifying natural gas for space heat, water heat, heat recovery and/or processes at commercial or industrial facilities.

Whether you are a developer, an expanding business or an EDO, it is vital to contact Nicor Gas during the initial planning stage for any existing or proposed facility in need of gas service. The reason this is so important is that there may be a considerable amount of work that will need to be done to bring natural gas to an area where pipelines do not yet exist, as well as costs for the labor and materials.

Additionally, existing facilities may already have gas service, but may not have enough gas load for new spaces or equipment. Just as with installing new service, a system upgrade may also require a fair amount of work and will have associated costs for increasing capacity, which could include installing larger pipe, adding extra meters, and other construction activities.

Nicor Gas encourages businesses to specify natural gas for heating and processes. It's an extremely reliable, clean burning fuel that has much less impact on the environment compared to other fossil fuels. Our storage assets give us a huge advantage when it comes to having ample supply at competitive prices. Through the use of financial purchasing instruments, hedging and our seven storage fields, we have historically been able to purchase natural gas at a lower cost than most utilities in the country.

Whether you are a business considering expansion, or an EDO working with prospective businesses, let Nicor Gas help you determine what will be necessary to bring natural gas service to new or expanding facilities. Check out the [Economic Development](#) section of our Web site, or if you have specific questions, send us an [email](#).

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Energy Price Trends for Winter 2007-2008

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The Energy Information Administration (EIA) projects that commercial and industrial customers should pay, on average, 4% and 12% more for natural gas, respectively, and about the same for electricity this heating season (October–March) than in 2006–2007. U.S. average winter residential fuel expenditures are expected to be 6% higher for natural gas, over 16% higher for propane and heating oil and slightly higher for electricity than last year. The average U.S. household will pay about 10%, or \$88, more for heating this winter than last winter, according to experts at the U.S. Department of Energy's (DOE) [2006 - 2007 Winter Fuels Outlook Conference](#), sponsored by the [National Association of State Energy Officials](#) (NASEO).

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[Energy Solutions for Healthcare Buildings](#)

[National Food and Energy Council](#)

[ENERGY STAR: Energy Savings Opportunities for Petroleum Refinerles](#)

Winter Weather

As of late October, [AccuWeather.com](#) Chief Long-Range Forecaster Joe Bastardi predicts that the traditional winter months, December through February, may be one of the top 10 warmest winters ever for the southeastern United States. For the nation as a whole, this winter will be warmer than last winter; especially in the second half of January and February when last winter season was at its coldest. For another perspective, the [commercial weather service, WSI](#), January forecast indicates warmer-than-normal temperatures in the Northeast and much warmer-than-normal in the Southeast.



The [National Oceanic Atmospheric Administration \(NOAA\) projection of heating degree days](#), published on September 20, indicates that winter in the lower forty-eight states is forecast to be 1.3 percent colder, compared to last winter, but still 2.8 percent warmer than normal (thirty-year normal; 1971 to 2000). Because of expected relatively colder weather, U.S. heating **fuel consumption** is projected to increase moderately compared to last winter.

Natural Gas Prices

According to the [EIA's Short-Term Energy Outlook](#), working gas inventories by the beginning of the heating season are projected to reach 3,444 bcf, which is above historical averages and slightly below the all-time high for natural gas storage inventories recorded at the end of November 1990. According to the EIA, heating degree-days in the fourth quarter of 2007 are expected to increase by 10 percent over the corresponding period in 2006, contributing to expectations of 6.9-percent growth in commercial sector natural gas consumption for 2007 over 2006. In 2008, however, the continuation of near-normal weather will slow expected year-over-year commercial and industrial gas consumption growth to zero to 0.4 percent.



A lack of significant hurricane activity in the Gulf of Mexico and historically high storage inventories have contributed to the recent [decline in the Henry Hub spot price](#). The Henry Hub spot price averaged \$6.26 per mcf in September, which marked the fourth consecutive decline in the monthly average spot price since May. Spot prices at the Henry Hub are projected to rise to a winter peak of \$8.65 per mcf in January 2008. Under the baseline weather case, winter (October 1 to March 31) [commercial and industrial gas retail prices](#) are expected to average \$11.40 and \$8.50, respectively. That represents a 2% increase for commercial and 12% increase for industrial. Residential natural gas retail prices are expected to average \$13.15 per thousand cubic feet (mcf) compared to \$12.40 per mcf last winter.

The Natural Gas Supply Association (NGSA) [Winter Outlook 2007-2008](#) also predicts flat market pressure on natural gas prices this heating season. NGSA examines five factors in making its assessment: the economy, weather, gas supply, storage, and gas demand. NGSA anticipates the economy will continue its low level growth, slightly colder weather than the past two warm winters, a 1.2 percent increase in natural gas production, another record inventory level, and a 1.8 percent increase in demand.

Propane and Heating Oil

EIA's Short-Term Energy Outlook predicts that retail propane prices will average \$2.13 per gallon in 2007 and \$2.20 per gallon in 2008. This winter, western households are projected to see an average increase of 10 percent, while Northeastern homes are expected to experience an average increase of 21 percent. The NASEO 2007–2008 Winter Fuels Outlook projects that [propane expenditures](#) will be 16 percent higher (\$2.28/gallon) compared to last year.

Following rising crude oil prices, residential heating oil prices are projected to average \$2.88 per gallon during the winter season compared to \$2.48 per gallon last winter. The average household is projected to pay 22 percent more than last winter (\$58) as a result of a 16-percent increase in prices and a 5-percent increase in consumption. The NASEO 2007–2008 Winter Fuels Outlook indicates that [heating oil inventories](#) are down 22% compared to last year.

Electricity Prices

EIA's Short-Term Energy Outlook predicts that commercial and industrial electricity prices will be higher this winter. Residential electricity prices are expected to average around 10.2 cents per kilowatt-hour this winter, up from 9.8 cents per kwh last winter. The NASEO 2007-2008 Winter Fuels Outlook projects electricity prices to be 4 percent higher.

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Have An Energy Efficient New Year!

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This year you can lower your expenses and protect the environment by making a resolution to save energy at your office, school or business. Along with cutting out waste and lowering energy costs, the changes you make can reduce the size of your facility's carbon footprint. Switching your heating and appliances to clean, efficient natural gas is another environmentally friendly step you can take.



You Might Also Be Interested In...

- [Burns Caused by Electricity](#)
- [ENERGY STAR as a Benchmarking Tool](#)
- [Your Building Can Become An ENERGY STAR®](#)

Energy Saving Resolutions

The following energy efficiency measures, if instituted properly, can help your facility cut costs on your 2008 energy budget.

Heating and cooling equipment will be inspected regularly and monthly maintenance will be performed. For commercial buildings nationwide, almost 35% of energy used is for space heating and 15% for space cooling. Annual inspections are necessary to forestall potential problems and to ensure that the system is functioning efficiently. Clean or change your HVAC filters monthly. Dirty filters can increase operating costs by 20%. See [Getting the Most From Your HVAC System](#).

Thermostats will be properly adjusted. Lowering or raising (depending on the season) the thermostat when the building is unoccupied can yield significant savings. Where appropriate, consider installing programmable thermostats. These inexpensive devices, most incorporating modern microprocessor-based electronics, can help optimize your building's heating and cooling needs. You also won't need to remember to change thermostat settings every time you open or close your business. See [Timers, Occupancy Sensors, Photocells, and Programmable Thermostats](#).

We will include sealing and weather-stripping as part of our regular maintenance program. Seal exterior cracks and holes to ensure tight-fitting windows. Seemingly small cracks or holes in the building exterior (like walls, windows, doors, ceiling, and floors) can really add up to substantial heating or cooling losses. Install weather stripping and caulking to stop these air leaks.

Office equipment will remain off when not in use. In many businesses, this simple approach can achieve big savings. Don't underestimate the energy savings you can get by turning off unused computers, monitors, printers, and copiers. See [Office Equipment: Cutting Energy Costs](#).

Lights will be turned off in un-occupied areas. Lighting accounts for significant energy use in most facilities, yet much of it is wasted by lighting unoccupied areas. Post reminders for staff to turn off lighting when they are the last to leave a room. Consider the use of lighting occupancy sensors for areas that do not have constant occupancy, such as restrooms or conference rooms. These sensors have been shown to result in significant energy savings. See [When To Turn Off the Lights](#).

Lighting will be retrofitted with newer, more efficient technology. Replace conventional incandescent bulbs with compact fluorescent light bulbs (CFLs). Incandescent bulbs consume 75% more electricity than CFLs. CFLs cost less to operate and last longer than incandescent bulbs. Replace T-12 fluorescent fixtures with more energy efficient T-8, T-5, and T5HO fixtures and electronic ballasts. See [Avoiding Retrofit Lighting Mistakes](#).

We will purchase only high efficiency products and equipment such as those qualified by ENERGY STAR®. ENERGY STAR® is a joint program of the U.S. Department of Energy and the Environmental Protection Agency that rates the energy efficiency of a variety of commercial products, from lighting and office equipment to heating and cooling systems. ENERGY STAR® qualified products use 25%-50% less energy than other products. For more information, see [ENERGY STAR® Purchasing and Procurement](#).

Getting Everyone Involved

Any successful energy efficiency initiative requires the involvement of more than just upper management and the maintenance staff. The active participation of all staff is necessary. For example, everyone must learn to shut down his or her computer or turn off his or her office light. An energy awareness program that is a mixture of incentives, training, and assigned responsibilities can help to make energy conservation a part of everyone's work routine. See [Get Energy Savings Working For You](#).

Start With A Plan

Becoming a truly energy efficient organization goes beyond a series of short-term energy saving measures and requires an energy management system that is a part of your overall business strategy. An energy management program is an organization-wide effort that will involve important decisions about equipment purchases, and will establish operational procedures that ensure greater energy efficiency and implement policies that encourage energy saving behavior. See [Best Practices in Energy Management](#).

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Looking at Energy Performance Contracts

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According to the [Energy Services Coalition](#), in an Energy Performance Contract (EPC), you enter into an agreement with a private energy service company (ESCO). The ESCO will identify and evaluate energy-saving opportunities and then recommend a package of improvements to be paid for through savings. The ESCO will guarantee that savings meet or exceed annual payments to cover all project costs—usually over a contract term of seven to ten years. If savings don't materialize, the ESCO pays the difference, not you. To ensure savings, the ESCO offers staff training and long-term maintenance services.



You Might Also Be Interested In...

[New Save Energy Now Initiative Launched](#)

[ENERGY STAR: Energy Savings Opportunities in Corn Refining](#)

[EERE Energy Fact Sheets for Homes and Businesses](#)

Included under this umbrella of energy improvements are:

- replacing aging boilers, steam traps and pumps,
- replacing aging chillers, cooling towers or pumps,
- installing variable speed ventilation fans or replace fan or pump motors,
- installing a new energy management control system or improving operational strategies,
- replacing lamps and ballasts or entire fixtures,
- water conservation measures, and
- training programs that help employees learn how to conserve energy

Request for Quotes and Contracts

The Energy Services Coalition states that there are [five steps](#) to a successful EPC experience:

1. Decide if energy performance contracting is a good solution for you.
 - Find out if your facility is a good candidate for a performance contract (at least 40,000 square feet of floor area and at least a \$40,000 annual energy bill).
 - Assemble a team that includes maintenance staff as well as financial, legal, and procurement staff at the onset.
 - Assess ESCO services and benefits.
2. Select an energy service company (ESCO).
 - Develop a facility profile.
 - Develop a Request for Proposal (RFP) ([model RFP/RFQ](#) in Word format; hit "Cancel" if the User Name and Password box appears for these links).
 - Invite ESCOs to tour the facility.
 - Evaluate the proposals (suggested list of [oral interview questions](#)).
3. Contract with your ESCO to identify energy saving opportunities.
 - Negotiate an energy audit and project development agreement with your ESCO ([sample audit contract](#)).
 - Review the technical and cost details presented in the audit.
4. Negotiate a long-term contract with your ESCO.
 - Negotiate the scope and terms of the contract ([sample EPC contract](#)).
 - Negotiate a guarantee to meet your needs.
 - Arrange financing.
 - Review maintenance requirements and services.
5. Verify savings and enjoy the benefits.
 - Approve the installation.
 - Operate the building as agreed in the contract.
 - Train staff to maximize benefits.
 - Review the quarterly reports.

Financing EPCs

Many states and utilities offer tax credits, loans, and grants for energy efficiency (and especially renewable energy) projects. The [Database of State Incentives for Renewable Energy](#) (DSIRE) lists these EPC financial sweeteners by state. Choose only the Energy Efficiency database to narrow your search. Using the Search function and selecting Grant Programs under Incentive Type reveals that twelve states have grant programs for energy efficiency. Searching under Technology Type reveals that over half the states offer financial incentives for boiler improvements.

State term contracts to winning ESCOs allow them to offer EPC services to many or all governmental customers (municipal and educational agencies) without the time and expense associated with typical RFQ competitive bidding. Over thirty states have [created legislation to use performance contracting](#) to acquire building upgrades and energy efficiency improvements. Only a couple of states have no EPC legislation. The rest selectively cover schools, colleges & universities, municipalities, counties, or state agencies.

The Energy Policy Act of 2005 (Public Law 109-58) created federal financial incentives for energy efficiency. For instance, the Deduction for Energy Efficient Commercial Buildings or §179D of the Internal Revenue Code creates a tax credit that applies to improvements in one of three building systems: building envelope, lighting, or HVAC. See the links below for additional details.

Coordination with Local Utility

If you are considering an Energy Performance Contract for upgrades to your facility, it would be to your advantage to also involve your local energy supplier. Contact your local utility account executive to receive valuable input into your energy project.

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The GreenSpace: Season's Greenings

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Each year, we start those winter holidays with the best of intentions—"This is going to be the BEST ONE EVER!"

Before you know it, however, it's late December and your place is buried in crumpled wrapping paper, turkey bones, fruitcake, pine needles, candle drippings, and worse. In fact, sometimes it seems like there's more being pushed out the door following the celebration than was brought in to start with. According to Robert Lilienfeld, author of *Use Less Stuff: Environmental Solutions for Who We Really Are*, between Thanksgiving and New Year's Day, Americans throw away a million extra tons [900,000 metric tons] of garbage each week, including holiday wrapping and packaging. While there are a wide array of suggestions for reducing the impact of your holiday affairs on the environment, ranging from the logical and simple to the more "out there" (yes, we've seen that tree-bark wrapping paper and those biodegradable golf balls), we thought we'd offer a few of the more accessible and easily-implemented remedies.



You Might Also Be Interested In...

[When is Making Your Own Electricity Appropriate?](#)

[The GreenSpace: The Wearin' o' the Green—Is It Time to "Cotton Onto" the Latest Trend?](#)

[Ethanol: The Road to a Greener Future](#)

Wrapper's Delight - It starts out looking great on the outside of a box, but when it ends up crumpled up in a garbage bag at the curb, you might be tempted to rethink your options before you head out to buy another roll. Unfortunately, recycling is probably not one of them. While you may find a few recyclers willing to accept tissue papers, most wrapping paper has enough foil and plastic to make recycling it a real challenge (not to mention the bits of cellophane tape, ribbons, and labels that get mixed in with it). At a minimum, look for paper with some post-consumer recycled content, but explore other options as well. Newspaper, brown paper grocery bags (spruced up with markers or tempera paints for color), reusable gift bags and boxes, and fabric can all make effective alternatives to wrapping paper. A great tradition from Japan is the [furoshiki](#), which is a traditional wrapping cloth that can be reused repeatedly. Better yet, why not...

Give Less Stuff - Gift giving doesn't always have to involve objects. Babysitting, pet sitting, snow shoveling, lawn care, or any other service you can think of can be thoughtful and well-received gifts. (Home-cooked meals or theater tickets are also great choices, if you've got any of us on your list this year.)

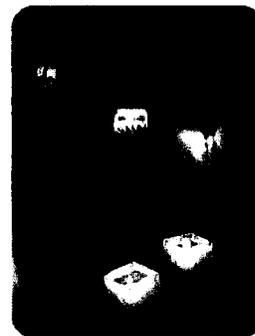
Bring the Lights Down - Look closely at your options for holiday lighting; there are some real opportunities for energy-saving displays.

Not-So-Good: C7 or C9 screw-in incandescent light bulbs, which can use 5 to 7 watts *per bulb*.

Good: Miniature or "mini" incandescent lights use only about 0.4 watts per bulb.

Best: LED lights holiday lights use only 0.04 watts per bulb, or 1/10th the amount of miniature bulbs. These bulbs are more durable, due to their solid-state construction, and safer, because they are difficult to break and run "cold." Ten sets of 100 of these LED bulbs cost in the range of \$0.60 per month to operate.

The Great Christmas Tree Debate - While some folks would have you believe that cutting down a live fir tree and bringing it indoors is the worst thing you can do for the environment, the truth is that it's most always a better choice than setting up an artificial tree, even if you can use the fake one year after year. (The Christmas Tree Council of Nova Scotia has a wonderfully detailed and well-documented [side-by-side comparison](#) of the pros and cons of artificial trees vs. live trees—just in case you get dragged into any heated debates at the office holiday party this year.) If you do pick up a live tree, be aware of any tree mulching programs your community might have for after the holidays, or fire up the chipper and do it yourself. Better yet, you can buy live trees at many nurseries and tree farms that can be replanted when the season is over. (They'll also be fresher and truly greener—not just spray painted that way to hide the browning needles.) If you're concerned about tree-farming use of pesticides and herbicides, then yes, Virginia, there are both certified and non-certified organic Christmas tree farms.



Even Candles Can Be Green - Conventional candles usually contain paraffin (a petroleum by-product) and stearic acid (a by-product of the meatpacking industry). If either of these ingredients concerns you, you might consider using 100% beeswax candles, which many people argue burn cleaner and longer than paraffin candles. If, on the other hand, you're philosophically opposed to benefiting from the labor of enslaved bees, then vegetable-based candles (usually soy or palm oil) will look just as stunning in your menorah or on your dinner table.

(All right, we still haven't figured out what to do with those turkey bones, but [Changing World Technologies](#) may be on the right track. Its technology has been used to turn poultry feathers, bones, and innards into renewable fuels.)

We hope we've sparked your interest in pursuing ways to make your holidays greener. As is usually the case with environmental initiatives, individual steps can seem small and inconsequential, but can have big impacts when widely adopted. Plus, we can't think of anything that better fits into the giving and sharing spirit of the season.

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