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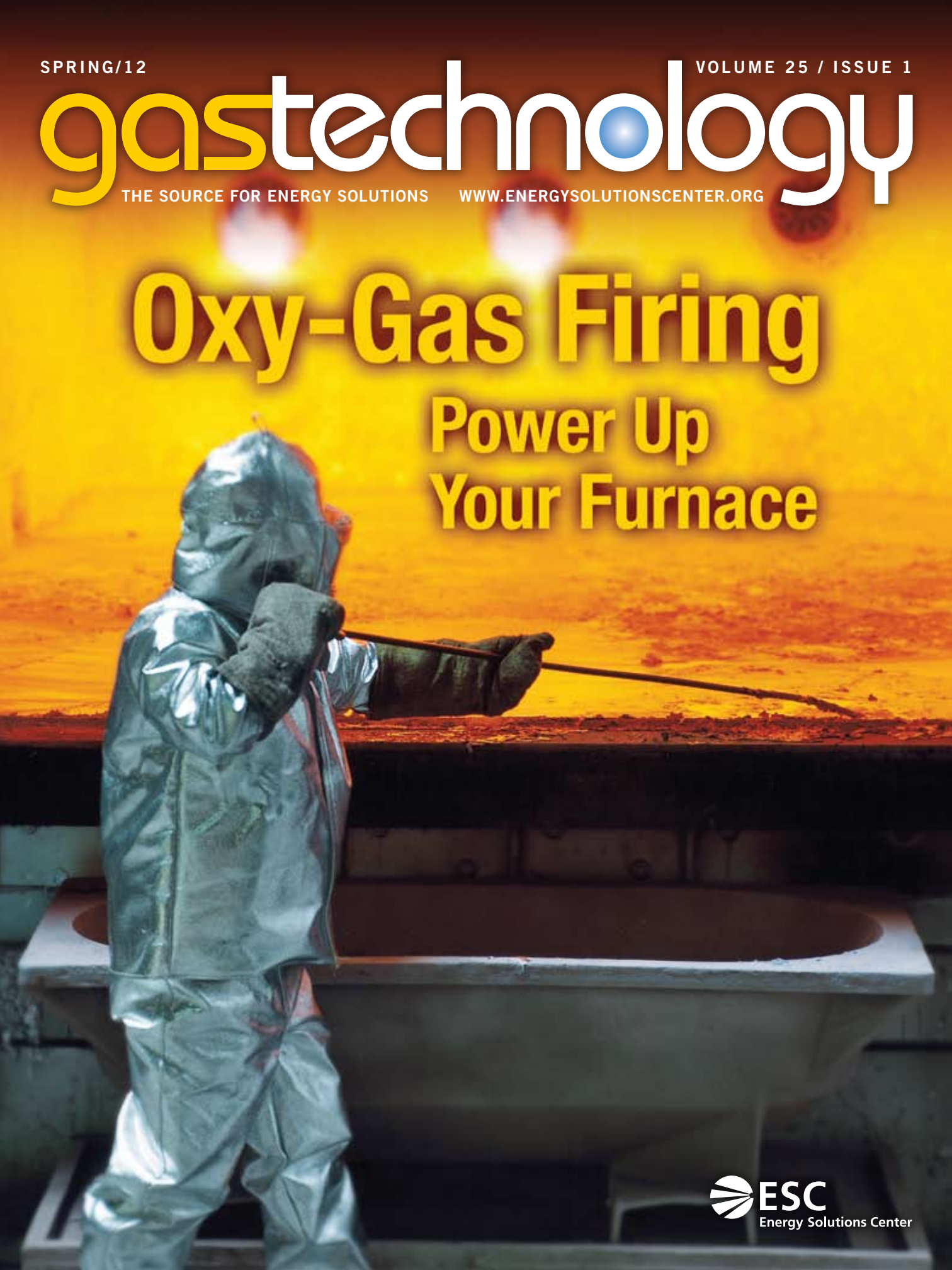
Oxy-Gas Firing

Power Up Your Furnace



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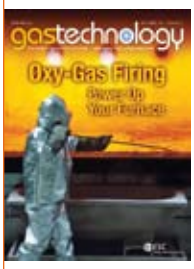

on the cover

A wide range of industrial furnaces, such as the aluminum-melting unit shown here, can benefit from the efficiency and increased capacity of oxy-gas firing. Photo courtesy The Linde Group.

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David Weiss, Executive Director
Jake Delwiche
Contributing Editor
Comments may be directed to:
Gas Technology Editor
Plant Engineering Magazine
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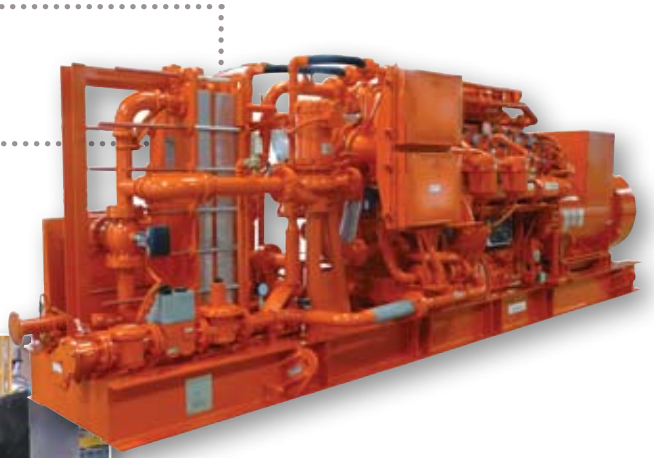
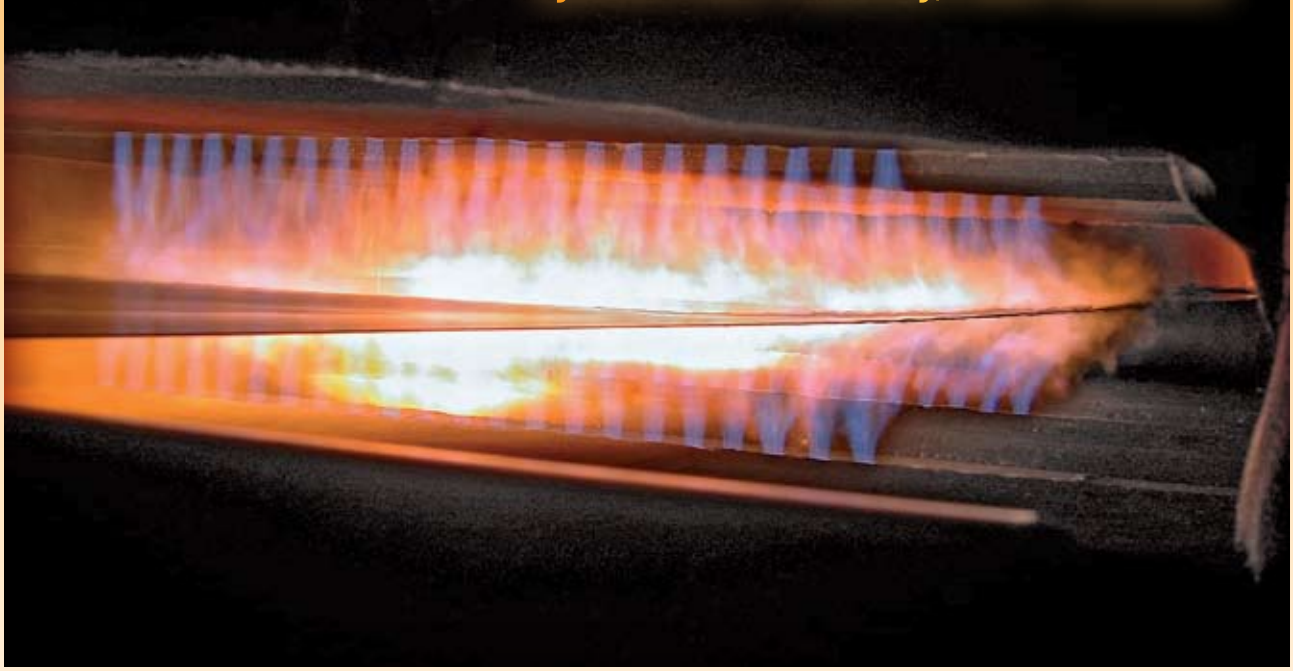
inside



Oxy-Gas Firing Grows in Popularity

Systems Offer Flexibility, Lower Emissions



A direct-flame flame impingement technology application with 120 oxy-gas flames heating a metal strip in a galvanizing line. Photo courtesy The Linde Group.

INDUSTRIAL ENERGY USERS are attracted to natural gas as a premium fuel that is available at very attractive market prices. Most energy experts believe that position is unlikely to change soon. Industrial furnaces that fire natural gas can combine the benefits of natural gas with the further advantages of oxy-fuel firing. The combination gives them even lower emissions, increased energy input from existing furnace spaces, lower flue gas volumes, and fuel savings ranging from 10% to 50%. This solution is worth considering.

Why It Makes Sense

Disregarding water vapor, atmospheric air contains about 78% nitrogen and only 21% oxygen. Thus, systems for air-fuel combustion need to be designed to handle a large volume of air to support combustion. Air intakes, blowers, furnace spaces, heat recovery accessories, emissions treatment systems and exhaust piping all have to be sized for much greater volume than if combustion were supported by oxygen only.

NO_x Emission Reduction

Eclipse Combustion, Inc. is a worldwide manufacturer of industrial heating systems, including burners. According to Todd Ellerton, Customer Insight Manager at Eclipse, a major advantage of oxy-fuel over air-fuel is the potential for reduction of total NO_x emissions. He notes, "Since nitrogen is removed as combustion

air is eliminated, total NO_x produced per ton of product is reduced 80% to 95%.

However, he points out, the concentration of NO_x in the flue gas may actually increase, as the total volume of flue gases is reduced significantly. NO_x in oxy-fuel combustion comes from infiltration of air in and around the furnace, plus some N_2 can be present in both the natural gas and oxygen." Ellerton explains that with industrial oxygen, some nitrogen is inherent in the process itself. He adds, "With air fuel combustion you typically have a 10 to 1 fuel ratio, but with oxy-fuel it is only 2 to 1."

Eclipse Combustion PrimeFire 300 burner installed on an aluminum melting furnace. Photo courtesy Eclipse Combustion.

Adds Furnace Capacity

Another advantage of oxy-fuel is where industrial furnaces that use air-fuel firing are at the peak of their capacity, and greater energy output is needed. By converting these to partial or complete oxy-fuel firing, the furnace output is increased without the capital expenditure of a complete furnace replacement. Product throughput in the furnace can be increased.

Glass Industry a Leader

According to Ellerton, one of the first and most prominent users of oxy-fuel technology has been the glass industry. Glass-making furnaces are major energy users, and operators are attracted to the higher combustion efficiency offered by burning natural gas with oxygen. These potential energy savings are quite variable, and depend on the type of furnace, the type of burner, and the degree to which the air-fuel burners are replaced.

Ellerton indicates, "Depending on the furnace operation and the efficiency of the operation, fuel savings can range from slightly over 50% to only 10%, so all the variables need to be reviewed prior to deciding if oxy combustion is a viable option." He reminds owners that that they will be saving some expense for the fuel, but it is also necessary to pay for the oxygen.

He estimates that 30% to 35% of glass furnaces are using oxy-fuel systems today. He notes, "Of the various market segments within the glass industry, the fiber glass segment has been the strongest adopter. Over half of these manufacturers are estimated to be using oxy-fuel."

Burner Improvements for the Glass Industry

Technology for oxy-fuel burners continues to advance. One recent introduction is the Eclipse PrimeFire 400, which was jointly developed by Eclipse Combustion, the Gas Technology Institute and the U.S. Department of Energy. This burner was designed to generate a certain amount of soot in the flame. This produces a more luminous flame and thus better heat transfer through radiation. This increased flame luminosity improves the performance of glass furnaces.

Conversion Trend Continues

Praxair, Inc is a major supplier of industrial gases and gas generation equipment. According to Pravin Mathur, Global Market Director, Steel and Combustion for Praxair, the trend of increasing conversion to oxy-fuel firing in the metals industries is continuing. He notes that because of low natural gas prices, the current motivation for conversion for pure energy cost savings may not be as strong, but there are other motivations. "Historically, customers considered converting from air-fired systems to oxy-fuel to save fuel costs. However given the low price of natural gas today, the main driver now is that oxy-fuel systems allow the customer to increase capacity, or to quickly substitute from more expensive fuels to natural gas without major capital outlay costs."

He notes that oxy-fuel combustion in some metal smelting also reduces NO_x emissions, CO_2 emissions (due to fuel use reduction), and also reduces flue gas volumes. In some cases this allows effective use of low-value fuels that otherwise might be flared as waste.

Supplement Existing Fuel-Air Furnaces

Mathur points out, "It is possible to convert specific zones of existing furnaces to oxy-fuel, or to add oxy-boosting burners as required at strategic locations in addition to air-fired burners." Mathur explains that this type of flexibility is attractive for industrial furnaces in the metals industries that have periods of high load interspersed with lighter loads.

Other Industrial Applications

According to Susan Brownlow from The Linde Group, another major industrial gas supplier, her firm is also noticing a growing use of oxy-fuel firing in other industries. She points out, "In the steel industry, oxy-fuel is used to enhance the melting process in electric arc and rotary furnace processes. Here it provides a substantially increased flame temperature. The higher the flame temperature, the faster the scrap

melting, with fuel savings and lower CO_2 emissions."

She emphasizes that increasing demands in the metallurgy and glass industries and new market challenges have called for accelerated development work in oxy-fuel technology. She notes, "Some of the most innovative and successful outcomes have been flameless combustion, direct flame impingement (DFI), and low-temperature oxy-fuel technology for the aluminum industry. New technologies to increase even further the benefits of oxy-fuel, including new burner firing methods for the glass industry, have seen enthusiastic uptake."

PrimeFire 400 Burner by Eclipse Combustion. With this burner, luminosity increases by 20 to 30% over comparable flat flame burners, while NO_x decreases by up to 18 %. This feature increases the effectiveness of the burner in glass furnaces. Photo courtesy Eclipse Combustion.

Expanding Into New Markets

She explains that process industries are continuing to seek ways to become more energy-efficient. "The embracing of oxy-fuel technology is likely to expand to applications within the non-traditional oxy-fuel industries, such as refineries and petrochemical plants. The utilization of increased oxygen in production over air-fuel solutions will enable major advantages in terms of reducing fuel consumption and increasing capacity and throughput, with the added benefit of lowering direct and indirect greenhouse gases to help meet increasingly stringent limits."

She adds that the use of oxy-fuel combustion also substantially increases the thermal efficiency of a furnace. This creates greater furnace output capacity and increased production — sometimes as much as a 50% increase.

Sources of Oxygen

Depending on the size of the oxygen requirement, it can be supplied in bulk as a liquid, or can be produced with on-site plants. A system called variable pressure swing adsorption (VPSA) is useful for industrial processes where significant amounts of oxygen are needed and high purity of the oxygen is not a requirement. VPSA systems are often used in the glass and steel industries.

Both liquid oxygen and support for an on-site oxygen generation plant can be supplied by several large national or international companies, including Praxair, and Linde. These types of companies are also a good resource in converting an existing system to oxy-fuel, or in designing a new plant. They can help owners analyze the potential benefits and have experts with in-depth experience with and knowledge of these operations.

Entire Burner Replacement Required

According to Ellerton from Eclipse Combustion, the conversion from an air-fuel combustions system to an oxy-fuel system will require a complete burner replacement. "Oxy-fuel burners are of a different design than air-fuel burners; it is not possible to simply insert an oxy-fuel element into an air-fuel burner." He adds that each situation needs to be studied.

Taking the Step

Ellerton stresses the need for a careful review of each opportunity for conversion. "Oxy-fuel combustion is not the answer to all applications, so it is very important to determine if it is a viable alternative. That said, in some processes that cycle, where loads are taken from cold to hot and melted, going from air combustion to oxy combustion not only reduces fuel use but can reduce cycle and heat-up time. This is where the operator can see significant cost reductions."

Add to this the potential for reduction in total NO_x emissions and the ability to reduce the plant's carbon footprint by reduction in fuel use, and the benefits of oxy-fuel can be important. Before replacing or adding air-fuel combustion systems, it can be valuable to take a look at the oxy-fuel option. **GT**

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CHP Does It All

Large Packaged Units More Attractive Than Ever

IT'S NOT ENTIRELY A NEW IDEA. We started talking seriously about cogeneration back in the 1970s. The idea was to find a use for waste heat from the engines or turbines used for on-site electric generation. This concept has found many adopters, and today is getting a serious foothold in the industrial energy market. Today, we're more likely to call it by the more descriptive name of "combined heat and power" (CHP). Refinements on the idea, and its range of applications in industry, have also expanded.

Better Than Ever

Industrial energy users often choose natural gas-powered engine units 1 MW or larger. Numerous manufacturers offer CHP equipment packages in this category, in a wide range of sizes and configurations. Today's engines are far more efficient than those when the cogeneration idea was first discussed.

Because of precise digital controls and overall improvements in engine design, the balance between electric production and heat output is more balanced than in the past. Where in the 1970s, efficiencies of natural gas-fired engines ranged from 28% to 33%, today a 2MW Caterpillar engine-generator set offers efficiency of 42.2%, and in a combined heat and power application, an overall thermal efficiency of 85% or higher. Packaged large gensets from GE Energy and others offer similar performance.

Capturing the Heat

Caterpillar is one of the major suppliers of both engines and packaged engine-generator sets. Brian Snyder from Caterpillar was a presenter at the Midwest Cogeneration Association conference in October, 2011. He explained that with a modern CHP arrangement, 42% of the fuel energy is converted to electric power. Approximately 3% is lost as radiated engine heat. The remainder, 55% of the heat energy, is with the exhaust gases, the engine jacket cooling water, the engine aftercooler and the oil cooler.

Typically 80% or more of this waste heat can be captured and used for plant process purposes, for building heating, or to supply energy for absorption cooling. Thus the unit thermal utilization efficiency goes from 42% to 86%. To accomplish this, the CHP packaged unit is equipped with the appropriate heat recovery devices. This includes coolant liquid-to-water plate heat exchangers and exhaust gas-to-water/steam heat exchangers.

Wide Variety of Applications

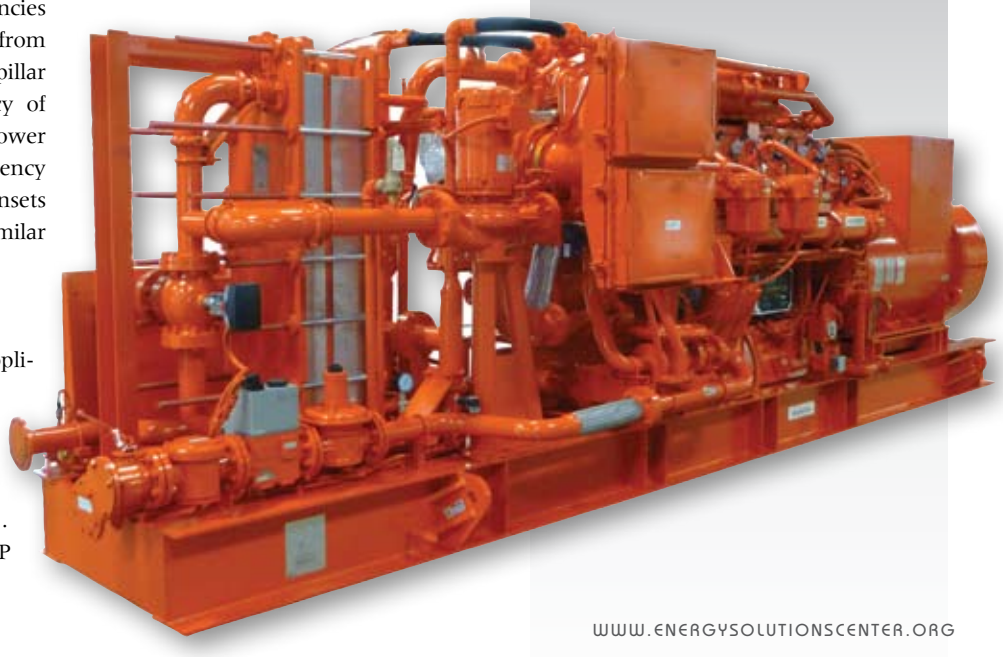
Snyder stressed the wide range of industrial applications for engine byproduct heat. He noted that one of the most basic applications was heating water with energy recovered from the engine exhaust to a temperature of up to 99°C. Such a hot water stream, as an example, supplies a water-to-air heat exchanger with 35° C air preheat for a drying tunnel in brick manufacturing.

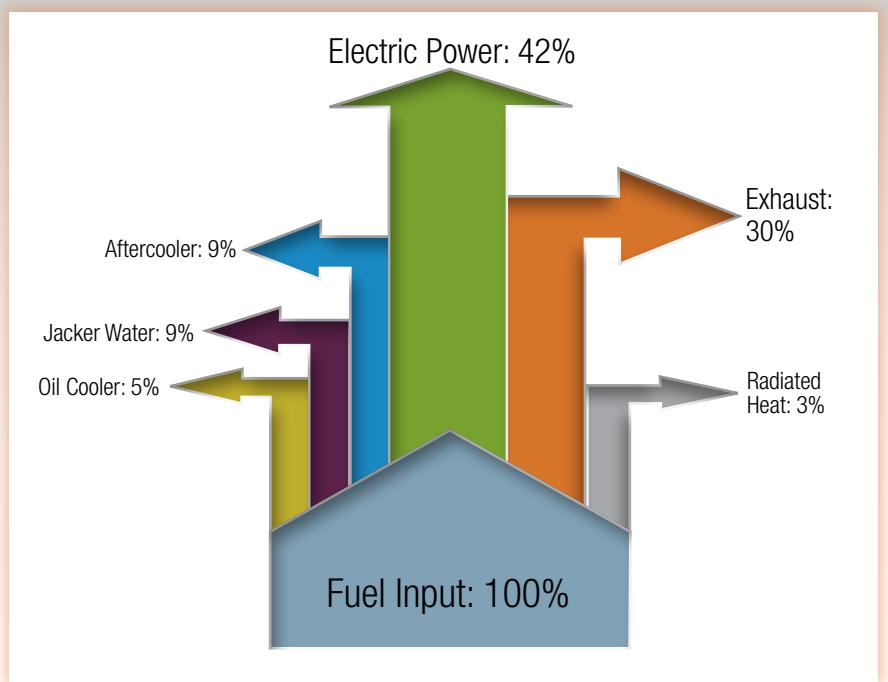
Other applications he described included systems that provide both saturated steam from the engine exhaust and 90° C hot water from the other engine heat sources. The steam and hot water can either be used for process purposes, or can supply an absorption chiller for building cooling or process chilled water.

Large Engines for Large Applications

GE Energy offers two lines of large engine-generator sets suitable for CHP applications. The company's Jenbacher engines are man-

GE Energy's Waukesha APG1000 Enginator® with CHP package, complete with plate and frame heat exchanger, control panel, gas train with design for easy customer connections. This unit is rated at 1,100 kWe, 1,260 kWth @ 60 Hz for 89.4% total efficiency. Photo courtesy GE Energy.





This illustration shows a typical distribution of the energy from a modern engine CHP installation. Illustration courtesy Caterpillar.

ufactured in Austria and sold worldwide for a wide range of applications. They are available in sizes ranging from 500 kW to 9.5 MW. According to Kerstin Lienbacher from GE, these engines are used both with natural gas, and with a wide range of other fuel gases, including landfill gases. These other gases can be used alone or in combination with natural gas.

Lienbacher gives an intriguing example of a sophisticated Canadian installation where not only the electric energy and the byproduct heat, but also the exhaust CO_2 are all used. This is at Great Northern Hydroponics, a division of Detroit-based Soave Enterprises, at a sprawling 55-acre tomato greenhouse complex in Kingsville, Ontario, near the north shore of Lake Erie.

Using All the Outputs

The site has a high-efficiency power plant powered by four 3.0 MW GE Jenbacher cogeneration modules. The electric energy from the plant is used on the site, and the surplus is sold to the Ontario Power Authority under a 20-year contract. According to the Power Authority, the plant will supply enough electricity to power 12,000 to 15,000 homes annually.

The engine heat will warm the greenhouses, eliminating the need for other supplemental heating equipment. In addition to generating power and heat to support greenhouse operations, the power plant also treats the exhaust stream from the gas engines, enabling CO_2 from the exhaust to be recycled and applied as a nutrient for greenhouse crop production.

According to Roger George, general manager for GE's Jenbacher gas engine business in North America, "Facilitating additional cogeneration projects in the greenhouse industry will support new sustainable energy, environmental and employment opportunities throughout this multi-billion dollar industry."

Interest on the Upswing

Interest in industrial application of CHP with large engines is definitely increasing. According Aaron Trexler, Power Generation Product Line Manager with GE Energy's Waukesha unit, this application has long been recognized in Europe. "We are starting to see more of this in the U.S. due to lower natural gas prices, which can help reduce the customer's overall cost of electricity while helping relieve grid congestion, increase energy security, and eliminate losses that normally occur in the transmission and distribution of electricity from a power plant to the user."

Trexler also points out that using engine CHP to supply steam or hot water can also eliminate or reduce the use of boilers, thus increasing overall system efficiency. "You are not wasting the heat provided by a reciprocating engine driving a generator. These cost saving provide additional competitiveness for industrial and commercial users, while also offering affordable heat and cooling."

Trexler points out that the growing desirability of CHP is not only a function of its increasing efficiency and low fuel costs, but also improved emission controls. "Advanced control technologies help minimize emissions to levels which are much lower than what were seen in the past decade."

Case-by-Case Evaluation

He stresses that customers need to evaluate project feasibility on a case-by-case basis. "In the case of natural gas-fueled CHP, which is the industry norm, users trade the capital costs of equipment and increased fuel costs for lower electricity costs. Electricity savings must exceed the increased natural gas, capital and operating costs to realize project profitability."

Many large industrial energy users are good candidates for natural gas-fired engine CHP. If your installation uses large blocks of electric power, and at the same time needs hot water or steam for process or comfort applications, now might be the time to have a qualified engineer do a study of this option. And if it has been some years since you have done such a study, it might be time to take another look. **GT**

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Packaged Watertube

Time-Honored Technology Has a New Luster

Modern packaged watertube boilers by Groupe Simoneau supply steam to a Canadian prison facility. Photo courtesy Groupe Simoneau.

SINCE THE BEGINNING of the last century, watertube boilers have been developed to meet the need for higher pressures and faster response times.

Today, watertube units are dominant in many industrial applications. Fire-tube units, tubeless units, and hybrid boilers have their places, but when an industrial user needs medium- or high-pressure steam, and lots of it, watertube boilers usually get the nod.

Factory Packaging Brings Advantages

In the distant past, most watertube boilers were assembled at the site, including installing tubing, walls, burners and controls. For all but the very largest industrial and utility installations, those days are past. Today, boilers of up to 500,000 pounds per hour are available as completely factory-packaged units. Even larger capacities are available with packaged modular designs that require very minimal assembly at the site. Customers have the assurance that unit assembly is done to the highest standards under controlled factory conditions.

Typically, packaged boilers are inspected and hydro-tested at the plant complete with required valves, controls, and power and control wiring. In the largest units, burner assemblies and overhead drums are usually attached at the site. It merely remains for the unit to be put in place and connections made.

Range of Applications

Cleaver-Brooks is a major supplier of large, packaged watertube boilers for industrial users in the U.S. and Canada, and worldwide. Jason Jacobi is Sales Manager at Cleaver-Brooks' Nebraska Boiler unit in Lincoln, Nebraska, and is involved in large packaged boiler sales for industrial applications. Jacobi indicates that steam from packaged industrial watertube boilers is being widely used in the petrochemical, refinery, pulp & paper, food & beverage, chemical & pharmaceutical, and miscellaneous manufacturing segments of industry.

He points out numerous benefits of replacing an older boiler with a new packaged unit. "In my opinion, the most influential advances in boiler technology in the past 20 years have come in the forms of lower emissions, increased reliability, innovative modularization and extreme efficiency improvements."

Eliminating Refractory

Jacobi indicates that Cleaver-Brooks has strived to eliminate the need for refractory in its industrial boilers. The benefits are reduced maintenance needed for replacing broken or missing refractory, and reduced potential for overheating of burner components while cooling.

Improved controls are another important advancement in boiler design. Jacobi points out that precise digital control of combustion is essential to meet air emission standards as well as maintaining highly efficient steam production over a range of turn-down conditions. "Advanced metering control systems allow for tight control of the fuel-air ratio." Applying these advanced controls on an existing boiler can also be beneficial.

Retrofits Possible, But . . .

Asked whether it is practical to put new burners and controls on an older boiler, Jacobi says, "This varies on a case-by-case basis, but in general there can be real value in retrofitting an existing boiler if it is in good condition and does not require significant pressure vessel rework."

"However," Jacobi cautions, "The existing pressure vessel remains, and is likely not optimized for the flame geometry and mass flows of today's green burner systems. Drawbacks of this approach can include higher fan power consumption and possibly reduced steam capacity." He notes that when many industrial customers start to consider a retrofit, their boiler vessels are already beyond reasonable repair. "In these cases, an entirely new state-of-the-

Boilers

art custom designed steam generating system offers maximum value."

New Boiler May Be Better

This thought is echoed by Ryan Cornell at The Babcock & Wilcox Company, another major manufacturer of watertube boilers for industrial plants. He explains, "Although a customer can certainly upgrade an existing boiler with a new burner and digital controls, there are substantial costs to retrofiting a unit in the field, as well as costs for other components that may need to be installed for emission control."

Cornell also points out that over the last 5-10 years boilers have been redesigned to improve internal heat transfer. "The heating surface is more effective than earlier designs, which allows the manufacturer to design more compact units with higher heat release rates than were possible in the past. This allows a customer to install a unit with higher capacity and better efficiency into the same footprint as an older unit in their plant." For plants that are undergoing operational expansion, or with crowded boiler rooms, this is attractive.

Boiler Selection

In addition to being able to operate at higher pressure than a firetube boiler, today's boilers can produce superheated steam for applications where a "dry" high-pressure steam is desirable.

According to Cornell, most industrial boiler manufacturers have the resources and are capable of assisting owners in making an assessment of the existing system and making recommendations for retrofit or replacement. Owners should work with consulting engineers that are familiar with industry trends.

Design Innovations

Examples of innovations in boiler design are units by Groupe Simoneau in Quebec. According to Marc Mitchell, Director of Sales and Marketing for the company, one new feature is a proprietary design for economizers integrated within the boiler.

Speaking about the boiler replacement process, Mitchell points out that many owners need to keep their old boiler operative until the new unit is installed in order to maintain plant production. He adds, "Many will keep their old one as a backup, if they have the space, instead of dismantling it after the new one is installed." In this case, because the unit is only infrequently operated, low boiler efficiency is not a great problem.

Finding New Opportunities

Packaged watertube boilers are being installed in interesting new ways. An example is the use of multiple very large units to generate steam to facilitate extraction of oil in Canada's western oil sands regions. Here the steam is injected into boreholes in the oil-sand deposit to heat it and facilitate oil and water removal, either from a parallel well or by cyclical injection and liquid extraction. According to Jacobi from Cleaver-Brooks, this operation replaces earlier facilities that extracted the sand and treated it on the surface, with some attendant environmental issues.

Over the past eight years, Cleaver-Brooks has manufactured nearly 40 of the massive boilers used to generate the huge quantities of steam needed in Canada's Athabasca Oil Sands.

"No one else in the world really needs that much steam," Jacobi says. He notes that these boilers usually use a combination of pipeline natural gas and produced gas that comes up the well with the oil. "Regardless of the fuel, environmental regulations require that all boilers be equipped with ultra-low NO_x burners to achieve Best Available Control Technology (BACT)."

Attractive Energy Prices

Today's comparatively low prices for natural gas for industrial use make it an easy choice for many industrial steam users. The payback for a modern boiler using natural gas can be very short. If a company is currently using another fuel, or if their existing boilers are in poor condition, now is the time to change to an efficient and reliable packaged watertube boiler firing natural gas. **GT**

A group of giant packaged watertube boilers are used to supply steam for oil extraction in a Canadian oil-sand operation.
Photo courtesy Cleaver-Brooks.

Boiler construction and assembly can be completed in a factory environment, assuring standard assembly techniques and a quality construction environment.
Photo courtesy Babcock & Wilcox.

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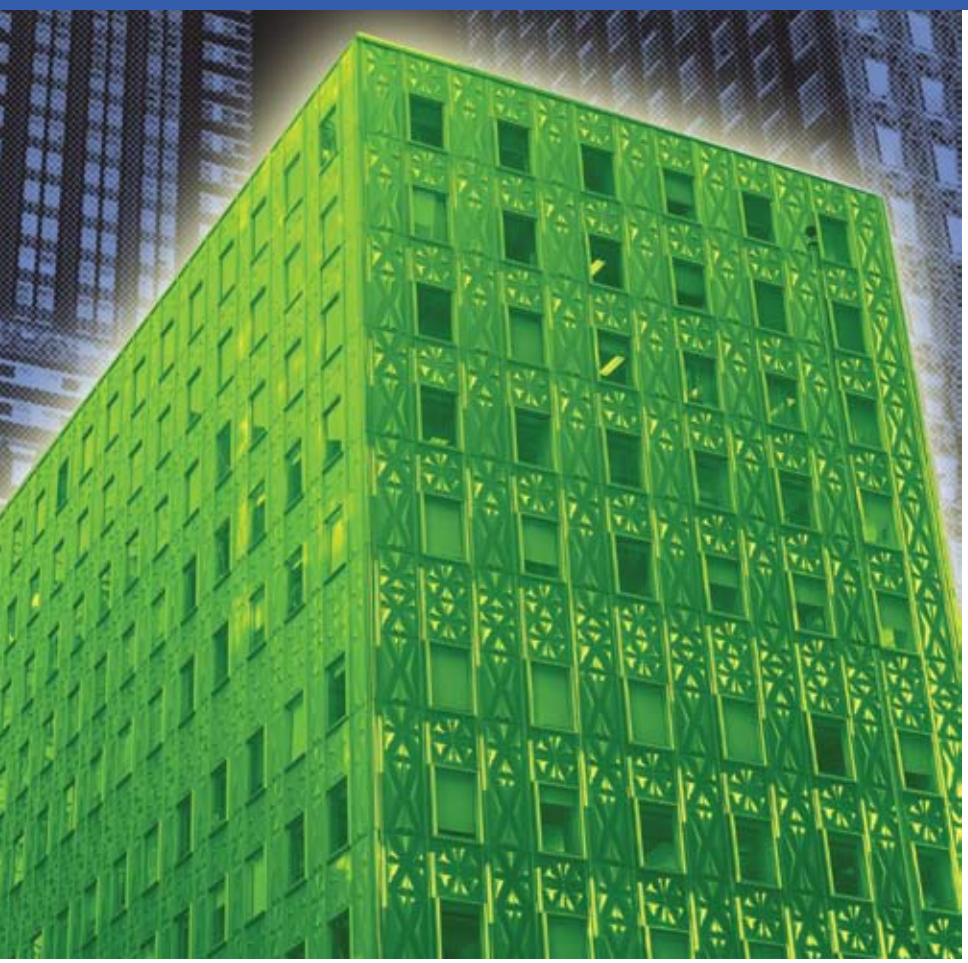

A BUILDING DESIGN AND PERFORMANCE scoring program called Green Globes is increasing in awareness and approval among both architects and owners of commercial and industrial buildings. In the U.S., the Green Globes program is operated by the Green Building Initiative (GBI). In Canada, the version for existing buildings is operated by BOMA Canada under the brand name 'BOMA BESt', and for new buildings by ECD Energy and Environment Canada Ltd.

Levels of Achievement

From one to four Green Globes can be awarded to new or existing buildings based on their levels of achievement in exceeding standards for environmental sensitivity and performance. The assessment and rating system represents more than 11 years of refinement by a range of prominent international organizations and experts.

The rating of the building or building plan is based on a possible pool of 1,000 credits. GBI Commercial Building Consultant Kevin Stover explains, "The 1,000 point pool allows for weighted criteria, hence promoting the primary focus of environmental design, and minimizing point chasing while still meeting the final goal of a certain rating level." Stover indicates that users of the online software program also have the option to use the ASHRAE 90.1 Appendix G energy design and benchmarking approach.

Useful for Industry

Manufacturers and commercial building owners look for ways that sustainable or "green" buildings can save energy, and can conserve water and other resources, while improving productivity and enhancing a company's public image. Green Globes for new and existing buildings is a tool to help owners do all of these. A Green Globes assessment will measure how effectively existing facilities are meeting green standards, and will make recommendations for improvements. Types of buildings in this sector that have been certified using Green Globes include: manufacturing plants, fire stations, transit centers, warehouses and parking garages. This variety of building types shows the flexibility of the scoring approach.

Transparent Process

Stover explains that the online program and the formal building assessment process are open and transparent. "The third-party assessor is directly involved with the client. Professional judgment enters into the assessment process, resulting in the most accurate and optimal final score and rating." He adds, "Green Globes is structured around the principle that the 'one size fits all' approach is inadequate for a green building program, given all the nuances and variables associated with commercial buildings."

The goal is to provide owners, builders and architects with an affordable process for assessing individual building plans or existing buildings. For U.S. companies, an online Green Globes Assessment Tool is available on a free 30-day trial basis. The owner can complete the Green Globe Assessment with payment of a moderate fee, and can make arrangements to have an assessor visit the facility or evaluate the plan and score it for an official Green Globes determination.

Program Supports Environmental Goals

This manufacturing building was formerly a sports gymnasium and was remodeled to meet the needs of RenewAire, LLC, a manufacturer of high efficiency heat exchangers. The building renovation was assessed under the Green Globes program and was awarded two Green Globes.

Rapid Feedback Essential

The program is attractive to owners because of its rapid feedback, relatively low cost, and online availability. Because plans can be assessed early in the process, it is practical to make changes or enhancements to improve the facility score. At least 25 U.S. states by law recognize the value of the program, and others are currently considering it for acceptance.

According to Sharene Rekow of the GBI, "The goal of the program is to provide early and meaningful feedback to help people have a greener building." According to one study, Green Globes assessments result in buildings that use significantly less energy, less water, and use a higher proportion of renewable resources.

Wide Range of Factors

Rekow points out that the program encompasses site selection and development, integrated environmental design processes, selection of materials, energy performance, use of natural lighting, the building envelope, and selection of energy-efficient and renewable building components. She emphasizes that the Green Globes program recognizes that different classes of building have differing priorities. An example is that while a bicycle rack is a valuable element at a retail facility, for a building in an industrial park, it has a low priority. The facility scoring can reflect that.

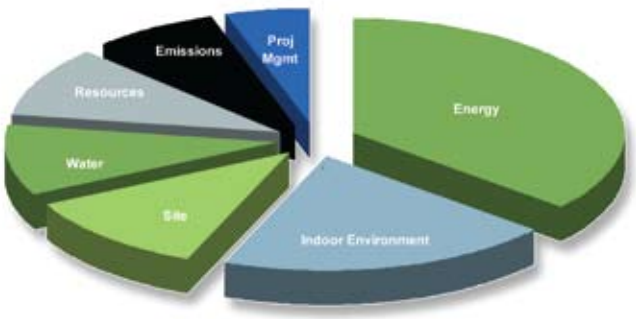

Illustration shows the weighting of the criteria used in assessing projects under the Green Globes program.

Make Adjustments While Still Time

Rekow notes that the prompt preliminary scoring aspect allows owners and designers to see opportunities for improvement and make adjustments. "That's why online access to the Assessment Tool, with its rapid feedback, is important." Rekow mentions that another important point for industrial users of natural gas is that the assessment program, in scoring, recognizes the value of natural gas as an environmentally desirable fuel because of its typical high energy efficiency and low emission levels.

An example of a manufacturing facility that has used the program to assess and improve its performance is a building owned by RenewAire, LLC, in Madison, Wisconsin. The building includes 28,000 square feet of manufacturing space and 9,000 square feet of office space. It was formerly a sports gymnasium and was renovated to meet the needs of its current owner. RenewAire used the assessment tool to tune the building renovation to achieve a high level of environmental performance. The project received a rating of two Green Globes, which represents "Excellent progress in achieving eco-efficiency results through current best practices in energy and environmental design."

U.S. Federal Acceptance

In the U.S., there has been widespread acceptance and use of the program by the Federal Government in many buildings such as Veterans Administration Hospitals and other facilities. The program goals mesh with the widely used "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings," which establish goals for facility performance for Federal facilities.

The free trial offer allows architects and owners to get a preliminary snapshot of possible design priorities for both new and existing projects. The Green Globes websites offer examples of various buildings which have benefitted from the assessment and have received Green Globes awards. To learn more about the program and to get access to the 30-day free trial, go to www.greenglobes.com **GT**

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Tankless Solution Saves Money

Owner Works with Utility to Reduce Energy Bill

THE SOLUTIONS TO REDUCING commercial and industrial energy bills are not always obvious, but with work and some help from your utility you can find them. An example is the steps taken at Champion Cleaners in Birmingham, Alabama. Here, a representative of Alagasco suggested the owner switch to tankless water heaters and replace a boiler. The owner now uses 25% less gas at the facility.

Looking for an Answer

Champion Cleaners operates three laundry and dry-cleaning facilities near Birmingham, Alabama. At one of the facilities, the one in Vestavia, the owner, David Whitehurst, asked for help from his gas supplier, Alagasco, to reduce his energy bill. He also wanted achieve a better supply of hot water when needed for cleaning operations.

The Alagasco representative, Clay Erwin, studied the installation looking for potential energy saving opportunities. He suggested that the owner replace an existing 100-gallon tank-type water heater with tankless units. In addition, he recommended replacement of an older boiler with a new high-efficiency vertical unit. The boiler selected was the Cleaver-Brooks Clearfire unit, with full- and part-load efficiencies up to 88%.

Consistent Hot Water

Owner Whitehurst had mentioned that one problem he had encountered was inconsistent water temperatures when conducting cleaning operations. Erwin found that the tank system was undersized for the periodic heavy hot water demands, and recommended replacement of the tank water heater with three tankless units that would supply on demand ample hot water at exactly the temperature needed. Three tankless units by Rinnai were installed on an exterior wall of the building. This also freed up indoor floor space that had been used by the tank water heater.

With the improved system, all three units are used when Champion is operating its equipment at 100% capacity. However, when demand is lower, Champion saves energy by running just the number of units needed to produce hot water for the needed cleaning process. According to Whitehurst, "The new equipment is not just using less energy for every gallon of water, but also the precise temperature control gives me a spot-free garment, which is an improvement from my old water heater."

MORE info

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Results Show at the Meter

Since installation of the new equipment, gas usage has dropped about 25%, using the same volume of hot water. The new equipment also reduced carbon emissions at Champion Cleaners by 25%. Whitehurst adds, "Never did I have to change the way I operate my business to achieve more efficient results. Every part of the process was seamless — from planning to installation to follow up service." **GT**

Three Rinnai tankless water heaters supply water at the set temperature at all flows, and save the owner energy.

Owner of this Birmingham-area cleaning facility asked for help in reducing energy bills. A 25% reduction in gas usage was achieved. Photos courtesy Alagasco.