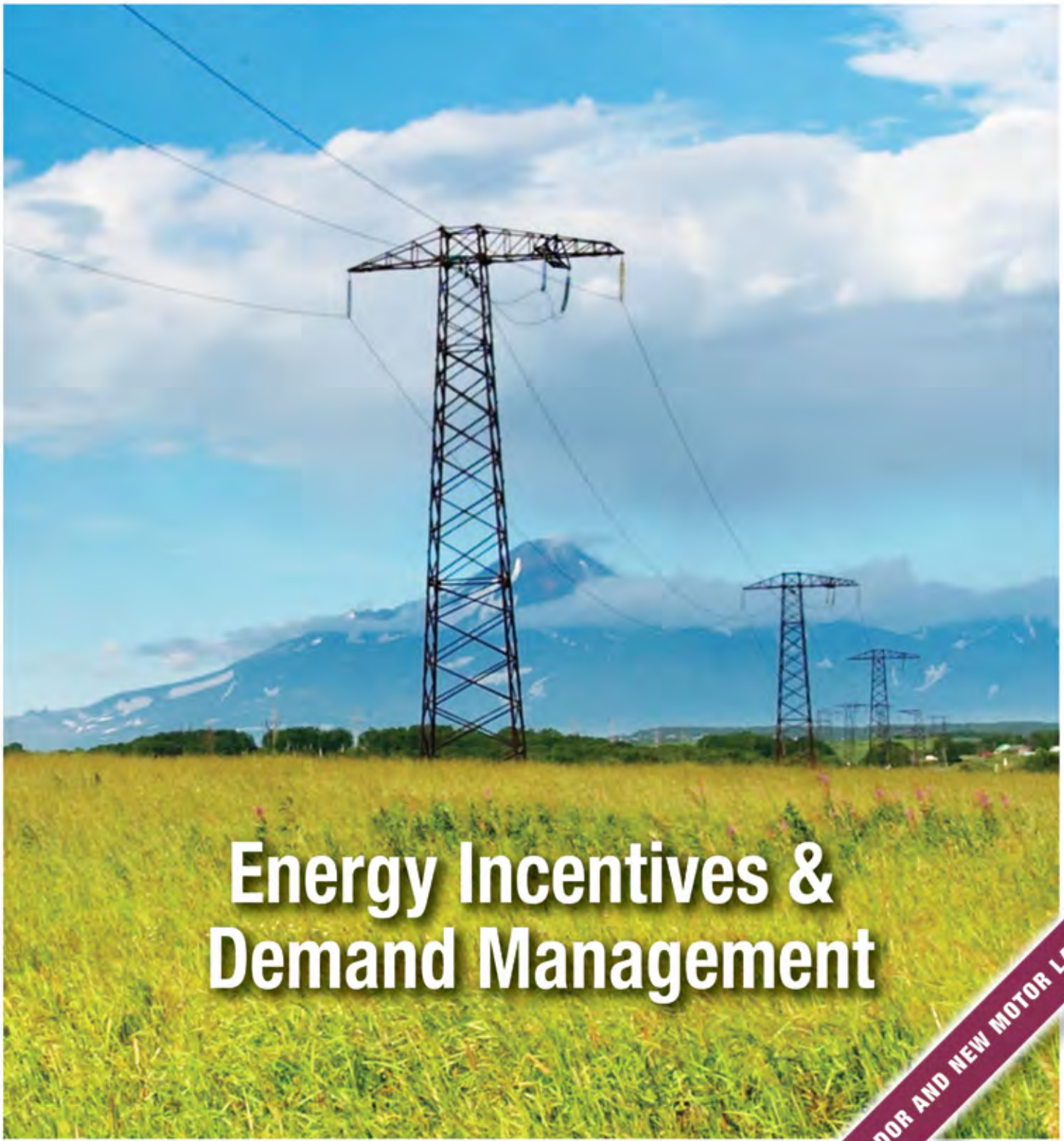
Southern California Edison | Factory Saves 1,881 scfm | Benchmarking

January 2010

COMPRESSED AIR BEST PRACTICES®



Energy Incentives & Demand Management

BALDOR AND NEW MOTOR LAWS

HydroThrift

Industrial Cooling Systems

DESIGNERS AND MANUFACTURERS OF ENGINEERED EQUIPMENT THAT WITHSTANDS THE MOST DEMANDING ENVIRONMENTS.

about Hydrothrift

For more than 30 years, HydroThrift has been building industry-leading cooling systems, designed and manufactured with careful attention to quality. With more than 15,000 thermal transfer systems installed around the globe, HydroThrift has built a reputation for quality and integrity that is second to none. Every HydroThrift system is guaranteed to work as quoted, providing customers with peace of mind.

HydroThrift's experienced engineers design each system to meet the most rigorous demands. Custom designed OEM solutions are also available, making HydroThrift the right choice for nearly any application.

capabilities

HydroThrift is well-versed in all types of process cooling, process heating and custom heat recovery systems. Whether you need a standard system or a custom-engineered solution, HydroThrift's experienced sales, engineering and manufacturing staff can help. HydroThrift will analyze the application and recommend or engineer a solution for your process cooling or heating needs. Custom design proposals are provided with no extra or hidden engineering fees.

If required, local representatives are available for on-site calls and start-up assistance. Private labeling is also available.

telephone: 330-837-5141 Fax: 330-837-0558 www.hydrothrift.com

HITACHI
Inspire the Next

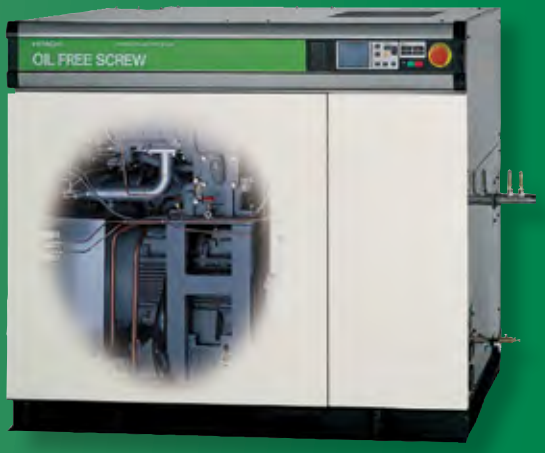
DSP Series Oil-Free Air Compressors

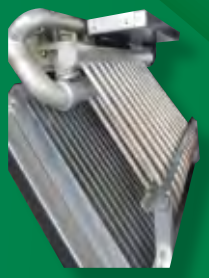
(15-240 kw/20-300 hp)

Class Zero

No Inlet Valve Design
(Patented)

Stainless Rotors with
PTFE-Free Coatings
(Patented)





Hi-Precooler
(Patented)

Oil Mist Remover
(Patented)

Hitachi MFG High
Efficiency Motor
and Inverter

Motorized Isolation Valve
(Exclusive)

"Hitachi DSP Oil-Free Compressors are designed with market leading technologies for increased customer satisfaction. Innovations of Compression, Air Quality, Protection of Process, Longevity of Design, and Efficiency of Application all combine to provide an unparalleled sum of value for the discriminating air user."

HITACHI AMERICA, LTD. AIR TECHNOLOGY GROUP
5808-Q Long Creek Park Drive, Suite Q; Charlotte, NC 28269
Tel: 704.494.3008 ext 28 www.hitachi-america.us/airtech; airtechinfo@hal.hitachi.com
Hitachi Industrial Equipment Systems Co., Ltd.

HITACHI
Inspire the Next

SUSTAINABLE MANUFACTURING FEATURES


20


26

COLUMNS


32

Rebate Ready!

Introducing the Next Generation of Compressed Air Filtration and Energy Savings Refrigerated Air Dryers!

Hankison compressed air treatment products have set the standard for premium performance, time proven reliability and optimal energy savings. After 60 years, we continue to develop innovative technologies to best serve our valued customers. Choose Hankison...New Products...New Ideas...Still the Best!

HANKISON

TEL: 724 | 745 | 1555
Email: hankison.inquiry@spx.com
www.hankisonintl.com/rebate

SPX

FROM THE EDITOR

Energy Incentives and Demand Management

Utility companies have always played an important role in the economy. Today, power companies can assist industry with system assessments, incentives and demand management — and ultimately help industry be more competitive.

Hank Van Ormer shares a demand-side assessment focusing on inappropriate uses of compressed air. The system assessment reduced compressed air consumption by over 1,800 scfm. Great opportunities exist in most compressed air installations if time and care is taken to truly measure and analyze the constituents of demand. Many utility companies are providing factories with financial assistance to have a thorough system assessment done.

In an interview, Southern California Edison's Rod Vickers was kind enough to spend some time with us reviewing SCE's three different types of energy incentives. SCE estimates that their energy efficiency programs have saved more than five billion kilowatt-hours over the past five years. SCE also recently received approval for its proposed 2010–2012 energy efficiency portfolio, and has been authorized for $1.2 billion of funding for its programs during this period.

SCE has been authorized for $1.2 billion of funding for its energy efficiency portfolio programs during this period.

Technology is helping industry achieve energy efficiency. John Malinowski, of the Baldor Electric Company, shares with us the significant increase in motor efficiencies that will become STANDARD at the company as of December 19, 2010. This is the same date that the new Energy Independence and Security Act (EISA) becomes effective, and sets a higher efficiency standard for industrial motors.

Benchmarking and demand management are two other important factors in energy management. Ed Schlect, from Advantage IQ, outlines the benefits of benchmarking energy efficiency and the ENERGY STAR resources available to energy managers. Thomas Mort, from Saving with Energy, discusses strategies that utilities can take to help industry manage demand and help the utility with load requirements.

We hope you enjoy this edition, and thank you again for your support and for investing in industrial energy efficiency.

ROD SMITH
Editor
rod@airbestpractices.com

SUSTAINABLE MANUFACTURING NEWS

DOE Awards Funding for Energy Efficiency

SOURCED FROM THE WEB

DOE Announces More than $155 Million for Industrial Energy Efficiency Projects

In November 2009, Energy Secretary Steven Chu announced that the Department of Energy (DOE) is awarding more than $155 million in funding under the American Recovery and Reinvestment Act for 41 industrial energy efficiency projects across the country. These awards include funding for industrial combined heat and power systems, district energy systems for industrial facilities and grants to support technical and financial assistance to local industry. The industrial sector uses more than 30% of United States energy, and is responsible for nearly 30% of U.S. carbon emissions.

"To remain globally competitive, American industry needs to be energy efficient. The funding for industrial energy efficiency technologies announced today will support a robust American industrial sector and help to usher in a clean energy economy," said Secretary Chu. "Many companies already realize that improving efficiency saves money while helping the environment. These projects will make energy efficiency technologies more widely available, cutting energy use and reducing carbon pollution across the country."

SUSTAINABLE MANUFACTURING NEWS

DOE Awards Funding for Energy Efficiency

"To remain globally competitive, American industry needs to be energy efficient. The funding for industrial energy efficiency technologies announced today will support a robust American industrial sector and help to usher in a clean energy economy."

— Energy Secretary Steven Chu

Nine Projects

Nine projects announced will promote the use of combined heat and power, district energy systems, waste energy recovery systems and energy efficiency initiatives in hospitals, utilities and industrial sites. Combined heat and power and district energy systems generate both the heat and power needed for industrial processes on-site, instead of using electricity from the grid, and can be nearly twice as efficient as conventional heat and power production. These nine awards — totaling approximately $150 million — will be leveraged with $634 million in private industry cost share for a total project value of up to $785 million. These industrial efficiency projects will result in almost 14 trillion Btu in estimated energy savings, which is equivalent to over 112 million gallons of gasoline per year.

Award #1: $31.6 million to ArcelorMittal USA

This project will install an efficient recovery boiler to use the waste blast furnace gas (BFG) generated during iron-making operations to produce electricity and steam on-site at the ArcelorMittal East Chicago, Indiana steel mill. The plant currently wastes 46 billion cubic feet annually of BFG that must be flared. The project will save an estimated 3.66 trillion Btu annually from the waste gas.

Award #2: $30.0 million to AK Steel Corporation

The project will construct a combined cycle power generation plant at the Middletown, Ohio works of AK Steel that will capture and process the blast furnace gas (BFG). The BFG, generated in iron-making operations, is either flared or used to make steam needed for industrial processes. Currently, over 50% of the BFG is flared. This project will utilize the waste gas, generating over 100 MW of power and saving an estimated 2.7 trillion Btu annually.

Award #3: $18.8 million to the Seattle Steam Company

This project will deploy a combined heat and power (CHP) plant in downtown Seattle that is integrated into the existing electrical and thermal energy distribution networks. It will increase the capacity and reliability of the electrical grid and district heating system in the downtown core, particularly in light of growing energy demand. The new CHP plant will generate 50 MW of electrical power and steam to offset existing, inefficient steam production equipment. The CHP plant will save an estimated 1.84 trillion Btu annually over the current, inefficient infrastructure.

Award #4: $15.0 million to Rhode Island LFG Genco

The project will construct and operate a combined cycle power plant facility at the Johnston, Rhode Island central landfill. The project will be the second-largest landfill gas-to-electricity generation facility in the United States. The project will generate 42 MW of power, and save an estimated 1.21 trillion Btu annually from the landfill gas that would otherwise be flared.

Award #5: $14.6 million to Clean Tech Partners

The project will implement a portfolio of 25 sub-projects to install energy-efficient equipment in facilities at nine different sites across the state of Wisconsin as part of the "Focus on Energy Program". The companies include a diverse cross-section of Wisconsin's industrial sector, including pulp and paper mills, printing, corn milling, plumbing and small engine manufacturing. The project will save an estimated 1.21 trillion Btu annually, increasing overall energy efficiency by 45%.

Award #6: $10.0 million to the Olinda Alpha Landfill

The project will modify and expand an existing landfill gas collection system and construct a combined cycle power generation facility at the Olinda Alpha Landfill in Brea, California. The project will generate 32 MW of power, and save an estimated 0.90 trillion Btu annually from the landfill gas that would otherwise be flared.

Award #7: $10.0 million to Texas Medical Center

The project will build a combined heat and power (CHP) facility at its existing district heating plant, serving the largest medical center in the world. The CHP system will increase electric and thermal efficiency, provide steam to the campus and improve the overall reliability of the existing plant, enabling continued operations — even in the event of a grid outage. The new CHP plant will generate 45 MW of power and provide steam to the district heating plant. The project will save an estimated 0.75 trillion Btu annually over separate electrical and steam generation.

SUSTAINABLE MANUFACTURING NEWS

DOE Awards Funding for Energy Efficiency

"Many companies already realize that improving efficiency saves money while helping the environment. These projects will make energy efficiency technologies more widely available, cutting energy use and reducing carbon pollution across the country."

— Steven Chu

Award #8: $9.4 million to Verso Paper Corporation

The project will implement a portfolio of 12 waste energy recovery sub-projects at Verso paper mills located in Jay, Maine, Bucksport, Maine and Sartell, Minnesota. The sub-projects were chosen for their energy savings potential and opportunity for immediate implementation. The bundled project has an overall efficiency of 33%, and will save an estimated 1.28 trillion Btu annually.

Award #9: $7.1 million to the Dow Chemical Company

This project will replace an existing acetylene recovery system with an acetylene hydrogenation reactor system at Dow Chemical's St. Charles, Louisiana ethylene plant. The existing system recovers the purified, highly energy-intensive acetylene. However, there is a lack of market demand for purified acetylene and the unsold product must be flared. The project will save an estimated 0.85 trillion Btu annually.

Industrial Assessment Centers and State Agencies

The remaining 32 awards will provide local technical support for the industrial sector through university-based Industrial Assessment Centers, state agencies, regional partnerships and a national technical assistance provider. This funding will enable DOE's Industrial Technologies Program to provide technical and financial support for local businesses and manufacturing facilities to save energy and reduce their energy costs, obtain financing to realize significant gains in efficiency and productivity and save and create manufacturing and industrial sector jobs across the country. These 32 projects are an extension of the DOE's successful Save Energy Now initiative, which provides plant energy assessments and technical assistance to energy intensive industrial facilities. Since the program's inception in 2006, more than 2,300 assessments have been completed. Over 1,500 industrial facilities implemented the identified energy measures, which has saved $218 million, 35 trillion Btu and 2.3 million metric tons of carbon dioxide each year.

Industrial Assessment Centers ($1.87 million total)

The awards were given to the following institutions:

- Bradley University, Georgia Institute of Technology, Lehigh University, Mississippi State University, North Carolina State University, Oklahoma State University, San Diego State, Tennessee Technological University, Texas A&M University, University of Alabama, University of Dayton, University of Delaware, University of Louisiana at Lafayette, University of Michigan and West Virginia University

State Agencies ($3.84 million total, approximately $350,000 awarded to each state)

- Alabama Department of Economic and Community Affairs
- Idaho Office of Energy Resources

- Kentucky Department for Energy Development and Independence
- Louisiana State Energy
- Maryland Energy Administration
- Minnesota Department of Commerce
- Mississippi Development Authority — Energy Division
- New Jersey Industrial Energy Program
- Ohio Energy Office, Ohio Department of Development
- Pennsylvania Department of Environmental Protection
- Wisconsin's Office of Energy Independence

Regional Partnerships ($2.5 million total, $500,000 awarded per region)

- Energy Resources Division of the Georgia Environmental Facilities Authority along with Georgia, Tennessee and North Carolina
- Massachusetts Department of Energy Resources and the Center for Energy Efficiency and Renewable Energy at the University of Massachusetts (CEERE)
- Illinois State Energy Office
- Washington Department of Community Trade and Economic Development
- West Virginia Department of Energy

National Technical Assistance Provider ($1.4 million)

The Oak Ridge (TN) Partnership for Industrial Energy Efficiency will perform 100 enhanced Save Energy Now assessments in large industrial plants and provide technical assistance to key large industrial plants in implementing identified assessment energy savings results. The Oak Ridge Partnership is one of two teams chosen by the DOE ITP to provide Save Energy Now Assessment Integrator support to key Industrial Technologies Program partners, with a priority to companies that have signed the Save Energy Now LEADER pledge. The Oak Ridge Partnership team is led by ORNL, and includes BCS Inc., Georgia Tech, FCS Consulting and Rutgers University as team partners.

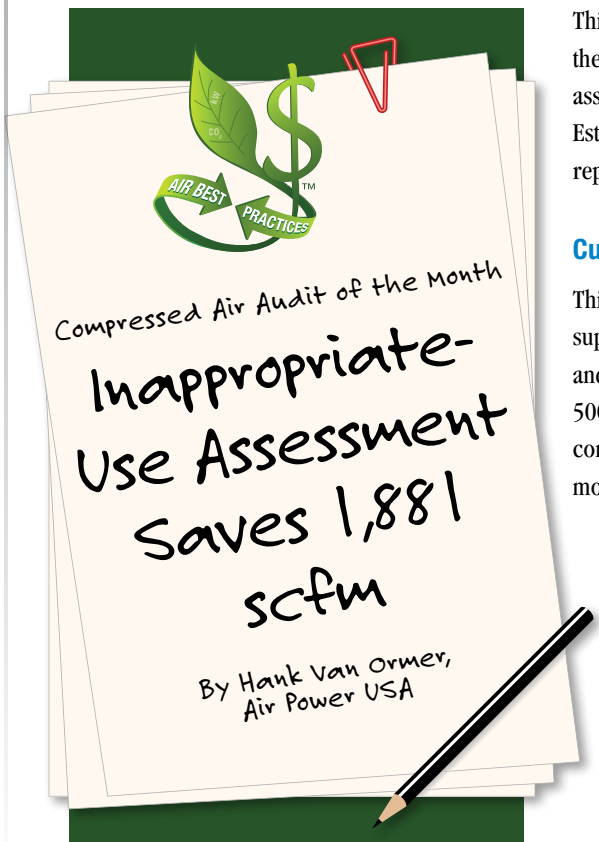
DOE Announces Updated State Incentives and Resources Database Website

The State Incentives and Resources Database on the State & Utilities Partnerships website has been upgraded and re-released. The website now contains 2,751 entries where commercial and industrial managers interested in reducing the energy consumption of their businesses or facilities can access an online library of energy incentives, tools and resources. The database features information on incentives available at the state, local, utility and non-profit levels, including rebates, waived fees, tax credits and loans. The site also offers such resources as analysis tools, education and training programs and energy audits. BP

THE SYSTEM ASSESSMENT OF THE MONTH

Inappropriate-Use Assessment Saves 1,881 scfm

BY HANK VAN ORMER, AIR POWER USA



January Audit of the Month

Where:	United States
Industry:	Food & Beverage
Issues:	Compressor Efficiency, End Uses
Audit Type:	Supply and Demand Side

System Assessment Win/Win Results*

Reduction in Energy Use:	5,870,564 kWh
Reduction in CO2 Emissions:	4,186 metric tons
Equivalent CO2 for Homes:	554 homes
Equivalent CO2 for Vehicles:	861 vehicles
Approximate Annual Savings:	$364,211
Investment:	$435,800
Energy Rebate:	$0
Simple ROI:	14.4 months

*Annual energy consumption

This factory currently spends $735,757 annually on the electricity required to operate the compressed air system at its plant. The group of projects recommended in the system assessment will reduce these energy costs by an estimated $364,211 (49% of current use). Estimated costs for completing the recommended projects total $435,800. This figure represents a simple payback period of 14.4 months.

Current System Description

This is a relatively large operation with ten production lines. The compressed air system is supplied compressed air by several generations of mostly Joy (Cooper Cameron) compressors and two 1995-era Ingersoll Rand 300 hp class units. The Joy units include two 1975-era, 500 hp class machines, two 1985-era, 450 hp class machines and one 2000-vintage 200 hp compressor. These compressors are well applied and apparently very well maintained and monitored on their central data acquisition system.

The air is water-cooled after-cooled and then goes to four blower purge dryers on the second floor. During our site visit, all the dryers were working well, with their dew point demand control engaged and working. Pressure dew points were always at 40 °F or lower.

The plant runs 24 hours a day, seven days a week, almost all 365 days a year. There are two planned shutdown days every year. For calculating usage, we have agreed to use 8,760 hours per year. The new negotiated power cost from the plant's utility provider is $0.06 per kWh.

Measurement Actions Taken

The following actions were taken to establish baseline measures for flow and pressure:

1. Temperature readings were obtained on all units using an infrared surface pyrometer. These were observed and recorded to correlate to the unit's performance, load conditions and integrity.
2. Critical pressures, including inlet and discharge, were measured with calibrated digital vacuum and pressure test gauges with an extremely high degree of repeatability.
3. The input kW and other pertinent electric operating data on all units were taken from the plant's very effective operating data monitoring systems.
4. The same basic measurement activity was carried out for system pressure using a similar, high-caliber Ashcroft test gauge.
5. Air flows (scfm) were measured and logged with a thermal mass, heated, wire-type flow meter with data fed to the plant's monitoring system. We were able to capture this data from the plant's monitoring system.

January Audit of the Month

Compressor System Before Assessment

Operating Hours:	8760 hours
Power Cost kW/h:	$0.06
Avg. Air Flow:	5,068 scfm
Avg. Compressor Discharge Pressure:	88–98 psig
Avg. System Pressure:	72 psig
Input Electric Power:	1,318 kW
Compressed Air Specific Power:	3.85 scfm/kW
Annual Energy:	11,545,680 kWh
Electric Cost per Unit of Air:	$137.00 per scfm per year
Annual Compressor Energy Cost:	**$692,740**
Annual Dryer Energy Cost:	**$43,016**

Compressor System After Assessment

Operating Hours:	8760 hours
Power Cost kW/h:	$0.06
Avg. Air Flow:	3,187 scfm
Avg. Compressor Discharge Pressure:	85 psig
Avg. System Pressure:	80 psig
Input Electric Power:	647 kW
Compressed Air Specific Power:	4.9 scfm/kW
Annual Energy:	5,675,116 kWh
Electric Cost per Unit of Air:	$103.08 per scfm per year
Annual Compressor Energy Cost:	$328,529
Annual Dryer Energy Cost:	$0

Establishing the Cost of Compressed Air

During our site visit, the air compressor units performed very well, spending very little time in blow-off. However, there are seven air compressors, and usually three units carry the plant. Two are at idle and two are not running, waiting to come on in the auto hot-start "ready" mode.

The air system operates 8,760 hours per year. The load profile (air demand of this system) is relatively stable during all shifts. Overall system flow ranges from 4,000 scfm during production to 5,000 scfm. The system pressure runs from 68 to 73 psig in the headers during production.

Actual electrical demand of the air compressors was measured at 1,318 kW, while producing 5,068 scfm of compressed air. The blended electric rate is $0.06/kWh and the facility operates 8,760 hours per year. Annual plant electric costs for compressed air production, as operating today, are $693,161 per year. This equals a "cost of compressed air per year" of **$136.69 per scfm**.

If the electric costs of $43,106 per year associated with operating ancillary equipment such as dryers are included, the total electric costs for operating the air system are $736,177 per year.

THE SYSTEM ASSESSMENT OF THE MONTH

Inappropriate-Use Assessment Saves 1,881 scfm

COMPRESSOR USE PROFILE – CURRENT SYSTEM							
UNIT #	COMPRESSOR: MANUFACTURER/MODEL	FULL LOAD		ACTUAL ELEC. DEMAND		ACTUAL AIR FLOW	
		DEMAND (KW)	AIR FLOW (SCFM)	% OF FULL KW	ACTUAL KW	% OF FULL FLOW	ACTUAL SCFM
First Shift: Operating at 88–98 psig discharge pressure for 8,760 hours							
7	Joy TA18	369	2,015	100%	389	100%	2,015
6	Joy TA17V	369	1,900	98%	363	90%	1,710
5	Joy TA22	369	2,200	OFF	—	—	—
8	Joy TA18	369	1,986	—	140.9	Unload	0
9	IR CV15M2	280	1,343	OFF	—	—	—
10	IR CV15M2*	280	1,343	100%	331	100%	1,343
11	Joy TA2000	174.6	1,099	—	94.9	Unload	0
TOTAL (Actual): 1,318 kW. 5,068 scfm							

*Unit #10 is drawing about 51 kW higher than calculated; maintenance personnel should check motor, starter, disconnect, feed lines, etc.

The INAPPROPRIATE USES of 1,881 scfm

The system assessment recommends both supply-side and demand-side modifications. Due to space limitations, we will only detail the demand-side action plans in this article. The summary of supply-side recommendations include:

1. Install a new, more efficient, base-load centrifugal air compressor to carry the load of the factory. The existing units will be shut-off and used as back-ups. The new air compressor will have a compressor-control system, allowing the factory to benefit from the air usage-reduction projects outlined in the demand-side recommendations.
2. Replace the current blower-purge desiccant dryers with a new heat-of-compression air dryer. Existing dryers will be shut-off and used as back-ups.

The demand-side assessment identifies several ways to reduce the compressed air demand (scfm) in the factory. It is critical to note that the energy savings documented will only be realized if the new air compressor with the load-adjusting compressor-control system is installed. The demand-side actions are:

1. Repair 218 tagged compressed air leaks for 908 cfm in savings.
2. Place automatic shut-off valves on laser cooler units for 150 cfm in savings.
3. Reduce blow-off and open-blows for 401 cfm in savings.
4. Make vacuum generator adjustments for 62 cfm in savings.
5. Eliminate pneumatic air amplifiers for 360 cfm in savings.

INAPPROPRIATE-USES PROJECT ACTION ITEM	SAVINGS PEAK KW	SAVINGS KWH	SAVINGS $	PROJECT COST
Install New Compressor, HOC Dryer and Storage	203.6	1,783,536	$106,514	$400,000
Repair Tagged Compressed Air Leaks*	285	2,500,616	$124,396	$24,800
Add Automatic Equipment Shut-Off Valves*	47.5	413,116	$20,550	$4,500
Reduce Blow-Off and Open-Blows*	126	11,043	$54,937	$2,500
Vacuum Generator Adjustments*	19.5	170,820	$8,494	$1,000
Eliminate Boosters and Air Amplifiers*	113.2	991,433	$49,320	$3,000
TOTALS		**5,870,564**	**$364,211**	**$435,800**

*Savings are dependent upon the installation of the new air compressor, which has the capacity-control system required to translate reductions in air usage into lowered electric costs.

Repair Compressed Air Leaks

A partial survey of compressed air leaks was conducted at the plant, and 218 leaks were identified, quantified, tagged and logged. Potential savings totaled 980 cfm for the 218 leaks that were identified. Repairing these 218 leaks translates into an annual savings of $150,037 per year (assuming the recommended compressor-control changes are implemented).

With a few minor exceptions, most of the leaks could not have been found without the use of an ultrasonic leak detector and a trained operator. We recommend an ultrasonic leak locator be used to identify and quantify the compressed air leaks. Leak locating during production time with the proper equipment is very effective, and often shows leaks that are not there when idle. In a system such as this one, some 80–90% of the total leaks will be in the use of the machinery, not in the distribution system.

A regular program of inspecting the systems in "off hours" with "air powered up" is also a good idea. Some of the areas surveyed in the leak study included a great deal of high background ultrasound noise that shielded many of the smaller leaks, particularly the blow-offs. As the blow-offs are repaired or modified (along with the Venturi vacuum generators), check the area closely for leaks that may have been missed. In continuing the leak management program, plant staff should perform leak detection during non-production hours in order to eliminate some of the high ultrasonic background noise.

ITEM	CALCULATION	BENEFIT
Airflow Saved by Fixing 218 Tagged Air Leaks	—	908 cfm/year savings
Value of Recoverable Energy	—	$137.00 cfm/yr
Electrical Energy Savings	$137.00 x 908 cfm	$124,396 per year
Cost of Project	Equipment + labor + materials	$24,800

Automatic Equipment Shut-Off Valves

Shutting off the air supply to machinery when not in use can often minimize some of the most significant air leaks. When such air users are found, there are usually some very economical and easy methods to switch off air automatically as machinery is shut off.

The project cost section of this audit lists some slow-acting electric-operated automatic ball valves that can be installed in the main feed line to a piece of equipment and wired so it will open and close whenever the machine is powered up or shut off.

The facility uses fifteen (15) Filtech laser coolers. Each cooling unit consumes 20 cfm each at 30 psi with ½" tubing venting. Most cooling units run 80% of the time — even if the line is down. Current peak demand with 15 units x 20 cfm is 300 cfm at 80% usage or 240 cfm average demand. According to plant personnel, these units were running even when the line was down

THE SYSTEM ASSESSMENT OF THE MONTH

Inappropriate-Use Assessment Saves 1,881 scfm

Most of the blowers we reviewed appeared to be severely fouled and also in the blow tube or air knife. This, of course, will not only lead to less effective blow-off, but is also a major cause for a blower running hot, leading to premature failure.

for cooling. If we consider a normal operation of the packer, or a device or part of the line depending on the product being packaged (6 pack, 12 pack, case, etc.), the estimate of average usage is 30% of the packager.

By shutting off cooling air flow when the process is off, the utilization factor will go from 80% to 30%. Air demand will go from an average flow of 240 cfm to an average of 90 cfm, making a net average savings of 150 cfm. We recommend a 10-minute delay after shutdown for additional cooling.

ITEM	CALCULATION	BENEFIT
Install Shut-Off Valves before Filtech Coolers	Reduce utilization factor from 80% to 30%	150 cfm savings
Value of Recoverable Energy	—	$137.00 cfm/yr
Electrical Energy Savings	$137.00 x 150 cfm	$20,550 per year
Cost of Project	Labor + solenoid/timer	$4,500

Reduce Blow-Off and Open-Blows

Many of the open-blows have been added as an "air assist", while the blower, used successfully in the past, is turned off. The energy to create blower air is only 15–25% that of high-pressure air (90 psig). Most of the blowers we reviewed appeared to be severely fouled and also in the blow tube or air knife. This, of course, will not only lead to less effective blow-off, but is also a major cause for a blower running hot, leading to premature failure.

We recommend that the facility convert all the listed blow-offs back to the original blower air — after the blower and tools have been maintained and returned to a useful state. This will remove the air-assist equipment from the line. If some of the blow-offs we labeled as "use blower" will not work on lower pressure, high-volume air, then install an appropriate Venturi airflow, including the nozzle unit.

Remove the air-blows that are not required. Use existing air blower knives after cleaning. If the blows are still necessary, use air amplifiers to start and cut back pressure. Most open blows should be able to be removed or changed to small blower air.

If the application must use open-blows, these units need to be set on a photo eye and also use a 25:1 air amplifier. By starting with a small 25:1 fixed amplifier first, a nozzle will use about 7 cfm at 80 psi instead of 30–40 cfm. The blow guns and extra nozzles will make all blow guns OSHA approved and should do a better job of blowing the plant product.

ITEM	CALCULATION	BENEFIT
Total Flow Saved from Blow-Off and Open-Blows	—	401 cfm savings
Value of Recoverable Energy	—	$137.00 cfm/yr
Electrical Energy Savings	$137.00 x 401 cfm	$54,937 per year
Cost of Project	Nozzle units + labor	$2,500

Vacuum Generator Adjustments

In order to create a vacuum, some kind of air pump or vacuum pump is required to evacuate the volume. There are two basic approaches to accomplish this task: mechanical pumps and vacuum generators (or ejector pumps). Vacuum generators are selected for more localized or "point-of-use" vacuum applications that require smaller volumes and faster local response times. Manufacturers of production machinery often supply them as standard equipment. There are two basic types of ejector pumps: single-stage vacuum generators (less efficient) and multi-stage vacuum generators (more efficient).

The facility has 50 single-stage vacuum generators installed on case packers, debaggers, case packers, labelers and other equipment. These single-stage vacuum generators use compressed air by accelerating the air through the restrictor tube to create a Venturi effect to evacuate the required volume of air. Typically, this type of vacuum generator has a ratio of compressed air consumption (scfm) to vacuum flow (the rate at which atmospheric pressure is removed from a system) of no better than 1:1, and sometimes as high as 2:1 or 3:1. These particular units have a ratio of 1:1, and with the modifications listed below we can improve this ratio by reducing their compressed air consumption by 62 cfm.

- Packer: change the solenoid to the air side instead of vacuum on cam. When the unit is on, it runs 100% (12 cfm x 2) at 90% utilization – demand is 22 cfm. Change air reduction at least 50% and savings is 12 cfm
- Lift Case: the generator runs 100% of the time, even when not running boxes. Total reduction is 70% and savings is 8 CFM
- Debagger is also breaking vacuum, which is not on air side. Demand is 24 cfm and savings is 12 cfm
- Lid Debagger has two units running the same as above, with break vacuum not on the compressed air side on all can lines. These units run at 80% utilization. Demand is 40 cfm for a savings of 50% and 20 cfm
- Jones Stacker is running vacuum at 80%, with the break vacuum not on the air side. Demand is 10 cfm and the solenoid should be moved. Savings is 5 cfm
- Case Packer unit is breaking vacuum instead of air side. Move solenoid. Savings is 5 cfm

The palletizer and depalletizer areas are candidates for small centralized vacuum systems. This should be evaluated in a "phase 2" project.

ITEM	CALCULATION	BENEFIT
Total cfm Reduction by Adjusting Vacuum Generators	—	62 cfm savings
Value of Recoverable Energy	—	$137.00 cfm/yr
Electrical Energy Savings	$137.00 x 62 cfm	$8,494 per year
Cost of Project	20 hours labor x $50/hr	$1,000

THE SYSTEM ASSESSMENT OF THE MONTH

Inappropriate-Use Assessment Saves 1,881 scfm

Shutting off the air supply to machinery when not in use can often minimize some of the most significant air leaks. When such air users are found, there are usually some very economical and easy methods to switch off air automatically as machinery is shut off.

Pneumatic Air Amplifiers (Boosters)

When the plant lowered its pressure on a continuing basis to the current 72 psig target, many good things happened, particularly when the plant processes received a stable operating pressure. However, in some cases, the lowered pressure apparently had a negative impact on production and quality, and these pneumatic amplifiers were installed to deliver higher pressure to several locations in the production lines. Discussions with various plant operating personnel indicated that at a system pressure of 80 psig, none of these amplifiers would be needed.

We observed 24 Haskall MPS pneumatic boosters in use in different production lines throughout the plant. Most of these units are the 20 cfm size. This means that they deliver 20 cfm at twice the intake pressure, but will require a total of 40 cfm to run. At least half of these units are not operating at full speed, and will therefore consume somewhat less air. To estimate the impact of this project on the air system, we will use an average of 15 cfm delivered (or 30 cfm consumed) for all 24 units. The total reduction in compressed air use will be 360 cfm. At the current value per cfm of compressed air, eliminating the amplifiers will produce energy savings of $59,486 per year.

ITEM	CALCULATION	BENEFIT
Remove 24 Pneumatic Amplifiers	24 units x 15 cfm each	360 cfm savings
Value of Recoverable Energy	—	$137.00 cfm/yr
Electrical Energy Savings	$137.00 x 360 cfm	$49,320 per year
Cost of Project	—	$3,000

Conclusion

This case study is a perfect example of a factory that "did not have any issues" with compressed air. Plant pressure was stable, air quality was good and production was never affected by compressed air. The only issue was that they were paying $364,211 more than necessary in electricity costs to power the compressed air system! A thorough supply- and demand-side system assessment was the solution. BP

For more information, please contact Hank Van Ormer, Air Power USA,
Tel: 740-862-4112, email: hank@airpowerusainc.com, www.airpowerusainc.com.

In 2010

high-tech will take business to new dimensions – at HANNOVER MESSE.

For further information go to: **hannovermesse.com**

HANNOVER MESSE

19–23 APRIL 2010
hannovermesse.com

GET NEW TECHNOLOGY FIRST

PARTNER COUNTRY 2010
ITALIA
sustainable mobility

BE PART OF THE WORLD'S MOST IMPORTANT TECHNOLOGY SUMMIT 2010

HANNOVER MESSE is the world's leading marketplace for future-oriented technologies, materials, and ideas. Meet the leaders in technology and discover innovations that will boost your business:

ABB · BLOCK · EPLAN · FESTO · HARTING · PEPPERL+FUCHS · PHOENIX CONTACT · RITTAL · SIEMENS

ENERGY INCENTIVES

Southern California Edison: Energy Advisors for Industry

BY ROD SMITH, COMPRESSED AIR BEST PRACTICES®

Rod Vickers, CEM, an account manager for Southern California Edison (SCE), has been responsible for managing the electricity accounts of some of the largest oil and gas producers in SCE's service territory

Compressed Air Best Practices® interviewed Mr. Rod Vickers, Account Manager, Business Customer Division, Southern California Edison (SCE).

Please describe the Business Customer Division and its role at SCE.

The primary role of Southern California Edison's (SCE) Business Customer Division is to deliver SCE's portfolio of energy efficiency programs to our business customers. It is our objective to use these energy incentives to help our customers put money straight to their bottom lines. The industrial sector, which I represent, spends more than $15 billion in energy costs annually in California to operate manufacturing systems and equipment, such as motors and pumps, compressed air systems, steam and process heating and cooling. Our energy efficiency programs help our clients flourish and stay here in California.

We have more than 100 representatives on the SCE team. I am one of nine account managers dedicated to our largest industrial accounts. These companies are involved in mining, aerospace, oil production, refining and manufacturing activities. They are located in our 50,000-square-mile service territory across California.

Our mission, as account managers, is to become the trusted energy advisor for our clients. While we also support our customers with power quality and delivery issues, our primary focus is to promote energy efficiency. As the utility, SCE is in a unique and unbiased position to help customers reduce their energy costs. As account managers, we have also developed expertise in market segments. For example, my personal focus includes refineries and oil producers.

What energy incentive funding will SCE have available in 2010?

The California Public Utilities Commission (CPUC), which regulates California's investor-owned utility companies, follows the energy policies of the state of California. The state's energy policies have been significantly influenced by the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006. Energy efficiency is defined as the top priority of this legislation and this is reflected in the CPUC's Energy Action Plan and California Long-Term Energy Efficiency Strategic Plan (CLTEESP).

During the past five years, SCE's energy efficiency programs have saved more than five billion kilowatt-hours — enough energy to power 725,000 homes for an entire year. The programs have reduced greenhouse gas emissions by more than two million metric tons — the equivalent of removing 350,000 cars from the road.

SCE recently received approval for its proposed 2010–2012 energy efficiency portfolio, and has been authorized for $1.2 billion of funding for its programs during this period. This represents a significant increase in funding from the previous cycle in order to achieve the aggressive energy efficiency goals set by the state. During the next two years, SCE will help customers save an additional two billion kilowatt hours (kWh), decreasing greenhouse gases by another one million tons.

Please describe the Industrial Energy Efficiency Program (IEEP).

SCE has three programs for the industrial segment. The first is the Industrial Energy Efficiency Program (IEEP). During the design of this program, we solicited feedback from our industrial customers. We asked their opinion on how to create a program which would motivate them to participate in energy efficiency projects. We also asked how to get a production engineer to spend time working on efficiency projects while maintaining his/her focus on increased production. Their responses identified the need for engineering and financial assistance to make energy efficiency projects a priority.

The new 2010–2012 IEEP is a "win" for both the customer and the contractors. By paying the IEEP contractor while reserving 100% of the incentive for themselves, the customer, in essence, gets a free extension to their engineering staff.

Incentive payments are based upon performance and are determined by the amount of annual kilowatt-hour savings achieved through process improvements or equipment retrofits. Incentive rates are shown to the right, but average $0.09 per kWh. On-peak demand savings are $100 per kW reduced.

2010 IEEP INCENTIVE PAYMENTS

TYPE OF RETROFIT/PROCESS MODIFICATION	INCENTIVE AMOUNT
Lighting (comprehensive)	$0.05 per kWh saved
Air Conditioning and Refrigeration	$0.15 per kWh saved
All Other (motors, controls, etc.)	$0.09 per kWh saved
Process Improvements	$0.09 per kWh saved

Please describe the Standard Performance Contract (SPC).

The SPC program offers financial incentives to offset the capital cost of installing new high-efficiency equipment or systems. Project examples may include common retrofits, like lighting, HVAC and refrigeration upgrades, or more specialized process improvements, like compressed air systems or customized equipment replacements. Retrofit and new equipment installations are also eligible.

Incentives are based on the type of measure installed, the kWh saved and the kW reduced over a 12-month period. Applicants are eligible to receive up to 50% of the total project cost. The incentive limit per project site is $2,400,000 annually.

2010 SPC INCENTIVE RATES

MEASURE CATEGORY	ANNUAL ENERGY SAVINGS INCENTIVE RATE (KWH)	PEAK DEMAND REDUCTION INCENTIVE RATE (KW)
LIGHTING	$0.05 per kWh saved	$100/kW
AIR CONDITIONING AND REFRIGERATION (AC&R) I*	$0.15 per kWh saved	$100/kW
AIR CONDITIONING AND REFRIGERATION (AC&R) II*	$0.09 per kWh saved	$100/kW
OTHER EQUIPMENT	$0.09 per kWh saved	$100/kW

*Refer to SCE Procedures Manual Section 1, Table 1–3 for a list of specifics

ENERGY INCENTIVES

Southern California Edison: Energy Advisors for Industry

"The new 2010–2012 IEEP is a "win" for both the customer and the contractors. By paying the IEEP contractor while reserving 100% of the incentive for themselves, the customer, in essence, gets a free extension to their engineering staff."

— Rod Vickers, Account Manager, Business Customer Division, Southern California Edison (SCE)

Please describe the Express Efficiency Program.

The third program (used by smaller businesses) is the Express Efficiency Program. This program provides pre-calculated incentives for lighting, air conditioning, food service equipment, refrigeration, agricultural equipment and premium efficiency motors.

To qualify, new equipment must replace existing equipment. Certain retrofits and upgrades also qualify for rebates. All equipment must be new, regardless of whether it will be used to replace, retrofit or upgrade existing equipment. Incentives are offered on a per-item basis and are limited to 100% of total measure cost. To learn the rebate value of each item, customers can access our published lists of qualified itemized measures at www.sce.com/rebates.

Rebates are paid on leased equipment if the equipment is acquired through either a lease/purchase agreement or a standard lease with a term of five or more years. Mandatory inspection of installed equipment is required for incentive rebates totaling $7,000 or more. Random inspections are at the discretion of SCE. Below is our itemized list of rebates for new premium efficiency motors.

2010 EQUIPMENT REBATE AMOUNTS

EQUIPMENT	REBATE AMOUNTS
Motors 1 hp	$35.00
Motors 1.5 hp	$35.00
Motors 2 hp	$35.00
Motors 3 hp	$40.00
Motors 5 hp	$50.00
Motors 7.5 hp	$60.00
Motors 10 hp	$70.00
Motors 15 hp	$80.00
Motors 20 hp	$90.00
Motors 25 hp	$135.00
Motors 30 hp	$230.00
Motors 40 hp	$300.00
Motors 50 hp	$320.00
Motors 60 hp	$355.00
Motors 75 hp	$540.00
Motors 100 hp	$720.00
Motors 125 hp	$945.00
Motors 150 hp	$1,260.00
Motors 200 hp	$1,260.00

How does SCE work with the IEEP contractors?

The contractors are divided into segment-specific markets so that they can develop market expertise with regard to energy efficiency projects. These segments include food processing, warehousing, fresh water/wastewater, oil and gas and manufacturing to other IEEP contractors.

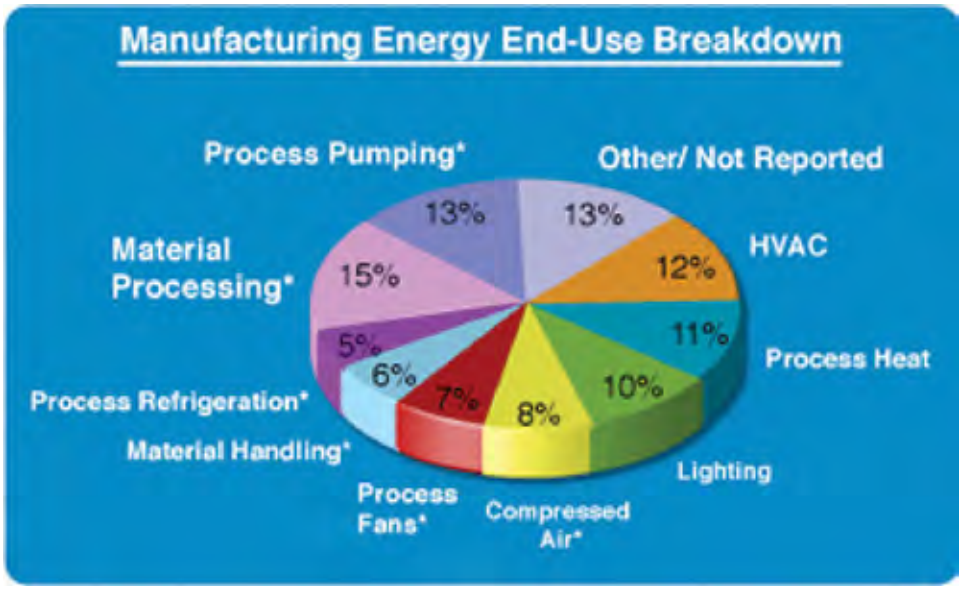
We are currently in negotiations and preparing to announce our IEEP contractors for the 2010–2012 period. All of our contracts are based on pay-for-performance agreements.

Where are the opportunities to save energy?

There are always energy saving opportunities to be found in industrial processes. Compressed air systems are always at the top of our radar screen. Currently, we have a customer working with an IEEP contractor on a refinery's compressed air system. We believe that there is a 10 MkWh opportunity, using state-of-the-art controls. Compressed air has always been a strong measure for both IEEP and SPC. It is a huge energy cost for our industrial customers, and controlling it properly is usually the main thing we look at. Identifying and fixing inappropriate uses of compressed air is an additional opportunity for savings.

Taking load measurements and matching the right air compressor at the right pressure and standard cubic feet per minute (scfm) is also a high priority. Going from a standard rotary screw air compressor with a DC motor to a Variable Frequency Drive (VFD) air compressor is very simple and saves money in the right applications. It is just a matter of matching up the right technology with the right application.

It is surprising how compressed air systems can be neglected. I had a client with a 150 horsepower air compressor supplying control and instrument air that had a compressed air receiver tank completely disconnected from the system. The client felt he had enough capacity in the distribution piping. After sharing some quick calculations from our field engineer, we began using the receiver and achieved good savings from it, while also increasing reliability. This is a great example of a low/no-cost opportunity for fully utilizing compressed air systems.



Motor-driven equipment. California Energy Commission, "California Energy Demand 2003-2013 Forecast", February 11, 2003, #100-03-002SD and Xenergy analysis

ENERGY INCENTIVES

Southern California Edison: Energy Advisors for Industry

"There are always energy saving opportunities to be found in industrial processes. Compressed air systems are always at the top of our radar screen."

— Rod Vickers, Account Manager, Business Customer Division, Southern California Edison (SCE)

What advice do you give your clients regarding managing SCE business rates?

In addition to striving for continuous energy improvement, I tell all my customers to think about flexibility and the opportunity to respond to price signals. It is well worth learning how to become price responsive and how to shut down or reduce demand during peak pricing periods.

Our technical assistance and technical incentives program can help our business customers become price/demand responsive. We can complete a technical assistance audit to quantify loads that can be reduced and/or shed during high rate periods. If a customer installs controls, SCE will provide incentives to help them.

I was part of a team at SCE that helped a lead-acid battery manufacturer become more price/demand responsive. They would charge newly manufactured batteries to the tune of 3 MW during peak periods. We contributed $580,000 in technical incentives toward the development of software and control systems, enabling them to more easily respond to price signals. This, coupled with other energy efficiency projects related to compressed air, dust collection systems and lighting, resulted in significantly lower energy costs and ultimately, kept this customer from moving out of state — saving 350 Southern California jobs.

What advice would you give other utilities designing industrial energy efficiency programs for the first time?

Don't reinvent the wheel. For starters, I'd encourage them to investigate what's available on the web. Just as a note, starting in 2010 some of these very programs will undergo name changes.

SCE has always been cooperative and open to sharing best practices with other utilities, and our account representatives are happy to talk about what we have to offer. We've been doing this for 20 years, and are leading the charge. The California Energy Commission site (www.energy.ca.gov) is also a great resource. BP

Thank you for your insights.

For more information, please contact Rod Vickers, SCE Account Manager, Tel: 714-895-0211, email: vickerrd@sce.com, or visit www.sce.com

COMPRESSED AIR

BEST PRACTICES

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

2010 FOCUS INDUSTRIES!

Energy Rebates, Oil & Natural Gas Drilling & Refining, Bulk Handling Pulp & Paper, Concrete, Steel & Metals, Processing Food-Powder-Pharma, Hospitals & Labs, Energy Audits, Water Treatment, Food Packaging, Energy Management Systems

Working Together for Compressed Air Best Practices

Compressed Air Best Practices® is a technical magazine dedicated to discovering **Energy Savings** and **Productivity Improvement Opportunities** in Compressed Air Systems for specific **Focus Industries**. Each edition outlines "Best Practices" for compressed air users — particularly those involved in **managing energy costs in multi-factory organizations**.

Utility and Energy Engineers, Utility Providers and Compressed Air Auditors share techniques on how to audit the "demand-side" of a system — including the **Pneumatic Circuits** on machines. This application knowledge allows the Magazine to recommend "**Best Practices**" for the "supply-side" of the system. For this reason we feature **air compressor, air treatment, measurement and management, pneumatics, blower and vacuum** technologies as they relate to the requirements of the monthly **Focus Industry**.

- **Compressed Air Users — Focus Industry**
  - A. Energy and Utility Managers share experiences
  - B. Audit case studies and "Best Practice" recommendations
- **Utility Providers & Air Auditors**
  - A. Utility Company Rebate Programs
  - B. Case Studies by Expert Compressed Air Auditors
- **Compressed Air Industry**
  - A. Profiles of Manufacturers and Distributors
  - B. Product Technologies Best Suited for the Focus Industries
  - C. Industry News

To subscribe visit www.airbestpractices.com

International pricing for print edition — $65 in Canada and $95 for other countries.

THE TECHNOLOGY PROVIDER

Baldor and New EISA Law Deliver Increased Energy Savings

BY COMPRESSED AIR BEST PRACTICES®

Compressed Air Best Practices® interviewed Mr. John Malinowski, Senior Product Manager, AC Motors, Baldor Electric Company.

Baldor's Super-E® NEMA Premium® Motors Meet the New EISA Efficiencies

Good morning. Please describe the new United States EISA legislation as it pertains to motors.

The Energy Independence and Security Act (EISA), which was signed into law in 2007, becomes effective on December 19, 2010. This law expands the mandated energy efficiency standards from the Energy Policy Act of 1992 (EPAct) for a wider range of industrial motors manufactured to be sold in the U.S. The new law covers general-purpose, three-phase AC industrial motors from 1 to 500 horsepower. The new efficiency standards will apply to motors manufactured after December 19, 2010.

What are the new efficiency standards under EISA?

For each general-purpose rating (Subtype I) from 1 to 200 hp that was previously covered by EPAct, the law specifies a nominal full-load efficiency level based on NEMA Premium® efficiency as shown in NEMA MG 1, Table 12-12. All 230- or 460-volt motors currently under EPAct and manufactured after December 19, 2010 must meet or exceed this efficiency level.

General Purpose Electric Motors (Subtype II) not previously covered by EPAct will be required to comply with Energy Efficient efficiencies as defined by NEMA MG 1, Table 12-11. The term "General-Purpose Electric Motor (Subtype II)" means motors incorporating the design elements of a general-purpose electric motor (Subtype I) that are configured as one of the following:

- U-Frame motor
- Design C motor
- Close-coupled pump motor
- Footless motor
- Vertical solid-shaft normal thrust motor (as tested in a horizontal configuration)
- 8-pole motor (900 rpm)
- Poly-phase motor with voltage of not more than 600 volts (other than 230 or 460 volts)
- 201–500 hp motors not previously covered by EPAct will be required to comply with Energy Efficient efficiencies as defined by NEMA MG 1, Table 12-11

How do the efficiency levels of EISA compare to the efficiencies of Baldor's standard motors and Super-E® motors?

The average efficiency improvement will be 2–3%. Generally, the mandated efficiency levels of EISA for Subtype I motors fall at the present efficiencies of Baldor's Super-E® NEMA Premium® efficient motors for general-purpose 1–200 hp motors. The Subtype II 1–200 hp motors may require Baldor to raise the efficiency of some designs to comply with MG 1, Table 12-11. However, many general-purpose 201–500 hp EPAct-level Standard-E® designs presently comply. Super-E® NEMA Premium® motors will meet or exceed the EISA requirements for either of these motor types.

NEMA MG-1 TABLE 12-12 FULL-LOAD EFFICIENCIES FOR 60 HZ NEMA PREMIUM® EFFICIENT ELECTRIC MOTORS RATED 600 VOLTS OR LESS (RANDOM WOUND)

MOTOR HORSEPOWER	NOMINAL FULL-LOAD EFFICIENCY					
	OPEN MOTORS			ENCLOSED MOTORS		
	2 POLE	4 POLE	6 POLE	2 POLE	4 POLE	6 POLE
1	77.0	85.5	82.5	77.0	85.5	82.5
1.5	84.0	86.5	86.5	84.0	86.5	87.5
2	85.5	86.5	87.5	85.5	86.5	88.5
3	85.5	89.5	88.5	86.5	89.5	89.5
5	86.5	89.5	89.5	88.5	89.5	89.5
7.5	88.5	91.0	90.2	89.5	91.7	91.0
10	89.5	91.7	91.7	90.2	91.7	91.0
15	90.2	93.0	91.7	91.0	92.4	91.7
20	91.0	93.0	92.4	91.0	93.0	91.7
25	91.7	93.6	93.0	91.7	93.6	93.0
30	91.7	94.1	93.6	91.7	93.6	93.0
40	92.4	94.1	94.1	92.4	94.1	94.1
50	93.0	94.5	94.1	93.0	94.5	94.1
60	93.6	95.0	94.5	93.6	95.0	94.5
75	93.6	95.0	94.5	93.6	95.4	94.5
100	93.6	95.4	95.0	94.1	95.4	95.0
125	94.1	95.4	95.0	95.0	95.4	95.0
150	94.1	95.8	95.4	95.0	95.8	95.8
200	95.0	95.8	95.4	95.4	96.2	95.8
250	95.0	95.8	95.4	95.8	96.2	95.8
300	95.4	95.8	95.4	95.8	96.2	95.8
350	95.4	95.8	95.4	95.8	96.2	95.8
400	95.8	95.8	95.8	95.8	96.2	95.8
450	95.8	96.2	96.2	95.8	96.2	95.8
500	95.8	96.2	96.2	95.8	96.2	95.8

NEMA MG-1 TABLE 12-11 FULL-LOAD EFFICIENCIES OF ENERGY EFFICIENT MOTORS

MOTOR HORSEPOWER	NOMINAL FULL-LOAD EFFICIENCY							
	OPEN MOTORS				ENCLOSED MOTORS			
	2 POLE	4 POLE	6 POLE	8 POLE	2 POLE	4 POLE	6 POLE	8 POLE
1	—	82.5	80.0	74.0	75.5	82.5	80.0	74.0
1.5	82.5	84.0	84.0	75.5	82.5	84.0	85.5	77.0
2	84.0	84.0	85.5	85.5	84.0	84.0	86.5	82.5
3	84.0	86.5	86.5	86.5	85.5	87.5	87.5	84.0
5	85.5	87.5	87.5	87.5	87.5	87.5	87.5	85.5
7.5	87.5	88.5	88.5	88.5	88.5	89.5	89.5	85.5
10	88.5	89.5	90.2	89.5	89.5	89.5	89.5	88.5
15	89.5	91.0	90.2	89.5	90.2	91.0	90.2	88.5
20	90.2	91.0	91.0	90.2	90.2	91.0	90.2	89.5
25	91.0	91.7	91.7	90.2	91.0	92.4	91.7	89.5
30	91.0	92.4	92.4	91.0	91.0	92.4	91.7	91.0
40	91.7	93.0	93.0	91.0	91.7	93.0	93.0	91.0
50	92.4	93.0	93.0	91.7	92.4	93.0	93.0	91.7
60	93.0	93.6	93.6	92.4	93.0	93.6	93.6	91.7
75	93.0	94.1	93.6	93.6	93.0	94.1	93.6	93.0
100	93.0	94.1	94.1	93.6	93.6	94.5	94.1	93.0
125	93.6	94.5	94.1	93.6	94.5	94.5	94.1	93.6
150	93.6	95.0	94.5	93.6	94.5	95.0	95.0	93.6
200	94.5	95.0	94.5	93.6	95.0	95.0	95.0	94.1
250	94.5	95.4	95.4	94.5	95.4	95.0	95.0	94.5
300	95.0	95.4	95.4	—	95.4	95.4	95.0	—
350	95.0	95.4	95.4	—	95.4	95.4	95.0	—
400	95.4	95.4	—	—	95.4	95.4	—	—
450	95.8	95.8	—	—	95.4	95.4	—	—
500	95.8	95.8	—	—	95.4	95.8	—	—

THE TECHNOLOGY PROVIDER

Baldor and New EISA Law Deliver Increased Energy Savings

What motors are not covered by EISA?

The following motors are not covered by EISA:

- Single-phase motors
- DC motors
- Two-digit frame sizes (48–56)
- Multi-speed motors
- Medium-voltage motors (Design D with high slip)
- Adjustable speed with optimized windings
- Customized OEM mounting
- Intermittent duty
- Integral with gearing or brake where motor cannot be used separately
- Submersible motors

How should air compressor manufacturers and other OEMs prepare themselves for EISA?

Air compressor manufacturers purchase both open and enclosed 2-pole motors. They are, in general, already aware of these upcoming changes. On December 19th, 2010 they will be forced to purchase more efficient motors meeting EISA efficiency levels (like Baldor's Super-E® NEMA Premium® efficient motors) for their air compressors. We recommend that OEMs begin preparing today to see how their products will be affected by this U.S. Government mandate. For those requiring new UL® and CSA approvals, they need to get moving on this.

The good news is that air compressors, as a category, will consume 2–3% less energy. Those industrial customers purchasing air compressors will realize energy savings and reduce their operating costs. Over a twenty-year period, energy costs typically represent 97.3% of the total cost of owning and operating a motor.

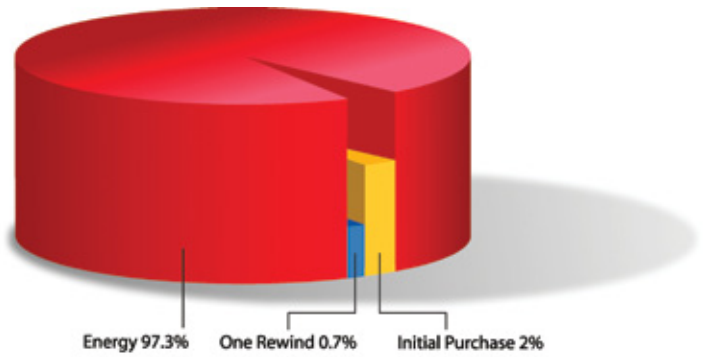
Will motor prices be increased?

Keeping in mind that the initial purchase cost of a motor represents 3% of the total ownership cost over twenty years, the answer is "yes". To provide the enhanced efficiency levels mandated by ESIA, all the motor manufacturers will need to add more active material (high-grade lamination steel, copper windings and aluminum). Tomorrow's "standard" motor will have the price and efficiency of today's "premium-efficiency" motor.

Are utilities going to offset the price increase with energy incentives?

We do know that in regards to energy savings, utilities are moving more incentive funding towards performance-based incentives as opposed to prescriptive incentives. This will help motor management programs and motor upgrades. It will also help industry realize energy savings when purchasing new air compressors to replace older units with older motors.

There is also a bill moving through Congress that will help. It is designed to pay $25 per horsepower to the owner of a motor who upgrades to a new EISA motor. It will also pay $5 per horsepower to the motor distributor. The bill has a budget of $700 million over five years. The bill is directing the DOE to set up and execute this program. The recommendation is to replace pre-EPAct motors. It may exclude smaller motors not normally rewound today, but this needs to be decided by the DOE.



20-year Motor Life-Cycle Cost

Tax credits may also become available from state and federal energy offices. There are many programs in the works. We also have accelerated depreciation provisions on motors and capital equipment in the Stimulus Bill, which has been extended. It is important that energy managers be aware of all the incentive programs available to them.

Are other countries enacting similar motor-efficiency legislation?

As a company, Baldor has embraced energy efficiency and making U.S. companies more productive. We have worked both in Washington D.C., to provide advice, and in our own factories to prepare for this change, which will benefit U.S. industry. We are pleased that the U.S. is taking a global leadership position on the topic of motor efficiency and the reduction of carbon emissions.

The U.S. is at least ten years ahead of any other country in the world on electric motor efficiency mandates. Europe just now defined what the level for a premium motor is (IEC IE3), and they won't make it mandatory for motor manufacturing until 2017. Until then, they will continue to raise their efficiency levels and manufacture more standard motors to efficiencies similar to where we are today with EPAct.

How is Baldor preparing for EISA?

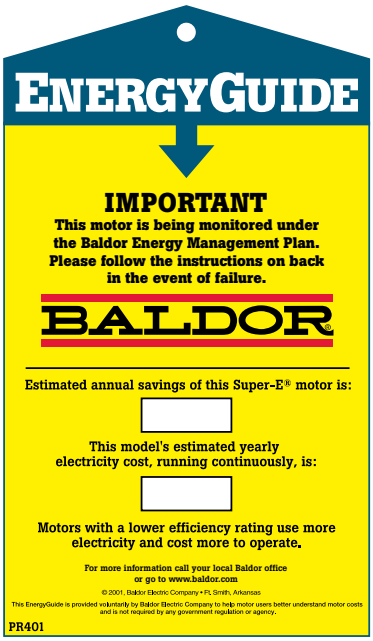
Baldor has long had a culture that embraces energy efficiency and energy management. Our own energy managers can tell you, right now, how much electricity and natural gas our own factories consume per motor manufactured (energy intensity). Baldor has 24 plants in the U.S., and we practice what we preach. For that reason, our whole company has embraced the new efficiency standards.

This is a unique situation for Baldor in that all of our motor plants are in the U.S. Many of our competitors build motors all over the world. We manufacture 5000 SKUs, with at least five times that many customized OEM designs. At Baldor, we process our own steel and have been working for a long time with our heat-treating ovens and steel-coating processes to prepare for this. It's an understatement to say that Baldor has been working hard and investing in the new motor designs. We are pleased that we are on schedule and will be ready to go well before December 2010.

Baldor Reliance Super-E Motors Will Exceed EISA Mandates

THE TECHNOLOGY PROVIDER

Baldor and New EISA Law Deliver Increased Energy Savings



How can one learn more about EISA?

We are actively engaged with energy management teams at large corporations and with our OEMs. First, we suggest that they become familiar with the requirements and opportunities presented by the EISA mandate. We have prepared an educational document titled:

"EISA — The Law's Requirements for 1 to 500 hp AC Motors. Effective December 19, 2010".

People can access this document at www.baldor.com, or contact me (John Malinowski) for more information.

What actions should energy managers take?

We work with many energy management teams as they work to upgrade their motor efficiencies. We offer a popular webinar called "**How to Save Energy and Reduce Downtime for Electric Motors**". We have done this for many food companies, utilities and for ENERGY STAR. It is a good educational experience that gets the teams started.

We then suggest a three-stage motor evaluation program. Baldor has experts who work with factories as they move through the following stages of this process:

- The first level is to create a motor inventory, and to "tag" each motor with instructions as to which EISA-compliant motor should be purchased in the event of failure
- The second level involves "right-sizing". This entails getting load measurement on specific motors and then upgrading to motors that will provide energy savings, which may be an adjustable speed motor or simply a newer motor
- The third level involves system assessments. This includes, but is not limited to, compressed air system assessments, more efficient belting and more efficient power transmission

Since electric motor-driven systems represent over 70% of the electricity used by most industries, we need to focus on these improvements. Electricity is a cost that industry can control by using better motors, adding adjustable speed drives and more efficient driven equipment. The most energy efficient motor is one that is turned off when not needed, so process control is also important. BP

Thank you for your insights into the new EISA legislation.

For more information, please contact Mr. John Malinowski, Senior Product Manager, AC Motors, Baldor Electric Company, Tel: 479-648-5909, or email: JMalinowski@baldor.com, www.baldor.com.

COMPRESSED AIR

BEST PRACTICES

FREE SUBSCRIPTION

DIGITAL EDITION FREE WORLDWIDE | PRINT EDITION FREE TO U.S. SUBSCRIBERS

2010 FOCUS INDUSTRIES!

Energy Rebates, Oil & Natural Gas Drilling & Refining, Bulk Handling Pulp & Paper, Concrete, Steel & Metals, Processing Food-Powder-Pharma, Hospitals & Labs, Energy Audits, Water Treatment, Food Packaging, Energy Management Systems

Working Together for Compressed Air Best Practices

Compressed Air Best Practices® is a technical magazine dedicated to discovering **Energy Savings** and **Productivity Improvement Opportunities** in Compressed Air Systems for specific **Focus Industries**. Each edition outlines "Best Practices" for compressed air users — particularly those involved in **managing energy costs in multi-factory organizations**.

Utility and Energy Engineers, Utility Providers and Compressed Air Auditors share techniques on how to audit the "demand-side" of a system — including the **Pneumatic Circuits** on machines. This application knowledge allows the Magazine to recommend "**Best Practices**" for the "supply-side" of the system. For this reason we feature **air compressor, air treatment, measurement and management, pneumatics, blower and vacuum** technologies as they relate to the requirements of the monthly **Focus Industry**.

- **Compressed Air Users — Focus Industry**
  - A. Energy and Utility Managers share experiences
  - B. Audit case studies and "Best Practice" recommendations
- **Utility Providers & Air Auditors**
  - A. Utility Company Rebate Programs
  - B. Case Studies by Expert Compressed Air Auditors
- **Compressed Air Industry**
  - A. Profiles of Manufacturers and Distributors
  - B. Product Technologies Best Suited for the Focus Industries
  - C. Industry News

To subscribe visit www.airbestpractices.com

International pricing for print edition — $65 in Canada and $95 for other countries.

SUSTAINABILITY PROJECTS FOR INDUSTRIAL ENERGY SAVINGS

Benchmarking Energy Performance

BY ED SCHLECT, PE, CEM, GBE, EXECUTIVE VICE PRESIDENT, ADVANTAGE IQ

Ed Schlect, Executive Vice President, Advantage IQ

It's no secret that cost cutting is now a main focus for many business owners. When times get tough, the first reaction is figure out where it's possible to spend less in order to maintain the bottom line. Over the last year, there have been countless examples of companies that have eliminated programs, slashed entire departments and sliced into salaries to protect profits.

Surprisingly, the line item that accounts for as much as 20% of operating costs, energy use, is often the last place businesses look when their searching for savings. The explanation you'll hear from a large corporation is typically: "We don't know where to start when it comes to controlling energy costs."

Find Your Own First Step

There is one specific action that a company can take to evaluate where they are in terms of energy consumption and spending, and where they could be. Benchmarking energy use across a portfolio has countless benefits for facility and multi-site owners. Primarily, the practice can lead to a reduction in energy use, with the added bonus of reduced expenses. Comparing facilities' energy performance against similar facilities makes it possible to prioritize which require immediate improvements.

The practice of energy benchmarking is rooted in data collection and analysis. Most of the information necessary to kick-start a quality energy management program can be found in utility bills. Start by collecting a year's worth of this billing data for every facility in your portfolio, and you're equipped with the tools you need to develop a detailed, site-level energy profile for the business.

Key Sustainability Projects

1. Bill Management
2. Demand Control
3. Boilers
4. Cooling Systems
5. Lighting
6. HVAC Systems
7. Steam
8. Water Conservation
9. Motors

Generally, Energy Usage Intensity (EUI) is the metric used for energy benchmarking. This is the measurement of energy consumption over a certain time period divided by the floor area. Factors such as HVAC systems, weather, lighting conditions and hours of operation all affect the amount of energy consumed at a facility. In some cases, factors other than floor area may ultimately prove to be more useful as the index for benchmarking.

Knowing how much energy each individual facility consumes during every billing cycle over a twelve-month stretch is powerful information. Once you've grouped comparable locations, based on the way each facility is equipped and used and the climate they operate in, you can compare energy usage patterns and EUIs to evaluate the performance of one site against another. This is how you determine the best place to start. You can identify which locations are the poorest performers and demand attention and action now. Further, you can identify which locations are good performers, and possibly utilize them as a source for best practices. With more advanced analysis, statistical adjustments can be made to adjust for variations in weather, hours of operation or differences in equipment, enabling a portfolio-wide comparison.

Make the Changes That Will Save You Money

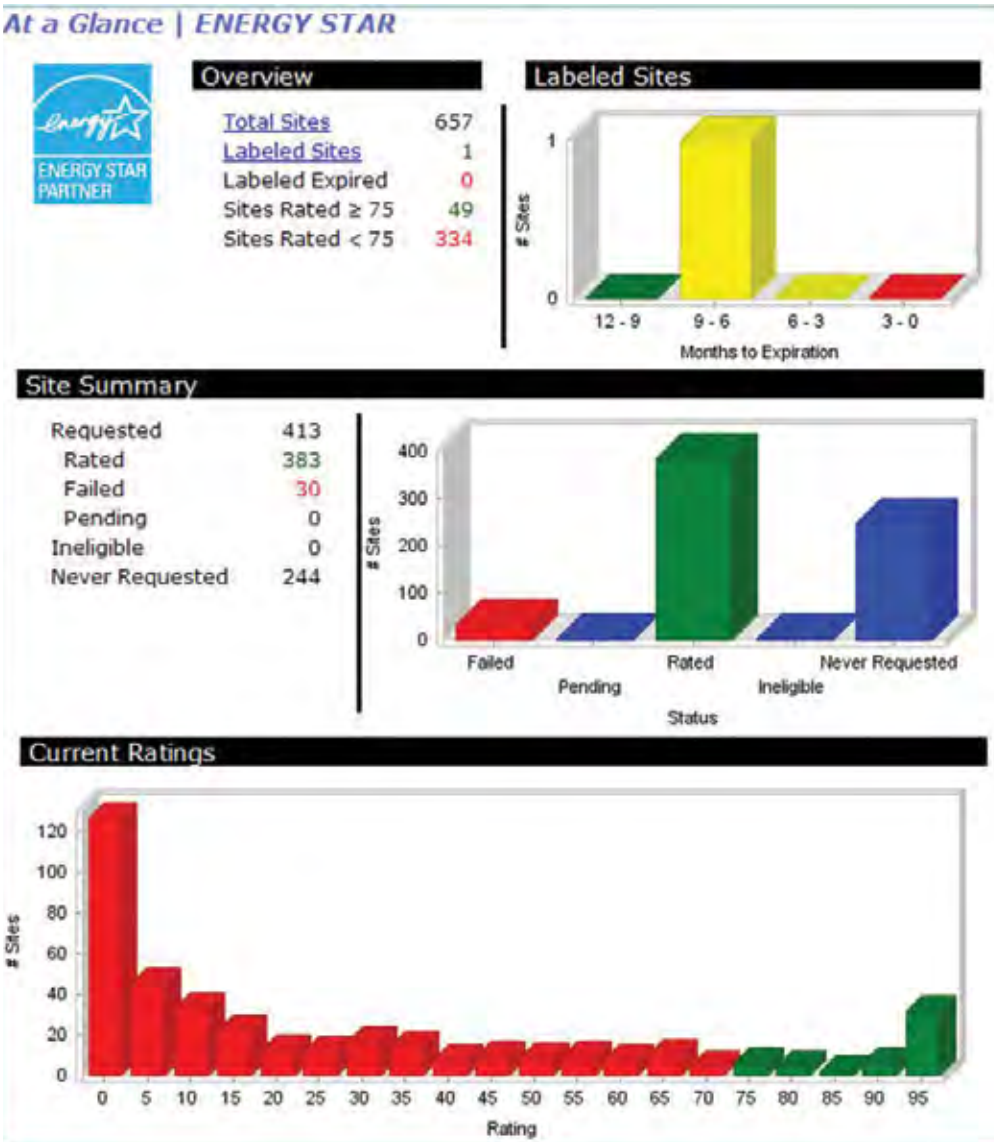
As a joint program with the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE), ENERGY STAR® helps companies save money and protect the environment through energy efficient products and practices. Energy managers can easily compare the energy use of their buildings against similar buildings nationwide using the EPA's ENERGY STAR energy performance rating system. This system, based on a scale of 1–100, takes into account the impact of weather differences, as well as the physical and operating characteristics of each building. Using the ENERGY STAR rating system as a first step to benchmark your facilities is a low-cost means to get started. Further, the ENERGY STAR rating provides a simple, easy-to-explain communication tool to share with building operators the impact of their behaviors, and also to share with decision makers the need for investment or the fruit of investment decisions. Finally, the ENERGY STAR provides excellent recognition of energy performance, through publishing of case studies, annual awards and access to the ENERGY STAR label.

Taking the time to establish benchmarks and evaluate your facilities' energy performance allows you to: pinpoint high and low performing facilities, identify which practices are working and which are not, recognize the role of energy expenditures in overall operating costs, create a historical perspective for future decisions and institute reference points for gauging and rewarding excellent operations.

The partnership with the EPA and ENERGY STAR maximizes the realization of savings by offering an established strategy in energy management that aides in gauging current performance, setting goals for future performance, following savings and rewarding improvements.

Benchmarking energy use across a portfolio has countless benefits for facility and multi-site owners. Primarily, the practice can lead to a reduction in energy use, with the added bonus of reduced expenses. Comparing facilities' energy performance against similar facilities makes it possible to prioritize which require immediate improvements.

SUSTAINABILITY PROJECTS FOR INDUSTRIAL ENERGY SAVINGS



ENERGY STAR ratings provide a single reference for normalized building comparisons.

However, benchmarks alone do not effect change! Be sure you make the investment in a broader energy program designed to leverage the benchmark process and convert it into action. Benchmarking information needs to be communicated in a meaningful way if you want those accountable to respond. Building energy performance is a function of two primary factors. Energy-using equipment is only part of the equation, as equipment selection and maintenance practices drive energy consumption. The choices made by building occupants about the use of equipment and building operations also have a substantial impact on the building's performance. In fact, the highest return on investment is often achieved through simple, low-cost operational changes, and energy benchmarking is a powerful tool to communicate the impact of such changes. You'll need an energy team that includes all people accountable for equipment selection, maintenance and operations. If you set goals, assign accountability, measure results and celebrate successes, the team will be able to accomplish much more.

The highest return on investment is often achieved through simple, low-cost operational changes, and energy benchmarking is a powerful tool to communicate the impact of such changes.

Who's Doing It Well?

The grocery sector has long been known as one of the biggest energy consumers in the multi-site retail world, and companies in this space stand to gain a lot from energy management and energy benchmarking. Food Lion has seen remarkable results from the program they put in place. According to data found on the EPA website (www.energystar.gov), Food Lion was able to benchmark more than 42 million square feet within 1,200 facilities. With the help of Advantage's Facility IQ™ service, Food Lion is not only able to monitor energy performance at all of its stores, it can also identify where improvements are needed the most and where facility upgrades are having the greatest impact on energy consumption.

Upgrades in lighting, refrigeration and HVAC systems have helped to reduce Food Lion's energy consumption by more than 25% over the last five years. The numbers say it all: the chain has saved almost $105 million in energy costs and also reduced its energy use by more than 2.29 trillion BTUs since 2001.

Utilizing automated benchmarking has the ability to increase the energy management program's results in many ways. Collecting and reporting data makes it possible to identify incongruity among different sites, investigate buildings that may not be performing up to standards and set goals and execute the change needed to reach these goals. The collected data enables companies to focus their efforts on the facilities that need it the most. Not only does benchmark data promote awareness in your organization, but it can also support healthy competition among site managers to maximize energy performance and demonstrate the fruits of your management efforts.

The impact of benchmarking energy performance is threefold. As mentioned already, the practice enables you to make the right changes to operations for greater efficiency, which in turn reduces energy waste. This translates to a reduced impact on the environment and a shrinking carbon footprint, which is key to many companies' sustainability programs. Finally, it will help your bottom line by identifying wasteful behaviors that needlessly cost you money. In times like these, there is no reason to not explore how energy benchmarking might serve your business. BP

For more information, please contact Ed Schlect, Executive Vice President, Advantage IQ, Inc., at Tel: 509-329-7602 or email: eschlect@advantageiq.com, www.advantageiq.com.

A DISCUSSION ON ELECTRIC DEMAND MANAGEMENT STRATEGY

BY THOMAS MORT, CEM,
SAVING WITH ENERGY

Thomas Mort received the 2003 Society of Automotive Engineers International Environmental Award. Mr. Mort actively trains professionals in industry and at utility companies on how to perform system assessments and implement incentive programs

SAVING WITH ENERGY
LOW COST-HIGH VALUE ENERGY SOLUTIONS

Introduction

This paper presents a discussion on the topic of Electric Demand Management as it relates to electric tariff rates, new power generation and incentives to curtail peak usage.

Peak electric demands are a significant component in the cost of electricity, requiring large capital investments and operating expenses for generation equipment that is required to operate only during the peak of the summer air conditioning season.

The production of electricity must closely match the usage for the electric grid to remain stable. In the summer when the outside temperature exceeds 90 ˚F, the demand for electricity can be 80% higher than on a pleasant 65 ˚F spring day. Generators must be standing by, often in a mode called "spinning reserve", to insure that as the air conditioners are turned on there is enough power available.

Electric power generation equipment is very expensive. A high-efficiency natural gas system costs about $750 for each kW to construct. A sophisticated clean coal or nuclear power plant can cost upwards of $4,800 per kW to construct. In addition, because interruptions of electric power are so devastating, there must also be back-up power ready in case the primary power plant has a failure.

A Utility Model

To support this discussion, a model has been developed using typical load profile, weather and user data for South Texas. This model will demonstrate peak demands and their relation to weather, and will be used to support discussion on actions that can be taken to reduce the need for expensive new power generators.

SOUTH TEXAS UTILITY MODEL		
Energy Used per Year	22,527,000	MW/hr
Number of Metered Facilities	700,000	Customers
Average Energy Used per Hour	2,564	MW/hr
Peak Energy Used per Hour on a Hot Work Day	4,500	MW/hr
Peak Energy Used during Non-Air Conditioning Work Day	2,400	MW/hr
Average Energy Used per Client per Hour	3.7	KW/hr
Peak Energy Used per Client, Non-Air Conditioning Work Day	3.4	KW/hr
Peak Energy Used per Client per Hour	6.4	KW/hr
Number of Hours per Year for **Top 20% of Demand (900 MW)**	**784**	**Hours per year**

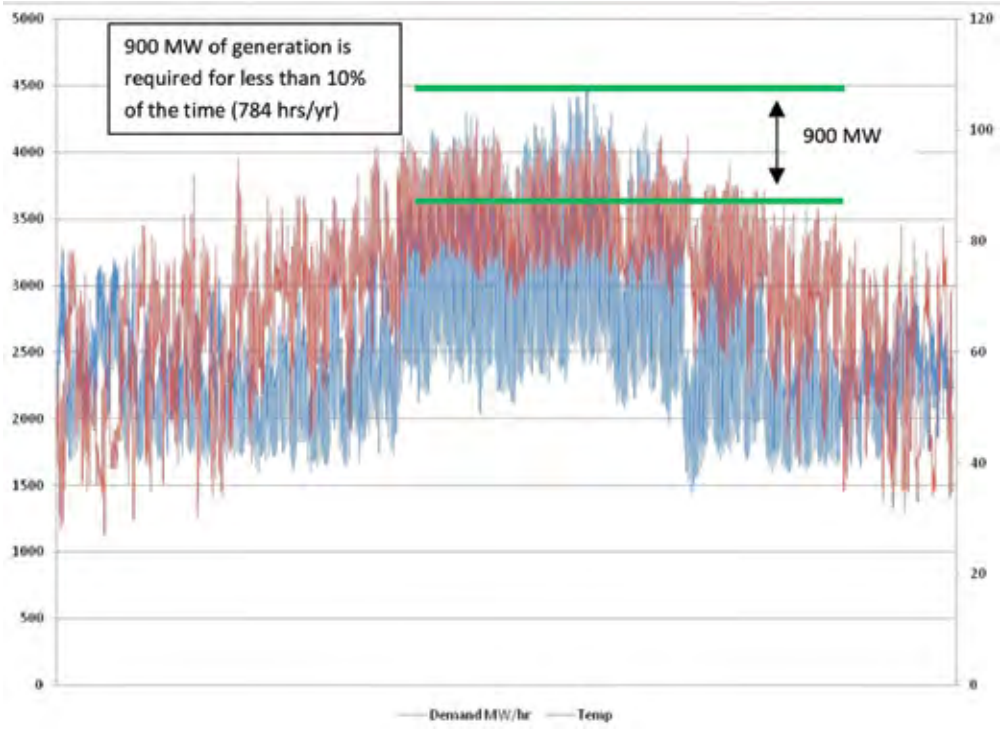
From this table, you can see that the difference in peak demand between a hot summer day and a cool spring day is: 4,500 – 2,400 = 2,100 MW/hr. This is the amount of extra power that can be attributed to air conditioning. You can also see that the top 20% of the peak demand, which is equal to 900 MW/hr, only occurs 784 hours per year, or 10% of the time. For this discussion, we will concentrate on this 900 MW/hr, which is equal to a typically sized large power plant.

To have power generators available to meet this 900 MW at a cost of $750 to $4,000 per kW would cost $675 million to $3.6 billion to build, not including the backup power. For this discussion, we will use a value of $1,500 per kW.

The Effects of Temperature on Demand

The following graph depicts the relationship between the temperature and the power generation based upon hourly data for a one-year period beginning January 1 and ending December 31. It is important to remember that during the spring and fall when the temperatures are moderate, most energy-using activities are ongoing, with the exception of air conditioning. Factories, schools, homes, stores and restaurants are still using power. Air conditioning is the primary reason for the increase of over 2,000 MW per hour.

Dividing this peak of 900 MW evenly among the 700,000 customers would mean that each customer would need to reduce peak demand during this period by 1.3 kW/hr. Since the cost of a kW is $1,500, this would mean $1,950 could be spent for each customer to reduce this peak.



A DISCUSSION ON ELECTRIC DEMAND MANAGEMENT STRATEGY

A review of large commercial electric users, such as malls, grocery stores, resorts, hotels, hospitals and universities, found that the per unit cost of electricity does not play an important part in their decision-making process for locating in a particular city. Electricity also takes a smaller percent of their total income as compared to residential customers.

Tariff Structures and Incentive Programs

The utility company can encourage customers to use less power during peak times through a tariff structure and incentive programs. A large commercial or industrial user will have two types of charges for power. One is the energy or kWh used, and the other is the demand or peak kW used during a one- month period. For this example, a large user is charged $0.04 per kWh for energy and $8.00 per kW for demand.

A residential or small commercial user will have a simple $0.09 per kWh charge.

DESCRIPTION	LARGE COMMERCIAL/INDUSTRIAL	SMALL COMMERCIAL/RESIDENTIAL
Total kWh for One Month	670,000	1,232
$/kWh Energy Charge	$0.040	$0.090
Total Energy Charge	$26,800	$111
Peak Demand kW	1,500	12
Peak Demand $/kW	$8.00	n/a
Total Demand Charge	$12,000	$0
Total Cost for Month	$38,800	$111
Average $/kWh	$0.058	$0.090

If the large user implements actions to reduce the peak demand by 10% (or 150 kW) by operating equipment outside of the peak period, he will receive a benefit of $8.00/kW per month x 150 kW x 12 months (or $14,400). Remember, $8/kw x 12 months = $96/kW per year.

Demand Response

Another incentive is called demand response. In this program, large users can contract to reduce a certain amount of kW during peak times. They are typically paid $20 per kW for this reduction, and it is limited to a set number of times per year (e.g., $20/kW x 10 occurrences/yr = **$200/kW per year**). A review found a 0.3% improvement in overall peak demand reduction from this program due to the small number of participants.

If the small user operates equipment outside of the peak period he will receive no incentive.

One incentive typically offered to residential users is a demand-controlled thermostat. This device will shut down the air conditioning unit for 20 minutes each hour during peak demand periods between 3 pm and 7 pm. The incentive paid to the residential customer is the free installation of the thermostat and the electricity savings that comes from reduced use of the air conditioner and from accepting a slightly higher in-house temperature of 1–2 °F (e.g., 6.0 kW/hr x 1.33 hours per day x 100 days per year x $0.090/kWh = $72/year). This program helps to reduce the utility demand by 2 kW (or $72/2 = **$36/kW per year**). A recent review found about 3% participation in this program.

In this model, the majority of the energy users are residential and small commercial. They pay up to a 50% premium cost for electricity, they receive less than 40% of the benefit to operate out of the peak demand period and they pay a larger percentage of the cost toward capital investments in new power generation.

A review of large commercial electric users, such as malls, grocery stores, resorts, hotels, hospitals and universities, found that the per unit cost of electricity does not play an important part in their decision-making process for locating in a particular city. Electricity also takes a smaller percent of their total income as compared to residential customers.

The typical incentive program pays $36 per kW for the majority of the users, and up to $200 per kW for the largest users, yet the cost for new generation is in the range of $750–$4,800 per kW.

Consider a goal of reducing the peak load of our model system from 4,500 MW to 3,600 MW. At our assumed $1,500 per kW x 900 MW, we could spend $1.35 billion to achieve this goal. With 700,000 customers, that would be $1,900 per customer to reduce 1.3 kW of peak per customer.

Allowing inefficient equipment and untimely use of power to justify building, maintaining and fueling 900 MW of power, many plants can be considered irresponsible in their management of money and resources, and in their pollution of our environment. The pollution related to 900 MW of power for 784 hours per year at 1.587 lbs/kWh is 560,000 tons of emissions per year, or the annual emissions of 68,000 cars.

A restructuring of the tariff rates would be a reasonable first step. The period of peak demand occurs May through September, and primarily in the afternoons from 3 pm to 7 pm. This would be the time that electricity should be most expensive. Other countries in Europe and Mexico have understood this concept for many years, and have applied a high-demand charge during this period. Increasing the demand charge from $8.00 per kW to $24.00 per kW would increase the incentive to implement actions to reduce peaks. An incentive of $1,500 per kW to counter the increased cost could help fund projects aimed at reducing the peak.

Since a majority of customers are residential and small commercial, it is imperative to create a program of peak demand reduction that also applies to this group, and not only to the large users. Reducing the peak demand at residential facilities by 1.3 kW (with funding of $1,500 per kW) is a feasible task, including the metering that is required for verification and long-term sustainability.

The small residential users, usually the lowest income group, currently pay the highest cost for utilities when compared to income. The typical method of increasing rates by a flat percentage of the cost per kW penalizes this group the most. A tiered approach, following an analysis of the base requirements to maintain a small residence, should be applied to provide the lowest rate to the smallest low-income user.

A detailed study of 102 industrial facilities over a six-year period has validated the ability to reduce peak demands by 20% with investments under $800 per kW.

Analysis of residential and small commercial facilities in South Texas has found the reduction of 1.3 kW peak demand per facility to be feasible, with average investments under $1,000 per kW.

A detailed study of 102 industrial facilities over a six-year period has validated the ability to reduce peak demands by 20% with investments under $800 per kW.

A DISCUSSION ON ELECTRIC DEMAND MANAGEMENT STRATEGY

The success of these types of programs is dependent upon having a set of prepackaged solutions with quantity pricing discounts, a method for measurement and verification, easy access to funding and education of service providers and end users.

Applying the methodologies used in the analysis of the above-mentioned industrial and residential facilities to review the historical utility bill data from the utility's database would allow targeting of the highest potential candidates towards meeting the target of 900 MW peak reductions. Based upon the statistical data, less than 50% participation in the program would accomplish the goals.

The success of these types of programs is dependent upon having a set of prepackaged solutions with quantity pricing discounts, a method for measurement and verification, easy access to funding and education of service providers and end users.

Public awareness is key in the management of peak demands. It is suggested that education of the public through forums, flyers and daily tracking and reporting of the electric demand trends in local papers be included in a comprehensive demand management program. BP

For more information, please contact Thomas Mort, CEM, Saving With Energy, Tel: 210-858-8454, email: tcmort@savingwithenergy.com, www.savingwithenergy.com.

RESOURCES FOR ENERGY ENGINEERS

TRAINING CALENDAR

TITLE	SPONSOR(S)	LOCATION	DATE	INFORMATION
Compressed Air Challenge® Fundamentals of Compressed Air Systems	ISU Extension Alliant Energy Baker Group Central Iowa Power	Des Moines, IA	1/12/10	Jennifer Tabke tel: 515-294-4700 email: tabke@iastate.edu www.compressedairchallenge.org
Compressed Air Challenge® Advanced Management of Compressed Air Systems	ISU Extension Alliant Energy Baker Group Central Iowa Power	Des Moines, IA	1/13/10	Jennifer Tabke tel: 515-294-4700 email: tabke@iastate.edu www.compressedairchallenge.org
Introduction to Compressed Air Systems	Association of Energy Engineers Globalcon 2010	Philadelphia, PA	3/22/10	Gary Wamsley tel: 678-977-1508 email: gary.wamsley@comcast.net

Editors' Note: If you conduct compressed air system training and would like to post it in this area, please email your info to rod@airbestpractices.com

INDUSTRY NEWS

Atlas Copco Acquires Quincy Compressor

On December 18, 2009, Atlas Copco announced that it would acquire U.S.-based Quincy Compressor from EnPro Industries, Inc., for approximately $190 million. The acquisition supports Atlas Copco's profitable growth in North America and China, adding a strong brand and an extensive distributor network. The acquisition is subject to regulatory approvals.

Quincy Compressor, with approximately 400 employees and an operating profit margin of about 15%, had 2008 revenues of $174 million. The company designs and manufactures reciprocating compressors, rotary screw compressors and vacuum pumps, primarily under the Quincy brand.

Atlas Copco plans to further develop the Quincy brand independently, in line with the Atlas Copco Group's well-established brand portfolio strategy. "We look forward to working with Quincy Compressor and its strong distributor network. The strategic fit is very good, and we will be able to better serve customers in the United States with an even more differentiated product portfolio," says Stephan Kuhn, Business Area President, Atlas Copco Compressor Technique. "For Atlas Copco, this acquisition offers interesting synergies in both product design and supply chain management, while adding a strong brand for our continued growth."

Quincy was founded in the 1920s and is headquartered in Bay Minette, Alabama. It has manufacturing facilities in Bay Minette, Quincy, Illinois and Kunshan, China. Their products are sold through a network of independent distributors and agents. More than three quarters of their sales are in the United States. The company expects the acquisition transaction to close in the first quarter of 2010.

For further information, please contact: Stephan Kuhn, Business Area President, Compressor Technique at Tel: +32 (0) 3 870 2938 or +32 (0) 474 881 154.

RESOURCES FOR ENERGY ENGINEERS

INDUSTRY NEWS

Compressed Air Challenge® — New Products and Expanded Activities

North American industry faces high energy costs and an increasingly difficult economic climate. The Compressed Air Challenge® (CAC), which promotes energy efficiency in industrial compressed air systems, is expanding its activities and participation to help industry surmount these burdens. The CAC has trained over 10,000 compressed air users since 1999. However, the United States has about 200,000 factories, most of which use compressed air. Add to this the substantial number of Canadian plants, and the opportunity becomes evident. Therefore, the CAC is not only broadening its reach through the new initiatives described below, but is expanding its opportunities for participation.

The mission of the Compressed Air Challenge® (CAC) is to provide resources that educate industry about optimizing their compressed air systems and thereby increasing net profits.

Training, Information and Tools

The CAC offers three training programs: Fundamentals of Compressed Air Systems, Advanced Management of Compressed Air Systems and, with the U.S. Department of Energy (DOE), Qualified AIRMaster+ Specialist Training. The organization also has a full offering of educational materials, such as the ***Best Practices for Compressed Air Systems, Guidelines for Selecting a Compressed Air System Service Provider and Improving Compressed Air System Performance: A Sourcebook for Industry***. New products include:

- Web-Based Fundamentals of Compressed Air Systems Training — A web-based version of the popular classroom training geared to increase participation in this valuable resource
- Best Practices for Compressed Air Systems Second Edition — An updated edition of the highly successful 2003 manual — available for order online at **www.compressedairchallenge.org**, click on "**Bookstore**"
- **Log-Tool** — An import tool that significantly enhances the usability of **AIRMaster+**. AIRMaster+ is a software package developed by the DOE which is designed to help you maximize the efficiency and performance of your compressed air system through improved operations and maintenance practices
- Newly defined levels of compressed air system assessment services, published in combination with an updated ***Guidelines for Selecting a Compressed Air System Service Provider***

In addition to the above, the CAC's online library is home to a wealth of resources, including fact sheets, tip sheets and case studies on a variety of topics.

Future Developments

The CAC is in the planning stages for a Production Floor Training program. The concept for this training is to bring the CAC's message to the entire plant floor. It will help floor personnel understand the costs of compressed air inefficiencies and offer some ways to address them. The program will build upon training developed by CAC member Weyerhaeuser, Inc., and will be piloted by CAC Northwest Energy Efficiency Alliance, a CAC sponsor.

Streamlined Hosting Opportunities

In previous years, an organization interested in hosting a CAC training class needed to co-host with a specific CAC board organization and work with that organization to plan the class and obtain the training materials. Now, an organization may co-host a training class with the CAC as a whole, easing the planning process. Also, the training host may purchase the training materials under a password-protected area of the CAC website. The host may work with any of the qualified CAC instructors located throughout the United States.

Contact the CAC Today!

Participation with the CAC offers access to the best, product-neutral compressed air system educational materials available, and opens the door to exchanging information on industrial efficiency with leaders in the field of compressed air systems. For more information about the CAC and how it could help you provide valuable information to your customers, please visit www.compressedairchallenge.org, or email the CAC at info@compressedairchallenge.org.

Fundamentals of Compressed Air Systems WE (Web Edition)

The Compressed Air Challenge® (CAC) is pleased to announce the launch of Fundamentals of Compressed Air Systems WE (Web Edition) on February 22, 2010. This web-based version of the popular Fundamentals of Compressed Air Systems uses an interactive format that enables the instructor to diagram examples, give pop quizzes and answer students' questions in real time. The introductory rate for the course is $795, and participation is limited to 25 students. Please visit the CAC website today (www.compressedairchallenge.org) to access online registration and for more information about the training. The deadline for registration is February 8, 2010.

If you have additional questions about the new web-based training or other CAC training opportunities, please contact the CAC at info@compressedairchallenge.org or call 301-751-0115.

Best Practices for Compressed Air Systems Second Edition — Now Available for Purchase Online at www.compressedairchallenge.org!

The Best Practices Manual was developed to provide you with the tools necessary to reduce the operating costs associated with the use of compressed air and to improve the overall reliability of the entire system. This one-source manual addresses improvement opportunities — from the air entering the compressor inlet filter to end uses, including hoses, quick couplers air tools, cylinders and/or other devices.

The Best Practices Manual also provides the "how to" information needed to implement recommendations which will achieve peak system performance and reliability at the lowest operating cost. The use of the recommendations will:

- Reduce energy and repair costs
- Improve system reliability
- Increase productivity
- Reduce unscheduled downtime

The 325-page manual begins with considerations for analyzing existing systems or designing new ones, and continues through the compressor supply from the auxiliary equipment and distribution system to the end uses. Learn how to use measurements to audit your own system, calculate the cost of compressed air and even how to interpret utility electric bills. Best practice recommendations for selection, installation, maintenance and operation of all the equipment and components within the compressed air system are in bold font and are easily selected from each section.

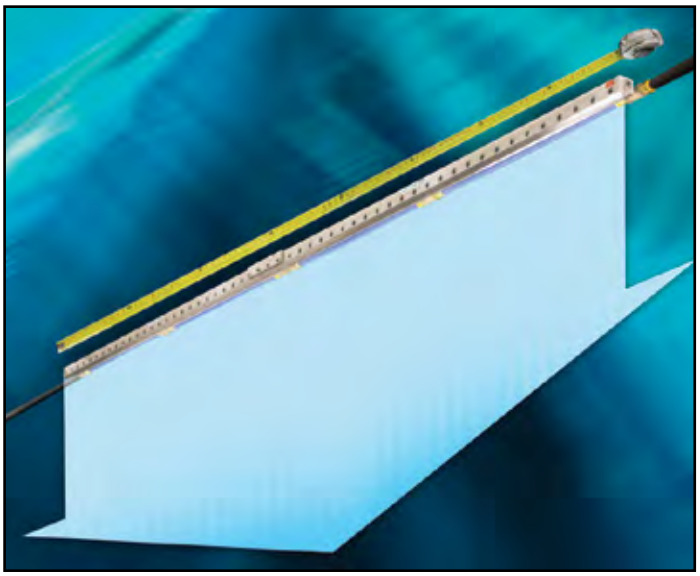
Best Practices for Compressed Air Systems, authored by Bill Scales, P.E. and David McCulloch, is a publication of the Compressed Air Challenge® and not affiliated with Compressed Air Best Practices® magazine.

RESOURCES FOR ENERGY ENGINEERS

PRODUCT PICKS

Long Super Air Knives Cover Wide Spans

EXAIR's new Long Super Air Knives produce a laminar sheet of airflow to blow-off, dry or cool wide surfaces up to 96" (2,438mm). The compact, energy efficient design minimizes compressed air use by entraining 40-parts room air to one-part compressed air. It is ideal for use on wide parts, webs and conveyors.



- The Long Super Air Knives provide a uniform, high-volume, high-velocity curtain of air that is infinitely adjustable — from gentle blowing force to a hard-hitting blast of air. The compact profile measures 1.75" x 1.44", with compressed air inlets located on each end and the bottom to permit easy mounting in tight spaces. The Long Super Air Knife is quiet, maintenance free and has no moving parts to wear out

- Long Super Air Knives are fully assembled and available in 60" (1524mm), 72" (1,829mm), 84" (2,134mm) and 96" (2,438mm) lengths. They ship from stock in your choice of aluminum, Type 303 stainless steel or Type 316 stainless steel. A factory installed plumbing kit is also available, making it easy to connect Long Super Air Knives to any plant's compressed air system to obtain the best performance. Prices start at $930 ***EXAIR Corporation***
  Tel: 800-903-9247
  E-mail: techelp@exair.com
  www.exair.com/lsak.htm

Redesigned 200 HP Compressor

Sullair Corporation announced the redesign of its 200 hp compressors, which combine the inherent reliability of Sullair's single-stage rotary screw air end with today's most innovative technology. These versatile compressors are offered with a choice of constant speed drive models (LS-200S) or constant speed drive with variable capacity control (VCC-200S and VCC-250S). These 200 hp compressors have capacities ranging from 457 to 980 acfm, and pressure ranges of 100 to 175 psig. The Variable Speed Drive (VSD) model (V-200S), with capacities of 576 to 967 acfm, completes the compressor offering. These compressors have flange-mounted motors and air ends to provide positive alignment and extend bearing life in both.

Variable Capacity Control, achieved with Sullair's spiral valve technology, allows the compressor to match pressure and capacity with system demand. Part load capacity and efficiency can produce energy savings up to 17–30%. Providing the highest power factor over the entire frequency range, the V-200S compressor with a Variable Speed Drive (VSD) achieves further part load and full load energy savings. BP

Sullair Corporation
Tel: 219-861-5089
Email: judi.seal@sullair.com
www.sullair.com

WALL STREET WATCH

BY COMPRESSED AIR BEST PRACTICES®

The intent of this column is to provide industry watchers with publicly held information, on publicly-held companies, involved with the sub-industry of compressed air. It is not the intent of the column to provide any opinions or recommendations related to stock valuations. All information in this column was during the trading day of December 31, 2009.

DECEMBER 31, 2009 PRICE PERFORMANCE	SYMBOL	OPEN PRICE	1 MONTH	6 MONTHS	12 MONTHS	DIVIDEND (ANNUAL YIELD)
Parker-Hannifin	PH	$54.31	$54.21	$42.21	$41.82	1.84%
Ingersoll Rand	IR	$35.93	$35.72	$20.96	$17.11	1.38%
Gardner Denver	GDI	$42.82	$37.75	$26.00	$22.63	0.46%
United Technologies	UTX	$69.95	$68.00	$51.70	$53.15	2.18%
Donaldson	DCI	$42.97	$42.77	$34.69	$33.30	1.07%
EnPro Industries	NPO	$26.76	$23.08	$16.16	$20.11	—
SPX Corp	SPW	$55.33	$53.67	$49.65	$40.93	1.78%

EnPro Industries Posts 3rd Quarter Results

EnPro Industries (NYSE: NPO) today reported net income of $1.8 million, or $0.09 a share, for the third quarter of 2009, compared with net income of $12.4 million, or $0.59 a share, in the third quarter of 2008. In the third quarter of 2009, the company reported a pre-tax loss of $1.0 million and a tax benefit of $2.8 million.

Sales in the third quarter decreased to $219.7 million, a 21% decline from the third quarter of 2008 when they were $278.6 million. Excluding the effect of foreign exchange, sales declined 19% from the third quarter of 2008. The decline in sales reflects the continued weak conditions of the worldwide markets served by EnPro's Sealing Products and Engineered Products segments.

Earnings (EBITDA) were $27.3 million in the third quarter of 2009, compared with $44.8 million in the third quarter of 2008. As a percentage of sales, EBITDA fell to 12.4% from 16.1% a year ago.

For the first nine months of 2009, EnPro reported a net loss of $100.7 million, or $5.05 a share, compared with net income of $45.3 million, or $2.12 a share, in the first nine months of 2008. The loss in the first nine months of 2009 includes a non-cash goodwill impairment charge of $96.1 million, or $4.81 a share, after tax. Sales in the first nine months of the year were $671.4 million, 24% below the first nine months of 2008 when they were $878.5 million.

ENGINEERED PRODUCTS		
QUARTER ENDED ($MILLIONS)	9/30/09	9/30/08
Sales	$88.1	$131.0
EBITDA	$5.7	$22.4
EBITDA Margin	6.5%	17.1%

In the Engineered Products segment, sales decreased by 33% from the third quarter of 2008 as all units in the segment reported decreases in demand. Unfavorable foreign exchange rates accounted for a 3% decrease in sales while acquisitions contributed an increase of 2%.

Weak market conditions led to lower volumes at all operations in the segment, reducing profits at Quincy Compressor and Compressor Products International and contributing to a loss at GGB. The segment's EBITDA declined to $5.7 million from $22.4 million a year ago, and EBITDA margins fell to 6.5% from 17.1% a year ago.

Gardner Denver Posts 3rd Quarter Results

Gardner Denver, Inc. (NYSE: GDI) announced that revenues and operating income for the three months ended September 30, 2009 were $428.8 million and $31.9 million, respectively, and net income and diluted earnings per share were $19.4 million and $0.37, respectively. For the nine-month period of 2009, revenues were $1,327.4 million and the Company generated an operating loss of $169.7 million and a net loss of $202.4 million, or $3.90 on a per share basis. The three- and nine-month periods ended September 30, 2009 included expenses totaling $15.8 million and $304.9 million, respectively, for profit improvement initiatives, nonrecurring expenses and impairment charges.

"During the third quarter, we continued to realize benefits from the restructuring and profit improvement initiatives we have implemented to date."

— Barry L. Pennypacker, Gardner Denver's President and Chief Executive Officer

WALL STREET WATCH

"As a result of our aggressive integration efforts, the operating margin for the CompAir business was comparable to that of the overall Industrial Products Group, excluding profit improvement initiatives and other nonrecurring charges."

— Barry L. Pennypacker

CEO's Comments Regarding Results

"During the third quarter, we continued to realize benefits from the restructuring and profit improvement initiatives we have implemented to date," said Barry L. Pennypacker, Gardner Denver's President and Chief Executive Officer. "As a result of our aggressive integration efforts, the operating margin for the CompAir business was comparable to that of the overall Industrial Products Group, excluding profit improvement initiatives and other nonrecurring charges. I am very pleased with the improvement in the operating margin attained by the Industrial Products Group in the third quarter of 2009 compared to that of the second quarter of 2009, which exceeded our expectations. The Group was able to quickly respond to incremental demand from OEM customers and realized some benefit from its cost reductions earlier than previously planned.

"The Engineered Products Group completed the consolidation of production facilities in Tulsa, Oklahoma and the integration of the Puchheim and Memmingen, Germany manufacturing operations. We were able to accelerate the relocation of certain manufacturing cells from Sheboygan, Wisconsin to Monroe, Louisiana, mainly due to the outstanding training support provided by the state of Louisiana, which has been integral to the success of this project.

"We plan to complete the closure of manufacturing operations in Gloucester, U.K. in the fourth quarter of 2009 and Sheboygan in the first quarter of 2010. Upon the completion of these projects, we will have closed seven facilities, reduced manpower by approximately 1,600 people and reduced our costs by approximately $70 million on an annualized basis. We believe approximately $40 million of these savings will be reflected in operating income in 2009 and an additional $25 million in 2010. We have implemented our standard information systems at five locations this year, and undertaken lean training and process improvements at every one of our facilities. We believe these actions will help us realize our objective to create a leaner organization, while maintaining our ability and capacity to satisfy increases in end-market demand when macroeconomic conditions improve.

"Compared to the second quarter of 2009, orders for industrial products in the third quarter increased in all regions of the world, with the greatest recovery on a percentage basis occurring in Europe. The most significant recovery in demand occurred for OEM products, which benefited both the Industrial Products Group and the Engineered Products Group. We believe this improvement is more a reflection of the replenishment of customers' inventory from unusually low levels rather than increases in end-user demand. We also received increased orders for petroleum products in the third quarter of 2009, as a result of our ability to meet customers' requirements for quick deliveries of drilling pumps destined for international locations, and increased demand for well servicing pumps and related aftermarket products as a result of reduced surplus inventory in the field. BP

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

ADVERTISER INDEX

Company	Page	Web Site
Kaeser Compressor	Outside Back Cover	www.kaeser.com
GLOBALCON 2010	Inside Back Cover	www.globalcomevent.com
Hydrothrift	Inside Front Cover	www.hydrothrift.com
Hitachi	3	www.hitachi.us/airtech
SPX Hankison	4	www.hankisonintl.com
Chicago Pneumatic	9	www.cp.com
CDI Meters	11	www.cdimeters.com
JORC Industrial	13	www.jorc.com
ALMiG USA	15	www.almig.us
Mattei Compressors	17	www.matteicomp.com
Hannover Fair	19	www.hannovermesse.de

COMPRESSED AIR BEST PRACTICES®
www.airbestpractices.com

Advertising & Editorial: Rod Smith
rod@airbestpractices.com
Tel: 251-680-9154

Subscriptions & Administration: Patricia Smith
patricia@airbestpractices.com
Tel: 251-510-2598
Fax: 412-831-3091

A Publication of: Smith Onandia Communications L.L.C.
217 Deer Meadow Drive
Pittsburgh, PA 15241

Compressed Air Best Practices® is published monthly by Smith Onandia Communications LLC., 217 Deer Meadow Drive, Pittsburgh, PA 15241. Phone 251-510-2598, Fax 412-831-3091, email patricia@airbestpractices.com. Compressed Air Best Practices® is a trademark of Smith Onandia Communications, LLC. Publisher cannot be held liable for non-delivery due to circumstances beyond its control. No refunds. Standard postage is paid at 233 Jefferson Street, Greenfield, Ohio 45123. Canadian and international distribution: IMEX International Mail Express, 1842 Brummel Drive, Elk Grove Village, IL 60007. POSTMASTER: Send address changes to Compressed Air Best Practices,® 217 Deer Meadow Drive, Pittsburgh, PA 15241. SUBSCRIPTIONS: Qualified reader subscriptions are accepted from compressed air professionals, plant managers, plant engineers, service and maintenance managers, operations managers, auditors, and energy engineers in manufacturing plants and engineering/consulting firms in the U.S. To apply for qualified reader subscriptions, please fill in the reader response cards herein and mail or fax or go to www.airbestpractices.com. To non-qualified subscribers subscriptions are $65 in Canada and $95 for other countries. When available, extra copies of back issues are $4 plus shipping. Contact Patricia Smith for subscription information at tel: 251-510-2598 or email: patricia@airbestpractices.com. REPRINTS: Reprints are available on a custom basis, contact Patricia Smith for a price quotation at tel: 251-510-2598 or email: patricia@airbestpractices.com.

THE MARKETPLACE

TECHNOLOGY

The Association of Energy Engineers

2010 ENERGY SHOWS

PHILADELPHIA • SEATTLE • WASHINGTON, DC

GLOBALCON 2010
Energy, Power, & Facility Management Strategies & Technologies

HOSTED BY PGW

March 24-25, 2010
Pennsylvania Convention Center
Philadelphia, PA

Globalcon 2010, presented by the Association of Energy Engineers is designed specifically to facilitate those who need to get up to speed on the latest developments in the energy field, explore promising new technologies, compare energy supply options, engage energy management initiatives and learn about innovative and cost-conscious project implementation strategies.

www.globalconevent.com

28th West Coast EMC Energy Management Congress

HOSTED BY PSE Puget Sound Energy

June 15-16, 2010
Washington State Convention & Trade Center
Seattle, Washington

The **West Coast Energy Management Congress** is the largest energy management conference and technology expo held on the U.S. West Coast specifically for business, industrial and institutional energy users. It brings together the top experts in all areas of the field to help you set a clear, optimum path to energy cost control, sustainability & green facilities. The full EMC 2010 agenda includes the two-day conference and expo, as well as several optional intensive seminars.

www.energyevent.com

WORLD ENERGY ENGINEERING CONGRESS WEEC 2010

HOSTED BY SAIC From Science to Solutions

December 8-10, 2010
Washington Convention Center
Washington, DC

Now in its 33rd year, the **World Energy Engineering Congress** is recognized as the most important energy event of national scope for end users in all areas of the energy field. A comprehensive forum where you can assess the "big picture" and see exactly how the economic and market forces, new technologies, regulatory developments & industry trends all merge to shape your critical decisions on your organization's energy and economic future.

www.energycongress.com

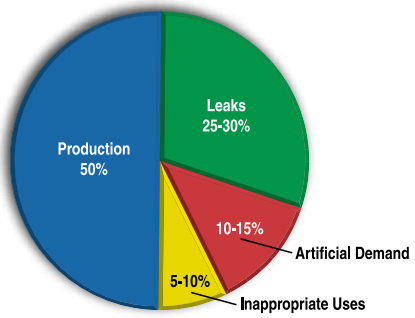
www.aeecenter.org • info@aeecenter.org • 770-447-5083

At Kaeser, our tradition of saving energy goes back generations.

Energy costs have never been higher. That's why it's so important to get maximum efficiency out of your compressed air system. And with as much as 50%* of compressed air being wasted, you could save a bundle.

Trust the specialists at Kaeser to find energy savings by reducing inefficiency in your air system, while also cutting maintenance costs and delivering process improvements. We are the industry leader in conducting *true, comprehensive* air system audits, so you know you'll get the best possible advice and recommendations.

Visit **www.kaeser.com/ada** to see if you'll benefit from an Air Demand Analysis (ADA) - and how we've helped other plants significantly improve their bottom line.



*Only 50% of compressed air is actually put to productive use.**

KAESER COMPRESSORS

Built for a lifetime.™

www.kaeser.com/ada