ENERGY SAVINGS IN ACTION

A Manufacturer's Guide to Supply-side kWh Reduction for Electrical Savings, Reduced Greenhouse Emissions and Surge Protection

This report addresses top concerns related to cutting energy costs and presents five case studies to demonstrate how reducing kWh consumption has cut costs, reduced CO^2 emissions and protected sensitive equipment from electrical surges for several manufacturers.

ABSTRACT

This white paper includes a compilation of excerpts, statements, facts, figures and demonstrated case studies from verified industry experts. These sources are identified in the footnotes. A WPS Global representative, Bill Behrmann, senior systems designer and a veteran within the energy management field, provided expert insights and field knowledge as well as oversight for the development of this report.

PROBLEM

Conflicting messages. Contradictory data. Opposing views from seemingly reputable sources. Today's industrial managers and executives are pushed to make black or white decisions based on a lot of gray information when it comes to reducing their energy – specifically electrical – usage, costs and greenhouse emissions.

Manufacturing and converting operations are savvier than ever about streamlining processes and employing technologies to create efficiencies and cost-saving opportunities. But executives and facility managers continue to be deceived by decade-old falsities that group all energy saving claims into one fraudulent category.

SOLUTION

This paper is specifically written for top-level executives and operations management running converting, manufacturing and industrial businesses. This report will present a cut and dry case to help these decision makers employ a modern energy saving strategy. One that utilizes a wide range of technologies and processes to create a customized energy management system that does one thing -- ensures that the equipment in a facility is not using more power than it needs.

When this goal is achieved, the end result will reduce kilowatt consumption and carbon dioxide emissions and protect equipment.

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INTRODUCTION

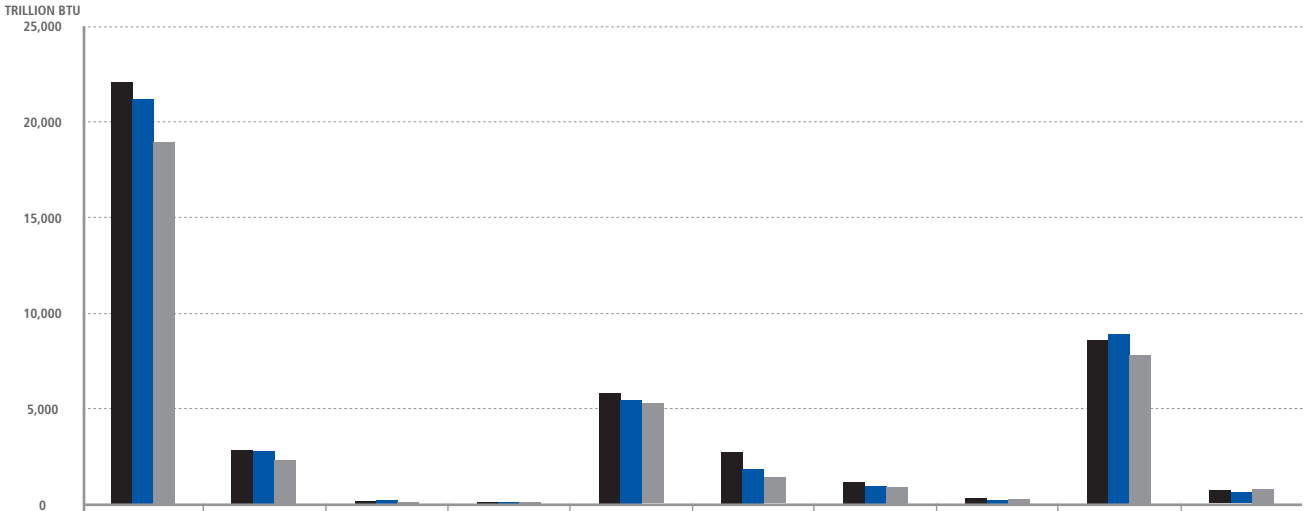
GAINING TRACTION: MANUFACTURING ENERGY CONSUMPTION IS DROPPING

Accounting for about one-third of all end-use energy in the United States, the industrial sector consumes more energy than any other. While industrial energy efficiency has increased steadily over the past three decades, there are still tremendous opportunities for energy savings, as well as the potential to instill the tenets of energy efficiency in a sector that employs and influences millions of people.

Total energy consumption in the manufacturing sector decreased by 17 percent from 2002 to 2010.

Manufacturing gross output decreased by only 3 percent over the same period. Taken together, these statistics indicate a significant decline in the amount of energy used per unit of gross manufacturing output. The significant decline in energy intensity reflects both improvements in energy efficiency and changes in the manufacturing output mix.[1]

Figure 1. Total U.S. manufacturing energy consumption for all purposes declined 17% from 2002 to 2010



	TOTAL*	NET ELECTRICITY	RESIDUAL FUEL OIL	DISTILLATE FUEL OIL	NATURAL GAS	LPG AND NGL	COAL	COKE AND BREEZE	OTHER	SHIPMENTS
2002	22,576	2,839	255	152	6,468	3,070	1,956	385	8,181	730
2006	21,098	2,851	314	143	5,911	2,376	1,433	272	8,443	645
2010	18,817	2,437	170	135	5,725	2,057	1,328	374	7,381	788

* Total is the sum of the energy sources minus the shipments. Shipments of energy sources produced onsite are those shipments produced or transformed onsite from the nonfuel use of other energy sources. Shipments are subtracted from the total to avoid duplication.

Source: U.S. Energy Information Administration, Manufacturing Energy Consumption Survey – Table 1.2: First use of Energy for All Purposes (Fuel and Nonfuel), 2002, 2006, and 2010.

[1] According to data from the U.S. Energy Information Administration's (EIA) Manufacturing Energy Consumption Survey (MECS); http://www.eia.gov/consumption/manufacturing/reports/2010/decrease_use.cfm.

The industrial sector, working constantly to increase shareholder value and reduce expenses, has found energy efficiency investments to be an attractive avenue to achieve those ends.[2]

However, this sector is facing a formidable obstacle: *misinformation*.

Manufacturers and other commercial consumers of energy are finding conflicting opinions, dated data, misleading reports and lackadaisical tests on the topic of energy savings; preventing them from confidently researching, investing in and implementing solutions that will reduce their electric bills.

Some of the erroneous information stems from outdated reports originally generated decades ago and propagated by utility companies and energy groups.

To maintain momentum in lowering consumption as an industry and within individual facilities, industrial energy users must learn to overlook outdated and misguided information.

[2] http://www.aceee.org/portal/industrial, The American Council for an Energy-Efficient Economy (ACEEE), a nonprofit, 501(c)(3) organization, acts as a catalyst to advance energy efficiency policies, programs, technologies, investments, and behaviors.

SETTING THE STAGE

THE PLAYERS

Before we present and address each top concern, we'll first set the stage. Let's take a look at the players involved in energy management:

1. Your Business

Your business is an organization - an enterprising entity - engaged in commercial or industrial activities. Typically a manufacturing business is a for-profit entity, such as a publicly-traded corporation, engaged in business activities to meet the fiscal needs of its stakeholders. You are operating a business to produce quality product and generate a profit.

Among your directives is to apply processes and technologies to compete within an increasingly competitive market, reduce operational costs and create a leaner, sustainability-minded operating environment.

Your facility manager is likely an important part of your decision-making team, developing objectives and strategies to achieve your organization's economic, ecological, risk-based and quality-based targets. His goal is to minimize the total cost of the energy-related processes (supply, distribution and use).

The opportunity to reduce energy consumption means your business will cut costs and reduce carbon dioxide emissions.

2. The Utilities

A public utility is an organization that maintains the infrastructure for a public service (often also providing a service using that infrastructure). Utilities provide electricity, natural gas, water and sewage services. Public utilities are subject to forms of public control and regulation ranging from local community-based groups to state-wide government monopolies.[3]

Utilities and government agencies must operate their organizations to continually support the increasing infrastructure and maintenance costs and pursue local and regional government economic development objectives. For-profit utilities strive for the same goals as for-profit businesses -- to make money and maximize shareholder value.

[3] http://en.wikipedia.org/wiki/Public_utility

3. Energy Management Providers

Broadly speaking, energy management is any systematic tracking and planning of energy use and can be applied to equipment, buildings, industrial processes, industrial or institutional facilities, or entire corporations.[4]

Energy management includes planning and operation of energy-related production and consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need.

Energy management is connected closely to environmental management, production management, logistics and other established business functions. The VDI-Guideline 4602[5] released a definition which includes the economic dimension: "Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the requirements, taking into account environmental and economic objectives."

Facility management is an important part of energy management, because a huge proportion – an average of 25 percent -- of complete operating costs are energy costs. According to the International Facility Management Association (IFMA), facility management is "a profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, processes and technology."

The central task of energy management is to reduce costs for the provision of energy in buildings and facilities without compromising work processes. Especially the availability and service life of the equipment and the ease of use should remain the same.

4. Manufacturers of Energy Management Devices

There is a wide range of devices, equipment and software manufactured to help better control energy consumption and sold to commercial consumers. Each plays a different role in addressing the needs and achieving a facility's electrical reduction and sustainability goals.

It is important for you to understand that not one single device is an all-inclusive solution.

For example, claims began surfacing in the 80s that types of transient voltage surge suppressors (TVSS) could not only prevent sudden voltage surges from damaging sensitive equipment, but also had the ability to produce energy savings. These devices usually contain metal oxide varistors (MOVs) configured to provide a path for current to flow away from the equipment during a transient event.

False or overly ambitious claims by some TVSS/MOV manufacturers and poorly devised research and tests of such devices by reports underwritten by utilities, created a negative perception of the entire category in the minds of industrial energy consumers.

[4] http://www.aceee.org/topics/energy-management

[5] Verein Deutscher Ingenieure (VDI) (English: Association of German Engineers) is an organization with over 150,000 engineers and natural scientists

5. Professional or Governing Entities for Energy

There are dozens of highly reputable governing or non-profit organizations that pursue and oversee advancements and safety related to energy usage and consumption.

A few examples of organizations that are referenced in this white paper:

IEC

The International Electrotechnical Commission is a non-profit, non-governmental international standards organization that prepares and publishes International Standards for all electrical, electronic and related technologies – collectively known as "electrotechnology."

IEEE

The Institute of Electrical and Electronics Engineers (IEEE, read I-Triple-E) is a professional, non-profit association that is dedicated to advancing technological innovation and excellence.

NEC

The National Electrical Code or NFPA 70, is a regionally adoptable standard for the safe installation of electrical wiring and equipment in the United States.

NEMA

The National Electrical Manufacturers Association is the association of electrical equipment and medical imaging manufacturers in the United States.

UL

Underwriters Laboratories is a safety consulting and certification company that provides safety-related certification, validation, testing, inspection, auditing, advising and training services to a wide range of clients, including manufacturers, retailers, policy makers, regulators, service companies, and consumers.

ISSUE 1

A CONFLICT OF INTEREST

You buy energy from your utilities. You are charged for your facility's consumption plus other fees and taxes. While you strive to make noticeable cuts in your consumption by seeking strategies to manage your energy usage and testing various tactics, it is not to the utility's benefit to see you succeed – too much.

You'll see a variety of articles, reports and case studies on the topic of energy savings programs offered by utilities. Just as you would carefully consider employing an energy management system, you'll need to judiciously deliberate the program(s) for which your company may be eligible.

In a U.S. News Money report, Robert Mittelstaedt, dean emeritus of the W. P. Carey School of Business at Arizona State University, states, "Electric utilities find money by selling power, but are required by regulators, and increasingly by consumers, to help customers find ways to save power or use renewable sources. The collision of new technology, social good, business strategy and politics will make the next decade the most interesting in the century-long history of the industry."[6]

Utilities are often mandated to take a small percentage of customers' payments to feed state or federal energy-efficiency programs. Promoting energy efficiency can be in the form of educational campaigns or rebate offers. Todd Recknagel is CEO of the Charleston, S.C.-based AM Conservation Group, a company that specializes in creating customized energy and water conservation programs for utilities throughout the nation. He says, "Like anything else, it's driven by the money. Still, that doesn't mean it isn't a good idea to save on one's electric bill, given that less electricity means the consumption of fewer natural resources."

The key to any effort to reduce energy is to proactively audit your recent past and current usage and costs. This data is critical to determining what opportunities your business should be pursuing and it will provide an irrefutable baseline for comparison following the initiation of your energy-reduction activities.

Another conflict of interest: **You may experience minimal support from equipment manufacturers. Keep in mind, manufacturers depend on revenue driven by sales of replacement parts, equipment upgrades and new models.**

[6] http://money.usnews.com/money/personal-finance/articles/2013/04/02/why-your-energy-company-wants-you-to-use-less-energy

* http://www.eia.gov/consumption/manufacturing/reports/2010/decrease_use.cfm

ISSUE 2

THE CONFUSION BEHIND "TVSS"

Let's start with what a TVSS is and what it is not.

WHAT IS A TVSS?

Transient voltage surge suppressors (TVSSs) are designed to prevent sudden voltage surges from damaging sensitive equipment such as computers, numerically controlled equipment, controllers, and instrumentation. These devices usually contain metal oxide varistors (MOVs) configured to provide a path for current to flow away from the equipment during a transient event. TVSSs afford protection from both highly damaging voltage surges and the less noticeable transients that, while they do not cause an immediate equipment failure, increase the cumulative wear on the equipment, shortening its operating life. TVSSs should indicate visually that all elements are still working. And, like any piece of electrical equipment, they have a finite life.[7]

TVSS IS NO LONGER ACCURATE

TVSS is, in fact, outdated terminology, replaced by surge protection device (SPD) over the last decade.

The terms surge protection device (SPD), or transient voltage surge suppressor (TVSS), are used to describe electrical devices typically installed in power distribution panels, process control systems, communications systems, and other heavy-duty industrial systems, for the purpose of protecting against electrical surges and spikes, including those caused by lightning. Scaled-down versions of these devices are sometimes installed in residential service entrance electrical panels, to protect equipment in a household from similar hazards.[8]

SPD manufacturers no longer describe their products as TVSSs. TVSS devices have always belonged to a larger family of surge suppression devices known as SPDs (Surge Protection Devices).

SPD REPLACES TVSS

Beginning with UL 1449 3rd Edition and the 2008 National Electrical Code, the term "SPD" has formally replaced the terms "TVSS" and "Secondary Surge Arrester." SPDs are now classified as Type 1, Type 2, Type 3 or Type 4 and are selected based on application and the location where they are to be used.

[7] http://www1.eere.energy.gov/manufacturing/tech_assistance/pdfs/motor.pdf

[8] http://en.wikipedia.org/wiki/Surge_protector

With the recent changes in terminology by UL and the NEC, there are no longer any standards organizations that use the term TVSS, as IEEE®, IEC® and NEMA™ have been using the term "SPD" for many years.[9]

An example of an SPD is a metal oxide varistor (MOV). A varistor is an electronic component with a "diode-like" nonlinear current–voltage characteristic. The most common type of varistor is the MOV. This contains a ceramic mass of zinc oxide grains, in a matrix of other metal oxides (such as small amounts of bismuth, cobalt and manganese) sandwiched between two metal plates (the electrodes).

MOVs degrade from repeated exposure to surges and generally have a higher "clamping voltage" so that leakage does not degrade the MOV. Both types are available over a wide range of voltages. MOVs tend to be more suitable for higher voltages, because they can conduct the higher associated energies at less cost.[10]

[9] http://apps.geindustrial.com/publibrary/checkout/DEQ-155?TNR=FAQslDEQ-155lgeneric

[10] http://en.wikipedia.org/wiki/Metal-oxide_varistor

ISSUE 3

MOVs CAN'T SAVE ENERGY

Some utility proponents will claim that no MOV (metal oxide varistor) can offer energy savings. On the contrary, any MOV is capable of saving energy. If you are looking at units that clamp at high voltages and have slow reaction times, then yes, the savings opportunity will be greatly diminished. However, you can increase the clamping voltage and reaction time to improve savings.

Here's how: Take that MOV that clamps at a high voltage and has a slow reaction time in the seconds or nano-second, and increase the clamping voltage and reaction time. Have the MOVs in the SPD clamp at 10 percent nominal voltage (on a 120 volt circuit, clamp 132) and increase the reaction time into picoseconds.

Now you have a device that passively regulates the electricity, controlling the voltage and spikes, but not restricting the amperage. You have an SPD that can save meaningful and measurable amounts of energy.

Case-in-point: If you isolate an electrical meter on both the supply and demand sides with an MOV that clamps at 1200 volts and introduce a spike of 2000 volts, it will shunt 800 volts to ground which the meter will never then see, and thus will not register as usage. ALL MOVs are capable of reducing electricity above its clamping voltage. If that entire spike is allowed through, the meter will read it as usage and the consumer would be billed accordingly.

THE ROLE OF MOVs IN ENERGY MANAGEMENT

The main component used for surge suppression is called an MOV. This component is what diverts the highly damaging voltage surges and the less noticeable transients away from the equipment.

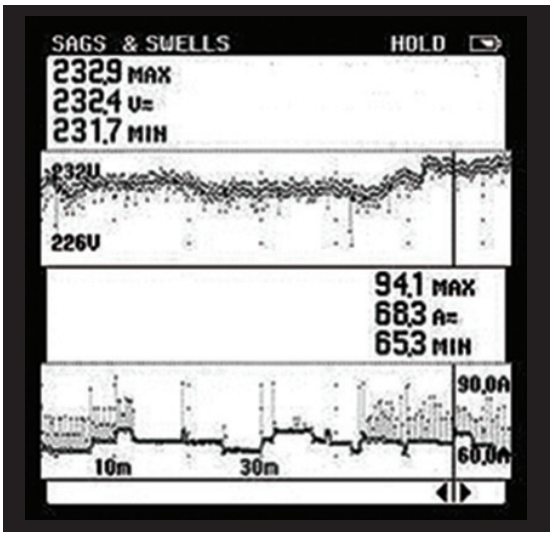
The MOV is not the only device in an effective energy management system. It works in conjunction with other devices, equipment and processes to combat "dirty" power. For example, the MOV is just one component WPS Global uses in its energy management system to deliver optimal protection. Bill Behrmann, senior systems designer, WPS Global Inc., explains, "Our energy management system integrates other components, which is a unique approach and sets it apart from other surge protection options. The additional technologies allow the MOV to be used to its fullest potential and thereby give astoundingly fast reaction speeds and lower thresholds."

WHAT CAUSES "DIRTY" POWER?

Whether it's called a surge, a sag, a spike, a transient, a fluctuation, an interruption, or noise, "dirty power" is some type of abnormality in the electricity that runs your facility.

Dirty power originates outside of and within your facility. For example, lightning, utility switching, capacitor switching, and faults on the utility's distribution system can all affect the quality of your power before it even reaches your facility.[11]

[11] http://www.emersonnetworkpower.com/en-US/Brands/SurgeProtection/Pages/WhatCausesDirtyPower.aspx



A power quality meter reading: the voltage and amperage levels demonstrate dirty power.

Most daily fluctuations are from internal electrical equipment—like devices that run in cycles or get turned on and off frequently—and can cause cumulative and equally damaging power hazards. Even a small appliance can cause problems in sensitive equipment that share the same line. And the more electrical equipment a company uses, the more transients accumulate.

Transients and surges can also be from large switching activity, such as energizing capacitor banks. In areas with large inductive loads, utilities will energize capacitor banks to increase the power factor, improve voltage, and reduce the system stresses that accompany large reactive loads. Unfortunately, energizing these capacitor banks can create transient voltage surges that affect sensitive equipment.

Lightning, another common cause of transients, can destroy controllers and equipment. Proper system grounding is essential to minimize the risk of equipment damage; however, sensitive equipment, such as computers and automated control systems, usually require additional protection. Dedicated SPDs are recommended for highly sensitive equipment.[12]

THE STANDARD MOV IS NO GUARANTEE

All MOVs used in surge protection devices (SPDs) are designed to take those larger, catastrophic electrical surges and divert them to the ground. While equipment manufacturers build-in MOV devices for protection, they currently offer customers no warranties against lighting or other causes of electrical surges and spikes. This is because once the surge takes place, the MOV is damaged and rendered useless.

In most cases, your equipment is being bombarded with smaller, more frequent surges that the utilities ignore or pass off as "noise." These smaller, more frequent surges are what quickly creates the efficiency loss of your equipment inside your facility. What you must realize at this point is that a surge suppressor with a plain MOV has a high clamping voltage and a slow reaction speed. They will do nothing for the smaller, more frequent surges on the circuit.

You will notice over time in your facility that your electric bills keep rising every year although you are not adding anything new to the circuit. You might also realize that you have made improvements to your facility's processes to run more efficient and still your electricity usage is increasing. This is called inefficiency.

ENERGY EFFICIENCY VS EFFECTIVENESS

Efficiency should not be confused with effectiveness. A system that wastes most of its input power but produces exactly what it is meant to is effective but NOT efficient. The instant you connect an electrical device to electricity, it starts to become inefficient. What others call "noise" and ignore, is actually the cause of increasing electrical costs. A large magnitude surge will damage or destroy equipment, while smaller, more frequent surges wear at your equipment and cause it to use more and more electricity.

[12] http://www1.eere.energy.gov/manufacturing/tech_assistance/pdfs/motor.pdf

ISSUE 4 PERFORMANCE TRACKING IS IMPOSSIBLE

Don't fear claims of energy saving opportunities or guarantees. Rather, take a look at proven case studies and how the savings were calculated. Recognize a solid methodology and commit your organization to establishing a well-founded performance tracking protocol.

PROVEN PROTOCOL: MONTH-TO-MONTH USAGE & BILLING ANALYSIS

No matter what type of energy management system you adopt, you'll first need to establish a baseline of historical data. For example, working off a correlation factor, compare the billing month to month before the installation of your energy management solution to month to month after the installation. The day after your system's installation, you'll be comparing apples to apples data on a month to month basis.

A CLOSER LOOK

Here's how the performance tracking is established for each customized energy management system installed by WPS Global Inc. The baseline is set up using the customer's monthly electric usage (kWh) and a correlation factor. The correlation factor is a tracked measurement of the business that fluctuates with its electric bills. Some examples are production numbers (units/pounds produced), raw material usage, or sales dollars. Once a good factor is found, the baseline is complete. In other words, WPS Global will have calculated, on a monthly basis, the average kWh consumption per that factor.

After installation, the savings are then tracked off the baseline. Each month, the kWh usage per the agreed-upon factor is compared to the average value for that month from the baseline. The percentage difference is the percentage of kWh reduction.

TIMEFRAME	BASELINE kWh/CF	CURRENT MONTH kWh/CF	% FROM AVERAGE	kWh SAVINGS	COST SAVINGS	CO^2 REDUCTION (TONS)
MONTH 1	3.797924	2.859176	-24.72%	134,549	$12,759.28	11.73
MONTH 2	3.329344	2.884243	-13.37%	59,630	$6,265.18	52.18
MONTH 3	3.115309	2.375297	-23.75%	122,063	$12,118.83	106.81
MONTH 4	3.492857	3.036860	-13.06%	61,623	$5,732.89	53.92
MONTH 5	2.843705	2.403061	-15.50%	73,934	$6,876.79	64.69
MONTH 6	3.018895	2.947284	-2.37&	10,380	$959.38	9.08
MONTH 7	2.953116	2.468854	-16.40%	79,322	$7,340.57	69.41

CF=Correlation Factor

The baseline is set up using your monthly electric usage (kWh) and correlation factor. The correlation factor is a tracked measurement of your business that fluctuates with your electric bills. Some examples are production numbers (units/pound produced), raw material usage, or sales dollars. Once a good factor is found, the baseline is complete. In other words, we will have calculated, on a monthly basis, the average kWh consumption per that factor.

After installation, the savings is then tracked off the baseline. Each month, the kWh usage per the agree-upon factor is compared to the average value for that month from the baseline. The percentage difference is the percentage of kWh reduction.

Case-in-point: Every energy management system installed by WPS Global begins with a careful audit and baseline assessment. The company specializes in reducing kWh consumption in high-energy using manufacturing facilities, such as corrugated and paperboard converters. Manufacturers have a variety of machinery and sensitive equipment running, and carefully assessing a facility's historical electrical usage and CO^2 emissions is a critical part of WPS Global's comprehensive pre-installation audit.

Bill Behrmann, senior systems designer, WPS Global, sees whole-facility billing analysis used in many customer businesses, large and small. "This is already common practice," he explains. "Yet the utilities make the 'tracking of savings' sound as if it is something unattainable."

Behrmann's experience demonstrates that most industrial consumers of energy have the capability to track savings. Those that do not may be deterred by information propagated by utility companies. It is possible that utilities would rather they didn't consistently track usage because rebate programs often don't show long-term savings.

Some manufacturers are weary of rebate and efficiency programs offered by their utility. "For good reason," says Behrmann. "These programs can be a Band-Aid or short term solution because the power hasn't been conditioned. In these cases, the usage goes higher after their 'efficient program' is installed. I've seen this type of piece-meal approach to 'savings' become more inefficient in less than 10 months."

During its comprehensive audit, whole-facility billing analysis has identified serious issues for WPS Global customers. In one case, a manufacturer with several U.S. facilities found that its smallest site was historically being charged one-third more usage compared to its larger sister locations. Following a careful month-to-month billing analysis for all plant locations, the problem was pinpointed and promptly addressed.

ISSUE 5 ALL ENERGY SAVING CLAIMS ARE UNTRUSTWORTHY

WPS Global offers customers a 10 percent kWh reduction guarantee. The reduction guarantee, combined with flexible leasing options, assures customers a prompt return on investment. This promise, along with projected savings and real-world success stories, helps WPS Global articulate the generous opportunity for cutting a plant's operating costs.

Fourteen years ago, WPS Global went to market with this bold promise and since then, WPS has installed its energy management system in dozens of manufacturing operations in North and South America. More than two dozen of those facilities are corrugated and sheet feeder operations. Word of mouth among executives and operations managers within this tight-knit and competitive marketplace has propelled interest in WPS Global's unique and customized solutions.

"Once we earned success in our first few installations, the word spread fast," explains Bill Behrmann, senior system designer, WPS Global.

Innovative Packaging Corp. (IPC), Milwaukee, Wisconsin, was the first corrugated facility to take WPS Global up on its energy savings promise. Since then, it's been installed in three Smurfit-Stone Container Corporation-owned plants (now owned by Rock-Tenn).

"We've had great success with it at all of our facilities," says John Lingle, IPC's former president. IPC was Lingle's first experience with the system about ten years ago. He admits the first installation was a leap of faith. "The risk was, 'What if they screw up our equipment?'"

His concern turned out to be unfounded.

> **"I recommended the system for all three plants at Smurfit and for seven of our plants in the Schwarz Group. I haven't found one yet that doesn't give us at least 10 to 12 percent savings."**
>
> **~JOHN LINGLE, MANAGER SHEET FEEDERS, SCHWARZ PARTNERS**

Each system placed by WPS Global is unique in that it is custom-designed to directly reduce kilowatt consumption for the individual facility. By creating a facility-specific plan, selecting equipment and placing it based on the customer's particular needs, a WPS Global solution quickly delivers significant and enduring electrical savings of 10 percent or more for at least 15 years.

A baseline is established in order to guarantee the savings. In a Corrugated Today article, November/December 2011, Lingle explains: "They'll take the previous two year's electrical bills and they'll show you what your consumption was. Then, after they've put their equipment in, they will compare it (the results) to that baseline. Let's say most of our plants are spending $30,000 a month in electricity, which is probably at least that. They (WPS) will give you an insurance policy to save you at least 10, 12 or 15 percent, and let's say that's $3,000 a month, they will give us a lease option or we can buy it."

> **"I can't believe more facilities aren't doing this … A facility can literally save thousands of dollars every year, get a return on their investment, and reduce carbon dioxide emissions by tons. It's a no-brainer."**
>
> **--JOHN LINGLE**

The equipment within industrial facilities are big consumers of energy. Manufacturing businesses partner with WPS Global to meet the challenges of an increasingly competitive marketplace and sustainability-minded operating environment. Just months after implementing a customized supply-side energy-saving solution, businesses are realizing thousands of dollars in energy savings – with zero effort or employee resources.

For financial and sustainability reasons, it's only natural for decision-makers to want to know how an energy management organization like WPS Global will reduce energy consumption and make it more efficient. After reviewing the following introduction and case studies, you'll be certain that there are significant reductions and savings to be had.

A Formal Introduction to Proven kWh Reduction

It isn't uncommon for operations leaders and executives to feel frustration with the lack of information or progress its company is making in the areas of energy reduction and surge protection. Your resources may be tight and there's little time to spare. Your maintenance crews are worried about day to day operations. The effort to research and qualify energy management solutions is time consuming and it can be difficult to discern credible resources and specify options that are viable for your facility.

Further, misinformation and misunderstood processes, tools, technology and expertise can hinder or even halt progress toward reducing energy usage and costs. And, your utility supplier may not be entirely transparent or supportive because it risks losing profit margins, especially for long term or substantial kWh-cutting solutions.

A PROACTIVE ENERGY SAVING STRATEGY

WPS Global Inc. introduced a proprietary technology in 2000 to specifically reduce manufacturing plants' kilowatt consumption and protect their equipment while reducing their carbon footprint. Once installed, this technology swiftly achieves three goals:

1. **Reduces energy usage and costs**
2. **Protects equipment against electrical surges**
3. **Reduces impact on the environment**

The goal of the remainder of this white paper is to introduce you to the proven solution exclusively designed, engineered and installed by WPS Global Inc. and present you with five case studies that support each of the three goal-achieving solutions its custom-developed system offers.

WHAT YOU NEED TO KNOW

When employing the WPS Global energy management strategy, the operation reduces electrical consumption without changing mechanical equipment, processes, lights, motors or compressors. It typically requires no downtime before, during or after installation nor does it require employee involvement during installation. Customers also appreciate that it requires no maintenance efforts following installation either.

Designed and engineered specifically for manufacturers operating equipment with high energy demands, every WPS Global system must be custom engineered to each facility's needs. This energy saving strategy combines proprietary technology and components, installed on site, to create a custom-designed solution for each individual facility. While the solution is designed exclusively for the facility and its energy management needs, the end result to directly reduce kilowatt consumption, never waivers. Once in place, the system quickly translates to significant and enduring electrical savings for at least 15 years.

Here, we'll answer a few of the most common questions:

WHERE IS IT INSTALLED?

The main switch gear is where power comes into the facility. WPS Global's system starts its work here and filters the power for the entire facility. The system components are mounted in:

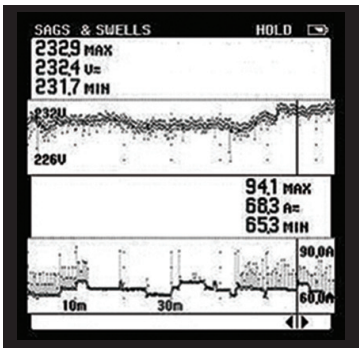
- **Drive cabinets**
- **Lighting panels**
- **Main switch gears**
- **Buss bars**
- **Disconnect clusters**
- **Motors**
- **And anywhere else to ensure the best results in kilowatt reduction and reducing card loss and drive malfunctions.**

After WPS Global's system installation, the facility's power room looks exactly as it did before the install. The system's components are installed so that they are accessible but not noticeable.

WHY ISN'T IT INSTALLED ONLY AT THE POWER SOURCE?

It is important to filter power at the drive cabinets because of the amount of sensitive equipment in a high volume action area. The voltage and amperage levels shown here demonstrate dirty power. Power distortion causes spikes in power usage and energy costs.

INSTALLED ON-SITE



WHEN DOES THE INSTALLATION TAKE PLACE?

WPS Global will visit your facility and meet with you to conduct a comprehensive energy audit. The investment of time and resources on your part includes hosting a facility walkthrough and sharing your electrical data. The end result is a detailed plan that defines how we'll implement a customized supply-side energy-saving system for your facility.

After the installation, WPS Global systems need only an annual "light panel check," during a facility's routine preventative maintenance process.

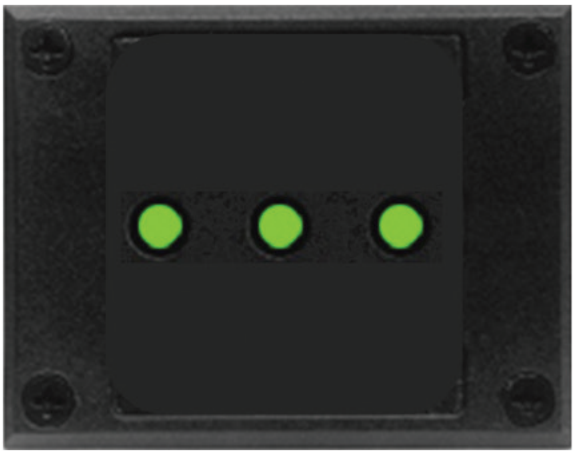
The customized plan for your facility involves proprietary technology, providing your equipment with clean, controlled power that is made available when it is needed.

WHAT ENVIRONMENTAL IMPACT IS EXPECTED?

WPS Global's solution directly reduces kilowatt consumption, thereby decreasing these and other dangerous emissions:

- **carbon dioxide**
- **sulfur dioxide**
- **nitrogen oxide**

By significantly reducing energy consumption, a facility will reduce its carbon dioxide emissions by thousands of tons.



ANNUAL LIGHT CHECK PANEL

HOW DOES IT PROTECT EQUIPMENT FROM ELECTRICAL SURGES?

Electrical storms wreak havoc on your computerized equipment. The typical surge protection approach offers no guarantees, literally. WPS Global is the only system to offer a warranty on its equipment against lightning strikes. The system diverts electrical surges away from the equipment's sensitive circuitry and redirects damaging surges with an arrangement of maintenance-free components.

Maintenance-free components, installed on-site, include a metal oxide varistor (MOV) to deflect the surge and other proprietary components. This combination allows the MOV to be used to its fullest potential and provide astoundingly fast reaction speeds and lower thresholds.

HOW IS ROI GUARANTEED?

WPS Global offers a 10 percent reduction guarantee combined with flexible leasing options to ensure customers a prompt ROI.

Savings at some facilities have reached upwards of 20 percent.

THE RESULTS ARE TRACKABLE AND LONG TERM

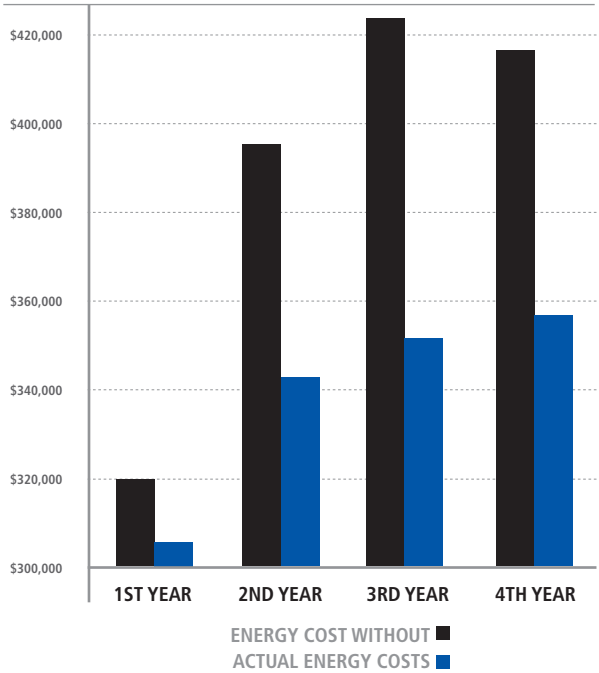
Based off of at least two years electrical history of tracking kWh consumption, not dollars, the WPS Global solution makes the correlation between production and consumption to offer an apples to apples comparison between monthly usage prior to the installation and after.

The solution WPS Global installs has a minimum of a 15-year lifespan, meaning savings are generated each year for at least 15 years.

The following case studies will demonstrate how WPS Global has partnered with manufacturers to produce meaningful and lasting results that deliver on its ROI promise and are cutting energy usage and costs, protecting equipment against electrical surges and reducing CO^2 impact on the environment.

MILESTONE	ELECTRICAL SAVINGS	KWH REDUCTION	PROGRAM INVESTMENT	POSITIVE CASH FLOW
4 MONTHS	$10,715	9.75%	$9,996	$3,719
2ND YEAR	$50,972	12.42%	$20,988	$29,984
3RD YEAR	$75,389	16.97%	$20,988	$54,401
4TH YEAR	$57,716	13.44%	$0	$57,716

Timeline of Dollar Savings



CASE STUDY 1

INCREASE PROFIT MARGINS BY LOWERING ENERGY CONSUMPTION

BANCROFT BAG BANKS ON HIGHER PROFIT MARGINS BY LOWERING ITS ENERGY CONSUMPTION

In October 2011, Bancroft Bag, Inc., West Monroe, LA, announced its proactive investment into reducing its supply-side kWh (kilowatt) consumption. The manufacturer of paper bags for pet food, fertilizer, mining, and chemical product applications, partnered with WPS Global Inc. to install a customized energy reduction system in its 348,000 square foot facility. "We expect this decision will produce a significant drop in our power usage, monthly electricity bills and in downtime and expenses associated with power surge damage," explained David Sheppert, project manager, Bancroft Bag.[13]

The supply-side kWh reduction solution from WPS Global meets the needs of a cost-conscious, sustainability-minded operating environment like Bancroft's with proprietary technology that ensures the bag-making equipment is not using more power than it needs. WPS Global's system conditions the facility's power, feeding the equipment the electricity it needs and preventing it from drawing more than necessary.

WPS Global provides a 10 percent kWh reduction guarantee and proven case studies demonstrating significant savings in energy use and costs within weeks following an installation. The system offers other benefits as well, including improved power quality and equipment surge protection.

"All types of packaging equipment are big consumers of energy," explains Bill Behrmann, senior systems designer, WPS Global Inc. "Even with the newest and most advanced, high efficiency equipment, you cannot realize optimal energy effectiveness or maximum savings without controlling the supply side of the equation."

[13] http://www.manufacturing.net/products/2011/10/lower-energy-consumption-higher-profit-margins

Power surges due to lightning strikes can wreak havoc on expensive, computerized manufacturing equipment, causing thousands of dollars in damage and production losses. WPS Global installs its system on a facility's computer-driven equipment, the most sensitive and vulnerable to electrical surges. Each system, made to withstand any lightning event that can lead to damage, involves a number of components that work together to divert electrical surges away from the equipment's sensitive circuitry.

According to Sheppert, Bancroft Bag's management has met with the local power supplier in the past, asking for ideas to reduce consumption, without much luck. "WPS Global's system is guaranteed to produce results. We believe it will help us achieve our main goal; to reduce our electrical, drive and motor replacement costs and further expand our sustainability commitment," Sheppert adds.

"Reducing energy consumption and improving our downtime will allow us to improve profitability and attain a larger market share in our industry."

~DAVID SHEPPERT, PROJECT MANAGER, BANCROFT BAG

By creating a facility-specific plan, selecting equipment and placing it based on the customer's particular needs, a WPS Global solution quickly translates to significant and enduring electrical savings for at least 15 years. After WPS Global conducts a comprehensive energy audit, presents a detailed plan and implements a customized supply-side energy-saving solution, customers see a reduction in energy usage and costs within weeks.[14]

About Bancroft Bag

Bancroft Bag operates the single largest diversified multiwall plant in the United States and serves a variety of markets -- from pet food to USDA food exports; from fertilizers to rare and costly minerals and chemicals. Bancroft Bag sells to its diverse group of customers via a network of sales representatives located throughout the US. The company was established in 1924 by Toby Bancroft, Sr., and is led by his granddaughter, co-chairman Bonnie Bancroft Woods.

[14] http://www.packagingdigest.com/automation/bancroft-bag-banks-higher-profit-margins-lowering-its-energy-consumption

CASE STUDY 2

CUT ENERGY COSTS, GET GREENER

SUPPLY-SIDE KWH REDUCTION INSPIRES CORRUGATORS TO CUT ENERGY COSTS AND GET GREENER

Six-digit energy cost savings in 24 months. CO^2 emissions cut by thousands of tons.

After just two years in place, the WPS Global energy management system Freedom Corrugated, Hazelton, PA, installed had already earned it a 15.38 percent overall reduction in kWh usage and an energy cost savings of over $177,000. The savings will continue for at least another 13 years, resulting in anticipated savings of more than $1,300,000 over a total of 15 years.

The system is also producing other positive results: environmental sustainability and surge protection. The WPS Global solution has lowered Freedom's CO^2 (carbon dioxide) emissions an average of 72.85 tons per month over 24 months. By year 15, the company expects to have cut its CO^2 emissions by a total of 13,113 tons. Since the installation, Freedom Corrugated has seen savings in maintenance costs as well.

Freedom Corrugated Savings

TIMEFRAME	COST SAVINGS	kWh SAVINGS	CO^2 REDUCTION (TONS)
1-YEAR SAVINGS	($89,386.50)	(977,780)	(856)
2-YEAR SAVINGS	($177,215.47)	(1,998,165)	(1,748)
ANTICIPATED 5-YEAR SAVINGS	($443,038.67)	(4,995,412)	(4,371)
ANTICIPATED 10-YEAR SAVINGS	($886,077.34)	(9,990,842)	(8,742)
ANTICIPATED 15-YEAR SAVINGS	($1,329,116.00)	(14,986,236)	(13,113)

Kilowatt reduction, resulting in energy cost savings, is one beneficial aspect of WPS Global's system. It also reduces carbon dioxide emissions and supports Freedom's environmental sustainability objectives.

These results have exceeded expectations by more than 50 percent. When Freedom Corrugated installed the supply-side energy reduction system by WPS Global in October 2010, the company anticipated a cut of at least 10 percent in electrical costs and felt confident that it would make greater strides toward cutting its CO^2 emissions.

THE DECISION TO INVEST IN KWH REDUCTION

The installation was wholeheartedly welcomed by management largely due to the success other corrugated facilities, like its sister company, Independence Corrugated, have had with WPS Global-customized systems. Other Schwarz-managed facilities have also added WPS Global systems, including Schwarz Packaging Partners Miami in 2011 and Northern Sheets in 2012.

"From here on out, the thousands of dollars we're saving each month goes right back to our bottom line," says Dave Galasso, general manager, Freedom Corrugated.

> **"This investment will pay for itself more than 10 fold during the lifetime of the system. We couldn't be more satisfied with these results."**
>
> **~DAVE GALASSO, GENERAL MANAGER, FREEDOM CORRUGATED**

"WPS Global's energy management system is reducing our operation costs in other areas as well," adds Galasso. "Since the installation, we've seen savings in our maintenance costs because we have fewer drive failures, less downtime, fewer repairs and we expect this will result in better longevity of our equipment."

Electrical surges can wreak havoc on vulnerable computer-driven equipment. Each WPS Global system involves a number of components that work together to divert electrical surges away from the equipment's sensitive circuitry.

"We call it surge protection on steroids," says Behrmann. "It not only protects equipment, but it facilitates efficiencies and increases the lifetime of the equipment."

WHERE THE SAVINGS BEGAN

After WPS Global conducted a comprehensive energy audit for Freedom, senior systems designer, Bill Behrmann, WPS Global, presented a detailed plan. Upon Freedom management's approval, WPS Global implemented the customized supply-side energy-saving solution and within weeks Freedom began to see a significant reduction in energy usage and costs.

"In the first month alone, our system reduced Freedom's kilowatt usage by nearly 25 percent, cutting their bill by nearly $13,000," explained Behrmann. "When customers see this huge impact take effect so quickly, it isn't difficult for them to imagine how their investment in our system will pay off."

About Freedom Corrugated

Freedom Corrugated, located in Hazelton, PA., is one of the newest, most modern, and perhaps one of the largest corrugated paper operations in the USA. Trenton Corrugated Products is privileged to be one of the 12 equal partners of this well-managed facility. Because Freedom has two new state of the art corrugators, it can receive product for fabrication in less than 24 hours. Freedom has a reputation for producing the best quality sheets in the industry. Sheets can be manufactured in any grade or flute utilizing both recycled and virgin Kraft paper.

[15] www.wpsglobalinc.com/real-world-success-stories

CASE STUDY 3

PROTECT SENSITIVE EQUIPMENT

WROUGHT WASHER TAKES MOTHER NATURE HEAD-ON

Threatened by electrical surges caused by severe weather and lightning, Wrought Washer protects its computerized equipment with WPS Global's protective energy management system.

Power surges due to lightning strikes can wreak havoc on expensive, computerized manufacturing equipment, causing thousands of dollars in damage and production losses. Wrought Washer Manufacturing Inc., Milwaukee, Wis., has experienced these losses first-hand and is proactively protecting its investment in high-tech machinery with a unique surge protection system installed by WPS Global.

Severe weather and lightning have caused Wrought Washer costly downtime and repair expenses due to electrical surges destroying sensitive and expensive equipment. Milwaukee County has experienced 311 severe weather events over the last 28 years, an average of 11 per year. Thirty two of these events involved severe lightning.

As the world's largest manufacturer of standard and special washers, Wrought Washer processes more than 200,000 pounds of steel per day. For a 175,000-square-foot factory operating more than 50 presses, downtime cripples the manufacturing process and causes substantial production and financial losses.

No longer willing to risk or incur these types of losses, Wrought Washer is taking Mother Nature head-on with the installation of protective energy management systems engineered by WPS Global specifically for manufacturers with computerized capital equipment.

WPS Global installed the systems between October 2010 and February 2011 on Wrought Washer's computer-driven equipment, the most sensitive and vulnerable to electrical surges. Each system involves a number of components that work together to divert electrical surges away from the equipment's sensitive circuitry.

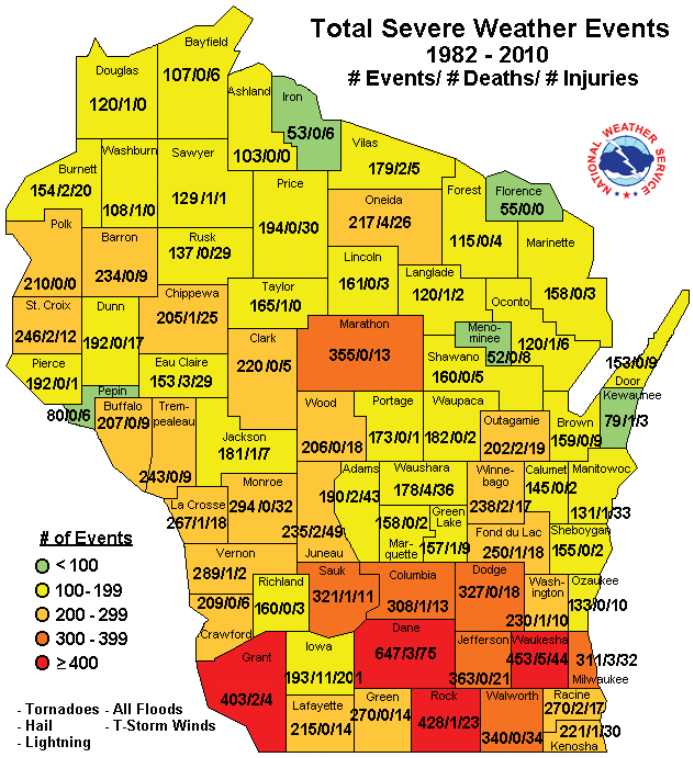
Sending 1,000 or more volts through any power wire or cable in its path, a surge, or oversupply of voltage, can disrupt software, delete data and destroy circuitry. A surge can last up to 50 microseconds, and although very short in duration, it can cause expensive problems for businesses in terms of downtime, lost income, repair and replacement expenses, or even fire damage.

Photograph: A nighttime photograph of multiple cloud-to-ground and cloud-to-cloud lightning strokes. Image by NOAA.

[16] When Lightning Strikes image and data from Geology.com; http://geology.com/articles/lightning-map.shtml

"With WPS Global's protective energy management system, we're proactively dealing with this problem by redirecting damaging surges away from our equipment." says David Rank, engineering /maintenance manager, Wrought Washer Mfg., Inc. "In addition to primary computer systems, our sophisticated lasers, CNC turning and milling, EDM and optical inspection machines are also protected by the arrangement of maintenance-free components that WPS Global installed on-site."

The main component used for surge suppression is called a metal oxide varistor (MOV). This component is what diverts the surge away from the equipment. However, the MOV is just one component WPS Global uses in its protective energy management system to deliver optimal protection.



Bill Behrmann, senior systems designer, WPS Global Inc., explains, "Our system integrates other components, which is a unique approach and sets it apart from other surge protection options. The additional technologies allow the MOV to be used to its fullest potential and thereby give astoundingly fast reaction speeds and lower thresholds."

WHOLE-UNIT WARRANTY

All MOVs used in surge protection devices (SPDs) are designed to take those larger, catastrophic electrical surges and divert them to the ground. While equipment manufacturers build in MOV devices for protection, Behrmann says they currently offer customers no warranties against lighting or other causes of electrical surges and spikes. He adds, "This is because once the surge takes place, the MOV is damaged and rendered useless."

It isn't always the large catastrophic weather events that cause damage. A piece of equipment can be subjected to smaller electrical surges which, over time, cause damage.

WPS Global's protective energy management system is unique in that it is made to withstand any lightning event that can lead to damage. In the rare instance a unit sacrifices itself, WPS Global's 10 year warranty guarantees the unit will be replaced. The warranty covers the whole unit, not just certain components.

[16] **Total Severe Weather Events** map and data from National Weather Service - Central Region Headquarters; http://www.crh.noaa.gov/images/mkx/severe/total-events.gif

No Maintenance Protection

WPS Global's protective energy management system is a maintenance-free surge protection solution. Once WPS Global installs a system, the customer need only check an indicator light periodically to ensure the unit is working properly.

About Wrought Washer

More than a century old, Wrought Washer Mfg., Inc., headquartered in Milwaukee, Wis., is the world's largest manufacturer of standard and special washers. Supplying high-quality washers for a broad range of markets including automotive, agricultural, electrical, appliance, construction equipment and material handling, Wrought has TS-16949 certification and offers state-of-the-art engineering, manufacturing, design, customer service and sales operations. Visit www.wroughtwasher.com for more information.

CASE STUDY 4

WPS DELIVERS A QUADRUPLE THREAT

CORRUGATED PLANTS ARE ADOPTING A NEW PROPRIETARY TECHNOLOGY TO REDUCE THEIR KILOWATT CONSUMPTION AND PROTECT THEIR EQUIPMENT

Corrugated industry leaders enthusiastically share their energy savings, improved power quality, lightning protection and reduced emissions with WPS Global's system.

Northern Sheets, McClellan, California, a Schwarz Group-managed facility, installed a WPS Global Inc. energy management solution in its 80,000 square foot facility late in 2011. The main goals for the installation were to reduce energy costs and obtain cleaner electricity with fewer spikes and surges.

Just eight months later, the facility's general manger, Guy DeYoung reported, "The WPS Global installation investment has proven to be a valuable tool for surge protection, sustainability initiatives and energy savings."[18]

Northern Sheets fully expected the installation would achieve a 15 percent reduction in energy costs. Two years after the November 2011 installation, the company is already ahead of its target results at a 16 percent reduction in kWh usage and $140,000 in electricity bill savings.

Quarterly Cumulative Savings

	% SAVINGS	$ SAVINGS	KWH SAVINGS	CO^2 SAVINGS (TONS)
QUARTER 1	-17.99%	$13,876.93	149,083	130.45
QUARTER 2	-15.67%	$24,084.09	258,061	225.80
QUARTER 3	-12.54%	$31,446.63	309,795	271.07
QUARTER 4	-12.13%	$41,132.23	413,944	362.20
QUARTER 5	-12.79%	$55,094.47	566,873	496.01
QUARTER 6	-13.94%	$75,220.69	789,106	690.47
QUARTER 7	-15.52%	$118,045.51	1,102,101	964.34
QUARTER 8	-16.00%	$139,143.02	1,317,659	1,152.95

DeYoung is not surprised based on what he'd heard first-hand from other corrugator and sheet feeder plants. Northern Sheets discovered WPS Global by word of mouth. WPS Global has installed successful energy management solutions within many other Schwarz Group managed facilities. According to DeYoung, those facility managers were very eager to share how their WPS Global system has resulted in energy savings, improved power quality, lightning protection, and reduced emissions.

[18] http://pffc-online.com/carton-box/10488-northern-sheets-cuts-kw-earns-rebate

NEEDS-BASED ELECTRICITY USAGE

Proprietary technology ensures that the equipment in the corrugator plants is not using more power than it needs.

"We are conditioning the power inside the facility, feeding the equipment the electricity it needs, and we're not allowing it to draw any more than what it is expected to draw," explains Bill Behrmann, senior systems designer, WPS Global Inc. Each solution is customized, depending on the plant's electricity usage, type of equipment and layout. The process begins with an audit of electricity usage. "From there we will design a system that will clean the power and protect the equipment," Behrmann adds. "WPS presents a proposal and when the company accepts it, then, off of my specs, we install the equipment."

THE 10 PERCENT GUARANTEE MAKES IT A LOW-RISK DECISION

Plants can either purchase or lease the equipment. WPS provides a savings contract that guarantees that the equipment will save the plant money. "Within the proposal, we have estimated savings of normally 10 percent within a payback period," Behrmann says.

WPS Global offers a 10 percent reduction guarantee, and combined with flexible leasing options, assures customers a prompt return on their investment.

"For example, one of our early adopters chose a 36-month lease and earned a positive monthly cash flow during the leasing period. Now post-lease, this manufacturer enjoys savings that are entirely pure profit," explains Behrmann.

CARVING OUT NEW, CREATIVE WAYS TO CUT COSTS FOR CORRUGATORS

Northern Sheets is among many WPS Global installations to have reported kilowatt reduction beyond 10 percent. Niagara Sheets is another company that partnered with WPS Global to implement the plan tailored specifically for its Tonawanda, New York plant. Just 90 days after WPS Global installed its comprehensive energy solution, Niagara Sheets had already realized a nearly 15 percent reduction in kilowatts consumption compared to the previous year, translating to over $10,000 in savings.[19]

Surviving in the uber-competitive corrugated business means sheet feeders must think out-of-the-box when it comes to reducing costs.

"Pennies can make the difference between making or losing a sale — we need to explore every opportunity to reduce our operating expenditures," says John Bolender, president, Niagara Sheets LLC.

It is this increasingly competitive marketplace and the growing interest in sustainability that has encouraged Bolender to keep an open mind when it comes to new cost-cutting ideas. So, when he heard about the significant savings other sheet and corrugated plants had earned with a customized energy-saving solution, he was all ears.

Niagara Sheets' Energy Savings After WPS Global's Installation

MONTH	% FROM AVERAGE	EFFECT ON ENERGY BILL
SEPTEMBER	-17.99%	$13,876.93
OCTOBER	-15.67%	$24,084.09
NOVEMBER	-12.54%	$31,446.63
AVG SAVINGS TO DATE	-12.13%	$41,132.23

[19] http://www.pffc-online.com/carton-box/8016-0201-niagara-sheets-cuts-costs

"To survive, I feel Niagara Sheets must be a low-cost producer, and reducing our energy costs is one element of that strategy."

~JOHN BOLENDER, PRESIDENT, NIAGARA SHEETS

"The system is designed to benefit high consumers of energy – plants operating large equipment, for example – by reducing kilowatt consumption," says Behrmann. "The custom-designed plan we prepare for each facility requires no equipment or process changes and no investment in resources."

Behrmann says WPS Global can save a plant money, even if it has newer equipment. "You would think with newer machinery you wouldn't see much of a savings, but it is susceptible to power fluctuations. We can save everybody money. Part of the process is the tracking. If the tracking isn't correct, we can't show you the full benefit of the system."

Within weeks, manufacturers see the benefits of a WPS Global system.

About Northern Sheets

Northern Sheets is located in McClellan, CA, and is a corrugated sheet co-operative serving the packaging industry in Northern California. Northern Sheets is a division of The Schwarz Group. The Schwarz Group, through its subsidiaries, engages in designing, manufacturing, and supplying shipping containers, displays, and retail packaging products for companies primarily in the United States. The company offers corrugated, wood, foam, plastic, blocking, and die-cutting packaging products. Its products include corrugated packaging sheets and boxes, interior packaging, partitions, cushioning, graphics, display and point of purchase packaging, and labeling, as well as returnable/reusable containers. The company provides custom packaging solutions as well.

About Niagara Sheets

Niagara Sheets LLC, Tonawanda, NY, manufactures corrugated paper sheets mainly used to manufacture boxes, shipping containers and a wide variety of other packaging products. Niagara Sheets is an independent company created in 2007 as a joint venture business by three corrugated industry corporations, Jamestown Container Companies, Norampac, and Rock-Tenn. Commonly called a "sheet feeder," the plant is fully equipped with a 110" BHS Corrugator installed in 2008 along with a full line of support equipment to provide quality corrugated sheets. It supplies custom-made corrugated sheets to box plants, sheet plants and other industries.

CASE STUDY 5

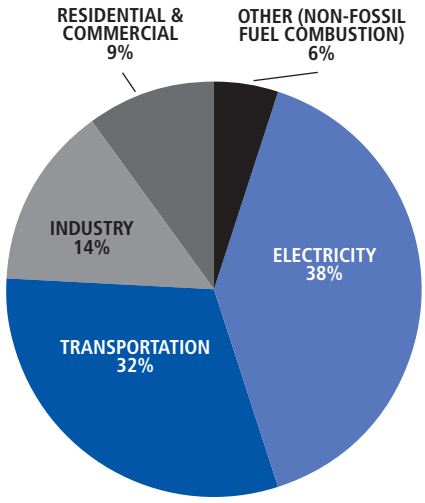
SAVINGS THAT MEET SUSTAINABILITY OBJECTIVES

What strides is the American corrugated industry making to reduce its carbon footprint?

While sustainability leaders in the closely-watched packaging industry, such as Rock-Tenn, are experiencing some progress — it reported a four percent reduced energy use in 2010-11 — by implementing several changes across multiple operations, WPS Global customers are seeing even stronger results by implementing one custom-developed solution within each plant. The WPS Global installation requires zero effort or employee resources on the customer's part and shows positive results one month after installation. And, WPS Global guarantees its system will reduce the facility's energy usage by 10 percent and produce enduring electrical savings for at least 15 years.

The minimum guaranteed savings for WPS Global installations outshines the progress abroad in most recent years as well. According to FEFCO (European Federation of Corrugated Board Manufacturers), the European corrugated sector has decreased the carbon footprint by 4.8 percent between 2009 and 2011. This is on top of a reduction by 11.7 percent between 2006 and 2008. The organization attributes the reduction mainly due to a considerable drop in electricity usage by kraftliner producers.

U.S. Carbon Dioxide Emissions, By Source



Note: all emmissions estimates from the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2012.

Here in the United States, The Responsible Package initiative says the forest products industry has made great strides in reducing its carbon footprint. Between 2000 and 2006, the industry collectively reduced its greenhouse gas intensity by 14 percent.

The Responsible Package initiative is an industry-wide effort to promote the versatile and sustainable packaging solutions provided by paper-based packaging. The group reports that in the U.S., the carbon sequestered by forests and products each year is enough to offset approximately 10 percent of the country's CO^2 emissions — equivalent to removing 108 million cars from roads each year.[20]

[20] http://theresponsiblepackage.com/sustainability

MAKING SUSTAINABILITY A PRIORITY

More and more businesses in the U.S. corrugated industry are establishing clear sustainability goals, timelines and are defining baselines from which they can measure their year-to-year progress. The trend is being adopted by individual facilities setting their own CO^2 – cutting goals as well as by corporate headquarters overseeing the sustainability initiatives for dozens or hundreds of locations.

TimBar Packaging & Display's Miami, Florida facility installed a WPS Global customized energy-saving solution. The system requires no involvement from TimBar employee resources and yet its installation plays an integral role in helping TimBar significantly reduce its energy usage and carbon footprint.

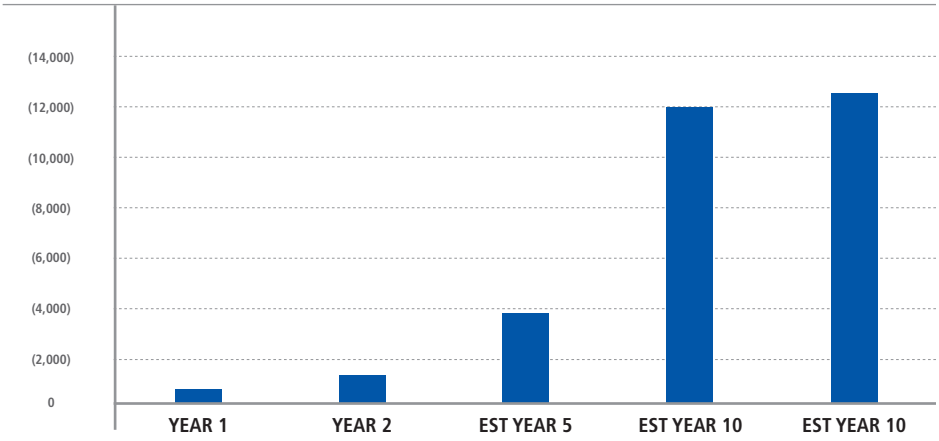
TimBar partnered with WPS Global to implement a customized supply-side energy-saving system that guarantees a 10 percent reduction in electrical costs. According to Bill Thom, senior vice president of operations, TimBar Packaging & Display, the company is hoping to achieve a 14 to 20 percent reduction based on the successes WPS Global has had with other corrugator and sheet plants.

ELECTRICTY = 38% of US CO^2 Emissions

Electricity is a significant source of energy in the United States and is used to power homes, business, and industry. The combustion of fossil fuels to generate electricity is the largest single source of CO2 emissions in the nation, accounting for about 38% of total U.S. CO2emissions and 31% of total U.S. greenhouse gas emissions in 2012. The type of fossil fuel used to generate electricity will emit different amounts of CO2. To produce a given amount of electricity, burning coal will produce more CO2 than oil or natural gas.

"Companies concerned with sustainability would prefer to do business with like-minded companies," explains Thom. "Like many of our customers are, TimBar is furthering its track record for investing in projects that will reduce our carbon footprint."

Ton of Carbon Dioxide Reduced



Even with the most advanced, high efficiency equipment, WPS Global's senior systems designer, Bill Behrmann, says that corrugated, paperboard and packaging businesses cannot realize optimal energy effectiveness or maximum savings. He says, "You must control the supply side of the equation."

By implementing WPS Global's specific system in its Miami facility, TimBar will see significant reductions in the power being consumed by its large-scale energy-consuming equipment. A big plus for TimBar is that the installation involved zero downtime and the system's daily implementation requires no involvement from employees.

As a manufacturer of corrugated packaging, Thom wants to ensure that sustainability remains top-of-mind as part of TimBar's business philosophy. The Miami Division is known as the market leader in South Florida for stock items, customized solutions and point-of-purchase displays. It also partners with TimBar's Tampa box plant to be a full service provider to the Central Florida market and the Caribbean as well.

"We have continually strived to minimize waste, increase productivity and design packaging that performs to specifications while utilizing the least amount of fiber possible," says Thom. "WPS Global's system meets our sustainability needs and we believe it will pay for itself in energy savings."

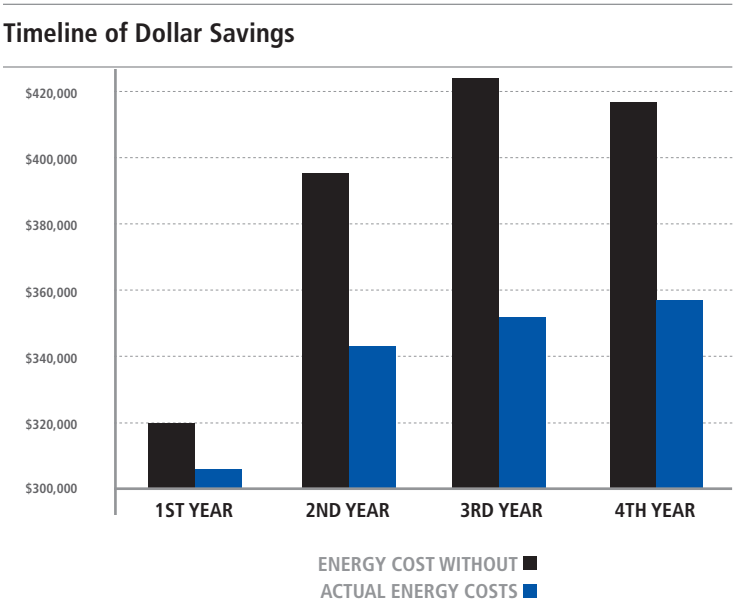
About Timbar Packaging & Display

Timbar Packaging & Display, Miami, Florida, has been a leading manufacturer of corrugated packaging for nearly 60 years. TimBar offers a large array of products and services including shipping containers, retail packaging, point of purchase displays, protective inserts and other specialty products as well as design, pack out and fulfillment services. For more information visit www.timbar.com.

CONCLUSIONS

MAKING THE COMMITMENT TO PURSUE SUPPLY-SIDE KWH REDUCTION

Rising energy costs are forcing manufacturing facilities to look for every opportunity to reduce usage. WPS Global's proprietary technology ensures that the equipment running in its customers' plants are not using more power than needed.



DIRTY ELECTRICITY IS THE CULPRIT

WPS Global's kilowatt reduction system does not affect the performance of a plant's machines. "On the contrary," says Bill Behrmann, senior systems designer, WPS Global, "The system positively affects all machinery and daily operations for the facility. It protects them from dirty electricity — an inconsistent supply of power." The system conditions the power inside the facility, feeding the equipment the electricity it needs, and not allowing it to draw any more than what it is expected to draw.

Behrmann says WPS Global can save any facility money, even if it has newer equipment. "You would think with newer machinery you wouldn't see much savings, but it is susceptible to power fluctuations. We can save everybody money," says Behrmann. He explains that part of the process is the tracking. If the tracking isn't correct, we can't show customers the full benefit of the system. "We've never went in and not saved the company money," he adds. "We've learned in the past that if we don't do our end of it, or if tracking isn't correct, we're not showing the customer exactly what we're saving them."

WHERE WILL YOU START?

According to Inc. Magazine, you should kick-off any energy-cutting initiative by benchmarking, that is, evaluating your energy use. Although you can do this yourself, there are also online tools to aid in the process. The EPA's Energy Star program, at energystar.gov, offers a set of tools called Portfolio Manager to gauge a company's energy and water use.

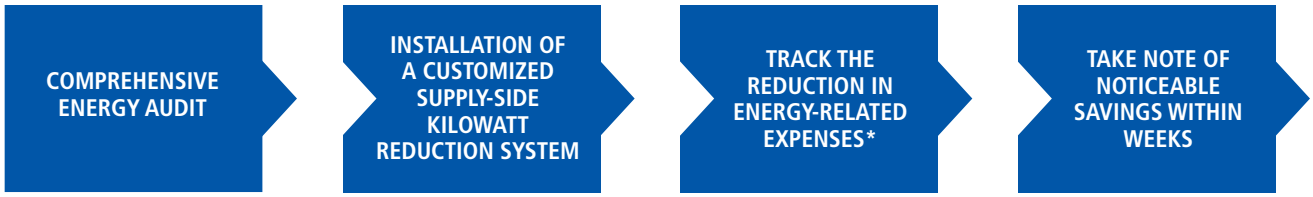
Behrmann agrees. WPS Global customizes each customer's solution based on the type of equipment the plant is running, its layout and electricity usage. "We begin the process with an audit of electricity usage," explains Behrmann. "From there we will design a system that will clean the power and protect the equipment."

WPS then presents a proposal for customer approval. Upon customer approval, the system is installed, which involves the use and set-up of proprietary energy management equipment. WPS Global customers can either purchase or lease the system's equipment. The company provides a savings contract that guarantees that the equipment will save the plant money.

There are more than 20 corrugated, sheet feeder and packaging facilities all over the U.S. that cut their electrical usage by 10 to 20 percent since 2000, adding up to millions of dollars in bottom line savings, thanks to a customized solution installed by WPS Global Inc.

ARE YOU READY TO TAKE THE FIRST STEP?

Let's recap how your organization can achieve energy savings with a proven supply-side KWH reduction strategy:



* Remember, there's typically no downtime and no employee involvement.

The savings will benefit your facility in six ways:

1. **Reduced electrical usage and lower energy bills**
2. **It protects your equipment**
3. **Reduced risks and costs associated with sudden power loss and surges**
4. **Substantially less downtime**
5. **Reduced maintenance cost**
6. **Contribution to the company's sustainability initiatives by reducing its carbon footprint**

Begin your initiative by scheduling a comprehensive energy audit from WPS Global. Next you'll see a detailed plan to implement your customized supply-side energy-saving solution. Within weeks of the installation, you'll see a reduction in your energy usage and costs.

WPS Global Inc.
(888) 803-2903
sales@wpsglobal.net

PREPARED FOR: WPS GLOBAL INC.
WPS Global is an energy management organization. Each energy management system placed by WPS Global is unique in that it is custom-designed to directly reduce kilowatt consumption for each individual facility. By creating a facility-specific plan, selecting equipment and placing it based on the customer's particular needs, WPS Global's systems quickly translate to significant and enduring electrical savings for at least 15 years.