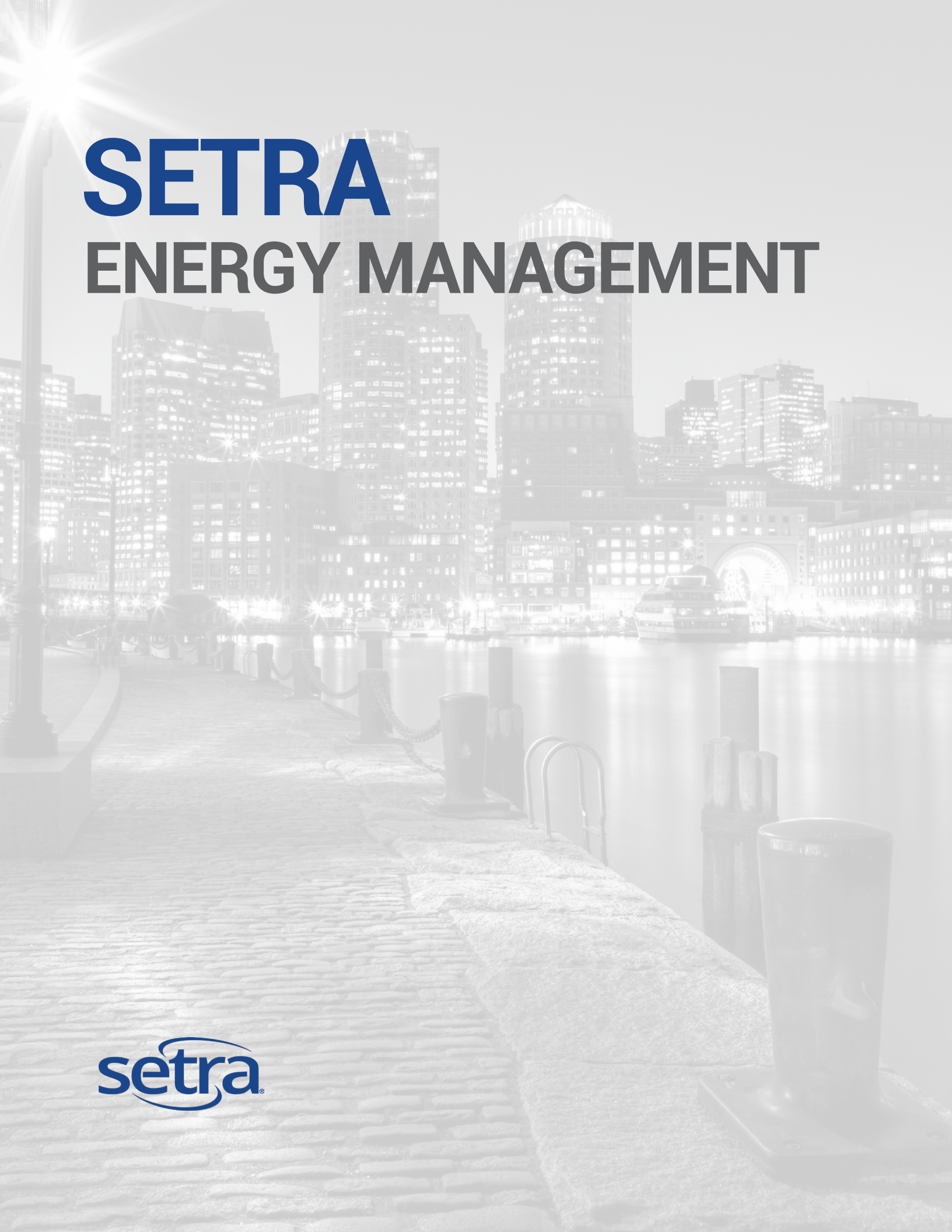


SETRA
ENERGY MANAGEMENT

setra®

WHO IS SETRA?

Setra was founded in an age of transducer innovation. Our founders, Dr. Y.T. Li and Dr. S.Y. Lee were Professors of Engineering at MIT and co-developers of the Variable Capacitance Transduction Principle. Building on this heritage of innovation, Setra has designed and developed one of the most comprehensive product lines of pressure sensing transducers in the world. In Energy Management, acquiring real-time accurate data is essential to reading overall energy consumption. Setra has nearly 50 years of experience in HVAC & Industrial applications so we understand how important it is to deliver superior quality.

WE'VE GOT YOU COVERED.

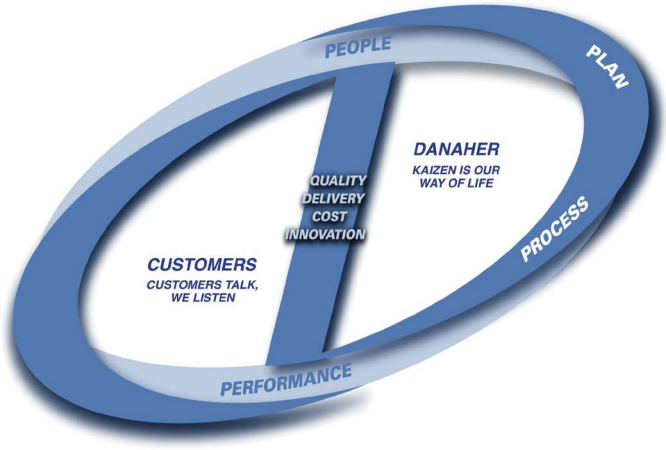
Our products allow facilities to verify:

- LEED Requirements
- EnergyStar Requirements
- Cost Allocation
- Peak Demand
- Energy Cost Savings

THE DISCIPLINED BUSINESS MODEL THAT ENSURES REPEATABILITY.

Setra is part of the Danaher group of companies. Danaher is a Fortune 200, NYSE-listed, science and technology leader that designs, manufactures and markets innovative products and services to professional, medical, industrial and commercial customers. The Danaher Business System employed by Setra provides a foundation to all our 63,000 associates around the world, serving customers in more than 125 countries.

How does that ensure performance in energy management? It means that we have the committed engineering resources and manufacturing processes in place to ensure that at every step of the way, quality and repeatability are absolutely guaranteed.



About Setra:

- 5-Sigma Quality
- 99% On Time Delivery (Based on Customer Request Date)
- Over 10M Devices Installed Globally
- Global Technical Support Staff
- ARRA (Made in USA)
- 2014 Johnson Controls Supplier Award

WHAT IS SUBMETERING?

Submetering is the installation of metering devices with the ability to measure energy usage after the primary utility meter. Submetering offers the ability to monitor energy usage for individual tenants, departments, pieces of equipment or other loads individually to account for their actual energy usage. With submetering, a clear and accurate picture of how and when energy is being consumed inside a facility is created.

SUBMETERING APPLICATIONS

HOSPITALS & HEALTHCARE FACILITIES

Healthcare facilities are among the most energy-intensive facilities in the U.S. Hospital facility managers find it challenging to identify energy inefficiencies in their buildings because the industry has lacked energy use data. A submeter can measure, analyze and report on the energy usage in these healthcare facilities. The energy cost savings potential in healthcare facilities ranges from 10% to 32%, according to an analysis completed of "typical" facilities in five climate zones.

BOTTOM LINE CONSIDERATIONS

In the United States, inpatient and outpatient healthcare facilities spend $8.8 billion/year on energy (Benz and Rygielski 2011). The average hospital spends $675,000 on energy costs annually, exceeding the per-building energy costs of other building types by a factor of 10 (DOE 2003). Healthcare facilities present many opportunities for energy efficiency improvements.

http://www.nrel.gov/docs/fy13osti/57864.pdf

INDUSTRIAL & MANUFACTURING PLANTS

Energy usage in industrial buildings is collected and monitored for multiple types of energy. Industrial buildings use energy-intensive HVAC systems to support processes and personnel. These support functions consume up to 33% of all energy used in manufacturing areas.

BOTTOM LINE CONSIDERATIONS

The energy used by U.S. manufacturing plants totals $180 billion annually. Government statistics show that, on average, 30 percent of energy in these types of buildings is wasted. A focus on improving energy efficiency is important to reduce the cost of these manufacturing plants.

http://energy.gov/sites/prod/files/2014/05/f16/industrial_buildings_fs.pdf
http://www.sustainableplant.com/2013/03/the-top-five-energy-efficiency-measures-for-industrial-businesses/

BENEFITS OF SUBMETERING

Increasing energy costs are frequently the largest variable expense for commercial and industrial facilities; the installation of submeters can provide numerous benefits to the facility manager. Real-time submetering data can help facility managers drive savings by highlighting opportunities to optimize equipment and site performance. This data can provide feedback on energy consumption; how much energy is being used throughout the day and identify which areas are consuming more energy than necessary.

UNIVERSITIES & EDUCATIONAL FACILITIES

The annual energy bill to operate America's primary and secondary schools totals nearly $8 billion - more than what is spend on textbooks and computers alone. A majority of schools must deal with again buildings that use energy inefficiently; student housing and recreation facilities require 24-hour heating, cooling and power. Without cost accountability, many student and on-campus vendors waste energy.

BOTTOM LINE CONSIDERATIONS

No longer assumed to be a fixed cost, energy consumption and demand can be managed to help mitigate other rising costs that may be more difficult to control. Next to salaries, energy is often the next highest expense for educational facilities. In today's educational facility environment, controlling bottom-line costs is key to maintaining current programs while ensuring affordable education.

webspm.com/articles/2009/10/1/energy-data-collection-and-saving-identification.aspx

RETAIL & COMMERCIAL BUILDINGS

All retail and commercial buildings present some opportunity for energy efficiency improvements. Retail buildings represent approximately 13% of energy use in commercial buildings nationwide. Over 70% of these buildings have been built before 1980, many are past due for energy management upgrades.

BOTTOM LINE CONSIDERATIONS

A typical 50,000 square-foot retail building in the U.S spends around $90,000 each year on energy costs. Every dollar saved in energy efficiency can result in over ten dollars in incremental revenue.

http://apps1.eere.energy.gov/tribalenergy/pdfs/doe_eere_aerg_retail.pdf
http://bea.touchstoneenergy.com/sites/beabea/files/PDF/Sector/Retail.pdf

TYPES OF SUBMETERING

MEASUREMENT & VERIFICATION

Meters and sensors are installed in a facility to monitor the energy savings from energy retrofit projects on systems such as lighting and HVAC. The sensors are connected to a data acquisition servers (DAS) or building control system (BCS) and the run times or energy consumption are measured and compared to energy usage prior to the installation

HOW DOES IT WORK?

The owner and the energy management contractor must agree about the desire to measure and verify the energy savings - it is important to establish a "benchmark" for performance before changes are made. The M&V system may have to be in place and operational for several days or months in advance to establish a sound baseline for comparison. The key to ultimate success or failure of the M&V program is the ability to isolate the specific system being modified from the rest of the energy consuming equipment in the building.

WHY DOES IT MATTER?

You can't manage what you don't measure. If you don't know your facility's baseline energy consumption, there will be no way to measure the savings from an energy management program.

TENANT SUBMETERING

Tenant submetering is a broad term applied to the use of hardware and software to bill tenants in commercial facilities for their actual usage of energy. The goals of tenant submetering are to ensure that the owner recovers the cost of energy from tenants and to make sure that tenants with high energy usage are not subsidized by those with lower usage.

HOW DOES IT WORK?

The owner installs meters to monitor the consumption of electricity, gas, water and steam by individual tenants. These meters are connected to a DAS; the DAS gathers data from the meters on the same schedule as the utility supplying the building and then communicates this data to a local or remote database. The tenant is then billed at the end of the month at the same rate the building owner pays for the building as a whole and thus the owner recovers the cost of energy from each tenant.

WHY DOES IT MATTER?

Charge for what your tenants actually use while reducing consumption. Studies have shows that the implementation of a tenant billing program reduce energy consumption in multi-tenant buildings by between 15-35%.

DEMAND RESPONSE

Demand response programs offered by utilities provide commercial and industrial building owners with reduced electrical rates in exchange for an agreement to curtail energy use at the request of the utility. Typically, these requests come during periods of high load such as hot summer afternoons. Building owners or managers who have the ability to reduce loads by turning off equipment or using alternative sources of energy can see significant savings under these programs.

HOW DOES IT WORK?

The utility notifies the owner of a curtailment request (typically a day in advance) and it is up to the customer to voluntarily meet the requested load reduction. Options for the end user range from adjusting temperatures to shutting off lights to closing facilities to meet the requested reduction levels. The future of demand response is likely to contain more options for automatic, real-time reductions to load, triggered directly by the utility with little involvement of the owner.

WHY DOES IT MATTER?

Demand response was designed so that utility grid infrastructure would not have to keep up with the pace of rising energy consumption. Want cheaper utility rates? Enrolling in a DR program can help reduce energy costs by more than 10%.

ENERGY COST ALLOCATION

Cost allocation refers to the use of meters and data acquisition servers (DAS) to submeter and allocate energy usage by department or cost center with a campus or industrial facility. Allocating these costs provides accountability for energy use in campuses and allows businesses to accurate determine the cost of projects and services.

HOW DOES IT WORK?

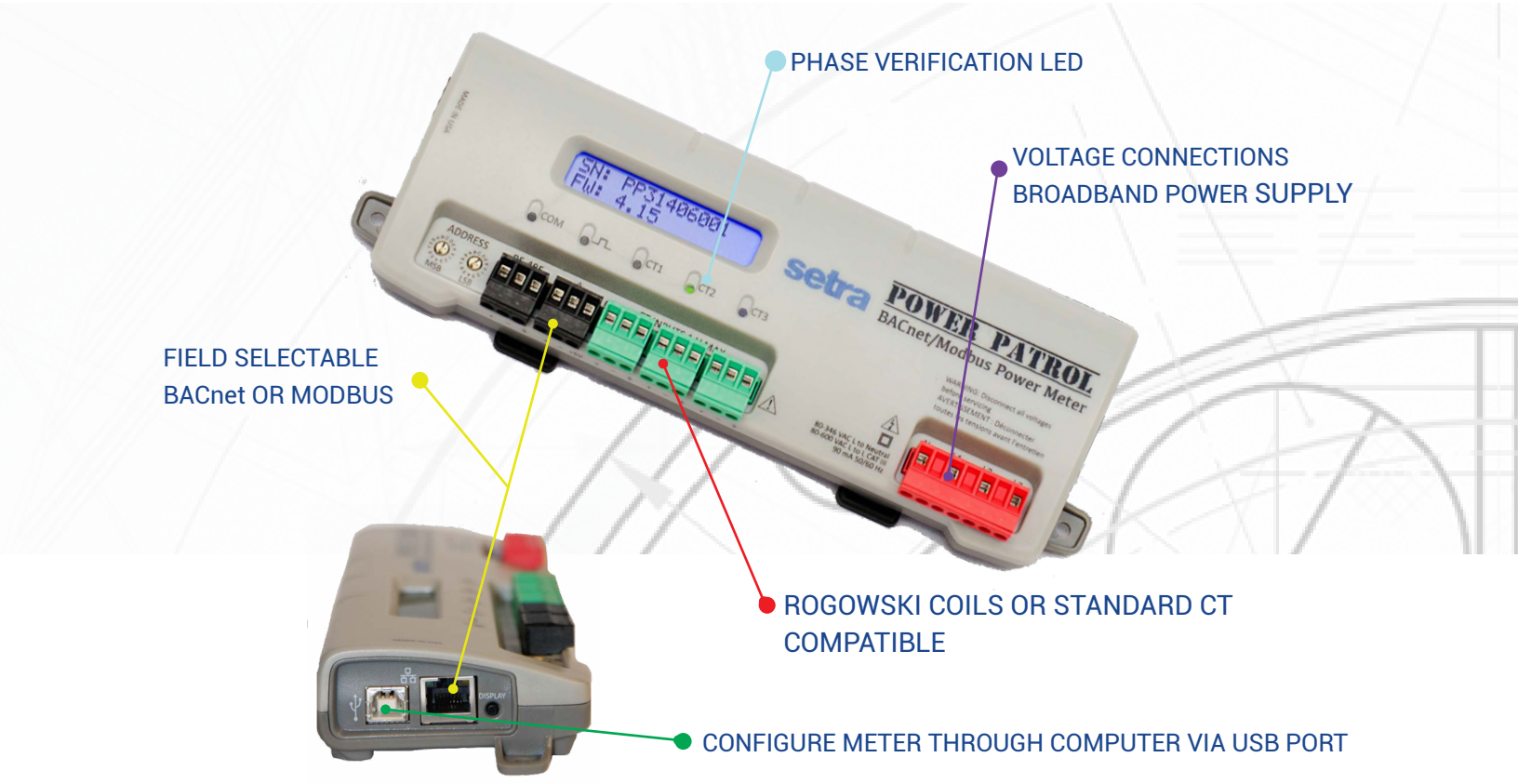
For each building or department, the facility manager installs the necessary sensors and meters to isolate and measure the energy used by that department. On a monthly basis, the data from the DAS is analyzed to produce a cost for energy assignable to the department. For most energy and facility managers, there are benefits and payback to investing in the hardware and software to submeter campuses or industrial facilities.

WHY DOES IT MATTER?

According to the USA Department of Environment estimates, 25% of energy is wasted in the U.S. If you don't know which parts of a facility are wasting the most energy, there is no way to be able to take effective action to reduce your utility bill.

MOST VERSATILE POWER METERS ON THE MARKET.

POWER PATROL
MONITORS 3 CIRCUITS



FIELD SELECTABLE CTS

The Power Patrol series works with either Rogowski Coil "flex" CTs or conventional split-core CTs. The ability to have inter-changeable CTs gives added flexibility for last minute changes at the job site. The Power Patrol series is embedded with the necessary amplifier/integrator circuitry for Rogowski Coil CTs - eliminating the need to provide external power.

Advantages:

- High Accuracy: ±0.5% FS
- Lightweight: <0.5 lbs.
- Best in Class Position Sensitivity

EASY USB CONFIGURATION

Using the Power Patrol series HeadStart software, power and configure the meter through your computer's UBS port. While other meter's require configuration in a live enclosure, the Power Patrol series can be easily configured outside of the panel, eliminating the risk of arc flash. HeadStart can save meter settings, allowing the installer to clone meter profiles quickly and easily.

Advantages:

- Quick Start-Up
- Clone Feature Settings
- Configure Anywhere

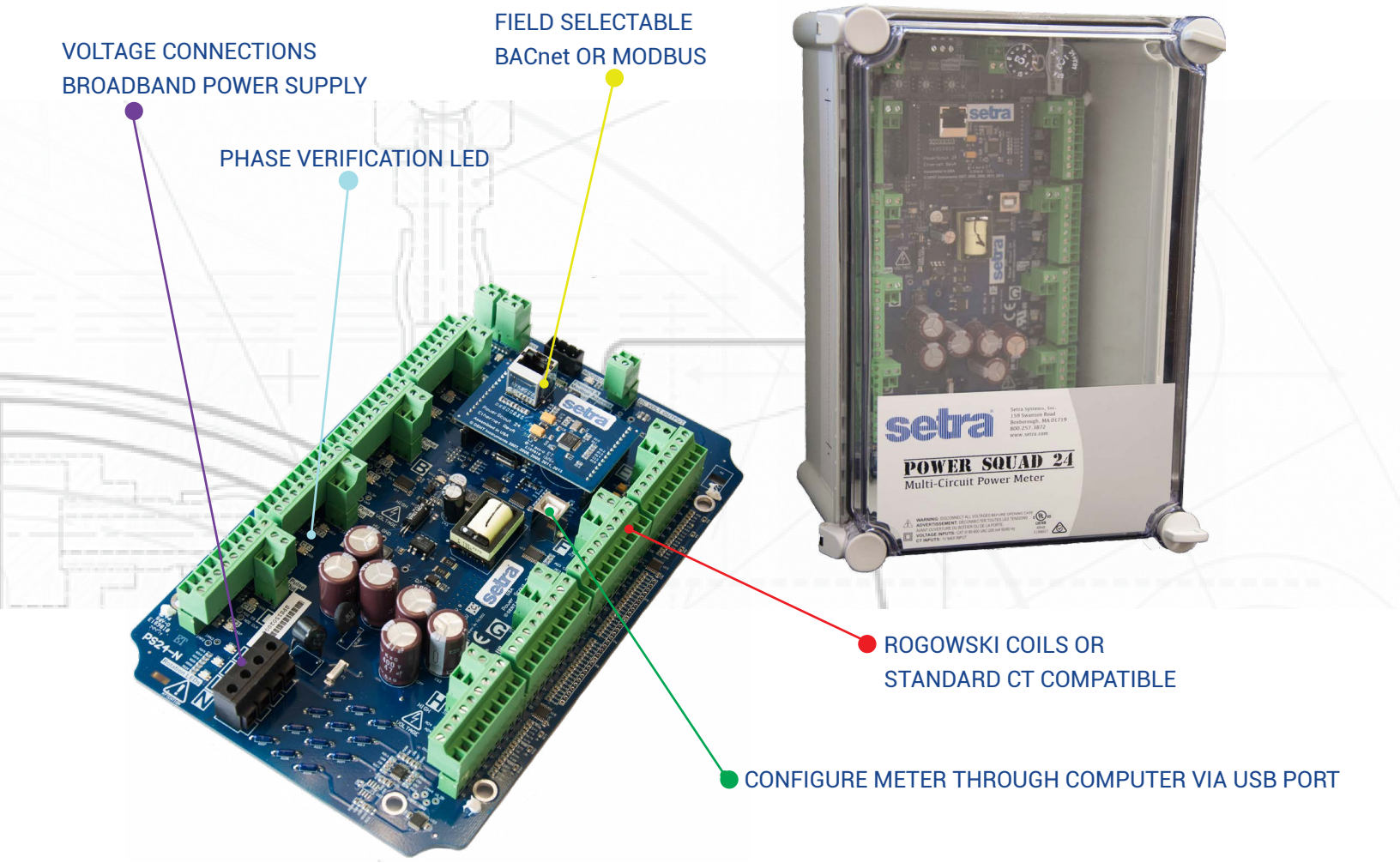
4-IN-1 COMMUNICATIONS

Unlike the competition which require costly expansion cards to carry multiple protocols, BACnet and Modbus are available with every unit giving the installer the flexibility to easily configure the unit anytime at no additional cost.

Advantages:

- Increased Flexibility
- Eliminate Ordering Mistakes
- BAS Compatible

POWER SQUAD 24
BRANCH CIRCUIT METER



BROADBAND LINE POWERED

The Power Patrol series instruments are line powered and do not require external power. Its power supply can accommodate service voltages ranging from 80-600V (phase-to-phase). This includes application where single phase, three phase WYE or three phase DELTA service is required.

Advantages:

- Self-Powered
- Reduce SKU's
- Increased Flexibility

PHASE VERIFICATION LED

Setra's Phase Verification LED's quickly and easily indicate to a user when the CTs have been improperly installed by simply activating a red or green LED light. In addition to eliminating installation errors and avoiding costly call backs to correct a faulty meter installation, the Phase Verification LEDs ensure that energy information is recorded correctly.

Advantages:

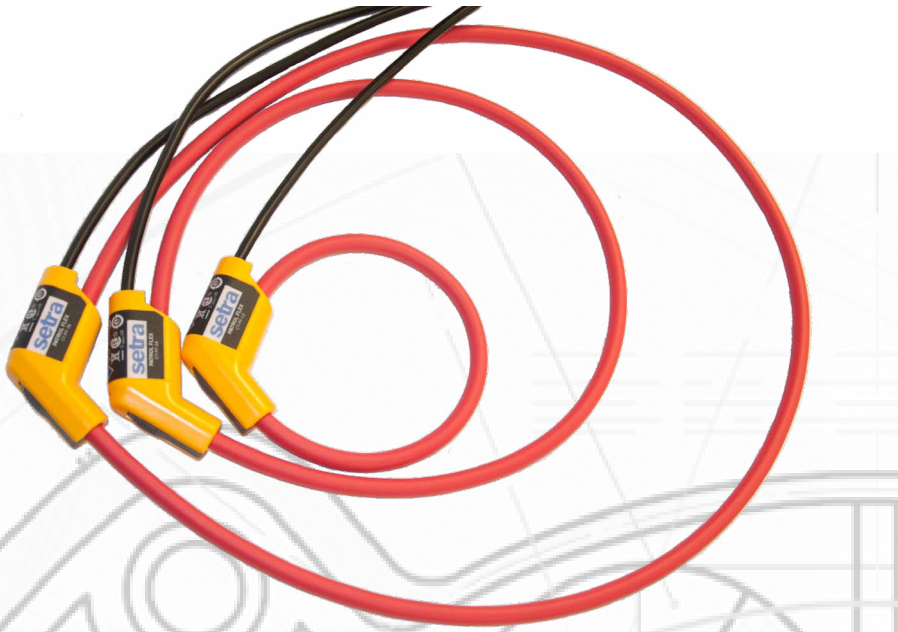
- Reduce Installation Time
- Avoid Call Backs
- Simple Pass/Fail Test

WORK SMARTER, NOT HARDER.

We know being called back to the job site can break that bank. That's why our line of power meters has 1 part number to our competitors 50+ part numbers.

SAVE TIME, SAVE MONEY, SIMPLIFY YOUR JOB.

GAIN FLEXIBILITY WITH ROGOWSKI COILS.



PATROL FLEX ROGOWSKI COIL

Offered in 12", 24" and 36" lengths, the Patrol Flex is the most accurate Rogowski Coil in submetering. Rogowski Coils offer significant installation advantages over split-core CTs because of their lightweight, wide current range, mechanical flexibility for mounting in tight quarters and easy placement around cable bundles and busbars. The Patrol Flex leads can be extended up to 300" without degrading the accuracy of the unit. The Patrol Flex is calibrated to better than 0.5% accuracy for use in revenue grade applications.

BEST IN CLASS LINEARITY

Conventional CTs are wound over a magnetic iron core, which makes them more susceptible to saturation leading to linearity error. Engineers and contractors must adjust the phase shift of the meter to compensate in order to achieve an accurate reading. Rogowski Coils are wound over a non-magnetic core, giving them perfect linearity and improved accuracy over wide current ranges.

Advantages:

- High Accuracy: ±0.5%FS
- Lightweight: <.5lbs
- Minimal Linearity Effect: ±0.2%

INSTALLATION SAVINGS

Installers can save significant time and labor using the Patrol flex due to its flexibility and ease of surrounding conductors of all sizes. Selecting a Rogowski Coil instead of a conventional split-core CT can save the installer over two hours per metering point in a challenging installation, which could be the different between making and losing money on a job.

Advantages:

- Easy Installation
- 3 Sizes (12", 24", 36")

WIDE CURRENT RANGE

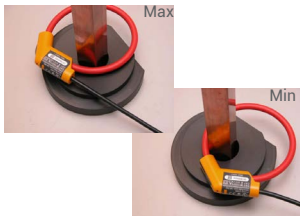
The Patrol Flex has a current range of 5-4000A and up, yet weights less than .5lbs, drastically reducing shipping costs. A typical 100A CT weighs 2lbs, however as the current range expands to 3000A, the average weight can increase from 2lbs to 20lbs. Considering three CTs are required to monitor a 3-phase motor, certain applications could require up to 65lbs or shipping weight per metering point; a serious waste of shipping dollars.

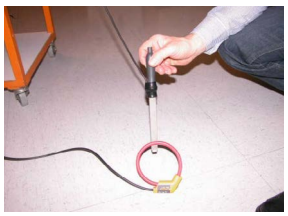
Advantages:

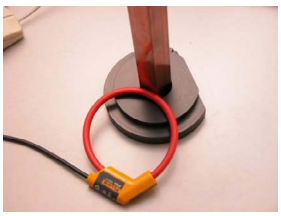
- Reduce Inventory
- Reduce Shipping Cost

LET US PROVE IT TO YOU.

Setra's performed lab studies to see how the Patrol Flex compares to the leading competition.







	Position Sensitivity	External Voltage Influence (w/ 15mm bus simulator & 100V/50Hz external voltage)	Impact on Cable from External Magnetic Field
SETRA	Max. Value: 1001.5A Min. Value: 998.5A	0.024mA	2.3A
LEADING COMPETITOR	Max. Value: 1005.A Min. Value: 990A	0.415mA	5A
RESULT	Setra <0.2 position influence, 5 times better than leading competitor	Setra is 17 times better than leading competitor	Setra is 2 times better than leading competitor

ROGO VS. CONVENTIONAL CT

Understanding specific job requirements, such as performance, installation, amperage load and environmental factors are critical to selecting the proper current transformer for an application. Conventional CTs do come with their limitations in that they are difficult to install and are lacking in performance and measurement range. Rogowski coils have significant advantages from installation, cost and performance standpoint.

Busbars and irregular shaped cable bundles are common in applications with high power requirements. Conventional CTs typically are not able to fit around the monitored conductor, leading to an exhausting and time consuming installation. The flexibility of Rogowski coils saves the installer a significant amount of time & physical exertion because of how easily they surround a conductor. Selecting a Rogowski coil over a conventional CT can save over two hours per metering point in a challenging installation, which could be the difference between making or losing money on a job.

A technical limitation of a conventional CT is the narrow range of current it can measure vs. the size of the CT; as the current range increases the size and weight of the CT required increases dramatically. Rogowski coils have a current range of 5-5,000A (depending on the max current rating of the meter), which means that any Rogowski coil can be installed in any application regardless of monitored amperage load.

Conventional CTs are wound over a magnetic iron core, which makes them more susceptible to saturation leading to linearity error. Rogowski coils are wound over a non-magnetic core, giving them perfect linearity and improved accuracy over wide current ranges, saving time on installation.

SETRA VS. THE COMPETITION

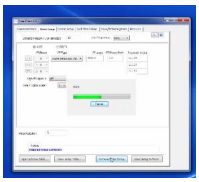
At Setra, the performance of our product is second to none, which is why we have no reason to exaggerate our product capabilities. By reading through various competitors technical specifications, it isn't always clear which product performs the best in specific applications; which is why we tested our product against two leading competitors.

Hardware	Rogowski Coil Compatible	✓	✓	—	The Setra Patrol Flex is the highest performance Rogowski Coil in the industry; offering better than 1% accuracy when connected to the Power Patrol
	Field Selectable Rogowski Coil/ Standard CT	✓	—	—	Flexibility to switch between Rogowski Coil and CT on the job; never get caught with the wrong hardware
	Broadband Power Supply	✓	✓	—	Every Power Patrol model has the ability to be powered off of 80-600 VAC; no need to manage different models
Communication Protocols	Ethernet	✓	—	✓	Ethernet connectivity allows the Power Patrol to communicate quickly over BACnet IP or Modbus TCP
	4-in-1	✓	—	—	The Power Patrol comes loaded with BACnet IP/Modbus TCP (ethernet) and BACnet MSTP/Modbus RTU (RS-485) offering the greatest field flexibility available today
Meter Config.	USB	✓	—	—	Avoid being forced to configure the meter in a live enclosure - the Power Patrol is powered and configured through a simple USB to PC connection
Meter Accuracy	ANSI 12.2	✓	✓	✓	Meets ANSI 12.2 Standards for Revenue Grade Requirements

WHICH POWER METER CAN SAVE YOU TIME & MONEY?

IS SETRA THE RIGHT SOLUTION FOR YOU?

With a variety of submeters available on the market, it can be difficult to know which meter is right for your specific application. Check out the Power Patrol versus two of the leading meter manufactures and see how it stacks up. If you value maximum versatility without sacrificing performance, then the Power Patrol is the right solution for you.



METER CONFIGURATION

1

Local configuration can take up to 3x longer than configuration with Head-Start software

MOUNTING METER

2

Power Patrol can mount directly in the switch-great - no need to create space for large enclosures

WIRING CT'S

3

Patrol Flex Rogowski Coils are thin and flexible to save time on challenging installations and do not require external power

VOLTAGE WIRING

4

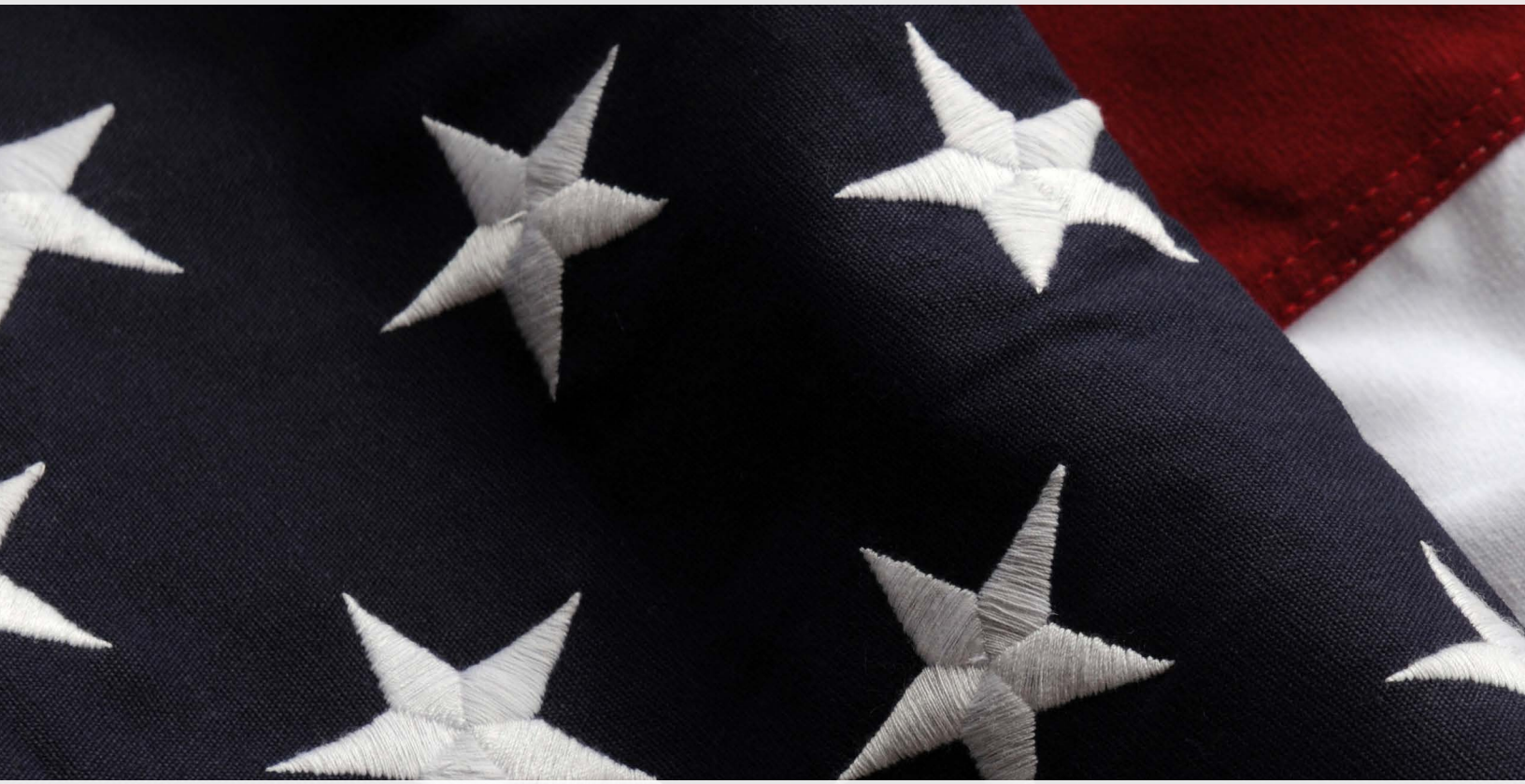
okay - so this is the one step Setra couldn't get any better at...but that's saying something, isn't it?

	Configuration	Mounting	Wiring CT	Voltage Wiring & Comms Protocols	Total Minutes*	Total Install Cost*
setra POWER PATROL 	3	5	4	15	27	$90
Competitor 1 Panel Mount 	10	25	25	15	75	$250
Competitor 2 Surface Mount 	15	40	25	15	95	$317

SAVE OVER 50% ON INSTALLATION

*Based on a $200/hr and an installation on a 2,000Amp service.

QUALITY IS BUILT IN.



Setra is an ISO 9001-2008 certified manufacturer with robust and mature processes at work to continually optimize team performance. From ideation and design, to validation and test, to volume production, quality is built in.

At each stage in Setra's production process there are built-in verifications to ensure that the products being supplied to our customers are of the highest quality. The Setra team has created numerous innovative manufacturing techniques and tools to catch, track and prevent future failures from occurring. Any newly discovered issues learned from the field, engineering labs, validation testing and even from the production line are reviewed on a regular basis and corrective actions are implemented quickly and efficiently to exceed our customers' expectations.

SAVE TIME, SAVE MONEY, SIMPLIFY YOUR JOB.

Not all meters are created equally. Setra's power meter is designed to streamline the entire experience from purchasing to installation and startup. Setra products get the job done safely and correctly.

Whether you need:

- High Accuracy Current Measurements
- 4-in-1 Communication Protocols
- Desktop Configuration
- Broadband Power Supply
- UL610 Rating
- Easy and Hassle-Free Installation
- Direct Application Support

SETRA HAS YOU COVERED.

To get started call 800-257-3872 or 978-263-1400.

Visit us at www.setra.com

Current wind turbines can power over 15 million homes.

http://blog.myfluenthome.com/look-future-fun-facts-renewable-energy/

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