

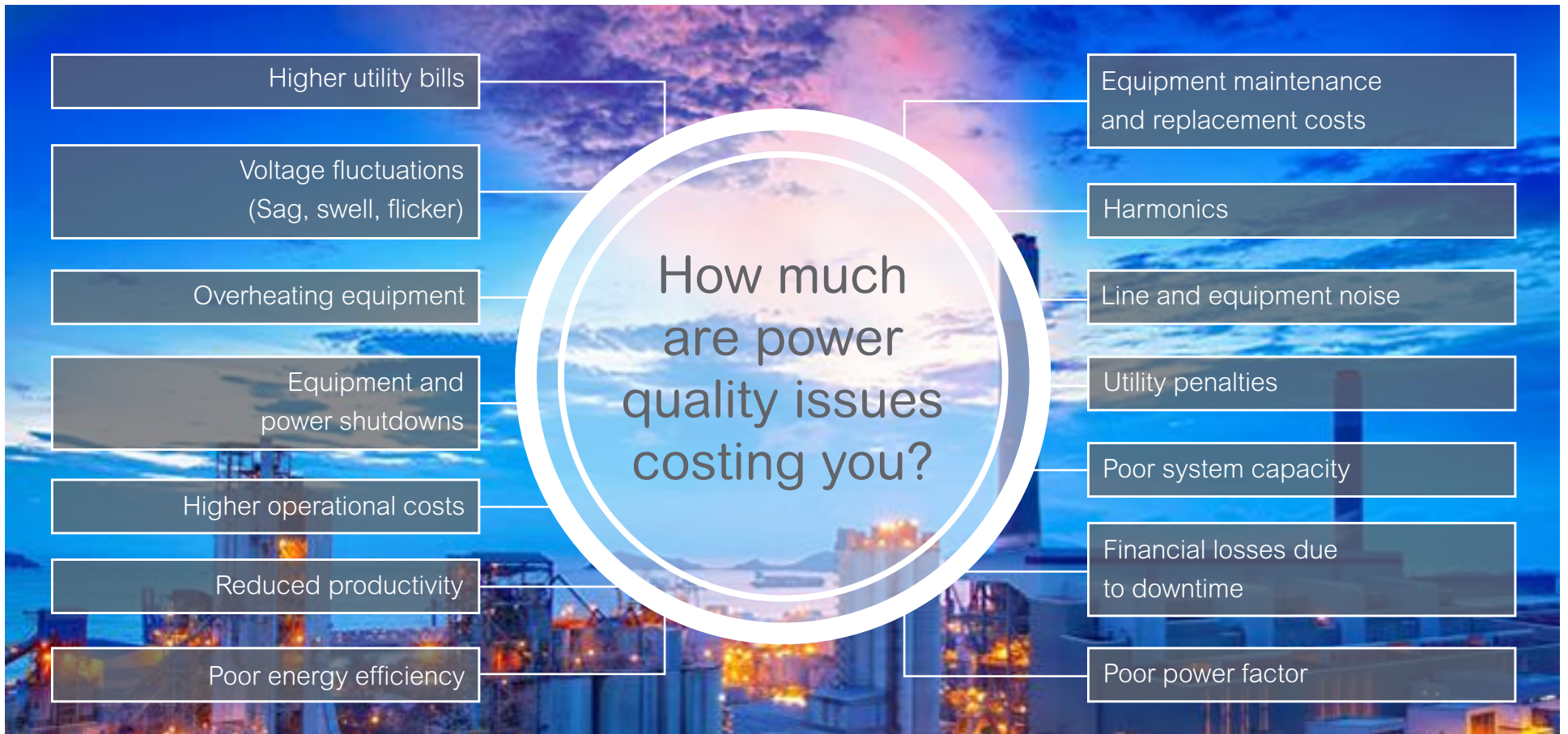
# Identifying Power Quality Issues and Implementing Solutions

Improve efficiency, boost productivity, and reduce costs

[schneider-electric.us/powerandenergy](https://schneider-electric.us/powerandenergy)

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 Electric



Power quality issues can affect multiple aspects of your business, with a long list of destructive and costly effects. You may be losing money and productivity without even being aware of it. Conversely, the benefits realized from power quality correction can be multifold and long lasting, improving your operations and your bottom line.

Don't let hidden power quality issues wreak havoc on your operations. Implementing power quality solutions is crucial to improving operations, boosting energy efficiency and productivity, and saving money.

Stop paying for power quality issues.

**30 – 40%**

The estimated percent of business downtime related to power quality problems.\*

\*J. Manson, R.Targosz, "European Power Quality Survey Report", Leonardo Energy, 2008

# Power Quality Solutions for Maximum Benefits

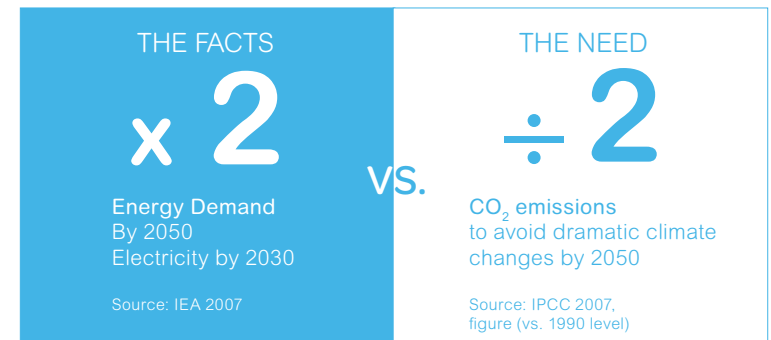
- Improve equipment and system reliability
- Minimize downtime and production losses
- Improve system capacity
- Reduce maintenance and equipment replacement
- Meet sustainability goals

- Lower utility costs
- Maximize energy efficiency
- Reduce operational costs
- Improve productivity
- Achieve standards compliance

Click on the market below to learn about issues and solutions tailored for your application.

**Power quality solutions** can help you increase energy efficiency while extending the life of your facilities and equipment, and reducing maintenance and operations costs.

The energy dilemma is here to stay





# Power Conditioning and Voltage Regulation

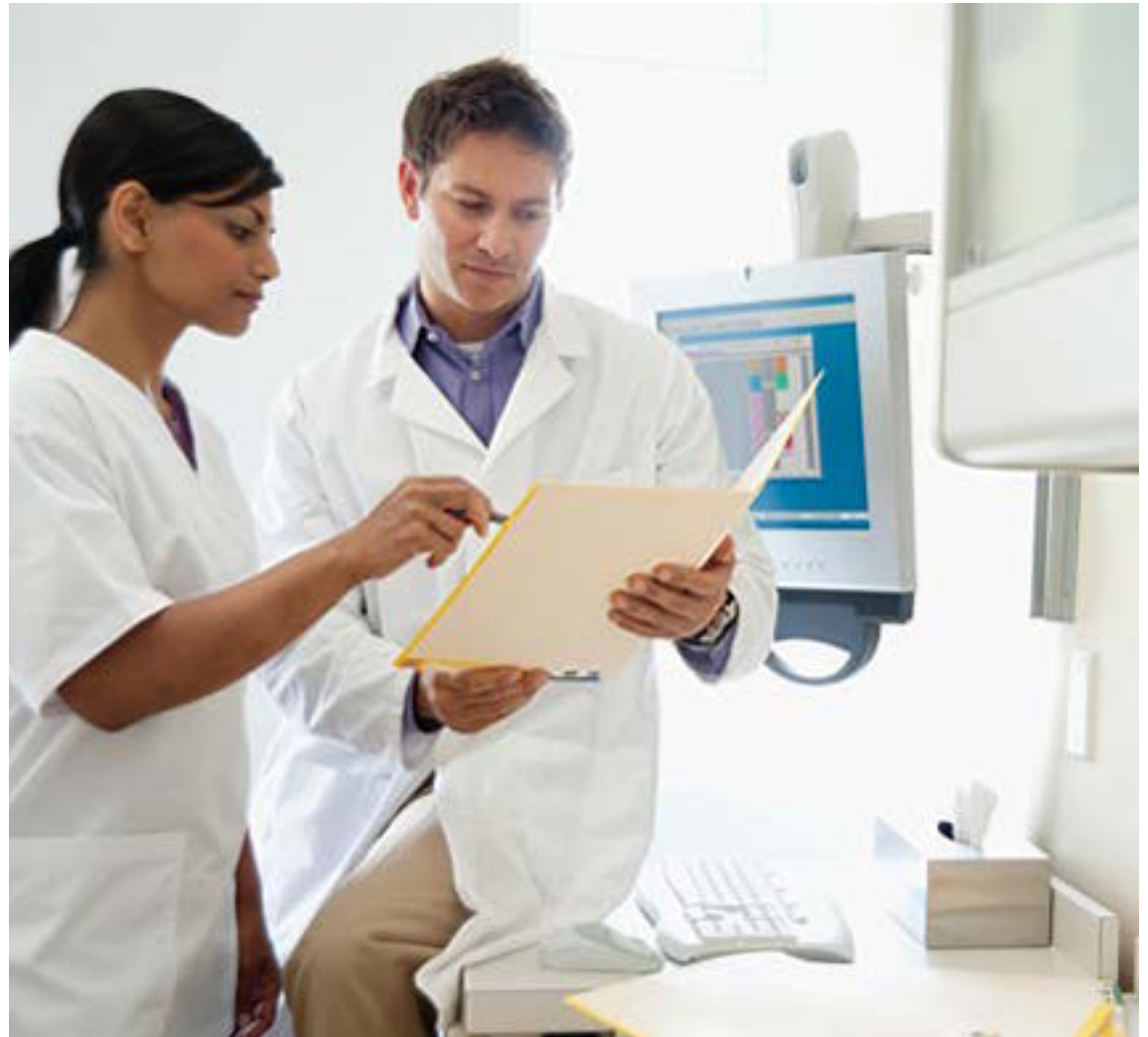
## The Issues and Applications

### The Issues

- Equipment glitches, sporadic operation
- Reliability issues
- Voltage sags, swells, flicker
- Shortened equipment lifespan
- High CO<sub>2</sub> emissions, poor energy efficiency

### Applications

- Healthcare
- Retail
- Data Center
- Hotels and Resorts



# Power Conditioning and Voltage Regulation

## The Solution

Install industrial-grade power conditioners and voltage regulators that are capable of mitigating all sags and swells within one cycle. Proven technology and advanced onboard intelligence means full power during brownouts without a UPS or diesel generator, better equipment protection, fewer motor failures, more uptime, and lower energy costs across a wide range of industries and applications.



### SureVolt™ Automatic Voltage Regulator

Provides continuous power conditioning and broad range of protection to guard against voltage fluctuations that can cause issues with your equipment and cost you money in damages and lost productivity. Delivers clean power, keeping you up and running with maximum efficiency. The SureVolt provides high overload capacity for loads with large inrush-current requirements. At the same time, it provides consistent voltage regulation and fast correction without regular maintenance or moving parts.



### SagFighter™ Active Voltage Conditioner

Protect critical production equipment against random voltage sags typically caused by transmission line disturbances or weather-related events. The SagFighter active voltage conditioner uses ultrafast correcting technology to ride through deep voltage sags common to both urban and remote industrial areas. Unlike computer-grade products or uninterruptible power supplies (UPS), the SagFighter is designed for frequent high-inrush current and low power factor loads without the need to oversize the product.



Learn how a hospital used SureVolt to keep critical equipment running smoothly!

# Power Factor Correction and Reactive Power Compensation

## The Issues and Applications

### The Issues

- Higher utility bills, low power factor
- Harmonic distortion
- Power glitches and reliability issues
- Power loss in transformers and conductors
- Flicker, voltage sag
- High CO<sub>2</sub> emissions, poor energy efficiency
- Nuisance breaker tripping
- Equipment overheating and reliability issues
- Generator faulting, AC motor winding and bearing destruction
- Cable insulation breakdown
- Random logic faults: CNC, PLCs, drives, UPSs, computers

### Applications

- Retail
- Commercial
- Hospitals/healthcare
- Hotels
- Small packaging facilities
- Small and medium industrial facilities
- Pumping stations



# Power Factor Correction and Reactive Power Compensation

## The Solution



### VarSet Standard Capacitor Banks

Compensating for reactive power and harmonic distortion with VarSet capacitor banks is an easy way to quickly maintain your facility's power factor at an ideal level for maximum system efficiency and cost reduction. Designed for easy installation, VarSet Standard has a small footprint, providing you with maximum power conditioning and reliability while saving valuable space. This range is available from 75 kVAR to 300 kVAR.

This range of wall-mounted, automatic capacitor banks helps to ensure that your power factor is corrected and your electrical network is delivering optimum power. Count on VarSet to help you improve energy efficiency and reduce utility bills.

Power factor correction helps lower operating and capital costs, providing quick ROI:

Reduce capital expenses by up to 30%.\*

Optimize electrical system capacity, avoid oversizing, and limit redundant capacity.

Reduce reactive energy billing penalties and lower operating expenses by up to 10%.\*

Boost power factor to lower utility bills and reduce losses in transformers and conductors.

Reduce energy losses by up to 30%.\*

Optimize power consumption, reduce total process energy consumption, and reduce CO<sub>2</sub> emissions.

Improve power system and equipment reliability by up to 18%.\*

Increase power quality to improve business performance and reduce unplanned outages, as well as enhance the reliability and service life of electrical devices, while reducing harmonics stress and potential damage to your electrical network.

**Up to 30%** better energy efficiency and lower electricity costs on your first day with VarSet

**Boost energy efficiency and productivity**

\*Performance reflects actual customer experience, your results may vary depending on your environment.

# Power Factor Correction and Reactive Power Compensation

## The Solution (cont.)



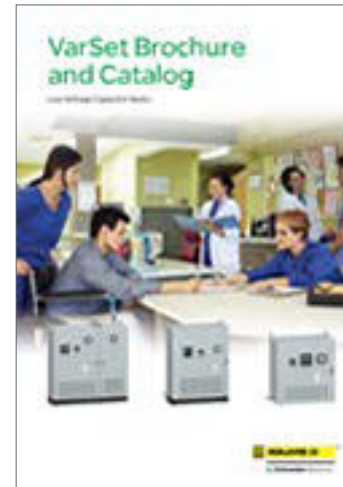
### VarSet Detuned Automatic Capacitor Banks

The detuned automatic power factor correction systems provide power factor correction in electrical distribution networks where moderate harmonic content exists. The series capacitor and reactor combination is tuned below the first dominant harmonic order (usually the 5th). This prevents resonance and harmonic amplification. Available from 75 kVAR to 800 kVAR. Other ratings available as special engineered to order products.



### VarSet Fast Capacitor Banks

VarSet Fast Capacitor Banks are suitable for nearly all electrical networks and are ideal to correct poor power factor in electrical networks with a high concentration of electronic loads. This system features quick response to load fluctuation and transient free switching and works well for sensitive networks. Available from 450 kVAR to 1200 kVAR. Other ratings available as special engineered to order products.



Email [powersolutions@schneider-electric.com](mailto:powersolutions@schneider-electric.com) for the VarSet brochure.



# Active Harmonic Filtering and Electronic VAR Control

## The Issues and Applications

### The Issues

- Nuisance breaker tripping/fuse clearing
- High harmonic content
- Hot distribution equipment and transformers
- Cable insulation breakdown
- Voltage fluctuation and flicker
- Equipment instability and reduced lifespan
- Vibrations and audible noise from electrical equipment
- Less available system capacity
- Increased downtime and lost productivity
- Poor quality of welded products due to flicker
- Generator faulting, AC motor winding and bearing destruction
- Noncompliance with IEEE1453 and IEEE 519-2014.

### Applications

- Data centers
- Pumping stations
- Office buildings, hotels
- Mills – refining, paper, steel, rubber, textile
- Semiconductor plants
- Automated factories
- Automotive
- Oil drilling and refineries
- Amusement parks and ski lifts
- Large industrial facilities
- Water/wastewater
- Wind and solar farms

**\$119 Billion–\$188 Billion**

Estimated amount of losses due to power quality phenomena in the U.S.\*



\*S. Bhattacharyya, S.Cobben, "Consequences of Poor Power quality – an Overview"

# Active Harmonic Filtering and Electronic VAR Control

## The Solution



AccuSine PCS+ and PFV+

### Reduce capital expenditures (CapEx)

- Provide opportunities for savings, especially on the cost of the electrical distribution
- Decrease the rms current value so that the size for busbars, cables, and transformers can be reduced
- Permit expansion without requiring additional distribution equipment

### Reduce operating expenses (OpEx)

- Contribute to reduced losses in switchgear, cables, and transformers – providing longer life and more effective use of capacity
- Decrease utility demand
- Reduce utility bills and eliminate utility penalty charges

### Improve electricity availability and business performance

- Increase reliability and service life
- Improve energy efficiency
- Provide optimization of electrical network
- Reduce risk of outages
- Increase productivity by eliminating downtime
- Increase product quality due to better process performance
- Extend equipment life, decrease equipment overheating
- Offer load balancing
- Increase generator performance and life
- Eliminate flicker and improve processes
- Maintain reactive current balance for renewable energy farms
- Improve system capacity
- Parallel connection allows for easy retrofit and installation of multiple units for large networks

**Harmonics can stress your electrical network and damage equipment.** AccuSine+ provides harmonic mitigation and reactive current correction to improve reliability, save money, and help you avoid downtime and lost productivity.

# Rapid Response Reactive Compensation and Power Correction

## The Issues and Applications

### The Issues

- Higher utility bills, low power factor
- Harmonic distortion
- Power glitches and reliability issues
- Poor product quality
- Decreased productivity
- Equipment damage and reliability issues
- Power loss in transformers and conductors
- Voltage sags and flicker
- High CO<sub>2</sub> emissions, poor energy efficiency

### Applications

- Industrial
- Welding applications
- Amusement parks
- Hoists and cranes
- Injection molding machines
- Ski lifts



# Rapid Response Reactive Compensation and Power Correction

## The Solution



### VarSet™ Hybrid System

VarSet Hybrid provides real-time power factor correction, voltage support, and harmonic suppression in networks with highly cyclical load profiles. The system mixes automatic banks of standard, or detuned capacitor banks and electronic VAR compensation to provide you with ultra rapid response and infinitely variable kVAR control never before seen in a power factor correction product. Specifically designed for the instantaneous support required by highly cyclical inductive loads, the VarSet Hybrid eliminates voltage sags and flicker while increasing system capacity, providing energy savings, and improving process and final product quality. It also provides current inrush support for applications such as large horsepower motor starting.

### The benefits:

- Increase productivity
- Improve product/process quality
- Lower utility bills
- Lower substation equipment and bussing cost
- Reduce repair and maintenance cost
- Increase system capacity
- Increase system reliability
- Proven energy savings
- Reduce operating costs



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Start correcting power quality issues today for improved efficiency and operations.

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