



Facility Cost Savings Plan from Cleaner Power

Rates will continue to rise!

- Facility costs continue to increase at rate of 8% YOY (based on parts & labor)
- Electric costs are expected to increase nationwide by no less than 5% YOY
 - Why?
 - Old power delivery system
 - infrastructure needs investment
 - cost more to deliver power to customer
 - Quality of power continues to degrade

Don't Be Scammed!

Beware of Companies and Manufacturers claiming “Miracle fixes” to lower electricity.

- There are no such thing as one black box fixes all problems

Facility Energy Savings comes from a well thought out strategy and through smart product purchases

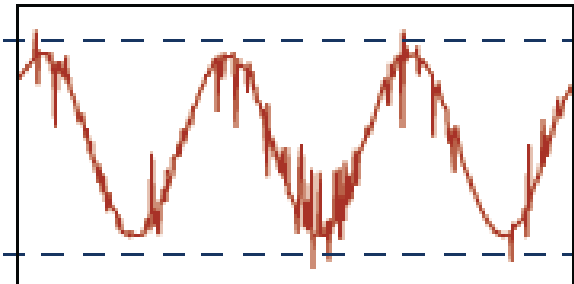
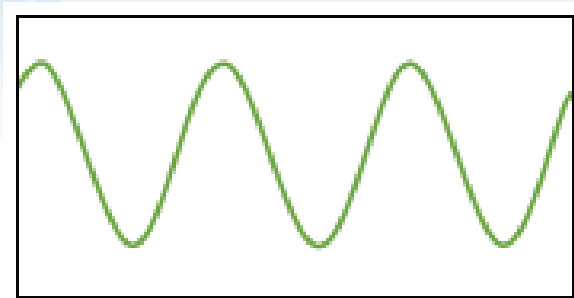
Typical Energy Saving's Product Solutions!

- **Electronic ballast vs Mechanical ballast - +35% savings**
 - This is #1 must do!
 - New technology has a Achilles' heel... it is very sensitive to transient surges and power noise – Maintenance Increases!
- **LED lighting will reduce electrical use even more!**
 - Again solid state devices are sensitive to surges and noise.
- **Higher energy rated motors**
 - Huge Savings for new motors in HVAC & Refrigeration.
 - Soft Starts installed in front of older motors
 - Variable Frequency Drive (VFD) Motors – Big Savings!
 - Power Factor Correction on Motors – expect no more than 8% savings on motor usage. ‘

Beware - Higher savings claims are A LIE!

Quality of Power is Decreasing

- Edison Power stated at the PQ Show 2008 in Baltimore – “Power Quality in the US will look like many 3rd world countries over the next 10 Years!”
- Like Europe, American Power Quality is now becoming the Facility Owners responsibility!



What does this mean to Facility Owners?

- Poor Power Quality attacks two key items on a facility budget
 - **Monthly Power Bill**
 - Dirty power causes inefficient power transfer to equipment – takes more power to do same job!
 - **Monthly Facility Electrical Maintenance**
 - Dirty power significantly reduces the life of all electrical and electronic products

Dirty Power Costs Facilities!

- Increased lighting repair costs /year
 - Electronic Ballast LED & HD Signage
 - Parking Lot Lighting
- Computer based product will have high power supply failures & computer data hang ups
 - Security Systems Computers Alarms
 - Xray equipment MRI 's Slot Machines
- Significantly increased HVAC & VFD's maintenance costs (controls & motors)

How can Facility Owners combat Increased Costs of Electrical / Electronic Equipment Failure?

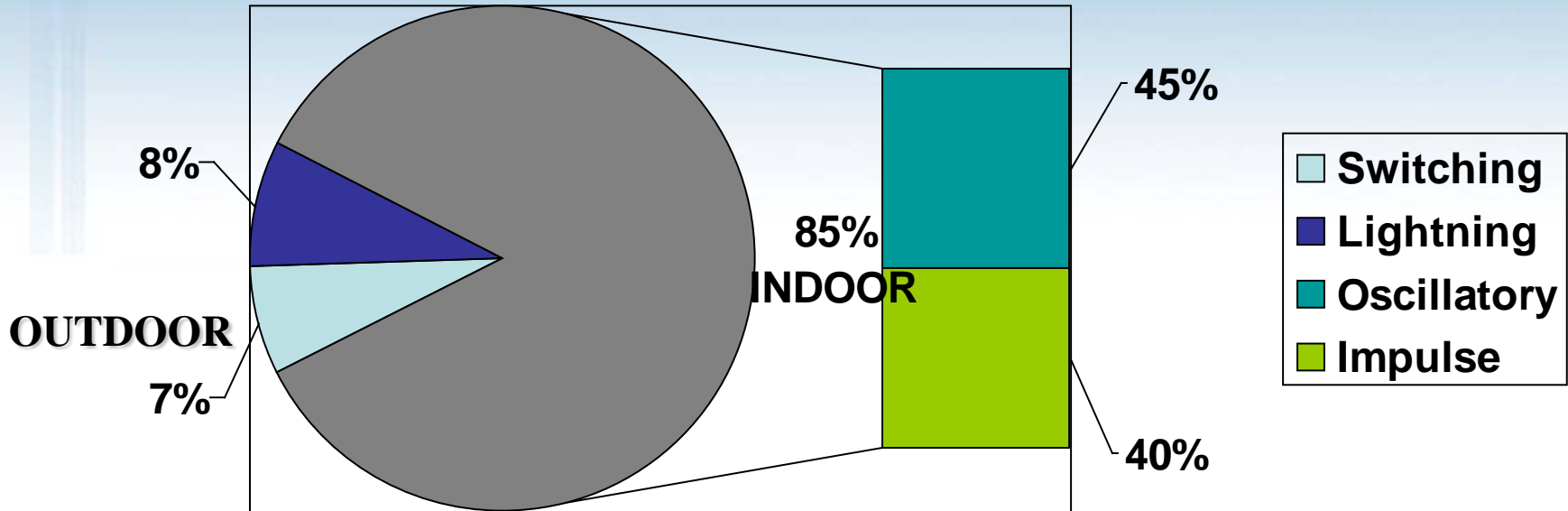
**“SIMPLE”
Cleaner Power!**

Power Quality

Power quality is a term used to describe electric power that motivates an electrical load and the load's ability to function properly with that electric power. Without quality power, an electrical device (or load) may malfunction, fail prematurely or not operate at all.

* *Wikipedia 2010*

Power Pollution Affecting Quality



* Source IBM 48 month PQ study

Most Managers worry about Lightning Surges, which is only 8% of the Power Events... 85% of all Power Pollution comes from INSIDE facility! Surge Protection is just not enough!

Electronics focus is on higher density circuits, smaller size, less power

277V - +/- 27V

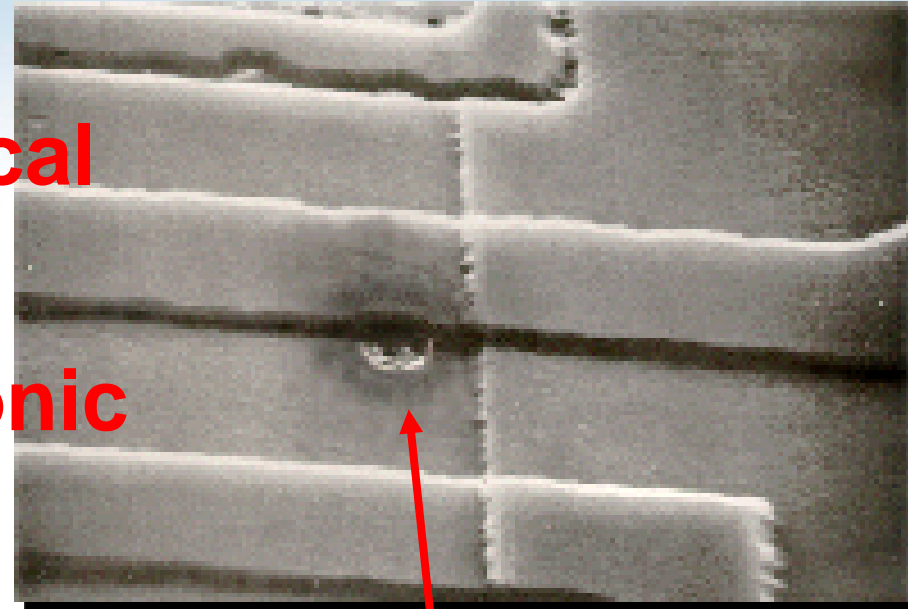
120V - +/- 12 V

12 V - +/- 1.2V

03 V - +/- 0.3V

Electrical

Electronic



The Smaller the operating voltage the more sensitive the circuit is!

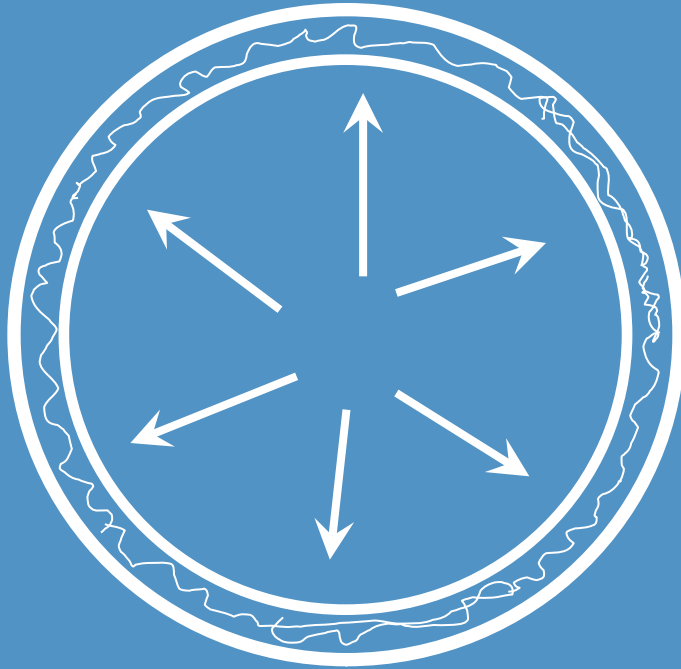
IC's extremely sensitive to noise and transients!

Noise = Dirty Power = Transients

- High Frequency Noise CANT go to ground so it's trapped in the facility.
- Interacting with ALL digital circuits (Adding and subtracting) until the "ringing" noise is large enough to damage electrical equipment
- These frequencies passes right through a standard MOV protector



MORE PROBLEMS!!!

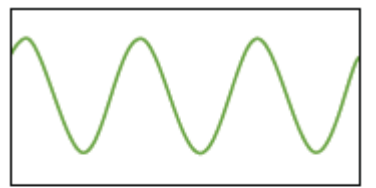


Skin Effect: is the tendency of high frequency noise to push A/C current towards the outside of any wire or conductor. - Crowding causes heat

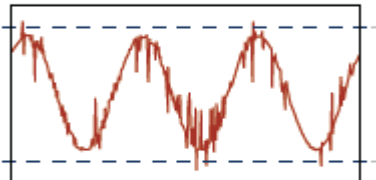
Proximity Effect: current flowing through one or more conductors can cause high impedance to the first conductor – High Impedance cause heat

Noise In Wires Causes HEAT !

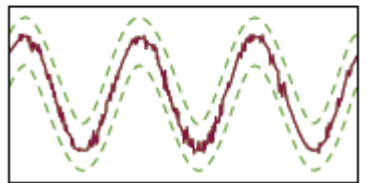
Cure For Power Pollution



Pure Power Is often sought but seldom found in the real world



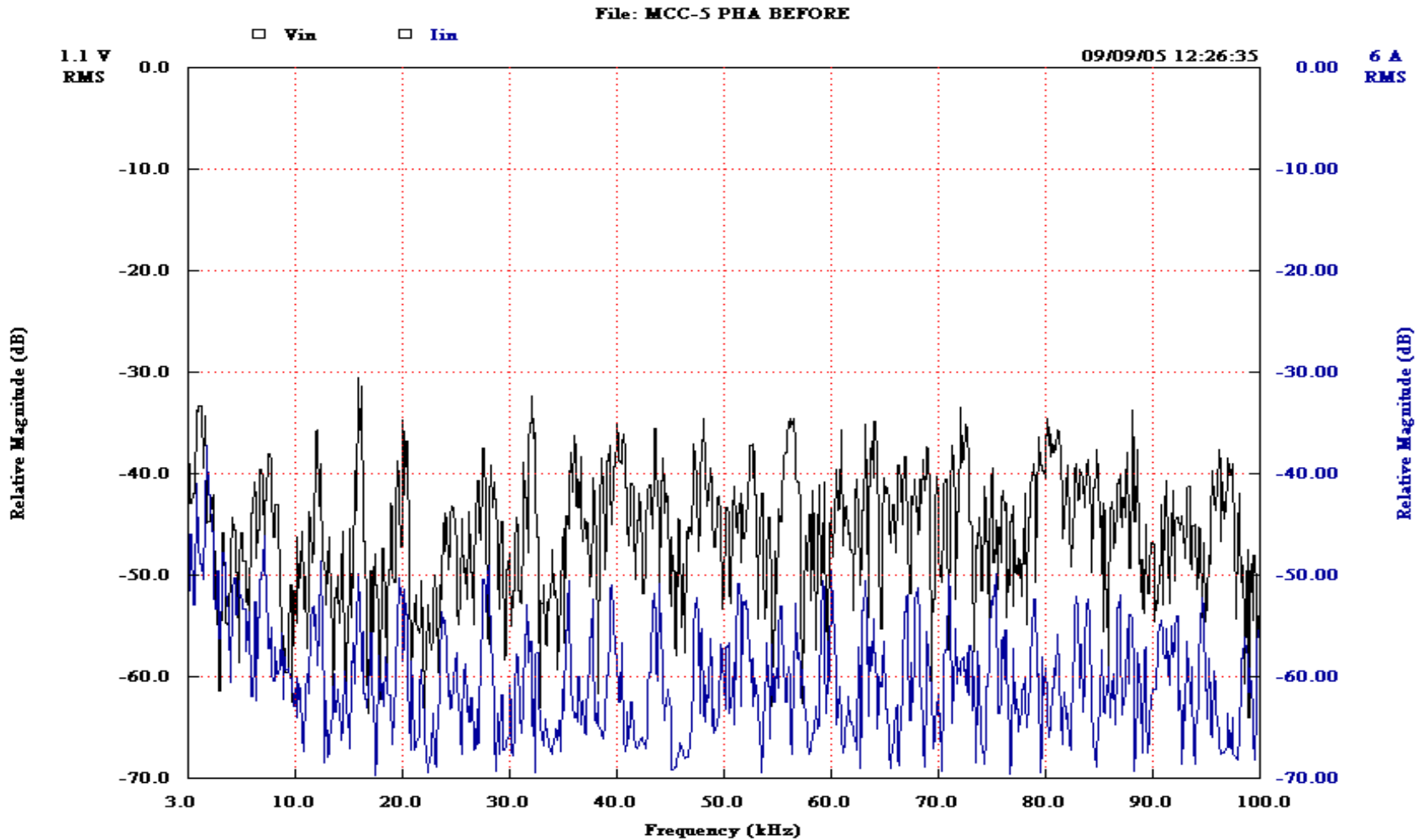
Real World Power continues to degrade until for some cities power will be so polluted, that it will start looking like power from a 3rd world country * Power Quality Show 2006



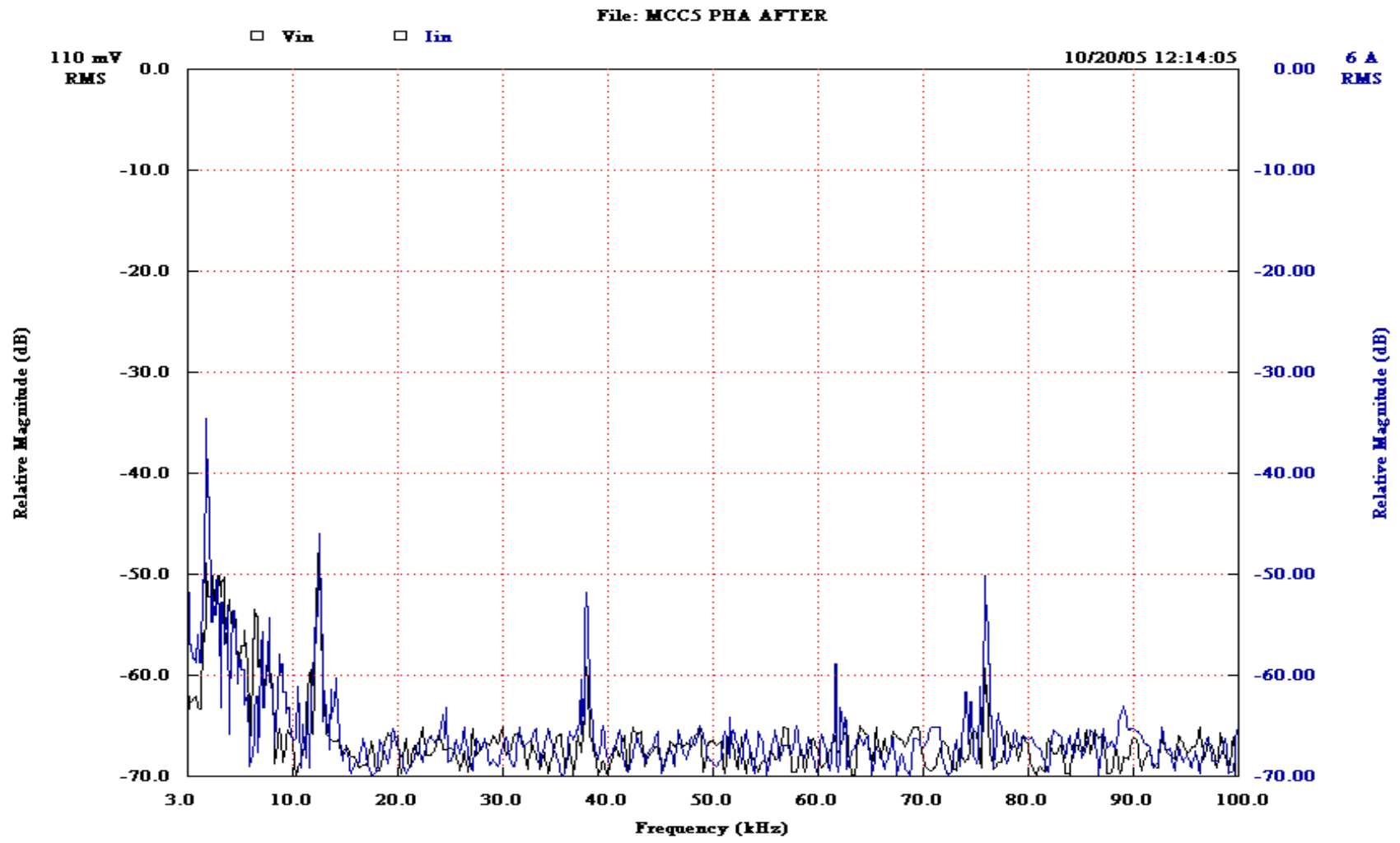
ACT System takes dirty power and **REMOVES NOISE** by filtering out any noise or transients **EVEN** below the clamp voltage of MOV's

Your Facility protection needs not only surge protection, but power filters to remove the damaging switching noise!

High Frequency Resonance Caused by a VFD



Facility Power after filters are installed



Facility Surge Protection Solutions



- **Primary High Frequency Filtered Surge Protectors** - best fit for both Primary protection like Switchgear and Motor controller panels (typically 80 – 160 kA)



- **POE High Frequency Filtered Surge Protectors** Filtered surge Protection products for critical down stream secondary power panels (typically 80 – 100 kA)

- **Light Pole Arrestors** – prevents surges from damaging light poles and bring surges in the back door

- **Security Camera Protectors**

Power Factor and Harmonic Mitigation

- **Power Factor Filters** are readily available for all types of facilities
- Improves power transfer to the motors
- Increase Efficiency = lower electric bill
- **Line Reactors** Lowers harmful Harmonics = Longer Motor and Transformer life.



ENERGY SAVINGS - PF Correction Can Reduce facility electrical Use by 3-8%

Case Study At Wal-Mart

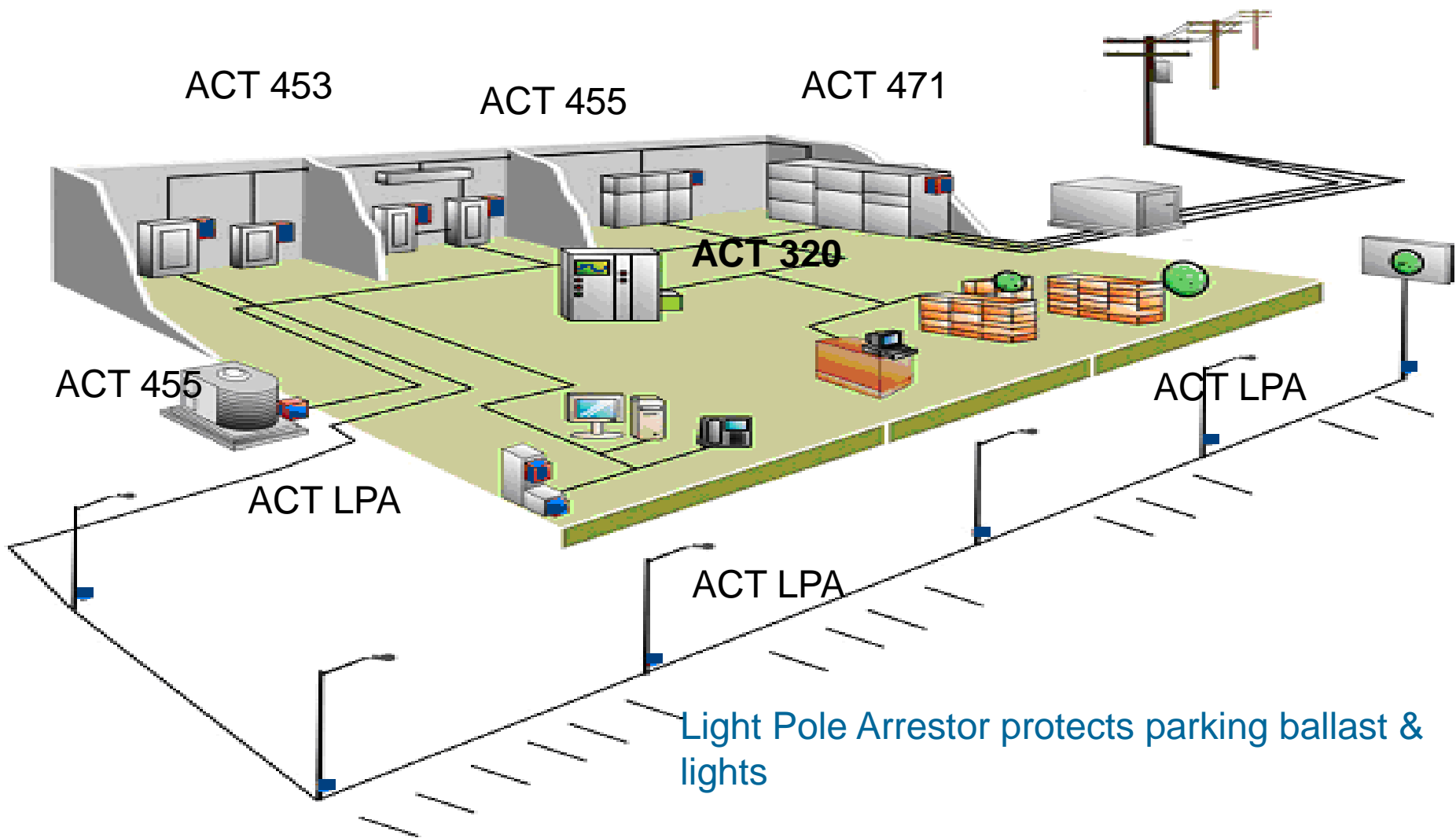
- Covered 7 States and 45 Locations
- Focus was on Lowering Lighting & Ballast Cost for Parts and Labor
- Last two years focus has included HVAC service calls



NOTE: EVERY FACILITY IS UNIQUE – A ROI MODEL SHOULD BE DONE FOR EACH FACILITY

Typical Wal-mart Facility Solution

Facility wide Power Filters and Surge protectors improve life of lighting, HVAC, Computers, all motors



Return on Investment Estimates For Wal-Mart

Typical Installed cost per store

Estimated Average Surge Protection cost per site	\$10,300
Estimated Labor by approved Lighting Electricians	<u>\$3,100</u>
Total per site	\$13,400

Return On Investment for Wal-Mart using 2004 – 2007 Data

Pompano Beach FL	-	2.1 months
Siloam Springs AR	-	5.5 months
Guntersville, AL	-	7.3 months
Mobile, AL	-	4.7 months
Houston, TX	-	4.1 months

**NOTE: EVERY FACILITY IS UNIQUE – BUT ROI WAS ALWAYS
LESS THAN 12 MONTHS**

Facility Strategy Needed For Energy & Facility Maintenance

- **Facility Evaluation**
 - A review of the 1 lines will tell where your facility risks are
 - A Frequency & PQ audit is recommended as the minimum for developing a facility baseline. We can recommend Power Quality Testing companies
 - Test Power Factor of existing motors
- **Recommended Facility Solutions May Include**
 - Adding power filter / protectors on Mains, VFD & HVAC, Lighting Panels, Parking lot poles – can reduce electrical maintenance by 70%
 - Adding Power Factor Filters to all motors (savings up to 8%)
 - Evaluating and installing Energy Efficient lighting products
 - Evaluating and installing VFD on Motors

Suggested Next Steps

Pilot Identification

- Identify a Facility Test Site
- If possible, the past two years facility cost data to use as a maintenance cost base line – this allows a more accurate ROI model for customer.

ROI calculations

- Baseline is prior two years of routine lighting maintenance divided by two.
- Maintenance reduction should be significant (especially for months March – November)
- ACT can help you work with your customers to develop a ROI model

Pilot Process

- Install ACT Filter / Protection System for full facility strategy
- Measure results monthly – immediately see savings – Project will SELF FUND other facility projects because return is usually 12 months or less.

Review

- Every Facility has an opportunity to save money with their Electrical Bill.
 - Electronic Ballast & New LED Lighting
 - Soft Start and VFD Controlers for your motors
 - Light Sensors in the room
 - **NEGATIVE** – Electronic Devices **MUST** have clean power
- Every Facility has an opportunity to save money in their Electrical Maintenance Budget. (Typically 70%)
 - Parking Lot Lighting should have Light Pole Arrestors
 - Facility Mains should have full facility protectors with power filters
 - Lighting Panels should have small protectors with power filters

Questions?

Ron Glaser's BIO

Received his BS in Engineering from SE Oklahoma University, and his Masters of Business Degree from City University in Seattle Washington.

He has been issued 6 power quality patents with over 120 unique claims and has been the Product Manager and Director of Engineering for Power Quality teams for companies like GE, Thomas & Betts, Joslyn and Current Technology. His 25 years of experience has allowed him to be guest speaker at 7x24, Power Quality Shows and write trade articles for EC&M, Construction News, Electrical Contractor and Casino Enterprise Management Magazine.



Ron is currently President of Phase Services which provides Facility Engineering services that includes: Energy Savings Audits, Ground Audits, Power Quality Audits, Thermal and Thermography Audits, Harmonic Studies, and 3rd party certifications.

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