

ACCENTZ, INC.

ECM Stories: When Energy-Saving Projects Create Unexpected Problems

Real-world examples of how power quality can affect

- Lighting,
- HVAC systems,
- VFDs, and motors

Energy conservation measures can reduce equipment-level energy use, but they can also change the electrical environment.

When power quality is not measured, facilities may experience new operational problems, higher losses, and maintenance costs that erode expected savings.

1. The Lighting Story

A simple upgrade becomes a recurring maintenance problem.

A facility manager proudly shared that the building had recently been upgraded to LED lighting to reduce energy use. Soon afterward, however, the maintenance team began receiving repeated complaints about flickering lights in several areas.

The team inspected the wiring, replaced fixtures, and contacted the manufacturer. On the surface, everything appeared to be installed and operating correctly.

The real problem was not the lighting equipment itself. The LED drivers were reacting to harmonic distortion in the electrical system.

More occupant complaints

Additional troubleshooting and labor hours

Repeated fixture replacement without correcting the root cause

Instead of simply reducing energy and maintenance, the retrofit introduced a new question: If the equipment is technically working, why does the system still not feel right?

This is often how power quality first appears - through symptoms that do not initially look like electrical problems.

2. The HVAC Story

Electrical inefficiency becomes an invisible cooling load.

During peak summer conditions, a facility's chillers and air-handling systems were operating at full capacity.

Operators began noticing motors running hotter than normal, occasional breaker trips, and utility bills that were higher than expected.

The maintenance team checked filters, belts, airflow, and control settings. Everything appeared normal.

The underlying issue was distorted current created by VFDs and other nonlinear loads. That distortion increased electrical losses throughout the system.

Higher I^2R losses in conductors and equipment

Additional heat in motors and transformers

Greater cooling demand to remove heat created by electrical inefficiency

The HVAC system was no longer cooling only the building. It was also cooling the heat produced by avoidable electrical losses.

That cost may not be visible on a work order, but the facility still pays for it through energy use, equipment stress, and reduced system capacity.

3. The VFD Story

A component-level efficiency measure creates system-wide effects.

Variable frequency drives are now common in modern facilities because they provide motor control and can reduce energy use under partial-load conditions.

One maintenance supervisor explained that, after installing VFDs, the facility began experiencing more electrical problems than before: nuisance tripping, sensitive equipment behaving unpredictably, and transformers operating at higher temperatures.

The VFDs themselves were functioning properly. The problem was the harmonic current they were injecting back into the electrical network.

5th, 7th, 11th, and higher-order harmonics circulating through the system

Increased stress on transformers, conductors, and sensitive electronics

Electrical disturbances affecting equipment connected elsewhere on the same network

The VFDs were doing their intended job at the motor, but their electrical impact extended far beyond the equipment they controlled.

Power quality problems rarely remain local. Once introduced, they can propagate throughout the electrical system.

4. The Motor Story

Repeated mechanical repairs fail to solve an electrical problem.

A plant had a motor that failed every 12 to 18 months. The maintenance team replaced bearings, checked alignment, reviewed loading, and eventually replaced the motor itself. The same failure pattern continued.

When the electrical system was finally measured, the team found several contributing conditions:

Voltage imbalance

Harmonic distortion

Poor power factor

Excess internal heating and insulation stress

The motor was not failing because of one isolated mechanical defect. It was being exposed continuously to electrical stress, and the resulting heat was shortening its insulation life.

Without power quality measurements, facilities often continue repairing symptoms instead of identifying and correcting the underlying cause.

The Common Thread

- Different symptoms.
- Different equipment.

The same underlying issue:

- Power quality.

In many facilities, power quality is not continuously measured, monitored, or fully understood.

As a result, energy conservation measures may achieve their intended equipment-level function while also creating electrical losses, operational instability, or accelerated equipment aging elsewhere in the system.

Why These Stories Matter

They reflect common field frustrations that facility teams immediately recognize.

They explain operational consequences before introducing technical theory.

They create a natural path from symptoms to causes, impacts, measurement, and remedies.

They reinforce the need to evaluate system-level performance - not only equipment-level efficiency.

A successful ECM should reduce energy use without creating hidden electrical losses, reliability problems, or new maintenance burdens.