Problem Description:
Because power quality issues are difficult to pinpoint, clients often reach the wrong conclusions about their power issues. That often leads to expensive solutions that don’t actually correct the underlying problem.

In one example, a facility hired a consultant to complete a site planning assessment survey for a proposed new server room. The server room was intended to minimize performance risks and reduce reliability problems.

Measurements taken
As always, the consultant started by collecting baseline readings. Connecting the Fluke 434 to the secondary side of the transformer, he checked the View Config screen (Fig. 1) diagram to verify proper connections. Switching to the phase view, (Fig. 2 & 3) the consultant checked polarity and voltage levels. The voltage and current phase arrows were too far apart for normal operations. Something was wrong with the power factor.
Analysis

Power factor compares the real power (watts) required to the apparent power (Volts-Amps) being consumed. A completely efficient system would have a power factor of 1.0. However, in this facility, inductive loads including motors, transformers, and high-intensity lighting were consuming significant reactive nonworking power in addition to real power. That was causing a low power factor.

And since utilities start charging higher fees for power factors less than .95, this facility was getting higher power bills in addition to the voltage drops and overheating issues.

Conclusion:

Based on the information gathered with the Fluke 434, the consultant recommended a capacitor bank to correct the low power factor. By counter-acting the reactive power of the inductive loads, the capacitors reduced the power factor discrepancy, increasing overall electrical system capacity and eliminating both the performance issues and the excess utility fees.