

INSIGHT

How MPTS Can Support Building Operations

Technical and financial perspectives on power management and power quality

Article purpose. This article explains how the MPTS Power Management Controls System may help facility teams understand and manage electrical conditions, and how to evaluate its financial value. The central point is practical: a power-management system creates value when it improves measured operating conditions and those improvements matter under the facility's actual operating requirements and utility tariff. Results must be established at each site.

Why electrical performance matters to operations

Building teams often focus on the equipment that uses electricity—motors, drives, lighting, HVAC, production lines, and information technology. The distribution network that supplies those loads also affects operating capacity, voltage conditions, heat losses, power-factor charges, and the quality of the data available to diagnose problems. DOE guidance identifies low power factor, voltage unbalance, over- or undervoltage, undersized conductors, leakage to ground, and poor connections among conditions that can contribute to in-plant distribution losses. The actual opportunity varies by facility and should be found through measurement and electrical inspection [1].

MPTS is intended to give operators a continuous view of selected electrical quantities and to apply dynamic correction at the point where it is installed. In the ACCENTZ product description, the system measures voltage, current, real power (kW), apparent power (kVA), reactive power (kVAR), power factor, and voltage and current total harmonic distortion (THD). It also provides local and remote monitoring, alarms, and building-management-system connectivity. These capabilities can help operations staff move from a monthly-bill-only view toward interval data and equipment-level investigation.

The technical connection between power quality and operations

Power factor, current, and available capacity

For a given real-power load, poor power factor generally means the electrical system must carry more current to supply the same useful kW. Higher current can increase resistive losses in conductors and transformers (which rise approximately with the square of current for a fixed resistance), increase voltage drop, and use more of the ampacity of upstream equipment. Reactive power and apparent power therefore matter to facility operations even when the building's useful kW demand does not change. DOE and major electrical manufacturers describe these relationships and note that utility tariffs may charge for power factor, kVA demand, or kVAR demand [2–4].

When MPTS improves power factor at its measurement boundary, the operator can check whether current, kVA, voltage profile, and any tariff-based power-factor charges changed under comparable load conditions. Lower current can release capacity on the conductors and transformers upstream of the correction point. That capacity is a planning benefit, not an automatic authorization to add load: engineers still need to check equipment ratings, protection coordination, conductor temperature, voltage drop, and applicable electrical codes before relying on it.

Harmonics and nonlinear loads

Variable-frequency drives, power supplies, LED drivers, UPS equipment, and other electronic loads can draw nonsinusoidal current. Harmonic currents can contribute to heating, affect neutral conductors and transformers, and complicate protection or equipment operation. The correct response depends on the source, network impedance, loading, and where the distortion is measured. IEEE 519-2022 establishes harmonic-control goals and steady-state voltage and current distortion limits at the point of common coupling (PCC); it is a system-design and interface reference, not a claim that every panel must meet the same limit or that any one device guarantees compliance [5]. IEEE 1459-2025 provides definitions and measurement methods for electric-power quantities under sinusoidal, nonsinusoidal, balanced, and unbalanced conditions [6].

MPTS monitoring can help operators compare current and voltage THD, load, and operating state before and after installation. A lower current-THD reading is not by itself proof of lower facility energy use, improved voltage distortion everywhere, or compliance at the PCC. Measurements should use appropriately rated instruments, consistent locations, intervals, and loading conditions; harmonic studies may be needed where the network is complex or equipment risk is material. Siemens' technical material likewise treats harmonics as a system issue requiring identification of sources and selection of suitable control methods [7,8].

Dynamic response and operating visibility

ACCENTZ describes MPTS as a passive parallel dynamic RLC system with an approximately 3-millisecond response. Those are product-description claims and should be confirmed for the specific model, test method, and installation. If validated at a site, fast response may help the control system follow changing electrical loads; however, it does not replace the need for protection, correct system design, or analysis of transient and harmonic behavior.

The monitoring layer may be just as useful as the correction function. Trend data and alarms can help staff identify when electrical conditions change, correlate those changes with production or HVAC schedules, and prioritize troubleshooting. Remote browser access and BMS connectivity can also make readings visible to facility teams without requiring every inspection to start at the electrical room. Monitoring supports diagnosis; it does not independently establish the cause of a fault or prevent equipment failure.

What building operators can track

Measure	Operational question	Possible financial pathway
kW / interval demand	Did the billed peak or facility peak change during comparable operating periods?	Demand-charge reduction only if the tariff and billing peak reflect the change.
kVA, kVAR, power factor	Did apparent/reactive demand or a power-factor adjustment improve?	Avoided tariff charges; possible capacity planning benefit.
Current and voltage	Did current or voltage drop change at the monitored point under similar load?	Potential reduction in upstream I ² R loss; capacity or maintenance value requires engineering confirmation.
Current and voltage THD	Did waveform distortion change at the measurement location and PCC?	Potentially fewer PQ-related service events; quantify from documented events and costs.
Run hours / operating state	Were readings captured across normal schedules and load changes?	Improves confidence in savings calculations and helps target maintenance.

The table identifies pathways to investigate, not guaranteed savings. Several effects may overlap, so avoid adding estimates for energy, demand, capacity, and reliability when they describe the same underlying change.

The financial case

The financial case for MPTS should separate bill savings from operating and capacity value. This avoids presenting engineering indicators as cash savings before they are reflected in a tariff or supported by facility records.

Utility charges. Review the actual rate schedule and bills for kW demand, kVA demand, kVAR charges, power-factor adjustments, and time-of-use rates. Savings are possible only when a measured change affects a billed quantity or charge. Tariffs vary by utility and customer class [3,4].

Electrical energy. A reduction in current can reduce resistive losses in the affected portion of the network, but that does not mean the useful loads automatically consume fewer kWh. Separate any measured reduction in equipment energy from estimated reductions in distribution losses, and use a defined measurement boundary.

Capacity and deferred work. If measured kVA or current falls, the facility may have more headroom on an existing feeder or transformer. A deferral value is credible only when a planned upgrade, its cost, timing, and engineering constraints are documented.

Maintenance and reliability. If PQ-related nuisance trips, overheating, or service calls are a documented problem, track event frequency, labor, replacement parts, production interruptions, and lost output before and after. Attribute avoided costs only when the event record supports the connection.

Investment return. Use total installed cost, metering/commissioning costs, annual verified bill savings, and any separately substantiated maintenance or capacity benefit. Simple payback = net installed cost ÷

annual verified savings. Report the assumptions and confidence range; do not count unverified benefits as guaranteed savings.

A defensible measurement and verification plan

A fair evaluation compares the same electrical boundary before and after installation and accounts for changes in production, occupancy, weather, equipment schedules, and utility rates when relevant. The Department of Energy's Federal Energy Management Program describes IPMVP Option B as a retrofit-isolation approach that measures all relevant parameters; continuous monitoring can provide operational data and improve the accuracy of savings calculations when the affected system and variables can be isolated [9]. EVO emphasizes that savings are calculated from measured before-and-after use or demand with suitable adjustments, because savings themselves are not directly metered [10].

1. Define the boundary. Identify the equipment, feeders, meters, and loads MPTS is expected to affect. Document any other changes made during the test.

2. Establish a baseline. Record interval kW/kVA, kVAR, power factor, voltage/current, THD, load or production indicators, and the applicable utility billing determinants over representative operating conditions.

3. Install and validate. Document configuration, CT orientation and location, meter setup, commissioning, protection coordination, and the measurement instrument's accuracy and interval.

4. Compare equivalent periods. Use the same measurement points and comparable load conditions. Adjust for operating changes and separate device performance from unrelated changes in facility operation.

5. Convert only supported changes to dollars. Apply the current tariff to measured bill determinants. Keep estimated line-loss reduction, avoided maintenance, and deferred-capacity value in separate categories until verified.

6. Review ongoing performance. Set operating thresholds and review intervals; investigate when readings drift or alarms occur. Confirm that the correction remains appropriate as loads change.

Standards and limits of the evidence

IEC 60364-8-81:2026 is the current IEC group energy-efficiency publication for low-voltage electrical installations. It provides an installation-level framework for energy efficiency; it does not endorse MPTS or prescribe a particular product [11]. IEEE 519-2022 addresses harmonic-control goals at the PCC, while IEEE 1459-2025 standardizes definitions and measurements for electric-power quantities across distorted and unbalanced conditions [5,6]. These standards help define how to assess a system. They do not establish that an MPTS installation is compliant, energy-saving, or suitable without site-specific engineering and measurement.

Manufacturer technical resources from Schneider Electric, Eaton, and Siemens are useful for explaining power factor, reactive current, distribution loading, harmonics, and monitoring. They are general technical references and product materials, not independent verification of MPTS performance [3,4,7,8]. Any claims for a particular installation should be supported by site records, test conditions, and a transparent measurement plan.

Conclusion

MPTS can support building operations by combining electrical measurements, correction, alarms, and remote visibility in one system. Its practical value may include improved understanding of electrical conditions, improved power factor, reduced reactive demand, changed current or harmonic readings, and better-informed capacity and maintenance decisions. The financial result depends on whether those changes are measured at the right boundary and recognized in the facility's tariff or operating records. A disciplined before-and-after evaluation gives owners and operators a clear basis to decide whether MPTS is performing, where it is helping, and whether the investment is justified at their site.

References

Technical standards and guidance cited in this article. Standard descriptions below identify their scope; use the complete published documents for project design and compliance decisions.

1. [U.S. Department of Energy, "Eliminate Excessive In-Plant Distribution System Voltage Drops," Energy Tips: Motor Systems, Tip Sheet #8.](#)
2. [U.S. Department of Energy, "Reducing Power Factor Cost," Advanced Manufacturing Office.](#)
3. [Schneider Electric, "The Benefits of Power Factor Correction That Can Impact Your Daily Life."](#)
4. [Eaton, "Power Factor Corrections FAQ."](#)
5. [IEEE Standards Association, IEEE Std 519-2022, "Standard for Harmonic Control in Electric Power Systems."](#)
6. [IEEE Standards Association, IEEE Std 1459-2025, "Standard Definitions for the Measurement of Electric Power Quantities Under Sinusoidal, Nonsinusoidal, Balanced, or Unbalanced Conditions."](#)
7. [Siemens, "Complex Electrical Systems," power monitoring and power-quality overview.](#)
8. [Siemens, "Unlocking the Secrets of Harmonics in Power Systems."](#)
9. [U.S. Department of Energy, Federal Energy Management Program, "Measurement and Verification Options for Federal Energy- and Water-Saving Projects."](#)
10. [Efficiency Valuation Organization, "International Performance Measurement and Verification Protocol \(IPMVP\)."](#)
11. [International Electrotechnical Commission, IEC 60364-8-81:2026, "Low-voltage electrical installations — Part 8-81: Functional aspects — Energy efficiency."](#)